GW - ___001___

WORK PLANS

Group 4 SWMUs 7 (Raw Water Ponds), 10 (Fire Training Area) & 16 (Active Landfill

December 2008
(Revised January 2010)

Western Refining

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2011 NOV -8 A 12: 43

November 4, 2011

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

UPS Tracking #: 1Z F9F 647 01 9183 8441 (NMED Delivery)
Certified Mail #: 7009 2250 0002 3833 5063 (OCD Delivery)

Re: Response to APPROVAL WITH MODIFICATIONS
INVESTIGATION REPORT GROUP 4
WESTERN REFINING SOUTHWEST INC., BLOOMFIELD REFINERY
EPA ID# NMD089416416
HWB-WRB-11-002

Dear Mr. Kieling:

Western Refining Southwest, Inc. - Bloomfield Refinery (Western) has prepared the following responses to comments received from the New Mexico Environment Department (NMED) in a letter dated June 21, 2011 (shown below in italics).

***NMED Comment No. 1* - Section 1 (Introduction), pages 1:**

Western's Statement: *"[p]roducts produced at the refinery included gasoline, diesel fuels, jet fuels, kerosene, propane, butane, naphtha, residual fuel, fuel oils, and LPG."*

NMED's Comment: *In future documents provide a list of acronyms for all acronyms included in the document. In addition, spell out the acronym when it first appears in the document. No revision is necessary.*

Western's Response to Comment No. 1: None required.

***NMED Comment No. 2* - Sections 2.1 (SWMU No.7 Raw Water Ponds), 7.1 (SWMU No.7 Raw Water Ponds), and 7.4 (Recommendations), SWMU No.7, pages 3-5, 39-40, and 43:**

NMED's Comment: *Western discusses the background and history of SWMU No.7 and includes information about a Closure Report approved by the New Mexico Oil Conservation Division (OCD). However, Western did not indicate that the investigation of the Raw Water Ponds has been deferred.*

Section 7.1 discusses the conclusions from the investigation and Section 7.4 describes the recommendations from the investigation. These Sections do not mention that the Raw Water Ponds were not investigated. Western must submit replacement pages that revise the last paragraph of Section 7.1 and the first paragraph of Section 7.4 to include a statement that the Raw Water Ponds were not investigated but will be addressed after use of the ponds is discontinued.

111 County Road 4990, Bloomfield, New Mexico 87413 • 505 632-8006 • www.wnr.com

Western's Response to Comment No. 2: The text in Sections 7.1 and 7.4 has been revised to note the fact that the investigation of the Raw Water Ponds has been deferred until after use of the ponds is discontinued. A copy of a redline-strikeout version of the changes is enclosed, along with replacement pages. In addition, an updated pdf file of the entire document is enclosed.

***NMED Comment No. 3.* - Section 2.2 (SWMU No. 10 Fire Training Area), page 6:**

Western's Statement: *"[t]he Fire Training Area, which has been identified as SWMU No. 10, is located immediately east of the Raw Water Ponds (Figure 2). It covers a small area approximately 160 wide by 250 long, with a surface drainage ditch along the west side that appears to catch any runoff from the area. The ditch flows into a small depression at the northern end of the Fire Training Area."*

NMED's Comment: *In future reports indicate the units of measure for all dimensions reported (i.e., 160 feet wide by 250 feet long). No revision is necessary.*

Western Response to Comment No. 3: None required.

***NMED Comment No. 4.* - Section 2.2 (SWMU No. 10 Fire Training Area), page 6:**

Western's Statement: *"[t]he pipelines and training props are shown on Figure 4. Some of the props included above ground open top metal tanks where the liquid fuels (gas and diesel) were allowed to pool to support the training fire."*

NMED's Comment: *In the response letter, provide the dimensions for the props described in the statement above. In future reports, provide dimensions for site features, where appropriate. No revision is necessary.*

Western's Response to Comment No. 4: The fire fighting training stations are arranged in two rows running north-south. Along the west row there are five training stations (refer to Figure 4 of the Group 4 Investigation Work Plan). The east row includes five additional liquid fueled training stations and one LPG training station. Each station was designed to replicate a specific scenario that potentially would be faced in the event of an on-site fire at the Refinery. Most of the props at each training station are designed for flame deflection, thus providing an opportunity for a real-life training experience in Refinery fire-fighting. It should be noted that the majority of liquid fuels are combusted during training exercise.

West Row of Training Stations

The west row of training stations includes three LPG training station and two liquid fueling training stations. The LPG training stations, located along the south end of the west row, were designed specifically to deflect flames and therefore replicate a potential real-life fire fighting event. These three LPG training stations do not include areas where fuels would pond.

The northern most liquid fueled training station located along the west row also was constructed to replicate flame deflection. This particular station includes an elevated catwalk area where piping and a horizontal vessel is positioned, providing experience in fighting fires at locations other than ground level. The vessel is not used to pond fuel, but rather provides additional complexity for flame deflection for training purposes. This northwestern most training station does not include a containment area where fuels would pond.

The second liquid fueled training station located along the west row includes a round metal containment basin within which a vertical and horizontal vessel is located. The vessels are used to replicate the effects of flames from a vessel in the event of a fire. Any fuels directed to these vessels during a training exercise are either completely combusted or are rinsed out during the fire-fighting exercise and contained within the circular containment area. The round containment area is approximately 29 feet in diameter and is constructed with 16-inch tall sidewalls.

East Row of Training Stations

The east row of training stations consists of five liquid fueled training stations and one LPG training station.

The northern most training station along the east row consists of two vertical towers, two vessels, two exchangers, one horizontal vessel, ancillary pumps and piping. All the props are located on a 36-foot square concrete pad constructed with an 11-inch tall concrete berm around the perimeter. The props were used as flame deflection tools to replicate a real-life fire event. The concrete containment was constructed to contain excess fuels and water during fire-fighting exercises.

The LPG training station is located south of the 36-foot square training station. The LPG training station was designed to help personnel perfect single-person fire fighting techniques.

South of the LPG training station there is a metal constructed training prop that includes a trough area where liquids could pond. This trough was approximately 33 inches by 19 inches by 14 inches deep.

The remaining three liquid fueled training stations located along the east row are concrete-constructed containment areas. One of the containment areas is approximately 7 feet square and constructed with a 6-inch tall concrete berm along the perimeter. The other area is approximately 4 feet square constructed with a 7-inch tall berm around the perimeter. The third area is in the shape of a cross, each extension of the cross shape being approximately 10 feet long by 4 feet wide. The cross shape is construed with a concrete berm that is approximately 15-inches tall.

<u>NMED Comment No. 5</u> - Section 2.2 (SWMU No. 10 Fire Training Area), page 6:

Western's Statement: *"[t]wo borings (B-7 and B-9) were placed along the west side in the drainage ditch and the other two borings (B-8 and B-I0) were located along the center of the area (Figure 4)."*

NMED's Comment: *In future reports, describe the sampling methods used when discussing past sampling. No revision is necessary.*

<u>Western's Response to Comment No. 5</u>: None required.

<u>NMED Comment No. 6</u> - Section 2.2 (SWMU No. 10 Fire Training Area), page 7:

Western' Statement: *"[t]he spent catalyst, fines, and elemental sulfur was placed in lifts and covered with clean soil."*

NMED's Comment: *Provide the source of the clean soil in the response letter. No revision is necessary.*

<u>Western's Response to Comment No. 6:</u> For clarification, Western notes that the referenced text is actually from Section 2.3 (SWMU No. 16 Active Landfill). The source of the "clean soil" is from on-site. Prior to placement of the material in the landfill, the surface soils were excavated and stockpiled to be used as future cover material.

<u>NMED's Comment No. 7</u> - Section 3.3 (Collection and Management of Investigation Derived Waste), page 10 and Appendix B (Field Methods), Management of Investigation Derived Waste, page B-3-4:

NMED's Comment: *Section 3.3 and Appendix B do not discuss the disposal location for the remediation related soils stored in the 55-gallon drums. In the response letter, identify where these soils were disposed. Western also does not report soil and purge/decontamination water volumes. In the response letter, provide the waste volumes. This information must be included in future documents. No revision is required.*

<u>Western's Response to Comment No. 7:</u> The soils generated during the investigation (approximately 1,500 pounds or approximately 0.75 cubic yards) were disposed off-site at the Painted Desert Landfill in Joseph City, AZ. The volume of purge water generated was less than one 55-gallon drum, which was disposed in the wastewater treatment system up-stream of the API Separator.

<u>NMED's Comment No. 8</u> - Section 4.3 (Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment), SWMU No. 10 - Fire Training Area, pages 17-18:

NMED's Comment: *There is a typographical error in Section 4.3 under SWMU 10-5, 10-6, and 10-7 where "gravelly" is misspelled. No revision is necessary.*

<u>Western's Response to Comment No. 8:</u> None required.

<u>NMED's Comment No. 9</u> - Section 4.3 (Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment), SWMU No. 16 - Active Landfill, page 22:

NMED's Comment: *Western discusses the collection of extra samples (SWMU 16-1-N, SWMU 16-1-E, SWMU 16-1-W, and SWMU 16-1-S) in Section 4.3 but do not provide an explanation for the collection of the samples. In addition, sample SWMU 16-1-W (1.5-2 feet) detected elemental sulfur and odor below a depth of one foot, but the boring was not advanced to greater depths. In the response letter, explain the reason for the collection of the extra samples and why soil boring SWMU 16-1-W was not advanced below a depth of two feet. No revision is required.*

<u>Western's Response to Comment No. 9</u>: The purpose for the extra samples is discussed in the Section 7.3 of the Investigation Report, "The detection of petroleum hydrocarbons in the upper two feet in boring SWMU 16-1 lead to the installation of four additional borings (SWMU 16-1-N, SWMU 16-1-E, SWMU 16-1-S, and SWMU 16-1-W) surrounding SWMU 16-1 in a effort to define the petroleum hydrocarbons." Soil boring SWMU 16-1-W was not advanced below two feet because the purpose of this boring was to evaluate the lateral extent of petroleum hydrocarbons detected in the upper two feet in SWMU 16-1. In addition, the vertical extent of sulfur had already been documented in adjacent boring SWMU 16-1.

***NMED's Comment No. 10* - Section 5 (Regulatory Criteria), pages 27-29:**

NMED's Comment: *Refer to the regulatory criteria comments in NMED's Approval with Modifications to the Group 2 and Group 3 Investigation Reports. Comments on Section 5 were not included in this approval unless deemed necessary. Apply the regulatory criteria changes to future submittals. No response is necessary.*

Western's Response to Comment No. 10: None required.

***NMED's Comment No. 11* - Section 6.1 (Soil Sampling Chemical Analytical Results), SWMU No. 10 and 16, Section 7.2 (SWMU No. 10 Fire Training Area), and Section 7.3 (SWMU No. 16 Active Landfill):**

NMED's Comment: *Throughout the Report, Western indicates that chloromethane was detected and that the detections are a result of laboratory contamination. Tables 5 and 6 contain bolded acetone results, indicating concentrations above screening levels; however, the text does not discuss the possible source of acetone (e.g., possible laboratory contaminant). NMED notes that Appendix F (Quality Assurance/Quality Control), Section 2.4.1 (Method Blank), bullet 3 states, "Acetone, Methylene Chloride, and Chloromethane were detected in numerous analytical field samples at low concentrations. The associated field sample detections were most likely the result of laboratory contamination." Discuss all possible laboratory contaminants in future documents, if detected, and discuss the reported concentrations relative to those detected in the laboratory or field blank samples.*

Western's Response to Comment No. 11: None required but it is noted that the bolded values for acetone only denote "detected" concentrations and not concentrations above the screening levels, which are indicated with yellow highlighting.

NMED's Comment No. 12 - Section 6.2 (Groundwater Sampling Chemical Analytical Results), SWMU No. 10, page 36:

Western's Statement: *"[t]he screening level used for TPH in Table 9 is based on a petroleum product type of diesel #2/crankcase oil because the only sample that had a detected result for DRO or MRO was at SWMU No. 10, where primarily diesel fuel was used."*

NMED's Comment: *The statement above contradicts Section 5, page 29, paragraph 1, where Western states, "[t]hese soil TPH screening levels for 'unknown oil' have conservatively been applied to all soil analytical results for all three SWMUs even though the hydrocarbon source at SWMU No. 10 is known to be predominantly diesel, which could potentially support a higher screening level." Table 9 applies the screening level for the diesel #2/crankcase oil. Explain this discrepancy in the response letter. Correct this discrepancy and provide a replacement page for page 29, Section 5.*

Western's Response to Comment No. 12: The text in Section 5 referenced by NMED refers to the soil screening levels, while the discussion in Section 6.2 is explaining the groundwater screening levels for TPH. In fact, the discussion in Section 5 notes the fact that diesel was the predominant potential source of TPH at SWMU No. 10, which is consistent with the discussion in Section 6.2 where the diesel #2/crankcase oil screening level is selected for groundwater. There is no discrepancy and no replacement pages are necessary.

***NMED's Comment No. 13* - Section 7.3 (SWMU No. 16 Active Landfill), page 41:**

Western's Statement: *Five soil borings (SWMU 16-1, SWMU 16-2, SWMU 16-3, SWMU 16-4, and SWMU 16-5) were completed within the footprint of the former "Active Landfill" as described in the investigation work plan. The detection of petroleum hydrocarbons in the upper two feet in boring SWMU 16-1 led to the installation of four additional borings (SWMU 16-1 N, SWMU 16-1-E, SWMU 16-1-S, and SWMU 16-1-W) surrounding SWMU 16-1 in an effort to define the petroleum hydrocarbons (Figure 14)."*

NMED's Comment: *The above paragraph indicates that four additional borings (SWMU 16-1 N, SWMU 16-1-E, SWMU 16-1-S, and SWMU 16-1-W) were installed in an effort to define the extent of petroleum hydrocarbon contamination. The discussion provided in Section 3.1 (Soil Boring, Monitoring Well installation, and Sample Collection), page 9 and Section 4.3 (Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment), page 22, under Active Landfill (SWMU No. 16) does not mention the detection of petroleum contamination, rather both sections discuss the detection of elemental sulfur. Western must explain this discrepancy in the response letter and submit corrected replacement pages accordingly (e.g., replacement page for Section 7.3).*

Western's Response to Comment No. 13: Section 3.1 is included to discuss the "Scope of Activities", as explained in the first sentence of this section, "This section presents a brief summary of the sample collection activities completed at each SWMU." The physical presence of process catalyst and elemental sulfur is noted but this section does not include a discussion on the chemical analyses. Similarly, Section 4.3 does not discuss the chemical analyses but rather as noted in the first paragraph, "This subsection provides a description of surface and 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 surface and subsurface impacts in soils." The presence of elemental sulfur is discussed as part of the field screening results; there is no discussion on the chemical analyses.

There is no discrepancy in Sections 3.1 or 4.3. The discussion on the chemical analyses is included in Sections 6.1 and 7.3. No replacement pages are necessary.

***NMED Comment No. 14* - Section 7.4 (Recommendations), SWMU No.7, page 43:**

Western's Statement: *"[t]he investigation at SWMU No.7 appears to have identified historical impacts from the operation of the Former South Evaporation Pond in the area of boring SWMU 7-1. This is demonstrated by the detection of mercury and benzo(a)pyrene above the residential screening levels in a single sample [SWMU 7-1 (4-5')]. A risk assessment should be performed for these two constituents to determine what, if any, additional actions are necessary. Cobalt was similarly detected in a single sample and should also be evaluated in the risk assessment. Site specific-soil background concentrations should be established for arsenic and other naturally occurring constituents of interest."*

NMED's Comment: *Upon completion of the background study, Western must evaluate cumulative risk and conduct a risk assessment that includes all contaminants, defined in Section III.B of the July 27, 2007 Order, detected at concentrations greater than background levels. No revision is necessary.*

<u>Western's Response to Comment No. 14:</u> None required.

<u>NMED Comment No. 15</u> - Table 5 (SWMU 7 Soil Analytical Results Summary), Table 6 (SWMU No. 10 Soil Analytical Results Summary), Table 7 (SWMU16 Soil Analytical Results Summary), and Table 9 (Groundwater Analytical Results Summary):

NMED's Comment: *The tables contain bolded text, bolded text highlighted in yellow, and text highlighted in green. The footnotes define the bolded text highlighted in yellow but do not define the bolded text or text with green highlight. Define the bolded text and text with green highlight in the response letter. The bolded text as well as text with other highlighting must be defined in future documents. No revision is necessary.*

<u>Western's Response to Comment No. 15</u>: A **bold** font was used to help distinguish between detected and non-detect results. A green font was used to help identify those samples collected below depths of 10 feet.

<u>NMED Comment No. 16</u> - Table 5 (SWMU 7 Soil Analytical Results Summary), Table 6 (SWMU No. 10 Soil Analytical Results Summary), and Table 7 (SWMU 16 Soil Analytical Results Summary):

NMED's Comment: *NMED's Approvals with Modifications for the Group 2 and Group 3 Investigation Reports discuss applying the chromium III Residential and Industrial value rather than chromium VI value. Western must apply the chromium VI standard unless an explanation is provided for using the chromium III value. This applies to all future documents.*

<u>Western's Response to Comment No. 16:</u>Chromium VI screening levels will be used in future documents unless an explanation is provided for using the chromium III values.

<u>NMED Comment No. 17</u> - Table 8 (Groundwater Screening Levels):

NMED's Comment: *See Comments 2 and 7 of NMED's June 21, 2011 Approval with Modifications Group 3 Investigation Report, which address the changes that must be applied to Table 8.*

<u>Western's Response to Comment No. 17:</u> Western used the EPA RSLs as specified in the Order issued by NMED on July 27, 2007, including adjusting the soil RSLs to a risk level of 1.0E-05 as per the Order. In future documents, Western will use the NMED Tap Water Levels where available and will adjust any EPA water RSLs used to a risk level of 1.0 E-05.

<u>NMED Comment No. 18</u> - Figures 6 (Cross Section A-A', West to East) and 7 (Cross Section B-B', North to South):

NMED's Comment: *Figures 6 and 7 contain the cross sections utilizing the logs of selected monitoring and recovery wells at the facility, but the figures do not show all information for all the wells (e.g., screened intervals). Figure 6 does not depict the screened intervals for wells MW-3, MW-40, MW-41, and RW-42. Figure 7 does not include the screened intervals for MW1, MW-3, and MW-5. Revise the figures to include the screened intervals for all wells in future reports. No revision is necessary.*

> **Western's Response to Comment No. 18:** The screen intervals were not included on these cross-sections because the drillers logs do not indicate the screen intervals, thus the information is not available to include on the cross-sections.

NMED Comment No. 19 - Figures 9 through 22 (Detected Contaminant Soil Maps):

NMED's Comment: *Figures 9 through 22 depict the results of the detected contaminants for SWMUs 7, 10, and 16. According to the legend, the red underlined values depict the concentrations that exceed the screening levels. On Figures 9, and 13 through 21 there are several concentrations that exceed the screening levels but are not underlined in red. Explain why the detections were not underlined in the response letter. If SSLs exceedences are highlighted this way in future figures, replace the example value with the screening level.*

> **Western's Response to Comment No. 19:** A review of the referenced figures indicates that Figures 14, 15, 17, 19, and 21 are correct. For some of the constituents (e.g., naphthalene), the results are reported under methods 8260 as a volatile organic and 8270 as a semi-volatile. For these constituents, the highest reported result is posted on the associated figure. NMED did not specify to provide replacement figures, but they are enclosed for Figures 9, 13, 16, 18, and 20. The revised report pdf file also contains the revised figures.
>
> **Figure 9:** The result of 3.7 mg/kg for 16-3 (1.5-2') was underlined but it should not have been underlined as the applicable screening level in Table 7 for arsenic is 3.9 mg/kg. In addition, the arsenic result for sample 16-1 (18-22') is underlined on Figure 9, but the original Table 7 result was not highlighted to indicate an exceedance of the respective screening level. Table 7 has been revised and is enclosed.
>
> **Figure 13**: The result of 0.055 mg/kg for sample 16-1 (2-4') was not underlined but should be underlined. This has been corrected.
>
> **Figure 16:** The result for manganese for sample 16-5 (12-14') was shown as 50 mg/kg but has been corrected to 56 mg/kg (it is underlined).
>
> **Figure 18:** The result for 1,3,5-trimethlybenzene for sample 16-5 (12-14') was shown as 2.8 mg/kg, but it has been corrected to 2.6 mg/kg (it is underlined).
>
> **Figure 20:** The values for 2-methylnaphthalene at sample location 16-2 have been corrected to match the values posted in Table 7. This results in none of the values at location 16-2 exceeding the screening levels.

NMED Comment No. 20 - Appendix D (Site-Specific Dilution/Attenuation Factor Calculations), page 2:

NMED's Comment: *Western incorrectly references the source of the climate data. The data was obtained from the National Oceanic and Atmospheric Administration (NOAA). Correct the reference in future documents. No revision is necessary.*

Western's Response to Comment No. 20: None required.

If you have questions regarding the above responses or the enclosures, please contact me at (505) 632-4171.

Sincerely,

Kelly Robinson

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

Enclosures

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

Section 7
Conclusions and Recommendations

This section summarizes and provides an evaluation of the impacts as shown in field screening data and analytical data. The investigation of soils and groundwater was conducted at the SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area, and SWMU No. 16 Active Landfill to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil borings and monitoring wells were installed to allow the collection of and chemical analysis of soil and groundwater samples as discussed in Sections 4 and 6, respectively. An evaluation of the results of both field screening and the laboratory analyses follows for each SWMU.

7.1 SWMU No. 7 Raw Water Ponds

The analyses of soil samples from the southern portion SWMU No. 7 indicate the presence of four constituents (arsenic, cobalt, mercury, and benzo(a)pyrene) at concentrations above their respective residential screening levels. It is noted that the northern portion of SWMU No. 7, which lies beneath the current location of the raw water ponds, was not investigated at this time because the ponds are still in use. Arsenic was detected above the residential screening level of 0.148 mg/kg in soil samples from each of the three soils borings completed at SWMU No. 7; however, the arsenic concentrations are generally low and ranged from <2.5 to 4.1 mg/kg (Figure 9). Site-specific background concentrations have not yet been determined for arsenic but the values reported at SWMU No. 7 should be compared to background prior to making any conclusions regarding the presence of arsenic at this SWMU.

Cobalt was detected in a single sample [SWMU 7-2 (10-12')] above the residential screening level of 5.51 mg/kg with a concentration of 7.1 mg/kg (Figure 10). This sample was collected from a high plastic, stiff clay without any field evidence (e.g., staining, odor, elevated PID reading) of impacts. The two overlying samples collected from depths of 5.75-7' and 7-8' reported cobalt concentrations of 2.7 and 1.3 mg/kg, respectively. It appears that the single detection of cobalt above the screening level may not be representative of cobalt concentrations in soils across SWMU No. 7 and further evaluation in a risk assessment should be performed prior to conducting remediation based on this single detection.

Mercury and benzo(a)pyrene were detected above the residential screening levels in a single sample [SWMU 7-1 (4-5')]. Mercury was reported at a concentration of 0.64 mg/kg vs. a screening level of 0.33 mg/kg and Benzo(a)pyrene was found to be present at a concentration of 1.3 mg/kg vs. the screening level of 0.48 mg/kg (Figures 11 and 12). Field screening of this sample indicated a slightly elevated PID reading (9.5 ppm vs. 3.0 ppm for overlying intervals) and black stains with a hydrocarbon odor. The sample collected from directly beneath this sample at a depth of 5-7' did not contain any constituents at concentrations above their respective screening levels except arsenic, which was detected at only 3.1 mg/kg. This boring (SWMU 7-1) is located close to the inlet pipe for the former South Evaporation Pond and it is possible that the elevated readings of mercury and benz(a)pyrene may be associated with historic operations of the evaporation pond. Similar to the detection of cobalt at a single location, an evaluation under a risk assessment (e.g., calculation of a representative concentration) should be considered prior to concluding what, if any, actions are warranted.

Groundwater samples were not collected at SWMU No. 7 because none of the soil borings encountered groundwater. As per the investigation work plan, no permanent monitoring wells were planned for this SWMU and groundwater samples only would have been collected if the soil borings were drilled to depths sufficient to encounter groundwater.

7.2 SWMU No. 10 Fire Training Area

Three constituents (arsenic, chloromethane, and diesel range organics) were detected at concentrations above their respective residential screening levels in the soil samples collected at SWMU No. 10. Arsenic was found above the screening level in one sample at a concentration 2.7 mg/kg. This is a similarly low concentration of arsenic as found at SWMU No. 7 and should also be evaluated in comparison to a site-specific background concentration. Chloromethane was detected at a concentration of 0.075 mg/kg in sample SWMU 10-9 (16-18'), which was collected at the top of saturation (Figure 13). This concentration slightly exceeds the residential screening level of 0.047 mg/kg and there is no field evidence of impacts in this sample or any of the overlying soils. Chloromethane was also detected in the surface sample collected from boring SWMU 10-9 at 0-0.5' but was non-detect at 1.5-2'. Chloromethane was not detected in the groundwater samples collected from nearby MW-67 and its presence in the soil analyses is attributed to laboratory contamination as described in the laboratory case narratives and the data validation in Appendix F.

Diesel range organics were detected in three samples at concentrations exceeding the screening levels at boring location SWMU 10-8 (Figure 14). The concentration at 0-0.5' was 2,800 mg/kg and it increased to 3,200 mg/kg at 1.5-2' but decreased to 1,400 mg/kg at 6-7'.

The concentration further decreased to 12 mg/kg at 10-12'. Field screening information mirrored these results with an odor present throughout the upper seven feet, with the highest PID reading of 10 ppm occurring in the 2-4' interval. Diesel range organics were detected in the nearby MW-67 in one of the two sampling events. This boring is located in a manmade depression, which was constructed to contain surface water flowing across the fire training area or any surface spills that may have occurred in the area. Therefore, it is in the location most likely to have impacts from historical operations in this area and the analytical results appear to confirm the presence of hydrocarbon impacted soils at this location.

One permanent monitoring well (MW-67) was installed at boring location SWMU 10-9 (Figure 23). The analyses performed on groundwater samples collected on August 25, 2010 and December 1, 2010 indicate the presence of three constituents at concentrations above their respective screening levels, as indicated in Table 9. These constituents include manganese (total and dissolved), sulfate, and total dissolved solids. Maps showing the distribution of these constituents across all Group No. 4 SWMUs are included as Figures 23 and 24. Based on the use of this area for training fire fighters and the constituents that were detected in soil above screening levels, diesel range organics would appear to be the only constituent of the four likely to be associated with the SWMU. Manganese could be associated with natural degradation of organics present in groundwater. As a site-specific background concentration has not yet been established for naturally occurring constituents in groundwater (e.g., sulfate and total dissolved soils) it is not yet possible to determine if the concentrations of sulfate and total dissolved solids are representative of naturally occurring concentrations or represent site-related impacts. The vadose zone vapor samples, as discussed in Section 4.7, did not indicate any significant biological activity in area of MW-67. The oxygen levels did not appear to be reduced below what could be expected in non-impacted areas and carbon dioxide levels are low.

7.3 SWMU No. 16 Active Landfill

Five soils borings (SWMU 16-1, SWMU 16-2, SWMU 16-3, SWMU 16-4, and SWMU 16-5) were completed within the footprint of the former "Active Landfill" as described in the investigation work plan. The detection of petroleum hydrocarbons in the upper two feet in boring SWMU 16-1 lead to the installation of four additional borings (SWMU 16-1-N, SWMU 16-1-E, SWMU 16-1-S, and SWMU 16-1-W) surrounding SWMU 16-1 in a effort to define the petroleum hydrocarbons (Figure 14).

As anticipated, elemental sulfur and catalysts, which were approved for disposal in the permitted landfill, were found to be present in all soil borings. Four metals (arsenic, iron, mercury, and manganese) were found with concentrations exceeding their respective residential soil screening levels. Establishment of site-specific background for these naturally constituents will be necessary before it can be determined if the detected concentrations exceed background values. However, it is likely that arsenic (max. concentration of 20 mg/kg) and mercury (max. concentration of 1.6 mg/kg) are present at concentrations above background and screening levels. Seven organic constituents (1,2,4-trimethylbenzene, 1,3,5-trimethlybenzene, 1-methlynaphthalene, 2-methlynaphthalene, naphthalene, xylenes, and diesel range organics) were also detected at concentrations that exceed their respective residential soil screening levels and these constituents may be associated with disposal of the elemental sulfur and catalysts. Chloromethane was also detected in soils at concentrations above the residential screening level, but its presence is attributed to laboratory contamination as described in the laboratory case narratives and the data validation in Appendix F.

Groundwater samples were collected at SWMU No. 16 from temporary wells completions at soil borings SWMU 16-2, SWMU 16-3, and SWMU 16-5 on August 25, 2010 and August 26, 2010. The analyses of the groundwater samples collected from the temporary well completions at SWMU No. 16 detected the presence of multiple constituents at concentrations above their respective residential screening levels, as presented in Table 9. The majority of these constituents are metals and inorganic constituents and include; aluminum (total), arsenic, barium, beryllium, chromium, cobalt, iron (total and dissolved), lead, manganese (total and dissolved), nickel, vanadium, chloride, nitrate, sulfate, and total dissolved solids (Figure 23). As discussed above for SWMU No. 10, establishment of background values for naturally constituents in groundwater will facilitate the evaluation of these detections. Of particular importance is the fact that all of the groundwater samples at SWMU No. 16 were collected from temporary well completions that produced low volumes of water and did not allow removal of sufficient water to remove sediment from the well or the samples. All of the groundwater samples collected from SWMU 16-2, SWMU 16-3, and SWMU 16-5 were described as cloudy, muddy. The presence of entrained sediments in the groundwater samples may have lead to artificially elevated concentrations of metals (e.g., aluminum, arsenic, barium, beryllium, chromium, cobalt, iron, lead, manganese, nickel, and vanadium).

Organic constituents (1,2,4-trimethylbenzene, 1-methylnaphthalene, and naphthalene) were found to be present in the groundwater sample collected from SWMU 16-5 at concentrations above the residential screening levels (Figure 24). All of these constituents were also detected in soils at SWMU No. 16 and may be associated with historical operations of the "Active Landfill."

7.4 Recommendations

SWMU No. 7

The investigation at SWMU No. 7 appears to have identified historical impacts from the operation of the former South Evaporation Pond in the area of boring SWMU 7-1. This is demonstrated by the detection of mercury and benzo(a)pyrene above the residential screening levels in a single sample [SWMU 7-1 (4-5')]. A risk assessment should be performed for these two constituents to determine what, if any, additional actions are necessary. Cobalt was similarly detected in a single sample and should also be evaluated in the risk assessment. Site-specific soil background concentrations should be established for arsenic and other naturally occurring constituents of interest.

The field investigation activities completed thus far focused on the southern portion of SWMU No. 7 (location of former South Evaporation Pond). After the Raw Water Ponds are taken out-of-service, the investigation will be expanded to the northern portion of SWMU No. 7.

SWMU No. 10

Impacted soils were located in the surface drainage feature, which was constructed to capture and control surface water that flows across the fire training area (Figure 4). Additional investigation of soils is recommended in the area of soil boring SWMU 10-8 to define the hydrocarbon impacted soils.

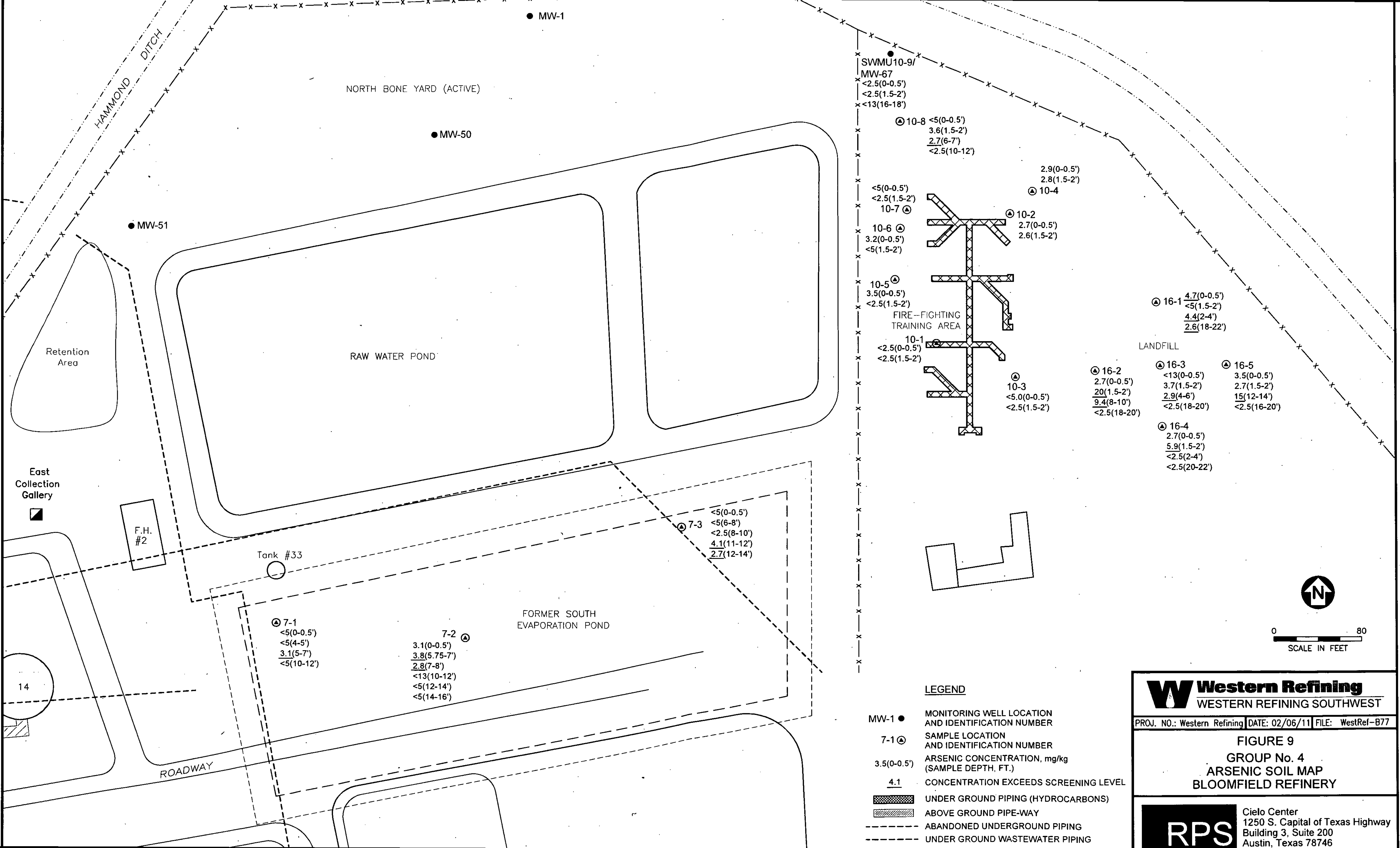
Background concentrations in groundwater should be established for naturally occurring constituents, if possible, to facilitate an evaluation of the concentration levels of sulfate and total dissolved solids detected at MW-67. Monitoring well MW-67 will be added to the Facility-Wide Groundwater Monitoring Plan as directed by NMED.

SWMU No. 16

Impacted soils were documented within the interior of the former "Active Landfill." Some of the constituents (e.g., iron and manganese) may be representative of background concentrations and a site-specific background concentration should be developed for comparison prior to making any final determinations regarding impacts for the potentially naturally occurring metals. The presence of organic constituents above screening levels in soils requires that further investigation be conducted to define the limits of the landfill. The sampling and analysis of soils within the main portion of the landfill has provided a good characterization of the potential constituents that can be used to facilitate lateral delineation. Vertical delineation was defined at soil boring SWMU 16-1, where process catalyst was found to extend to a depth of 18 feet or approximately two feet above saturation.

Although there appears to be very limited groundwater present at SWMU No.16, a permanent monitoring well should be installed at SWMU No. 16 to provide more reliable information regarding the detection of the many inorganic constituents in groundwater at SWMU 16-2 and SWMU 16-3. This well should be added to the Facility-Wide Groundwater Monitoring Plan to allow an on-going evaluation of the organic constituents detected at SWMU 16-5.

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 16-1 (0-0.5')	SWMU 16-1 (1.5-2.0')	SWMU 16-1 (2-4')	SWMU 16-1 (18-22')	SWMU 16-2 (0-0.5')	SWMU 16-2 (1.5-2.0')	SWMU 16-2 (8-10')	SWMU 16-2 (18-20')	SWMU 16-3 (0-0.5')	SWMU 16-3 (1.5-2.0')	SWMU 16-3 (4-6')	SWMU 16-3 (18-20')	SWMU 16-4 (0-0.5')	SWMU 16-4 (1.5-2.0')	SWMU 16-4 (2-4')	SWMU 16-4 (20-22')	SWMU 16-5 (0-0.5')
							Lab Sample ID	1008811-01	1008811-02	1008811-03	1008811-04	1008B15-01	1008B15-02	1008B15-03	1008B15-04	1008B32-01	1008B32-02	1008B32-03	1008B32-04	1008B31-01	1008B31-02	1008B31-03	1008B31-04	1008B21-01
							Sample Date	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/26/2010
Metals (mg/kg)																								
Aluminum	7.81E+04	(1)	7.81E+04	(2)	6.17E+05	(4)	mg/Kg	**6400**	**1100**	**9100**	**5100**	**9700**	**14000**	**22000**	**7600**	**12000**	**10000**	**7200**	**5600**	**11000**	**10000**	**6100**	**4800**	**8800**
Antimony	3.13E+01	(1)	7.44E+00	(4)	7.44E+00	(4)	mg/Kg	<2.5	<2.5	<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	<2.5
Arsenic	3.90E+00	(1)	1.48E-01	(4)	1.48E-01	(4)	mg/Kg	**4.7**	<5.0	**4.4**	**2.6**	**2.7**	**20**	**9.4**	<2.5	<13	**3.7**	**2.9**	<2.5	**2.7**	**5.9**	<2.5	<2.5	**3.5**
Barium	1.56E+04	(1)	3.39E+03	(4)	3.39E+03	(4)	mg/Kg	**60**	**26**	**120**	**86**	**130**	**210**	**180**	**140**	**160**	**160**	**120**	**100**	**160**	**270**	**120**	**88**	**100**
Beryllium	1.56E+02	(1)	1.56E+02	(1)	6.49E+02	(4)	mg/Kg	**0.19**	<0.15	**0.19**	**0.16**	**0.31**	<0.75	**0.28**	**0.24**	<0.75	**0.29**	**0.23**	**0.19**	**0.33**	**0.36**	**0.21**	<0.15	**0.3**
Boron	1.56E+04	(1)	2.70E+02	(4)	2.70E+02	(4)	mg/Kg	<2.0	<2.0	**2.9**	<2.0	<2.0	<10	<2.0	<10	<10	**2.8**	**2.6**	<2.0	**2.6**	**3.3**	**2.1**	<2.0	<2.0
Cadmium	7.79E+01	(1)	1.55E+01	(4)	1.55E+01	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium	1.13E+05	(1)	1.13E+05	(1)	1.11E+09	(4)	mg/Kg	**3.7**	**2.1**	**5.1**	**3.8**	**7.7**	**11**	**39**	**5.1**	**11**	**7.3**	**4.1**	**3**	**7.6**	**6.4**	**4.4**	**2.5**	**5.4**
Cobalt	2.30E+01	(2)	5.51E+00	(5)	5.51E+00	(5)	mg/Kg	**1.5**	**0.64**	**1.6**	**2.1**	**2.7**	**3.9**	**3.7**	**2.6**	**4.3**	**2.5**	**1.9**	**1.6**	**3**	**3.1**	**2.1**	**2.3**	**2.3**
Cyanide	1.56E+03	(1)	8.37E+01	(4)	8.37E+01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Copper	3.13E+03	(1)	5.79E+02	(4)	5.79E+02	(4)	mg/Kg	**5.6**	**4.7**	**6.1**	**4.6**	**6.2**	**18**	**23**	**5.2**	**8.5**	**6.9**	**4.7**	**2.4**	**7.3**	**7.7**	**4.6**	**2.2**	**5.5**
Iron	54800.00	(1)	7267.50	(4)	7267.50	(4)	mg/Kg	**7700**	**4200**	**8500**	**8500**	**9700**	**11000**	**13000**	**9200**	**13000**	**10000**	**8700**	**6100**	**12000**	**9700**	**7900**	**6200**	**8400**
Lead	4.00E+02	(1)	400.00	(4)	–		mg/Kg	**2.5**	**0.87**	**3.4**	**2.1**	**3.2**	**4.6**	**8.4**	**2.7**	**6.1**	**3.8**	**2.4**	**2**	**4.7**	**3.8**	**2.1**	**1.6**	**2.7**
Mercury	7.71E+00	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.16	**0.034**	<0.033	<0.033	<0.033	**0.074**	<0.033	<0.033	<0.033	<0.033
Manganese	1.80E+03	(2)	3.04E+00	(4)	3.04E+00	(4)	mg/Kg	**93**	**43**	**93**	**150**	**200**	**220**	**210**	**190**	**230**	**180**	**150**	**110**	**220**	**180**	**160**	**150**	**180**
Molybdenum	3.90E+02	(2)	4.16E+01	(4)	4.16E+01	(4)	mg/Kg	**0.52**	**0.49**	**1.8**	**0.55**	**0.58**	**4.4**	**10**	**0.52**	<2.0	**0.86**	**0.77**	<0.40	**0.7**	**1.9**	**0.69**	<0.40	**0.58**
Nickel	1.56E+03	(1)	5.36E+02	(4)	5.36E+02	(4)	mg/Kg	**9.6**	**2.2**	**7.3**	**4.1**	**6**	**41**	**82**	**4.3**	**7.3**	**10**	**4.7**	**4.4**	**5.3**	**11**	**4.4**	**2.1**	**5.9**
Selenium	3.91E+02	(1)	1.09E+01	(4)	1.09E+01	(4)	mg/Kg	<2.5	<2.5	<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	<2.5
Silver	3.91E+02	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Thallium	5.16E+00	(1)	1.94E+00	(4)	1.94E+00	(4)	mg/Kg	<2.5	<2.5	<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	<2.5
Uranium	2.35E+02	(1)	2.35E+02	(1)	5.51E+02	(5)	mg/Kg	<980	<490	<1000	<1000	<2500	<2400	<5000	<2500	<2500	<2500	<2500	<1000	<2500	<2500	<2500	<2500	<2400
Vanadium	3.91E+02	(1)	3.91E+02	(1)	2.05E+03	(4)	mg/Kg	**15**	**3.7**	**22**	**21**	**20**	**330**	**160**	**15**	**24**	**32**	**13**	**10**	**26**	**91**	**14**	**9.8**	**21**
Zinc	2.35E+04	(1)	7.67E+03	(4)	7.67E+03	(4)	mg/Kg	**140**	**28**	**80**	**17**	**42**	**660**	**290**	**20**	**42**	**160**	**94**	**15**	**36**	**150**	**45**	**11**	**46**
Volatile Organic Compounds - (EPA Method 8260) mg/kg																								
1,1,1,2-Tetrachloroethane	2.92E+01	(1)	1.94E-02	(4)	1.94E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,1,1-Trichloroethane	2.18E+04	(1)	3.35E+01	(4)	3.35E+01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,1,2,2-Tetrachloroethane	7.97E+00	(1)	2.53E-03	(4)	2.53E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,1,2-Trichloroethane	1.72E+01	(1)	7.58E-03	(4)	7.58E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,1-Dichloroethane	6.29E+01	(1)	6.85E-02	(4)	6.85E-02	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
1,1-Dichloroethene	6.18E+02	(1)	1.34E+00	(4)	1.34E+00	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,1-Dichloropropene	–		–		–		mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
1,2,3-Trichlorobenzene	–		–		–		mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
1,2,3-Trichloropropane	9.15E-01	(1)	4.01E-04	(4)	4.01E-04	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
1,2,4-Trichlorobenzene	1.43E+02	(1)	1.15E-01	(4)	1.15E-01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.70E-01	(5)	2.70E-01	(5)	mg/Kg	**0.13**	**0.56**	**0.22**	<0.0009744	<0.0009237	<0.050	**0.15**	<0.050	<0.050	<0.050	**0.19**	<0.050	<0.050	<0.0009422	**0.77**	<0.050	<0.0010463
1,2-Dibromo-3-chloropropane	1.94E-01	(1)	3.35E-05	(4)	3.35E-05	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
1,2-Dibromoethane (EDB)	5.74E-01	(1)	1.78E-04	(4)	1.78E-04	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,2-Dichloroethane (EDC)	7.74E+00	(1)	4.11E-03	(4)	4.11E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,2-Dichloropropane	1.47E+01	(1)	1.25E-02	(4)	1.25E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.25E-01	(5)	2.25E-01	(5)	mg/Kg	**0.12**	**0.57**	**0.079**	<0.0009744	<0.0009237	<0.050	**0.067**	<0.050	<0.050	<0.050	**0.33**	<0.050	<0.050	<0.0009422	**6.1**	<0.050	<0.0010463
1,3-Dichlorobenzene	–		–		–		mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,3-Dichloropropane	1.60E+03	(2)	3.04E+00	(5)	3.04E+00	(5)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1-Methylnaphthalene	2.20E+02	(3)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	**1.1**	**3.3**	**0.78**	<0.1	<0.1	**0.31**	**0.75**	<0.20	<0.20	<0.20	**0.74**	<0.20	<0.20	<0.1	**6.4**	<0.20	<0.1
2,2-Dichloropropane	–		–		–		mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
2-Butanone (MEK)	3.96E+04	(1)	1.43E+01	(4)	1.43E+01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.0009744	<0.0009237	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.0009422	<5.0	<0.50	<0.0010463
2-Chlorotoluene	1.56E+03	(1)	7.02E+00	(4)	7.02E+00	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
2-Hexanone	–		–		–		mg/Kg	<0.50	<0.50	<0.50	<0.0009744	<0.0009237	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.0009422	<5.0	<0.50	<0.0010463
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	**0.51**	**1.4**	**0.8**	<0.1	<0.1	**0.23**	**0.99**	<0.20	<0.20	<0.20	**1.1**	<0.20	<0.20	<0.1	**2.4**	<0.20	<0.1
4-Chlorotoluene	5.50E+03	(2)	3.15E+01	(5)	3.15E+01	(5)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
4-Isopropyltoluene	–		–		–		mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	**0.13**	<0.050	<0.050	<0.0009422	**0.92**	<0.050	<0.0010463
4-Methyl-2-pentanone	–		–		–		mg/Kg	<0.50	<0.50	<0.50	<0.0009744	<0.0009237	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.00102**	<5.0	<0.50	**0.00115**
Acetone	6.75E+04	(1)	4.32E+01	(4)	4.32E+01	(4)	mg/Kg	<0.75	<0.75	<0.75	<0.0019488	<0.0018474	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.0018844	<7.5	<0.75	<0.0020926
Benzene	1.55E+01	(1)	2.08E-02	(4)	2.08E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Bromobenzene	9.40E+01	(2)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Bromodichloromethane	5.25E+00	(1)	3.11E-03	(4)	3.11E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Bromoform	6.10E+02	(3)	2.59E-02	(5)	2.59E-02	(5)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Bromomethane	2.23E+01	(1)	2.18E-02	(4)	2.18E-02	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
Carbon disulfide	1.94E+03	(1)	2.84E+00	(4)	2.84E+00	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.0009744	<0.0009237	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.0009422	<5.0	<0.50	<0.0010463
Carbon tetrachloride	4.38E+00	(1)	8.32E-03	(4)	8.32E-03	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
Chlorobenzene	5.08E+02	(1)	6.06E-01	(4)	6.06E-01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463



LEGEND

MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

7-1 SAMPLE LOCATION AND IDENTIFICATION NUMBER

3.5(0-0.5') ARSENIC CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)

4.1 CONCENTRATION EXCEEDS SCREENING LEVEL

UNDER GROUND PIPING (HYDROCARBONS)

ABOVE GROUND PIPE-WAY

ABANDONED UNDERGROUND PIPING

UNDER GROUND WASTEWATER PIPING

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/06/11 | FILE: WestRef-B77

FIGURE 9
GROUP No. 4
ARSENIC SOIL MAP
BLOOMFIELD REFINERY

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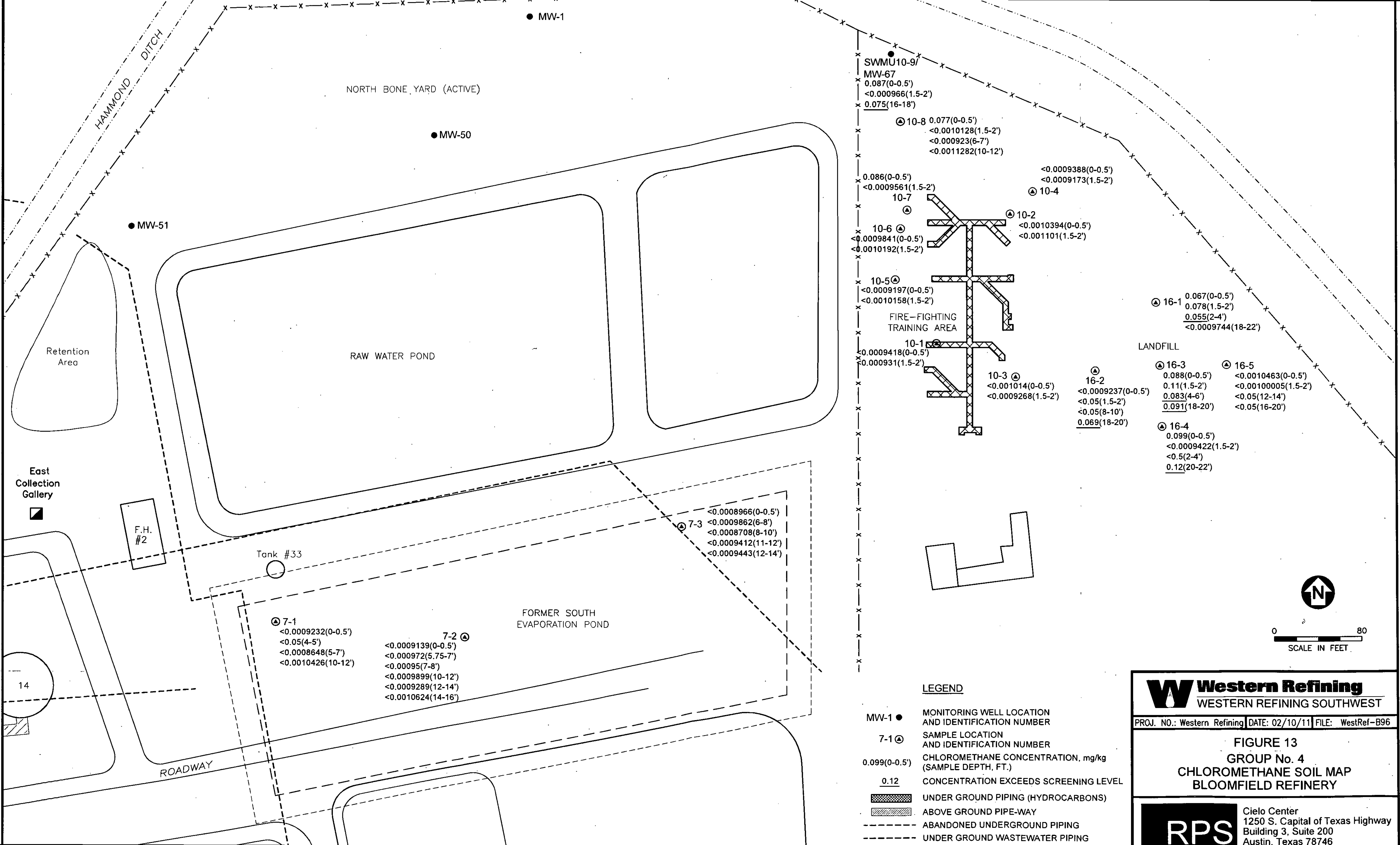
Building 3, Suite 200
Austin, Texas 78746



LEGEND

MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

7-1 ◬ SAMPLE LOCATION AND IDENTIFICATION NUMBER

0.099(0-0.5') CHLOROMETHANE CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)

0.12 CONCENTRATION EXCEEDS SCREENING LEVEL

UNDER GROUND PIPING (HYDROCARBONS)

ABOVE GROUND PIPE-WAY

ABANDONED UNDERGROUND PIPING

UNDER GROUND WASTEWATER PIPING

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/10/11 | FILE: WestRef-B96

FIGURE 13
GROUP No. 4
CHLOROMETHANE SOIL MAP
BLOOMFIELD REFINERY

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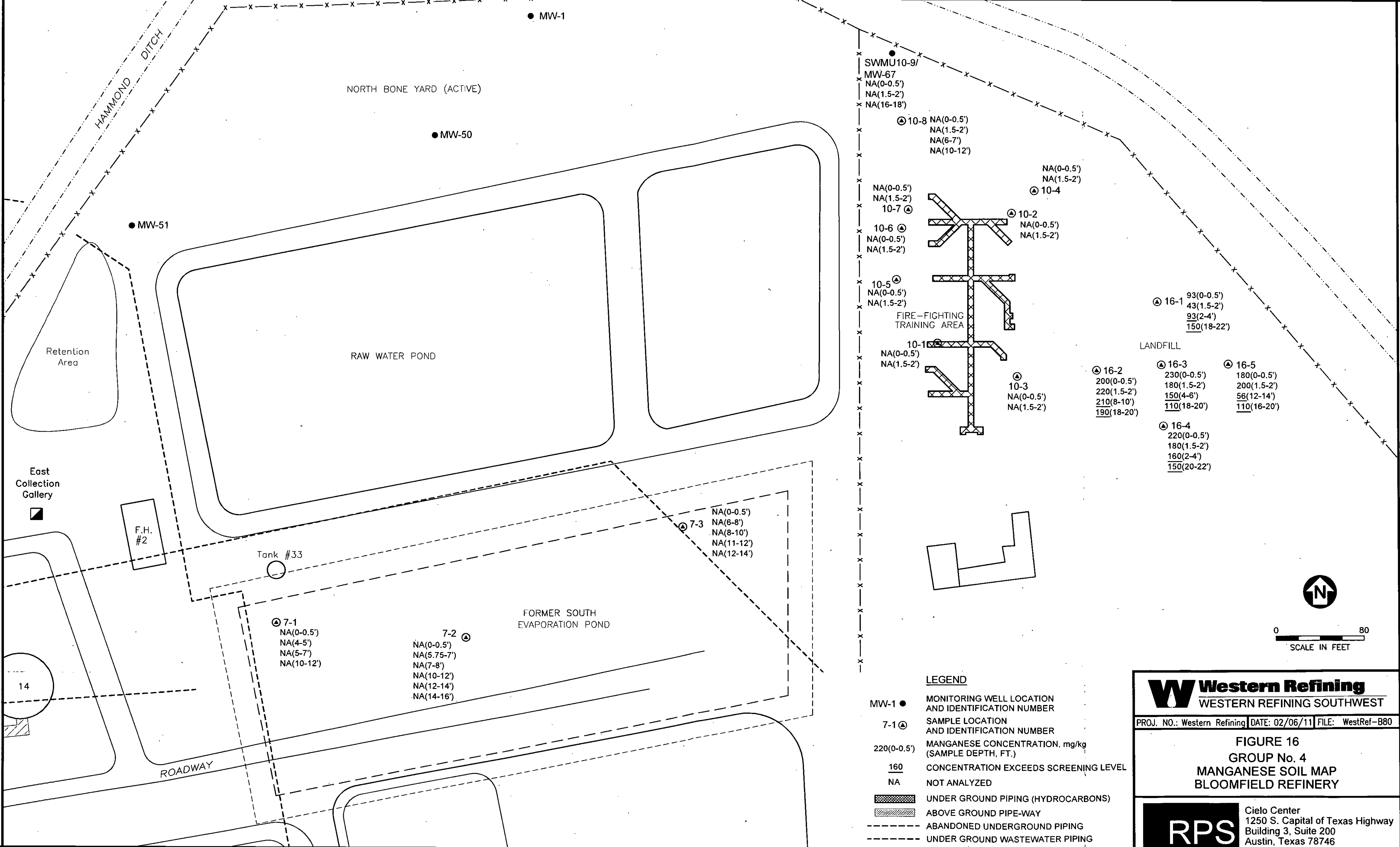
Building 3, Suite 200
Austin, Texas 78746



LEGEND

MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 ⊛	SAMPLE LOCATION AND IDENTIFICATION NUMBER
220(0-0.5')	MANGANESE CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
160	CONCENTRATION EXCEEDS SCREENING LEVEL
NA	NOT ANALYZED
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
------	ABANDONED UNDERGROUND PIPING
------	UNDER GROUND WASTEWATER PIPING

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/06/11 | FILE: WestRef-B80

FIGURE 16
GROUP No. 4
MANGANESE SOIL MAP
BLOOMFIELD REFINERY

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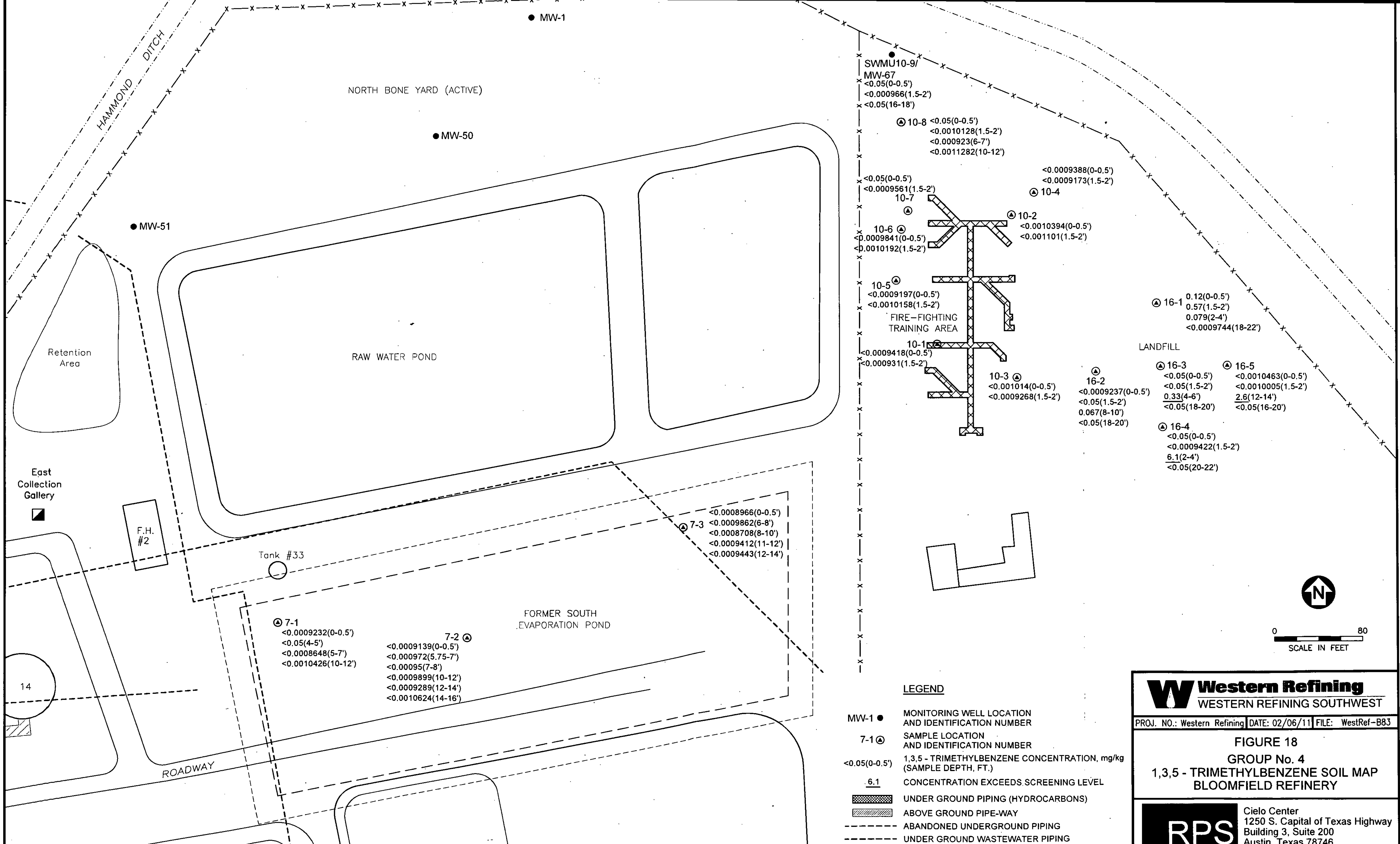
Austin, Texas 78746



LEGEND

MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 ◎	SAMPLE LOCATION AND IDENTIFICATION NUMBER
<0.05(0-0.5')	1,3,5 - TRIMETHYLBENZENE CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
6.1	CONCENTRATION EXCEEDS SCREENING LEVEL
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
------	ABANDONED UNDERGROUND PIPING
------	UNDER GROUND WASTEWATER PIPING

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/06/11 | FILE: WestRef-B83

FIGURE 18
GROUP No. 4
1,3,5 - TRIMETHYLBENZENE SOIL MAP
BLOOMFIELD REFINERY

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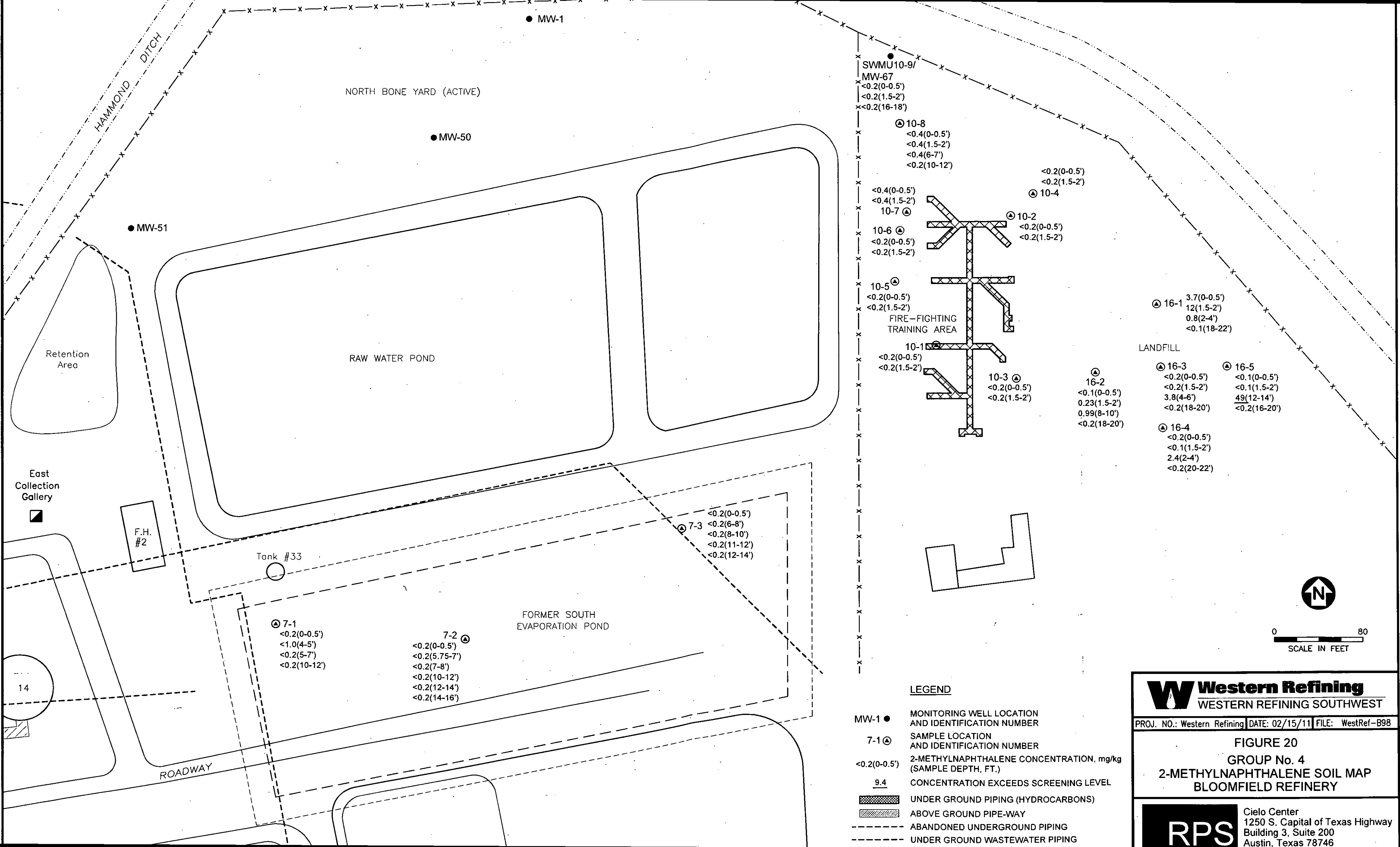
Building 3, Suite 200
Austin, Texas 78746



HAMMOND DITCH
NORTH BONE YARD (ACTIVE)
MW-1
MW-50
MW-51
Retention Area
East Collection Gallery
F.H. #2
RAW WATER POND
Tank #33
14
ROADWAY
FORMER SOUTH EVAPORATION POND
7-1 <0.2(0-0.5') <1.0(4-5') <0.2(5-7') <0.2(10-12')
7-2 <0.2(0-0.5') <0.2(5.75-7') <0.2(7-8') <0.2(10-12') <0.2(12-14') <0.2(14-16')
7-3 <0.2(0-0.5') <0.2(6-8') <0.2(8-10') <0.2(11-12') <0.2(12-14')
SWMU10-9/ MW-67 <0.2(0-0.5') <0.2(1.5-2') <0.2(16-18')
10-8 <0.4(0-0.5') <0.4(1.5-2') <0.4(6-7') <0.2(10-12')
10-7 <0.4(0-0.5') <0.4(1.5-2')
10-6 <0.2(0-0.5') <0.2(1.5-2')
10-5 <0.2(0-0.5') <0.2(1.5-2')
10-4 <0.2(0-0.5') <0.2(1.5-2')
10-2 <0.2(0-0.5') <0.2(1.5-2')
10-1 <0.2(0-0.5') <0.2(1.5-2')
10-3 <0.2(0-0.5') <0.2(1.5-2')
FIRE-FIGHTING TRAINING AREA
16-1 3.7(0-0.5') 12(1.5-2') 0.8(2-4') <0.1(18-22')
LANDFILL
16-2 <0.1(0-0.5') 0.23(1.5-2') 0.99(8-10') <0.2(18-20')
16-3 <0.2(0-0.5') <0.2(1.5-2') 3.8(4-6') <0.2(18-20')
16-5 <0.1(0-0.5') <0.1(1.5-2') 49(12-14') <0.2(16-20')
16-4 <0.2(0-0.5') <0.1(1.5-2') 2.4(2-4') <0.2(20-22')
N
0 80
SCALE IN FEET
LEGEND
MW-1 MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 SAMPLE LOCATION AND IDENTIFICATION NUMBER
<0.2(0-0.5') 2-METHYLNAPHTHALENE CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
9.4 CONCENTRATION EXCEEDS SCREENING LEVEL
UNDER GROUND PIPING (HYDROCARBONS)
ABOVE GROUND PIPE-WAY
ABANDONED UNDERGROUND PIPING
UNDER GROUND WASTEWATER PIPING
Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining
DATE: 02/15/11
FILE: WestRef-B98
FIGURE 20
GROUP No. 4
2-METHYLNAPHTHALENE SOIL MAP
BLOOMFIELD REFINERY
RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, August 16, 2011 7:40 AM
To: Tsinnajinnie, Leona, NMENV
Subject: Bloomfield Refinery (GW-001) SWMU No. 16 Investigation Work Plan Monitoring Well Installation (August 2011)

Leona:

OCD's only comment is on the analytical methods proposed. OCD recommends that Gen. Chemistry parameters be included for monitoring near the Active Landfill as acidity and other indicators in ground water would be useful to monitor. Some of the proposed metals monitoring appears to satisfy the Gen Chemistry parameters, i.e., Magnesium. Sulfate, chloride, fluoride, iron, nitrate/nitrite,... However, parameters like pH, TDS... are not analyzed for.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
"Why not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward with the Rest of the Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at: http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

SWMU No. 16 Investigation Work Plan
Monitoring Well Installation

Western Refining

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

August 2011

RPS
404 Camp Craft Road, Austin, TX 78746
Tel: (512) 347 7588 Fax: (512) 347 8243
Internet: www.rpsgroup.com/energy

Western Refining

WNR LISTED NYSE

August 12, 2011

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

Certified Mail #: 7010 1870 0002 6760 0276

Re: Submittal of Work Plan for Installation of Monitoring Well at SWMU No.16
Western Refining Southwest, Inc., Bloomfield Refinery
EPA ID# NMD089416416
HWB-WRB-11-002

Dear Mr. Kieling:

Pursuant to your letter of June 21, 2011, which approved the Investigation Report for Group 4 with specified modifications, please find the referenced work plan enclosed. The work plan was developed based on NMED's direction and I trust that it will meet your requirements.

We are tentatively scheduling the implementation of the Investigation Work Plans for Group 8 and the background sampling early this fall. If your approval is received prior to completion of this work effort, then I would like to complete the installation of the monitoring well at SWMU No. 16 at the same time. Otherwise, I would prefer to combine the well installation with next subsequent field mobilization that will most likely not occur until the spring or summer of 2012.

If you have questions regarding the enclosed work plan, please contact me at (505) 632-4171.

Sincerely,

James R. Schmaltz
Environmental 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
Kelly Robinson – Western Refining Bloomfield
Scott Crouch - RPS

SWMU No. 16 Investigation Work Plan
Monitoring Well Installation

Primary Purpose

The purpose of this Work Plan is to specify the procedures related to the installation of one monitoring well at SWMU No. 16 (Active Landfill) and the subsequent collection and analysis of groundwater samples from this well. The well will provide groundwater quality and elevation data in the area of SWMU No. 16. 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 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. Figure 1 shows the proposed location of the well near the center of SWMU No. 16.

Conceptual Model

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).

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 depth-to-groundwater at the proposed drilling location is estimated to be 22 feet and the Nacimiento Formation is estimated to be at a depth of 25 feet.

Drilling Approach

One monitoring well will be drilled using either hollow-stem auger or if necessary, air rotary methods including ODEX. The monitoring well construction/completion will be conducted in accordance with the requirements of Section IX of the Order. 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 the well boring.

Appropriate actions (e.g., installation of protective surface casing) will be taken to minimize any negative impacts from the investigative boring. The soil boring to be completed as a permanent monitoring well will be drilled to the top of bedrock (Nacimiento Formation) and the anticipated completion depth ranges from 25 to 30 feet. Soil samples will be collected continuously and logged by a qualified geologist or engineer. Slotted (0.01 inch) 2-inch PVC well screen will be placed at the bottom of the well and will extend 10 to 15 feet to ensure that the well is screened across the water table and to the extent possible the entire saturated zone is open to the well, with approximately five feet of screen above the water table. A 10/20 sand filter pack will be installed to two feet over the top of the well screen.

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 the boring prior to surveying the location. The boring location will be measured to the nearest foot, and locations will be recorded on a scaled site map upon completion of each boring.

Potential Drilling Fluids, Composition, and Use

No drilling fluids are proposed to be used to advance boreholes.

Hydrogeologic and Geochemical Objectives

The primary objective for the supplemental groundwater well is to monitor groundwater quality and the groundwater elevation in the area of SWMU No. 16. Secondary objectives are to further define the hydrostratigraphy of this portion of the site.

Potential Groundwater Occurrence and Detection

Within the refinery property, the presence of groundwater is less certain in the far eastern and southeast portion of the property. Drilling will be interrupted at the alluvium-bedrock contact to determine whether groundwater is present. Groundwater is anticipated to occur at depths ranging from approximately 22 to 25 feet below ground surface. Methods for groundwater detection may include drillers' observations, water-level measurements, and lithologic logs.

Core Sampling

No soil samples will be retained for laboratory analysis, as the monitoring well boring will be located adjacent to a former soil boring (SWMU 16-3), from which soil samples were previously collected and analyzed for site-related constituents.

Geophysical Testing

No down-hole geophysical logging will be performed.

Well Development

The groundwater monitoring well will be developed by mechanical means that may include swabbing, bailing, and/or pumping. After sufficient swabbing, bailing, and/or pumping, a submersible pump or bailer will be used to complete the development process until turbidity of the development water lessens.

Well Purging

Prior to the collection of groundwater samples, the monitoring well will be purged by removing groundwater with a dedicated bailer or disposable bailer prior to sampling in order to ensure that formation water is being sampled. Purge volumes (a minimum of three well volumes including filter pack) will be determined by monitoring, at a minimum, groundwater pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, and temperature after every two gallons or each well volume, whichever is less, has been purged from the well. Purging will continue, as needed, until the conductivity, pH, and temperature readings are within 10 percent between readings for three consecutive measurements. Field water quality parameters will also be compared to historical data provided in Table 3 of the *Group 4 Investigation Work Plan* (revised January 2010) to ensure that the measurements are indicative of formation water. The volume of groundwater purged, the instruments used, and the readings obtained at each interval will be recorded on the field-monitoring log. Well purging may also be conducted in accordance with the NMED's Position Paper *Use of Low-Flow and other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring* (October 30, 2001, as updated).

Groundwater Sampling

Groundwater samples will be collected within 24 hours of the completion of well purging using dedicated bailers or disposal bailers. Alternatively, well sampling may also be conducted in accordance with the NMED's Position Paper *Use of Low-Flow and other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring* (October 30, 2001, as updated). Sample collection methods will be documented in the field monitoring reports. The samples will be transferred to the appropriate, clean, laboratory-prepared containers provided by the analytical laboratory. Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below.

Groundwater samples intended for metals analysis will be submitted to the laboratory as total and/or dissolved metals samples as specified in the table shown below. A field duplicate water sample will be collected to monitor the validity of the groundwater sample collection procedures.

Sampling Handling Procedures

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. Samples collected for chemical analysis will be transferred into clean sample containers supplied by the project analytical laboratory. 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.

Chemical Analyses

All samples collected for laboratory analysis will be submitted to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico. 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.

Groundwater 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.

Groundwater samples will also be analyzed for the following constituents using the indicated analytical methods.

Analyte	Analytical Method
Antimony (Total)	SW-846 method 6010/6020
Arsenic (Total)	SW-846 method 6010/6020
Barium (Total)	SW-846 method 6010/6020
Beryllium (Total)	SW-846 method 6010/6020
Cadmium (Total)	SW-846 method 6010/6020
Chromium (Total)	SW-846 method 6010/6020
Cobalt (Total)	SW-846 method 6010/6020
Cyanide (Total)	SW-846 method 335.4/335.2 mod
Lead (Total)	SW-846 method 6010/6020
Mercury (Total)	SW-846 method 7470/7471
Nickel (Total)	SW-846 method 6010/6020
Selenium (Total)	SW-846 method 6010/6020
Silver (Total)	SW-846 method 6010/6020
Thallium (Total)	SW846 method 6010/6020
Vanadium (Total)	SW-846 method 6010/6020
Zinc (Total)	SW-846 method 6010/6020
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Calcium (Total)	EPA method 6010/6020
Magnesium (Total)	EPA method 6010/6020
Sodium (Dissolved)	EPA method 6010/6020
Potassium (Dissolved)	EPA method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+
Aluminum (Dissolved and Total)	SW-846 method 6010/6020
Boron (Dissolved and Total)	SW-846 method 6010/6020
Copper (Dissolved and Total)	SW-846 method 6010/6020
Manganese (Dissolved and Total)	SW-846 method 6010/6020

Analyte	Analytical Method
Molybdenum (Dissolved and Total)	SW-846 method 6010/6020
Iron (Dissolved and Total)	SW-846 method 6010/6020
Uranium (Dissolved and Total)	SW-846 method 6020
Chloride (Total)	SW-846 method 300
Sulfate (Total)	SW-846 method 300
Fluoride (Total)	SW-846 method 300

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. 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.

Investigation Derived Waste

All Investigation Derived Waste (IDW) will be properly disposed of in accordance with all federal, State, and local rules and regulations for storage, labeling, handling, transport, and disposal of waste. It is anticipated that minimal quantities of soil IDW will be generated from the activities associated with the installation of one monitoring well. Excess solids (e.g., drill cuttings and used soil cores) will be placed directly into a 55-gallon drum and staged in the satellite accumulation area pending waste characterization and coordination of off-site disposal.

A dedicated decontamination area will be setup 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 area will be shoveled into 55-gallon drums and stored at the designated satellite accumulation area pending proper waste characterization and coordination of off-site disposal.

Purge water generated during groundwater sampling activities will be containerized in 55-gallon drums and then disposed of at the refinery wastewater treatment system upstream of the API separator. 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.

Schedule

Western requests that implementation of this investigation Work Plan be included with the next subsequent field mobilization. The estimated timeframes for each of the planned activities is as shown below:

- Field work (inclusive of all initial groundwater sampling) -- two weeks;
- Laboratory analyses for initial sampling event – four weeks;
- Data reduction and validation (initial groundwater event) – three weeks;
- Second groundwater sampling event – one week;
- Laboratory analyses for second groundwater sampling event – three weeks;
- Data reduction and validation (second groundwater event) – two weeks; and
- Data gap analysis – three weeks.

Completion of the data gap analysis will complete all activities conducted under this investigation Work Plan. A summary of the analytical results from activities conducted under this Work Plan will be included in the subsequent Groundwater Remediation and Monitoring Annual Report which is submitted to NMED by April 15th of each year.

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, 2010, Investigation Work Plan Group 4; SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training, and SWMU No. 15 Active Landfill.

Aerial Map Source: Google Maps, 2008 DigitalGlobe.

N

0 60
SCALE IN FEET

LEGEND

SWMU9-1 ● 2008 RFI SAMPLE LOCATION

SWMU16-1 2010 SOIL BORING LOCATION

PROPOSED MONITORING WELL LOCATION

— — — — QUADRANT DIVIDING LINE

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.:Western Refining	DATE:08/03/11	FILE: WestRef-B112

FIGURE 1
SWMU No. 16
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY

RPS

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

Chavez, Carl J, EMNRD

From: Martinez, Cynthia, NMENV
Sent: Tuesday, June 21, 2011 2:46 PM
To: Cobrain, Dave, NMENV; Kieling, John, NMENV
Cc: Chavez, Carl J, EMNRD; Allen.Hains@wnr.com
Subject: FW: Western Refining: Bloomfield, Approval with Modification Letters for Grps 3 & 4
Attachments: WRB 11-002 Invest Rpt Grp 4 Appr w_Mod.pdf; WRB 10-001 Invest Rpt Grp 3 Appr w_Mod.pdf

Please see attachments.

From: Tsinnajinnie, Leona, NMENV
Sent: Tuesday, June 21, 2011 11:36 AM
To: Martinez, Cynthia, NMENV
Subject: Western Refining: Bloomfield, Approval with Modification Letters for Grps 3 & 4

Hi Cynthia-

Attached are the scanned copies of the Approval with Modification letters for Western Refining, Bloomfield Groups 3 & 4. I placed the originals on your desk. Please send out the original today and everyone else (including John) can receive an e-mailed copy of the letter.

Thanks,
Leona

~~~~~~
Leona Tsinnajinnie
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg 1
Santa Fe, NM 87505-6303

Main HWB Phone: (505) 476-6000
Direct Office Phone: (505) 476-6057
Fax: (505) 476-6030 or (505) 476-6060
~~~~~~

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

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 21, 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 REPORT GROUP 4
WESTERN REFINING SOUTHWEST INC., BLOOMFIELD REFINERY
EPA ID# NMD089416416
HWB-WRB-11-002**

Dear Mr. Schmaltz:

The New Mexico Environment Department (NMED) has received Western Refining Southwest, Inc., Bloomfield Refinery's (Western) *Investigation Report Group 4 (SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area, and SWMU No. 16 Active Landfill)* (Report) dated February 2011. NMED has reviewed the Report and hereby issues this Approval with the following modifications.

1. Section 1 (Introduction), pages 1:

Western's Statement: "[p]roducts produced at the refinery included gasoline, diesel fuels, jet fuels, kerosene, propane, butane, naphtha, residual fuel, fuel oils, and LPG."

NMED's Comment: In future documents provide a list of acronyms for all acronyms included in the document. In addition, spell out the acronym when it first appears in the document. No revision is necessary.

2. **Sections 2.1 (SWMU No. 7 Raw Water Ponds), 7.1 (SWMU No. 7 Raw Water Ponds), and 7.4 (Recommendations), SWMU No. 7, pages 3-5, 39-40, and 43:**

NMED's Comment: Western discusses the background and history of SWMU No. 7 and includes information about a Closure Report approved by the New Mexico Oil Conservation Division (OCD). However, Western did not indicate that the investigation of the Raw Water Ponds has been deferred.

Section 7.1 discusses the conclusions from the investigation and Section 7.4 describes the recommendations from the investigation. These Sections do not mention that the Raw Water Ponds were not investigated. Western must submit replacement pages that revise the last paragraph of Section 7.1 and the first paragraph of Section 7.4 to include a statement that the Raw Water Ponds were not investigated but will be addressed after use of the ponds is discontinued.

3. **Section 2.2 (SWMU No. 10 Fire Training Area), page 6:**

Western's Statement: "[t]he Fire Training Area, which has been identified as SWMU No. 10, is located immediately east of the Raw Water Ponds (Figure 2). It covers a small area approximately 160 wide by 250 long, with a surface drainage ditch along the west side that appears to catch any runoff from the area. The ditch flows into a small depression at the northern end of the Fire Training Area."

NMED's Comment: In future reports indicate the units of measure for all dimensions reported (i.e., 160 feet wide by 250 feet long). No revision is necessary.

4. **Section 2.2 (SWMU No. 10 Fire Training Area), page 6:**

Western's Statement: "[t]he pipelines and training props are shown on Figure 4. Some of the props included above ground open top metal tanks where the liquid fuels (gas and diesel) were allowed to pool to support the training fire."

NMED's Comment: In the response letter, provide the dimensions for the props described in the statement above. In future reports, provide dimensions for site features, where appropriate. No revision is necessary.

5. **Section 2.2 (SWMU No. 10 Fire Training Area), page 6:**

Western's Statement: "[t]wo borings (B-7 and B-9) were placed along the west side in the drainage ditch and the other two borings (B-8 and B-10) were located along the center of the area (Figure 4)."

NMED's Comment: In future reports, describe the sampling methods used when discussing past sampling. No revision is necessary.

6. Section 2.2 (SWMU No. 10 Fire Training Area), page 7:

Western' Statement: "[t]he spent catalyst, fines, and elemental sulfur was placed in lifts and covered with clean soil."

NMED's Comment: Provide the source of the clean soil in the response letter. No revision is necessary.

7. Section 3.3 (Collection and Management of Investigation Derived Waste), page 10 and Appendix B (Field Methods), Management of Investigation Derived Waste, page B-3-4:

NMED's Comment: Section 3.3 and Appendix B do not discuss the disposal location for the remediation related soils stored in the 55-gallon drums. In the response letter, identify where these soils were disposed. Western also does not report soil and purge/decontamination water volumes. In the response letter, provide the waste volumes. This information must be included in future documents. No revision is required.

8. Section 4.3 (Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment), SWMU No. 10 – Fire Training Area, pages 17-18:

NMED's Comment: There is a typographical error in Section 4.3 under SWMU 10-5, 10-6, and 10-7 where "gravelly" is misspelled. No revision is necessary.

9. Section 4.3 (Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment), SWMU No. 16 – Active Landfill, page 22:

NMED's Comment: Western discusses the collection of extra samples (SWMU 16-1-N, SWMU 16-1-E, SWMU 16-1-W, and SWMU 16-1-S) in Section 4.3 but do not provide an explanation for the collection of the samples. In addition, sample SWMU 16-1-W (1.5-2 feet) detected elemental sulfur and odor below a depth of one foot, but the boring was not advanced to greater depths. In the response letter, explain the reason for the collection of the extra samples and why soil boring SWMU 16-1-W was not advanced below a depth of two feet. No revision is required.

10. Section 5 (Regulatory Criteria), pages 27-29:

NMED's Comment: Refer to the regulatory criteria comments in NMED's Approval with Modifications to the Group 2 and Group 3 Investigation Reports. Comments on Section 5 were not included in this approval unless deemed necessary. Apply the regulatory criteria changes to future submittals. No response is necessary.

11. Section 6.1 (Soil Sampling Chemical Analytical Results), SWMU No. 10 and 16, Section 7.2 (SWMU No. 10 Fire Training Area), and Section 7.3 (SWMU No. 16 Active Landfill):

NMED's Comment: Throughout the Report, Western indicates that chloromethane was detected and that the detections are a result of laboratory contamination. Tables 5 and 6 contain bolded acetone results, indicating concentrations above screening levels; however, the text does not discuss the possible source of acetone (e.g., possible laboratory contaminant). NMED notes that Appendix F (Quality Assurance/Quality Control), Section 2.4.1 (Method Blank), bullet 3 states, "Acetone, Methylene Chloride, and Chloromethane were detected in numerous analytical field samples at low concentrations. The associated field sample detections were most likely the result of laboratory contamination." Discuss all possible laboratory contaminants in future documents, if detected, and discuss the reported concentrations relative to those detected in the laboratory or field blank samples.

12. Section 6.2 (Groundwater Sampling Chemical Analytical Results), SWMU No. 10, page 36:

Western's Statement: "[t]he screening level used for TPH in Table 9 is based on a petroleum product type of diesel #2/crankcase oil because the only sample that had a detected result for DRO or MRO was at SWMU No. 10, where primarily diesel fuel was used."

NMED's Comment: The statement above contradicts Section 5, page 29, paragraph 1, where Western states, "[t]hese soil TPH screening levels for 'unknown oil' have conservatively been applied to all soil analytical results for all three SWMUs even though the hydrocarbon source at SWMU No. 10 is known to be predominantly diesel, which could potentially support a higher screening level." Table 9 applies the screening level for the diesel #2/crankcase oil. Explain this discrepancy in the response letter. Correct this discrepancy and provide a replacement page for page 29, Section 5.

13. Section 7.3 (SWMU No. 16 Active Landfill), page 41:

Western's Statement: Five soil borings (SWMU 16-1, SWMU 16-2, SWMU 16-3, SWMU 16-4, and SWMU 16-5) were completed within the footprint of the former "Active Landfill" as described in the investigation work plan. The detection of petroleum hydrocarbons in the upper two feet in boring SWMU 16-1 led to the installation of four additional borings (SWMU 16-1 N, SWMU 16-1-E, SWMU 16-1-S, and SWMU 16-1-W) surrounding SWMU 16-1 in an effort to define the petroleum hydrocarbons (Figure 14)."

NMED's Comment: The above paragraph indicates that four additional borings (SWMU 16-1 N, SWMU 16-1-E, SWMU 16-1-S, and SWMU 16-1-W) were installed in an effort to define the extent of petroleum hydrocarbon contamination. The discussion provided in Section 3.1 (Soil Boring, Monitoring Well installation, and Sample Collection), page 9 and Section 4.3 (Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment), page 22, under Active Landfill (SWMU No. 16) does not mention the detection of petroleum contamination, rather both sections discuss the detection of elemental sulfur. Western must explain this discrepancy in the response letter and submit corrected replacement pages accordingly (e.g., replacement page for Section 7.3).

14. Section 7.4 (Recommendations), SWMU No. 7, page 43:

Western's Statement: "[t]he investigation at SWMU No. 7 appears to have identified historical impacts from the operation of the Former South Evaporation Pond in the area of boring SWMU 7-1. This is demonstrated by the detection of mercury and benzo(a)pyrene above the residential screening levels in a single sample [SWMU 7-1 (4-5')]. A risk assessment should be performed for these two constituents to determine what, if any, additional actions are necessary. Cobalt was similarly detected in a single sample and should also be evaluated in the risk assessment. Site specific soil background concentrations should be established for arsenic and other naturally occurring constituents of interest."

NMED's Comment: Upon completion of the background study, Western must evaluate cumulative risk and conduct a risk assessment that includes all contaminants, defined in Section III.B of the July 27, 2007 Order, detected at concentrations greater than background levels. No revision is necessary.

15. Table 5 (SWMU 7 Soil Analytical Results Summary), Table 6 (SWMU No. 10 Soil Analytical Results Summary), Table 7 (SWMU 16 Soil Analytical Results Summary), and Table 9 (Groundwater Analytical Results Summary):

NMED's Comment: The tables contain bolded text, bolded text highlighted in yellow, and text highlighted in green. The footnotes define the bolded text highlighted in yellow but do not define the bolded text or text with green highlight. Define the bolded text and text with green highlight in the response letter. The bolded text as well as text with other highlighting must be defined in future documents. No revision is necessary.

16. Table 5 (SWMU 7 Soil Analytical Results Summary), Table 6 (SWMU No. 10 Soil Analytical Results Summary), and Table 7 (SWMU 16 Soil Analytical Results Summary):

NMED's Comment: NMED's Approvals with Modifications for the Group 2 and Group 3 Investigation Reports discuss applying the chromium III Residential and Industrial value rather than chromium VI value. Western must apply the chromium VI standard unless an explanation is provided for using the chromium III value. This applies to all future documents.

17. Table 8 (Groundwater Screening Levels):

NMED's Comment: See Comments 2 and 7 of NMED's June 21, 2011 Approval with Modifications Group 3 Investigation Report, which address the changes that must be applied to Table 8.

18. Figures 6 (Cross Section A-A', West to East) and 7 (Cross Section B-B', North to South):

NMED's Comment: Figures 6 and 7 contain the cross sections utilizing the logs of selected monitoring and recovery wells at the facility, but the figures do not show all information for all the wells (e.g., screened intervals). Figure 6 does not depict the screened intervals for wells MW-3, MW-40, MW-41, and RW-42. Figure 7 does not include the screened intervals for MW-1, MW-3, and MW-5. Revise the figures to include the screened intervals for all wells in future reports. No revision is necessary.

19. Figures 9 through 22 (Detected Contaminant Soil Maps):

NMED's Comment: Figures 9 through 22 depict the results of the detected contaminants for SWMUs 7, 10, and 16. According to the legend, the red underlined values depict the concentrations that exceed the screening levels. On Figures 9, and 13 through 21 there are several concentrations that exceed the screening levels but are not underlined in red. Explain why the detections were not underlined in the response letter. If SSLs exceedences are highlighted this way in future figures, replace the example value with the screening level.

20. Appendix D (Site-Specific Dilution/Attenuation Factor Calculations), page 2:

NMED's Comment: Western incorrectly references the source of the climate data. The data was obtained from the National Oceanic and Atmospheric Administration (NOAA). Correct the reference in future documents. No revision is necessary.

Additional investigation activities may be required for the SWMUs within Group 4. However, the need for further work cannot be determined until the background study has been completed. Western must evaluate each SWMU to determine whether additional corrective action is necessary once the background study is completed. Upon completion of the background study, Western must submit a work plan providing the necessary additional investigation for Group 4. NMED is aware that SWMUs within other groups may also require additional investigation; Western may choose to provide a work plan that incorporates the investigation of SWMUs from other groups. If additional investigation activities are not necessary, Western may submit requests for certificates of completion.

Western must address all comments contained in this Approval with Modifications and submit a response letter to NMED on or before **November 7, 2011**. Western must submit a work plan to install a monitoring well at SWMU No. 16 to NMED on or before **August 22, 2011**.

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

Sincerely,

John E. Kieling
Acting Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
L. Tsinnajinnie, NMED HWB
C. Chavez, OCD
A. Hains, Western Refining Company, El Paso, Texas

File: HWB-WRB-11-002 and Reading 2011

Western Refining

WNR LISTED NYSE

RECEIVED OCD

2011 MAR -3 P 1:20

February 28, 2011

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 known as Western Refining Southwest, Inc. – Bloomfield Refinery) Order No. HWB 07-34 (CO) Solid Waste Management Unit (SWMU) Group No. 4 Investigation Report

Dear Mr. Bearzi:

Western Refining Southwest, Inc. – Bloomfield Refinery submits the referenced Investigation Report pursuant to Section IV.B.7 of the July 2007 HWB Order. The Investigation Report summarizes the site environmental investigation activities completed for SWMUs designated as Group 4. These include SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area, and SWMU No. 16 Active Landfill. The Investigation Report was developed and formatted to meet the requirements of Section X.C of the July 2007 HWB Order.

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

Sincerely,

James R. Schmaltz
Environmental Manager
Western Refining Southwest, Inc.
Bloomfield Refinery

cc: Hope Monzeglio – NMED HWB (w/attachment)
Dave Cobrain – NMED HWB
Carl Chavez – NMOCD (w/attachment)
Laurie King – EPA Region 6 (w/attachment)
Allen Hains – Western Refining El Paso

404 Camp Craft Rd., Austin, Texas 78746, USA
T +1 512 347 7588 F +1 512 347 8243 W www.rpsgroup.com

INVESTIGATION REPORT
GROUP 4
(SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area and SWMU No. 16 Active Landfill)

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

February 2011

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

Table of Contents

List of Sections

Executive Summary iii

Section 1 Introduction 1

Section 2 Background 3
- 2.1 SWMU No. 7 Raw Water Ponds 3
- 2.2 SWMU No. 10 Fire Training Area 6
- 2.3 SWMU No. 16 Active Landfill 6

Section 3 Scope of Activities 8
- 3.1 Soil Boring, Monitoring Well Installation, and Sample Collection 8
- 3.2 Background Information Research 9
- 3.3 Collection and Management of Investigation Derived Waste 10
- 3.4 Surveys 10

Section 4 Field Investigation Results 12
- 4.1 Surface Conditions 12
- 4.2 Subsurface Conditions 13
- 4.3 Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment 14
- 4.4 Monitoring Well Construction and Groundwater Sampling 22
- 4.5 Groundwater Conditions 25
- 4.6 Surface Water Conditions 25
- 4.7 Vadose Zone Vapor Sampling Results 26

Section 5 Regulatory Criteria 27

Section 6 Site Impacts 30
- 6.1 Soil Sampling Chemical Analytical Results 30
- 6.2 Groundwater Sampling Chemical Analytical Results 33
- 6.3 General Groundwater Chemistry 38

Section 7 Conclusions and Recommendations 39
- 7.1 SWMU No. 7 Raw Water Ponds 39
- 7.2 SWMU No. 10 Fire Training Area 40
- 7.3 SWMU No. 16 Active Landfill 41
- 7.4 Recommendations 43

Section 8 References 45

Table of Contents *(Continued)*

List of Tables

Table 1 Historical Groundwater Analytical Results Summary
Table 2 Historical Soil Analytical Results Summary
Table 3 Soil Sample Vapor Screening Results
Table 4 Residential Soil Screening Levels
Table 5 SWMU No. 7 Soil Analytical Results Summary
Table 6 SWMU No. 10 Soil Analytical Results Summary
Table 7 SWMU No. 16 Soil Analytical Results Summary
Table 8 Groundwater Screening Levels
Table 9 Groundwater Analytical Results Summary
Table 10 General Groundwater Chemistry Parameters
Table 11 Water Level Measurements

List of Figures

Figure 1 Site Location Map
Figure 2 SWMU Group No. 4 SWMU Locations
Figure 3 SWMU No. 7 Sample Location Map
Figure 4 SWMU No. 10 Sample Location Map
Figure 5 SWMU No. 16 Sample Location Map
Figure 6 Cross Section A-A' West to East
Figure 7 Cross Section B-B' North to South
Figure 8 Potentiometric Surface Map (August 2009)
Figure 9 Arsenic Soil Map
Figure 10 Cobalt Soil Map
Figure 11 Mercury Soil Map
Figure 12 Benzo(a)pyrene Soil Map
Figure 13 Chloromethane Soil Map
Figure 14 Diesel Range Organics Soil Map
Figure 15 Iron Soil Map
Figure 16 Manganese Soil Map
Figure 17 1,2,4-Trimethylbenzene Soil Map
Figure 18 1,3,5-Trimethlybenzene Soil Map
Figure 19 1-Methylnahthalene Soil Map
Figure 20 2-Methylnahthalene Soil Map
Figure 21 Naphthalene Soil Map
Figure 22 Xylenes Soil Map
Figure 23 Groundwater Analytical Results – Metals and Inorganics Map
Figure 24 Groundwater Analtytical Results – Organics Map

List of Appendices

Appendix A Boring Logs
Appendix B Field Methods
Appendix C TPH Screening Level Calculations
Appendix D Site-Specific Dilution/Attenuation Factor Calculations
Appendix E Analytical Data Reports
Appendix F Quality Assurance/Quality Control

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 for the SWMUs designated as Group 4. This group includes SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area, and SWMU No. 16 Active Landfill.

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 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 investigation activities included collection and analysis of soil and groundwater samples for potential site-related constituents beginning on August 17, 2010 and continuing through December 1, 2010. This included the completion of 21 soil borings with groundwater samples collected from four of the soil borings, one of which was completed as a permanent monitoring well. A summary of the results of the investigation is provided as follows:

- SWMU No. 7 – Three soil borings (SWMU 7-1 thru SWMU 7-3) were advanced to a depth of 16 feet below ground level (bgl). Groundwater was not encountered during the drilling activities. Surface soil (0-0.5 ft) samples were collected at each soil boring. In addition, soil samples were collected from each boring where a discernable layer was encountered. This includes soil samples collected at SMWU 7-1 (4 to 5 ft, 5 to 7 ft, and 10 to 12 ft), SMWU 7-2 (5.75 to 7 ft, 7 to 8 ft, 10 to 12 ft, 12 to 14 ft, and 14 to 16 ft), and SMWU 7-3 (6 to 8 ft, 8 to 10 ft, 11 to 12 ft, and 12 to 14 ft). The soil analytical results indicate the presence of four constituents (arsenic, cobalt, mercury, and benzo(a)pyrene) at concentrations above their respective residential screening levels.

- SWMU No. 10 – Seven soil borings (SWMU 10-1 thru SWMU 10-7) were advanced to a depth of 10 feet bgl. One soil boring (SWMU 10-8) was advanced to a depth of 12 feet bgl. Groundwater was not encountered in soil borings SWMU 10-1 thru SWMU 10-8. One soil boring/monitor well (SWMU 10-9/MW-67) was completed northwest (downgradient) of SWMU No. 10 to a depth of 23 feet bgl. Surface soil samples (0 to 0.5 ft) and a lower sample (1.5 to 2 ft) were collected from each soil boring location (SWMU 10-1 thru SWMU 10-9). There was no field evidence of impacted soils at locations SWMU 10-1 thru SWMU 10-7 or SWMU 10-9. At boring SWMU 10-8, a soil sample (6 to7 ft) was collected from the base of an interval that appeared to have been impacted from the surface to 7 feet bgl. Also at boring 10-8, a soil sample (10 to 12 ft) was collected five feet below the impacted interval. At boring location SWMU 10-9, an additional soil sample was collected immediately above saturation (16 to 18 ft).

Three constituents (arsenic, chloromethane, and diesel range organics) were detected at concentrations above their respective residential screening levels in the soil samples collected at SWMU No. 10. Chloromethane is attributed to laboratory contamination. Three constituents [manganese (total and dissolved), sulfate, and total dissolved solids] were detected in groundwater samples at concentrations above their respective screening levels.

- SWMU No. 16 – Five soil borings (SWMU 16-1 thru SWMU 16-5) were installed to depths ranging from 22 to 26 feet bgl pursuant to the Group No. 4 Investigation Work Plan. Four additional soil borings (SWMU 16-1-E, SWMU 16-1-S, SWMU 16-1-W, and SWMU 16-1-N) were completed to a depth of two feet around boring SWMU 16-1. Surface soil samples (0 to 0.5 ft) and a lower sample (1.5 to 2 ft) were collected from all of these soil boring locations. Soil samples were collected at other intervals based on field observations and the proximity of saturation. This included SWMU 16-1 (2 to 4 ft and 18 to 22 ft), SWMU 16-2 (8 to10 ft and 18 to20 ft), SWMU 16-3 (4 to 6 ft and 18 to 20 ft), SWMU 16-4 (2 to 4 ft and 20 to 22 ft), and SWMU 16-5 (12 to 14 ft and 16 to 20) ft. Process catalyst and elemental sulfur were encountered at each of the locations, as anticipated based on the fact that all of the borings are located within the footprint of the landfill. Saturation was encountered in all soil borings except SWMU 16-4 and the additional four two-foot borings surrounding SWMU 16-1. Groundwater samples were collected from temporary wells located at SWMU 16-2, SWMU 16-3 and SWMU16-5. A groundwater sample was not collected from the temporary well completion at SWMU 16-1 because a sufficient volume of water did not enter the well screen.

  Four metals (arsenic, iron, mercury, and manganese) and eight organic constituents (1,2,4-trimethylbenzene, 1,3,5-trimethlybenzene, 1-methlynaphthalene, 2-methlynaphthalene, chloromethane, naphthalene, xylenes, and diesel range organics) were detected in soil samples at concentrations exceeding their respective residential screening levels. Chloromethane is attributed to laboratory contamination. The analyses of groundwater samples detected concentrations of mostly metals and inorganic constituents [aluminum (total), arsenic, barium, beryllium, chromium, cobalt, iron (total and dissolved), lead, manganese (total and dissolved), nickel, vanadium, chloride, nitrate, sulfate, and total dissolved solids] and three organic constituents (1,2,4-trimethylbenzene, 1-methylnaphthalene, and naphthalene) above their respective residential screening levels.

Conclusions and Recommendations

There are a number of constituents that are detected at relatively low concentrations when compared to their residential screening levels and in some instances in only a single sample above the screening level. These constituents should be evaluated in a risk assessment. Site-specific background concentrations should be established for the naturally occurring constituents in soils (e.g., arsenic, iron, and manganese) and groundwater (e.g., sulfate and total dissolved solids) to facilitate an evaluation of the detection of these constituents.

Additional investigation of soils will be required to define the lateral limits of impacts at SWMU No. 10 and the outer limits of the SWMU No. 16 landfill. Monitoring well MW-67, which was installed at SWMU No. 10, will be added to the Facility-Wide Groundwater Monitoring Plan as directed by NMED. Although there appears to be very limited groundwater present at SWMU No.16, a permanent monitoring well should be installed at SWMU No. 16 to provide more reliable information regarding the detection of inorganic constituents in groundwater samples collected from temporary well completions at SWMU 16-2 and SWMU 16-3. This well should be added to the Facility-Wide Groundwater Monitoring Plan to allow an on-going evaluation of the organic constituents detected at SWMU 16-5.

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 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, 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 Report has been prepared for the Solid Waste Management Units (SWMUs) designated as Group 4 in the Order. This includes:

- SWMU No. 7 Raw Water Ponds;
- SWMU No. 10 Fire Training Area; and
- SWMU No. 16 Active Landfill.

The location of the individual SWMUs is shown on Figure 2 and all of these SWMUs are located on the northeastern portion of the refinery property, north of County Road 4990. Only one of the SWMUs (Raw Water Ponds) is currently used by Western. Site operations at SWMU No. 16 Active Landfill were voluntarily terminated following a meeting with the New Mexico Oil

Conservation Division on January 13, 2010, and use of the Fire Training Area ceased prior to November 23, 2010.

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 pursuant to the Group No. 4 Investigation Work Plan dated December 2008 (revised January 2010), which was approved with modifications by the NMED on June 7, 2010. The investigation focused on soils and groundwater.

Samples of soil and groundwater were analyzed for volatile and semi-volatile organic constituents, metals, and inorganic general chemistry constituents. The results of these analyses are compared to applicable State or federal cleanup and screening levels as specified in Section VII. of the Order.

Section 2
Background

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

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

2.1 SWMU No. 7 Raw Water Ponds

The first recorded site operations in this area were fresh water ponds, which were constructed in 1976. In 1982, the fresh water ponds were converted to evaporation ponds. There were two ponds of approximately 2.5 acres each. The northern pond is now the Raw Water Ponds and the southern pond was located immediately to the south (Figure 2). The ponds were lined with four to six inches of bentonite with earthen dikes. Process wastewater flowed from the current north aeration lagoon directly into the northern evaporation pond and directly into the southern evaporation pond as shown on Figure 3. The water evaporated or some was pumped to the Spray Irrigation Area. After a Class I injection well was permitted, the evaporation ponds were decommissioned in 1994.

Following implementation of the Closure Plan for the evaporation ponds as approved by the New Mexico Oil Conservation Division (OCD) in May 1996, two Raw Water Ponds were constructed in 1996 within the former northern evaporation pond. The Raw Water Ponds, which cover approximately 2.5 acres and impound water to an average depth of six feet, are currently used as temporary storage for the refinery's fresh water supply. Surface water is pumped from the San Juan River to the ponds, where any entrained sediment is allowed to settle before the water is pumped to the refinery's on-site water treatment plant and subsequently stored in Tank #2, which is a 2,814,000 gallon steel above ground storage tank. These operations are not associated with any waste management activities.

In addition to storage of water pumped from the San Juan River, water that collects in the #1 East Outfall was pumped to the Raw Water Ponds. On July 31, 2003 Western (Giant Industries at the time of the discovery) noted hydrocarbon at the #1 East Outfall. Initially, Western implemented an Emergency Action Plan that included construction of two earthen containment dikes configured in series. Water that collected in this area was transported via vacuum trucks to the refinery's wastewater treatment system. On October 15, 2003, Western notified the OCD of their plans to install an oil-water separator (Tank #33) to which the fluids would flow through before being diverted to the Raw Water Ponds. Routine sampling of the discharge from Tank #33 to the Raw Water Ponds was initiated and the sample results starting in February of 2005 are included in Table 1. While there have been some periodic increases in concentrations of constituents discharged from Outfall #1, the concentrations have been very low during most of the time period in which water was being discharged to the Raw Water Ponds. The analyses for a sample collected at Tank #33 on January 4, 2010 showed a sudden significant increase in the concentrations of benzene, ethylbenzene, toluene, and xylenes (BTEX). The discharge from #1 East Outfall was redirected to the API Separator on January 14, 2010.

An additional source of water that is diverted to the Raw Water Ponds comes from remediation activities at the river terrace area. Effluent from the dewatering operations at the river terrace area is first treated via carbon adsorption units and then discharged to the Raw Water Ponds. The effluent is routinely sampled before it is discharged and the analytical results indicate that no environmental impacts have occurred to the Raw Water Ponds from the river terrace operations. The analytical results from the effluent testing, which are all non-detect, are included in Table 1.

There have been numerous past sampling events in the area of the Raw Water Ponds. Groundwater has been routinely monitored immediately down-gradient of the ponds at MW-1 since the well was installed in 1984 pursuant to the facility Discharge Permit (GW-1). The historical groundwater results as shown in Table 1 for MW-1 have not indicated any concentrations of chemicals above applicable standards.

As part of the on-going investigation of the refinery being conducted under the 2007 NMED Order, additional groundwater samples were recently collected immediately down-gradient of the ponds in the area of SWMU No. 2 Drum Storage Area North Bone Yard. Two permanent monitoring wells (SWMU2-5/MW-50 and SWMU2-9/MW-51) and seven temporary monitoring wells (SWMU2-1, SWMU2-2, SWMU2-3, SWMU2-4, SWMU2-6, SWMU2-7, and SWMU2-8) were installed in October 2008, located immediately down-gradient of the Raw Water Ponds. Groundwater samples were collected from these new locations in October 2008 and analyzed for potential site-related constituents. These samples confirmed the earlier results of MW-1, that there were no historical impacts to groundwater from the Raw Water Ponds that exceed applicable standards, with the exception of a few metals. It is common to detect low concentrations of total metals in samples collected from temporary or new wells, where turbidity readings are high and sediment has been entrained in the water samples. The sample locations are shown on Figure 3 and the analytical results are provided in Table 1.

Soil samples were first collected in the area of the ponds during the 1993 RCRA Facility Investigation. Two soil borings (B-5 and B-6) were located immediately west of the evaporation ponds and two soil borings (B-7 and B-9) were located immediately east of the evaporation ponds, which also places them in the SWMU No. 10 Fire Training Area. Soil samples were collected from each of these soil borings and analyzed for volatile and semi-volatile organics, total petroleum hydrocarbons, and metals. All of the organic analyses were non-detect and the metals concentrations were generally low. The locations of the soil borings are shown on Figure 3 and the analytical results are provided in Table 2. Copies of the soil boring logs are presented in Appendix A.

After the evaporation ponds were decommissioned 1994, a closure plan entitled, Closure Plan for the Unlined Evaporation Lagoons and the Spray Evaporation Area, was completed on August 13, 1996. A copy of the closure plan is included in Appendix B of the Group 4 Investigation Work Plan, dated December 2008 (Revised January 2010). The results of analytical testing on soil samples collected from beneath the evaporation ponds are discussed on pages 2 and 3 of the closure plan and are summarized in a table in Attachment C to the closure plan. All organic analyses were non-detect and the metal results do not indicate any impact to soils beneath the ponds. Chloride and sulfate concentrations were elevated in the 0-1' sample but reduced significantly in the sample collected at 3-5 feet below ground surface. A map showing sample locations is included in Attachment B of the closure plan. On page 3 of the closure plan, Giant proposed to use the closed evaporation ponds as raw water ponds.

The New Mexico Oil Conservation Division (OCD) approved the Closure Plan for the Unlined Evaporation Lagoons and the Spray Evaporation Area on August 28, 1996 with the requirement to continue monitoring groundwater at MW-1 and MW-5. A copy of the August 28, 1996 OCD letter is included in Appendix B of the Group 4 Investigation Work Plan, dated December 2008 (Revised January 2010).

2.2 SWMU No. 10 Fire Training Area

The Fire Training Area, which has been identified as SWMU No. 10, is located immediately east of the Raw Water Ponds (Figure 2). It covers a small area approximately 160 wide by 250 long, with a surface drainage ditch along the west side that appears to catch any runoff from the area. The ditch flows into a small depression at the northern end of the Fire Training Area.

This area was used from 1981 through 2009 by the on-site fire fighting team for practice and training. There are two small approximately 250-500 gallon above ground storage tanks on the south end of the area that are used to fuel the training fires. One tank contains mostly diesel with a small fraction of gasoline and the other contains liquefied petroleum gas (LPG), which is predominantly propane. There are a number of props arranged in two rows running north-south on both sides of the area where the actual training exercises take place. The pipelines and training props are shown on Figure 4. Some of the props included above ground open top metal tanks where the liquid fuels (gas and diesel) were allowed to pool to support the training fire. One station was fueled only by LPG. Several stations used a mixture of LPG and liquid fuel but the fuel was predominantly LPG at these stations and only a minor fraction of liquid fuels were used to enhance the flame. Dry powder composed of sodium bicarbonate and potassium bicarbonate and aqueous film forming foam are used as the fire suppressant agents.

This area was previously investigated during the 1993 RCRA Facility Investigation with four soil borings located in this area. Two borings (B-7 and B-9) were placed along the west side in the drainage ditch and the other two borings (B-8 and B-10) were located along the center of the area (Figure 4). One soil sample was collected from each of the borings and analyzed for volatile and semi-volatile organic constituents, total petroleum hydrocarbons, and metals. All of the organic analyses were non-detect and the metals concentrations are reported to be less than the background concentrations developed during the 1993 RCRA Facility Investigation (Groundwater Technology Inc., 1994 and Groundwater Technology Inc., 1995). The analytical results for the soil samples are presented in Table 2. The analytical results in Table 2 are compared to the NMED screening levels and not the background concentrations developed during the 1993 RCRA Facility Investigation, as the NMED has not approved any background studies at this time.

2.3 SWMU No. 16 Active Landfill

The active landfill, which began operation in approximately 1983, is located immediately adjacent to the fire training area, on the east side (Figure 2). It occupies an area approximately 120 feet by

150 feet. The landfill is included as an active disposal facility in the refinery's Discharge Plan, which is reviewed and approved by the OCD; however, it is no longer in use. The materials disposed of in the landfill included elemental sulfur, which was produced at the sulfur recovery unit, and fines and spent catalyst from the Fluidized Catalytic Cracking (FCC) unit. The FCCU catalyst is a non-hazardous metallic (alumina) solid, which was periodically replaced.

The spent catalyst, fines and elemental sulfur was placed in lifts and covered with clean soil. The lateral extent of the landfill is visibly obvious; however, the thickness of the material placed in the landfill is uncertain but is estimated to be 10 to 15 feet. No historical assessments have been conducted in this area as it is a permitted disposal area.

Section 3
Scope of Activities

3.1 Soil Boring, Monitoring Well Installation, and Sample Collection

This section presents a brief summary of the sample collection activities completed at each SWMU. Pursuant to Section IV of the Order, an investigation of soils and groundwater was conducted to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil borings and one monitoring well were installed at the Raw Water Ponds (SWMU No. 7), the Fire Training Area (SWMU No. 10), and the Active Landfill (SWMU No. 16) pursuant NMED's *Approval with Modifications* (dated June, 7, 2010) to the Group 4 Investigation Work Plan (dated December 2008, revised January 2010). Four additional soil borings were installed surrounding location SWMU 16-1 (Figure 5).

The soil borings were drilled using the hollow-stem auguring (HSA) method. All soil borings were drilled to a minimum depth of 10 feet, with the exception of the four additional borings (SWMU 16-1-E, SWMU 16-1-S, SWMU 16-1-W, and SWMU 16-1-N), which were completed to a depth of two feet using a hand auger. Soil samples were collected continuously and logged by a qualified geologist in accordance with USCS nomenclature. Soil samples were collected using split-spoon samplers with the exception of the four aforementioned samples completed with a hand auger, for which the soil samples were collected directly from the auger bucket.

<u>Raw Water Ponds (SWMU No. 7)</u>

Three soil borings (SWMU 7-1 thru SWMU 7-3) were advanced to a depth of 16 feet below ground level (bgl) (Figure 3). Groundwater was not encountered during the drilling activities and no groundwater samples were collected. Surface soil (0 to 0.5 ft) samples were collected at each soil boring. In addition, soil samples were collected from each boring where a discernable layer (e.g., change in lithology or physical evidence of impacted soils) was encountered. This includes soil samples collected at SMWU 7-1 (4 to 5 ft, 5 to 7 ft, and 10 to 12 ft), SMWU 7-2 (5.75 to 7 ft, 7 to 8 ft, 10 to 12 ft, 12 to 14 ft, and 14 to 16 ft), and SMWU 7-3 (6 to 8 ft, 8 to 10 ft, 11 to 12 ft, and 12 to 14 ft).

<u>Fire Training Area (SWMU No. 10)</u>

Seven soil borings (SWMU 10-1 thru SWMU 10-7) were advanced to a depth of 10 feet bgl (Figure 4). One soil boring (SWMU 10-8) was advanced to a depth of 12 feet bgl. One soil boring/monitor well (SWMU 10-9/MW-67) was completed northwest (downgradient) of SWMU No. 10 to a depth of 23 feet bgl. Surface soil samples (0 to 0.5 ft) and a lower sample (1.5 to 2 ft) were collected from each soil boring location (SWMU 10-1 thru SWMU 10-9). There was no field evidence of impacted soils at locations SWMU 10-1 thru SWMU 10-7 or SWMU 10-9, thus no deeper samples were collected for analysis with the single exception of a soil sample collected immediately above saturation (16 to 18 ft) at SWMU 10-9. At boring SWMU 10-8, a soil sample (6 to 7 ft) was collected from the base of an interval that appeared to have been impacted from the surface to 7 feet bgl. Also at boring 10-8, a soil sample (10 to 12 ft) was collected five feet below the impacted interval. Groundwater was not encountered in soil borings SWMU 10-1 thru SWMU 10-8 and no groundwater samples were collected from these borings. Groundwater and vadose zone vapor samples were collected at SWMU 10-9/MW-67.

Active Landfill (SWMU No. 16)

Five soil borings (SWMU 16-1 thru SWMU 16-5) were installed to depths ranging from 22 to 26 feet bgl pursuant to the Group No. 4 Investigation Work Plan. Four additional soil borings (SWMU 16-1-E, SWMU 16-1-S, SWMU 16-1-W, and SWMU 16-1-N) were completed to a depth of two feet around boring SWMU 16-1 (Figure 5). Surface soil samples (0 to 0.5 ft) and a lower sample (1.5 to 2 ft) were collected from all nine of these soil boring locations. Soil samples were collected at other intervals based on field observations and the proximity of saturation. This includes SWMU 16-1 (2 to 4 ft and 18 to 22 ft), SWMU 16-2 (8 to 10 ft and 18 to 20 ft), SWMU 16-3 (4 to 6 ft and 18 to 20 ft), SWMU 16-4 (2 to 4 ft and 20 to 22 ft), and SWMU 16-5 (12 to 14 ft and 16 to 20 ft). Process catalyst and elemental sulfur were encountered at each of the locations, as anticipated based on the fact that all of the borings are located within the footprint of the landfill. Saturation was encountered in all soil borings except SWMU 16-4 and the additional four two-foot borings surrounding SWMU 16-1. Groundwater samples were collected from temporary wells located at SWMU 16-2, SWMU 16-3 and SWMU16-5; however, a sufficient volume of groundwater was not present in the temporary well completion at SWMU 16-1 to allow collection of a sample.

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 No. 4 Investigation Work Plan. The previously collected data provides very good information on the overall subsurface conditions, including hydrogeology and contaminant distribution within groundwater. The data collected under this scope of services supplements the historical groundwater information and provide SWMU-specific information regarding contaminant occurrence and distribution within soils and 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 were contained and characterized using methods based on the boring location, boring depth, drilling method, and type of contaminants suspected or encountered. Additional discussion on management of IDW is presented in Appendix B. Two samples were collected for IDW characterization (one sample from the drums generated at SWMUs 7 and 10, and a second sample from drums associated with SWMU No. 16). The IDW soil samples were analyzed for TCLP RCRA 8 Metals (EPA method 6010B), Total Petroleum Hydrocarbons (gasoline, diesel, and motor oil ranges- EPA method 8015B), Polyaromatic Hydrocarbons (EPA method 8310), and BTEX and methyl tertiary butyl ether (EPA method 8260B). The laboratory analytical report (Order No. 1011444) is included in Appendix E.

The non-hazardous soil (0.75 cubic yards) was sent to the Envirotech Inc. Soil Remediation Facility in Hill Top, NM. All purged groundwater and decontamination water was disposed in the refinery wastewater treatment system upstream of the 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 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 surface sampling location; the surface coordinates and elevation of each boring, the top of each monitoring well casing, and the ground surface at each monitoring well location; 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.

Section 4
Field Investigation Results

This section provides a summary of the surface and subsurface conditions at the refinery, including the subject SWMUs. A discussion is included on the installation of soil borings, field screening of subsurface soils, and collection of soil samples for analysis. This is followed by a description of the installation of permanent and temporary well completions and the collection of groundwater samples. Groundwater and surface water conditions are described, followed by a discussion on field screening of vadose zone soil vapors.

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 portion of the refinery property where the process units, tank farm, and SWMU No. 7 (Raw Water Ponds) are located is generally of low relief with an overall northwest gradient of approximately 0.02 ft/ft. The Fire Training Area (SWMU No. 10) and the Inactive Landfill (SWMU No. 16) are slightly lower in surface elevation than the Raw Water Ponds. The land surface at the Fire Training Area is generally flat with a slight gradient to the west, while the land surface slopes to the northeast at the Active Landfill. 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, which 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 property, where the Landfill Pond (SWMU No. 9) is 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 refinery complex is bisected by County Rd #4990 (Sullivan Road), which runs east-west. The process units, storage tanks (crude oil and liquid products), wastewater treatment systems, and SWMUs No. 7, No. 10, and No. 16 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 Class I injection well are located south of the county road. There is very little vegetation throughout any of 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 slopes that are not too steep to support vegetation. The land surface at SWMUs No. 10 and No. 16 is mostly bare dirt and gravel. The northern half of SWMU No. 7 is currently covered by the Raw Water Ponds and the southern half (former Southern Evaporation Pond) is sparsely vegetated soil and gravel.

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. Twenty one soil borings, one of which was completed as permanent monitoring well, were completed under this scope of work for SWMU Group No. 4. Three temporary wells were installed and sampled in the SWMU No.16 area.

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 near 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, 1994).

Figures 6 and 7 present cross-sections of the shallow subsurface based on borings logs from on-site monitoring well completions. One underground wastewater pipeline is present in the area of the Raw Water Ponds and there are underground pipelines that supply liquid and gaseous fuel to the Fire Training Area props. At SWMU No. 10, the western underground line supplies liquid fuel to the props and the eastern line supplies propane to the natural gas props as shown on Figure 4. These underground pipelines are part of SWMU No. 3 Underground Piping Currently in Use and will be investigated under the Group No. 8 Investigation Work Plan, although some of the borings completed under this Scope of Work are also located near these underground lines. These underground pipelines are shown on Figures 9-24. A discussion of the analytical results of soil samples collected near the underground pipelines (SWMU 10-1 and SWMU 10-2) is presented in Section 6.1

4.3 Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment

This subsection provides a description of surface and 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 surface and subsurface impacts in soils.

The soil borings were drilled using hollow-stem auguring (HSA) method and a general description of the exploratory drilling activities is as follows. All soil borings were drilled to a minimum depth of 10 feet, with the exception of four additional (i.e., not specified in the investigation work plan) soil borings (SWMU 16-1-E, SWMU 16-1-S, SWMU 16-1-W, and SWMU 16-1-N), which were hand augered to a depth of two feet. At least one boring at each of the individual SWMUs was drilled to the top of saturation, with the exception of SWMU No. 7 where none of the borings encountered saturation. If there was any indication of impacts based on field screening results at 10 feet or evidence of waste materials or other signs of impacts, then the boring was drilled deeper until reaching a depth of five feet below any observed impacts (e.g., odors or elevated PID readings) or to the top of saturation, whichever was achieved first. If impacted media was detected at the water table, then the boring was drilled five feet below the water table or to refusal (whichever occurred first) to facilitate collection of groundwater samples.

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

- 0-0.5' (all borings);
- 1.5-2' (all borings except at SWMU No. 7);
- From the 6" interval at the top of saturation;
- The sample from each boring with the greatest apparent degree of contamination, based on field observations and field screening;
- From each discernable layer (SWMU 7 only); 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 chronological order within each SWMU. Copies of the boring logs are provided in Appendix A. In addition to being included on the soil boring logs, the soil vapor (i.e., headspace) screening results are summarized in Table 3.

SWMU No. 7 – Raw Water Ponds

Three soil borings were completed at SWMU No. 7 as described below and none of these were completed as either temporary or permanent monitoring wells (Figure 3).

SWMU 7-1

On August 17, 2010 the drilling rig was set up on location SWMU 7-1 and four soil samples were collected from boring SWMU 7-1. One surface soil sample was collected from 0 to 0.5 feet. The sample was collected from a silty sand with a PID reading of 2.2 ppm and no odor. A second sample was collected from 4 to 5 feet in an interval that exhibited black staining of a clayey sand and a hydrocarbon odor. The PID reading was 9.5 ppm, which was the highest observed in the boring. A third sample (5 to 7 feet) was collected immediately below the suspected impacted interval from within the same clayey sand lithologic horizon, but with a reduced PID reading of 3.6 ppm. A two-inch thick high plastic clay interval was encountered at 9.5 feet bgl. The fourth sample was collected below the clay from 10 to 12 feet from within a silty sand horizon with a PID reading of 2.0 ppm. The boring terminated at 16 feet bgl in a damp to moist gravelly sand. Saturation was not encountered. None of the PID readings collected were greater than 10 ppm. The borehole was grouted to the surface on August 17, 2010.

SWMU 7-2

On August 17, 2010 the drilling rig was set up on location SWMU 7-2 and six soil samples were collected from boring SWMU 7-2. One surface soil sample was collected from 0 to 0.5 feet in a clayey/silty sand with a PID reading of 10.2 ppm. The second sample was collected from 5.75 to 7 feet from first interval that was discernable from the overlying clayey/silty sand. The 5.75 to 7 foot interval has a noticeable increase in clay content and most obviously a black to dark brown staining and an odor. The PID reading for this interval was 26.6 ppm, which was the highest PID reading for the entire soil boring. A third sample was collected from 7 to 8 feet, which is below the suspected impacted interval and has a lithology change back to a silty sand. The PID reading for this interval was 15.6 ppm.

The fourth sample was collected from a high plastic clay layer (10 to 12 feet); the fifth sample was collected from a silty sand layer (12 to 14 feet); and the sixth sample was collected from a sandy silt layer (14 to 16 feet). None of these discernable layers appeared to be impacted with the PID readings ranging from 10.4 ppm to 4.2 ppm. Saturation was not encountered. The boring terminated at 16 feet bgl. The borehole was grouted to the surface on August 17, 2010.

<u>SWMU 7-3</u>

On August 17, 2010 the drilling rig was set up on location SWMU 7-3 and five soil samples were collected from boring SWMU 7-3. A surface soil sample and duplicate soil sample were collected from 0 to 0.5 feet in a silty sand that registered a PID reading of 5.2 ppm. The second sample was collected at a depth of 6 to 8 feet from a silty clay, which was considered to be a discernable layer from the silty sand encountered from 0 to 6 feet. The PID reading at this interval was 36 ppm, which was the highest reading observed in this boring.

The three lowermost samples were collected due to three additional discernable layers encountered during the sampling. The third sample was collected from silty sand (8 to 10 feet), the fourth sample was collected from high plastic clay (11 to 12 feet), and the fifth sample was collected from silty sand (12 to 14 feet). None of these discernable layers appeared to be impacted with the PID readings ranging from 2.7 to 1.8 ppm. Saturation was not encountered. The boring terminated at 16 feet bgl. The borehole was grouted to the surface on August 17, 2010.

<u>SWMU No. 10 – Fire Training Area</u>

Nine soil borings were completed at SWMU No. 10 with one of these borings completed as a permanent monitoring well (MW-67) (Figure 4).

<u>SWMU 10-1</u>

On August 17, 2010 the drilling rig was set up on location SWMU 10-1 and samples were collected from soil boring SWMU 10-1. Soil samples were collected from 0 to 0.5 feet and 1.5 to 2 feet. There were no indications of impacts based on the PID readings, which ranged from 0.5 to 4 ppm, nor was there any visual or olfactory evidence of impacts from the surface to a depth of 10 feet bgl. The lithology was similar throughout the boring with all samples composed of a fine-grained silty sand. The boring was terminated at a depth of 10 feet bgl. Saturation was not encountered. The borehole was grouted to the surface on August 17, 2010.

SWMU 10-2

On August 17, 2010 the drilling rig was set up on location SWMU 10-2. There were no indications of impacts based on the field screening results, which ranged from 0.3 to 0.5 ppm, nor was there any visual or olfactory evidence of impacts from the surface to a depth of 10 feet bgl. Soil samples were collected from 0 to 0.5 feet and 1.5 to 2 feet from fine-grained silty sand that was consistent throughout the boring. The boring terminated at 10 feet bgl and saturation was not encountered. The borehole was grouted to the surface on August 17, 2010.

SWMU 10-3

On August 18, 2010 the drilling rig was set up on location SWMU 10-3. There were no indications of impacts based on the field screening results, which ranged from 0.5 to 1.8 ppm, nor was there any visual or olfactory evidence of impacts from the surface to a depth of 10 feet bgl. Two soil samples were collected from 0 to 0.5 feet and 1.5 to 2 feet bgl. The soil is composed of fine-grained silty sand from 0 to 6 feet and fine-grained sand from 6 to 10 feet. The boring terminated at 10 feet bgl. Saturation was not encountered. The borehole was grouted to the surface on August 18, 2010.

SWMU 10-4

On August 18, 2010 the drilling rig was set up on location SWMU 10-4. There were no indications of impacts based on the field screening results, which ranged from 0.6 to 4.8 ppm, nor was there any visual or olfactory evidence of impacts from the surface to a depth of 10 feet bgl. Two soil samples were collected from 0 to 0.5 feet and 1.5 to 2 feet bgl. The soil is composed of fine-grained silty sand from 0 to 6 feet and fine-grained sand from 6 to 10 feet. The boring terminated at 10 feet bgl. Saturation was not encountered. The borehole was grouted to the surface on August 18, 2010.

SWMU 10-5

On August 18, 2010 the drilling rig was set up on location SWMU 10-5. There were no indications of impacts based on the field screening results, which ranged from 0.2 to 4.4 ppm, nor was there any visual or olfactory evidence of impacts from the surface to a depth of 10 feet bgl. Two soil samples were collected from 0 to 0.5 feet and 1.5 to 2 feet bgl. The soil is composed of fine-grained silty sand from 0 to 7 feet, silt from 7 to 8 feet, and gravely sand from 8 to 10 feet. The boring terminated at 10 feet bgl. Saturation was not encountered. The borehole was grouted to the surface on August 18, 2010.

SWMU 10-6

On August 18, 2010 the drilling rig was set up on location SWMU 10-6. There were no indications of impacts based on the field screening results, which ranged from 0.3 to 1.0 ppm, nor was there any visual or olfactory evidence of impacts from the surface to a depth of 10 feet bgl. Two soil samples were collected from 0 to 0.5 feet and 1.5 to 2 feet bgl. The soil is composed of fine-grained silty sand from 0 to 6 feet, sandy silt from 6 to 9 feet, and gravely sand from 9 to 10 feet. The boring terminated at 10 feet bgl. Saturation was not encountered. The borehole was grouted to the surface on August 18, 2010.

SWMU 10-7

On August 18, 2010 the drilling rig was set up on location SWMU 10-7. There were no indications of impacts based on the field screening results, which ranged from 0.2 to 0.4 ppm, nor was there any visual or olfactory evidence of impacts from the surface to a depth of 10 feet bgl. Two soil samples were collected from 0 to 0.5 feet and 1.5 to 2 feet bgl. The soil is composed of fine-grained silty sand from 0 to 8 feet, sandy silt from 8 to 9 feet, and gravely sand from 9 to 10 feet. The boring terminated at 10 feet bgl. Saturation was not encountered. The borehole was grouted to the surface on August 18, 2010.

SWMU 10-8

On August 18, 2010 the drilling rig was set up on location SWMU 10-8. Potentially impacted soils were encountered from 0 to 7 feet bgl. There were no significantly elevated PID readings (1.1 to 10 ppm throughout the boring); however, dark brown to black soils that exhibited an odor were encountered throughout this interval. Soil samples were collected from 0 to 0.5 feet, 1.5 to 2 feet (included duplicate sample), 6 to 7 feet (sample from the lowermost interval exhibiting an odor), and 10 to 12 feet (bottom of boring, which is five feet below the lowermost impacted soil interval). The soil is composed of clayey sand from 0 to 7 feet and gravelly sand from 7 to 10 feet. The sampling terminated at 12 feet bgl and groundwater was not encountered. The borehole was grouted to the surface on August 18, 2010.

SWMU 10-9/MW-67

On August 26, 2010 the drilling rig was set up on location SWMU 10-9. There were no indications of impacts based on the field screening results (i.e., PID readings ranged from 0.3 to 3 ppm) nor was there any visual or olfactory evidence of impacts from the surface to a depth of 23 feet bgl. Three soil samples were collected from SWMU 10-9 at the following depths: 0 to

0.5 feet (surface sample included duplicate sample), 1.5 to 2 feet, and 16 to 18 feet (interval immediately above saturation). The lithology is described as very fine-grained silty sand from 0 to 6 feet, gravelly sand from 6 to 21.25 feet, and stiff clay from 21.25 to 23 feet. Saturation was encountered at approximately 18 feet bgl and the Nacimiento Formation was encountered at 21.25 feet bgl. In order to accommodate the well installation the borehole was advanced to a depth of 23 feet bgl and the boring was completed as monitor well MW-67, as discussed in Section 4.4.

SWMU No. 16 – Active Landfill

Five soil borings were completed at SWMU No. 16 and temporary well completions were installed in four of these borings to facilitate collection of groundwater samples (discussed in Section 4.4) (Figure 5). In addition, four shallow (two –foot) soil borings were completed beyond the initial scope of work.

SWMU 16-1

On August 18, 2010 the drilling rig was set up on location SWMU 16-1 with four soil samples collected at this boring. A surface sample (0 to 0.5 feet) was collected from a silty sand with no odor but a PID reading of 12.4 ppm. The next sample was collected for analysis from the 1.5 to 2 feet bgl interval, which was predominantly elemental sulfur and catalyst with a PID reading of 70 ppm and the sample did exhibit an odor. The third sample was collected from a depth of 2 to 4 feet in a silty sand mixed with process catalyst and elemental sulfur and a reduced PID reading of 6.9 ppm. The lowermost sample was collected immediately above saturation from a depth of 18 to 22 feet. The longer (four-foot) sample interval was required to obtain enough soil volume from the gravelly interval.

After encountering a moist to saturated gravelly sand at 20 to 22 feet bgl the drilling was discontinued until well materials for a temporary monitor well were mobbed onto the site. The hollow stem augers were left in the borehole until August 25, 2010, when the drilling and sampling resumed to a termination depth of 24 feet bgl. The boring was then converted to a temporary monitoring well as discussed in Section 4.4. After an adequate volume of groundwater failed to enter the well to allow collection of a sample, the temporary well screen was removed and the borehole was grouted on August 25, 2010.

SWMU 16-2

On August 25, 2010 the drilling rig was set up on location SWMU 16-2 and four soil samples were collected from boring SWMU 16-2. No elevated PID readings were observed at this location; however, the soils were odiferous throughout much of the boring. A surface sample was collected from 0 to 0.5 feet from a silty sand. There was no odor associated with this sample. The second sample was collected from 1.5 to 2 feet in a silty sand mixed with elemental sulfur. The PID reading from the 1.5 to 2 foot interval was only 3.9 ppm but the sample did exhibit an odor. The third sample came from the 8 to 10 feet interval, also from a silty sand mixed with process catalyst and elemental sulfur. The PID reading was 2.0 ppm and the sample did exhibit an odor. Saturation was observed at 24 feet bgl but may have been higher, as no sample was recovered from approximately 20 to 24 feet. A sample was collected for analysis from the 18 to 20 foot interval to the represent the soil sample near the top of saturation. The Nacimiento Formation was encountered at 25 feet bgl and consisted of high plastic, very stiff, damp to dry, yellowish brown to reddish brown clay. The boring was terminated at 26 feet bgl.

A temporary stainless steel well screen was installed at this location. A groundwater sample was collected from the well as discussed in Section 4.4. The well screen was removed and decontaminated. The borehole was grouted on August 25, 2010.

<u>SWMU 16-3</u>

On August 25, 2010 the drilling rig was set up on location SWMU 16-3 and four soil samples were collected. The first sample was collected at the land surface from 0 to 0.5 feet from a silt with a PID reading of 2.4 ppm. The second sample was collected from a depth of 1.5 to 2 feet and was also from a silt. There was no odor in either of the first two samples. The next sample was obtained from a depth of 4 to 6 feet from a silty sand mixed with elemental sulfur. This sample interval did exhibit an odor and had the highest PID reading in the boring at 97.4 ppm. The lowermost soil sample was collected based on the presence of saturation, which began to increase markedly at a depth of 20 feet. This sample was collected from 18 to 20 feet bgl from a silty sand interval that had no odor and a PID reading of 2.7. The Nacimiento Formation was encountered at 24.5 feet bgl and consisted of high plastic, very stiff, damp to dry, yellowish brown and gray clay. The boring was terminated at 26 feet bgl.

A temporary stainless steel well screen was installed in SWMU 16-3 on August 25, 2010. On August 26, 2010, after a groundwater sample was collected from the temporary well, the well screen was removed and the borehole was grouted to the land surface.

<u>SWMU 16-4</u>

On August 25, 2010 the drilling rig was set up on location SWMU 16-4 and four soil samples were collected for analysis. A surface soil sample was collected from the 0 to 0.5 feet interval from a silty sand with a trace of elemental sulfur. There was a faint odor associated with this sample and PID reading of 3.2 ppm. The next sample was collected from similar material at a depth of 1.5 to 2 feet. There was a faint odor associated with this sample and a PID reading of 2.5 ppm. The third sample was collected from the interval with the highest recorded PID reading (77.2 ppm), at a depth of 2 to 4 feet. This was also a silty sand mixed with elemental sulfur and the addition of some process catalyst. It did exhibit an odor. The lowest interval with the indication of potential impacts was at 16 feet with the presence of elemental sulfur and process catalyst. The lowermost sample was collected for analysis from a depth of 20 to 22 feet, from a sandy gravel without an odor and a PID reading of only 1.9 ppm. The boring was terminated at a depth of 22 feet after drilling six feet below any observed potential impacts and saturation was not encountered. Therefore, a temporary monitor was not installed at this location and the borehole was grouted on August 25, 2010.

SWMU 16-5

On August 26, 2010 the drilling rig was set up on location SWMU 16-5 a total of four soil samples were collected from boring SWMU 16-5. The soil samples were collected from the following intervals. The surface sample was collected from 0 to 0.5 feet in a silty sand with elemental sulfur. The sample did exhibit an odor and a PID reading 0.4 ppm. The second soil sample, including a duplicated sample, was collected from 1.5 to 2 feet bgl from a silty sand and elemental sulfur. The sample did exhibit an odor and had a PID reading of 1.8 pm. The third sample (12 to 14 feet) was collected from an interval predominantly composed of elemental sulfur and process catalyst. It did exhibit an odor and had the highest observed PID reading at 38.3 ppm. The lowermost (16 to 20 feet) soil sample consisted of silty sand and gravelly sand. Due to poor recovery rates the sample was collected from a four foot interval. No odor was observed in the soil samples from 16 to 20 feet and the PID readings ranged from 6.2 to 1.7 ppm.

The Nacimiento Formation was encountered at 21.5 feet bgl and consisted of high plastic, very stiff, damp to dry, reddish brown to tan clay. The boring was terminated at 22 feet bgl. Saturation was encountered at approximately 20 feet and a temporary well completion was installed to facilitate collection of groundwater samples. The groundwater sample was collected on August 26, 2010 as discussed in Section 4.4 and the boring was grouted to the land surface on August 27, 2010.

SWMU 16-1-N

On August 30, 2010 a soil boring at location SWMU 16-1-N was completed to a depth of two feet using a hand auger. The soils were composed of a silty sand with a trace of elemental sulfur and a faint odor. Samples were collected for analysis from depths of 0-0.5 feet and 1.5-2 feet, where PID readings of 1.4 and 1.7 were recorded, respectively. The boring was plugged with bentonite chips.

SWMU 16-1-E

On August 30, 2010 a soil boring at location SWMU 16-1-E was completed to a depth of two feet using a hand auger. Samples were collected for analysis from depths of 0-0.5 feet and 1.5-2 feet, where PID readings of 2.6 and 7.5 were recorded, respectively. The soils were composed of a silty sand with elemental sulfur and a faint odor. The boring was plugged with bentonite chips.

SWMU 16-1-S

On August 30, 2010 a soil boring at location SWMU 16-1-S was completed to a depth of two feet using a hand auger. The soils were composed of a silty sand with elemental sulfur and an odor. Samples were collected for analysis from depths of 0-0.5 feet and 1.5-2 feet, where PID readings of 2.3 and 2.3 were recorded, respectively. The boring was plugged with bentonite chips.

SWMU 16-1-W

On August 30, 2010 a soil boring at location SWMU 16-1-W was completed to a depth of two feet using a hand auger. Samples were collected for analysis from depths of 0-0.5 feet and 1.5-2 feet, where PID readings of 2.6 and 25.5 were recorded, respectively. The soils in the upper one foot were composed of a silty sand with elemental sulfur and an odor. Below one foot, the sample was described as elemental sulfur with an odor. The boring was plugged with bentonite chips.

4.4 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 chronological order within each SWMU. Copies of the boring and well construction logs are provided in Appendix A. The well development and purging procedures are discussed in Appendix B.

All soil borings completed as either a permanent or temporary monitor well were drilled to the top of bedrock (Nacimiento Formation). The depth to the top of the Nacimiento Formation ranged from 21.25 to 25 feet below ground level.

SWMU 10-9/MW-67

On August 26, 2010 the drilling rig was set up on location SWMU 10-9. 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 23 feet bgl (see Section 4.3).

As shown on the well construction log for MW-67, the Nacimiento Formation was encountered at 21.25 feet bgl and consisted of highly plastic, very stiff, damp to dry, yellowish brown clay. In order to accommodate the well setting the borehole was advanced to a depth of 23 feet bgl. Slotted (0.01 inch) rigid PVC well screen was placed at the bottom of the well and extended for 10 feet (12.00 to 22.00 feet) to ensure that the entire saturated zone was open to the well. Rigid Schedule 40 PVC with threads was utilized for the well casing. A 7-inch sand bed was placed at the bottom of the well bore. The 10/20 sand filter pack was installed to 2 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 August 27, 2010 an annular grout was installed to within two feet of the ground surface and allowed to cure for a minimum of 24 hours. On August 30, 2010 the surface pad and protective aluminum cover were installed.

The surface completion is a "stickup" completion. The concrete pad was wire reinforced. The stickup completion consisted of 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-67 on September 7, 2010 and December 1, 1010. On both occasions, the well was first purged and the water samples collected following the procedures discussed in Appendix B.

SWMU 16-1

As discussed in Section 4.3, boring SWMU 16-1 was completed using the HSA drilling method on August 25, 2010. As shown on the soil boring log for SWMU 16-1, the Nacimiento Formation was encountered at 22 feet bgl and consisted of high plastic, very stiff, damp to dry, gray and reddish brown clay. A temporary 10-foot stainless steel well screen was installed at this location; however, the formation did not yield enough water for the collection of groundwater samples. The well screen was removed and decontaminated and the borehole was grouted on August 25, 2010.

SWMU 16-2

Boring SWMU 16-2 was completed using the HSA drilling method on August 25, 2010. The Nacimiento Formation was encountered at 25 feet bgl and consisted of high plastic, very stiff, damp to dry, yellowish brown to reddish brown clay. A temporary 10-foot stainless steel well screen was installed at this location on August 25, 2010. A groundwater sample was collected from the well as discussed in Appendix B. The well screen was removed and decontaminated. The borehole was grouted on August 25, 2010.

SWMU 16-3

On August 25, 2010 the drilling rig was set up on location SWMU 16-3 and the boring was drilled using the HSA drilling method to a depth of 26 feet. As shown on the soil boring log for SWMU 16-3, the Nacimiento Formation was encountered at 24.5 feet bgl and consisted of high plastic, very stiff, damp to dry, yellowish brown and gray clay. A temporary 10-foot stainless steel well screen was installed at this location. After collection of a groundwater sample, as discussed in Appendix B, the well screen was removed and decontaminated. The borehole was grouted on August 26, 2010.

SWMU 16-5

On August 26, 2010 the drilling rig was set up on location SWMU 16-5 and the boring was drilled using the HSA drilling method a depth of 22 feet. The Nacimiento Formation was encountered at 21.5 feet bgl and consisted of high plastic, very stiff, damp to dry, reddish brown to tan clay. A temporary 10-foot stainless steel well screen was installed at this location and a groundwater sample was collected from the well on August 26, 2010. On August 27, 2010, the well screen was removed and decontaminated and the borehole was grouted.

4.5 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 August 2009 is presented in Figure 8 and shows the groundwater flowing to the northwest, toward the San Juan River. 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 depth to water in the area of the Group No. 4 SWMUs varies from approximately 18 feet near SWMU No. 10 to 22 feet at SWMU No. 16. No separate phase hydrocarbon (SPH) was observed in the new permanent monitor well (MW-67) installed during this investigation or the temporary well completions at SWMU No. 16. The saturated thickness in the water table aquifer varies from zero feet in the southern and eastern portions of the site to a maximum of approximately eight feet along the northern portion of the refinery. A maximum of three feet of saturation was observed in the Group No. 4 borings in SWMU 10-9/MW-67, while no free water was present in boring SWMU 16-1, which terminated two feet within the top of the Nacimiento Formation. The areas with the greatest saturated thickness are 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).

4.6 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 or conditions likely to result in the future accumulation of surface water. 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. The portion of the refinery property where the process units, tank farm, and SWMU No. 7 are located is generally of low relief with an overall northwest gradient of approximately 0.02 ft/ft. Surface drainage flows to the northeast across SWMU No. 16 and to the west across SWMU No. 10. 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, which 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 Landfill Pond (SWMU No. 9) is located and there are several steep arroyos along the northern refinery boundary that primarily capture only local surface water flows.

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. Further, the refinery implements a Stormwater Pollution Prevention Plan to ensure that surface waters of the State are not impacted by refinery operations.

4.7 Vadose Zone Vapor Sampling Results

Prior to collection of the groundwater samples at MW-67, a total well vapor sample was collected and field analyzed for carbon dioxide and oxygen. Field vapor measurements were collected using a multi-gas meter as described in Appendix B, and the results were recorded on a field sampling log. On the September 7, 2010 sampling event, measurements of 18.2%, and 1.4% were recorded for oxygen and carbon dioxide, respectively. Measurements of 18.6% and 0.9% were recorded for oxygen and carbon dioxide, respectively, on December 1, 2010. These measurements are included in Table 10 along with the associated PID readings.

Section 5
Regulatory Criteria

This section discusses the screening levels that are used throughout the report for soil and groundwater. 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 soil screening levels, with the soil screening levels based on NMED guidance taking precedence over EPA's Region VI Human Health Medium Specific Screening Levels. NMED guidance used to establish soil cleanup levels includes 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). 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. If a NMED soil screening level is not available, then the EPA Regional Screening Levels are utilized and for carcinogenic constituents only the soil screening level is multiplied by 10 to meet the target excess cancer risk of 10^{-5}.

For non-residential properties (e.g., the Bloomfield Refinery), there are soil screening levels that may be utilized to ensure environmental media are protective of Industrial/Occupational exposures throughout the upper two feet of surface soils and construction workers throughout the upper ten feet. However, as the three SWMUs (Raw Water Ponds, Fire Training Area, and the "Active" Landfill) that are the subject of this investigation report are generally not currently active areas with the recent suspension of petroleum refining at the refinery property, residential screening levels are used for comparison to site concentrations. In addition to potential direct contact exposures, soils must also be protective of the underlying groundwater. Table 4 provides a list of the available NMED and EPA soil screening levels for residential properties.

Based on direction provided by NMED, the residential soil screening levels taken from 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) are applied to the upper ten feet of soils. While EPA guidance (Supplement Guidance for Developing Soil Screening Levels for Superfund Sites, December 2002) references the application of their screening levels to the upper two centimeters, Western has conservatively applied the EPA soil screening levels to the upper ten feet to provide a consistent approach with application of the NMED residential soil screening levels. These soil screening levels are also listed in Tables 5 through 7 with their applicable depths. Some of the constituents reported by the laboratory do not have screening levels but most were not detected with the exception of some constituents that were detected in samples collected from within the interior to the SWMU No. 16 Active Landfill.

The groundwater cleanup levels are based on New Mexico WQCC standards (20.6.2.7 WW NMAC, 20.6.2.3103, and 20.6.2.4103) unless there is a federal maximum contaminant level (MCL), in which case the lower of the two values is selected as the cleanup level. If neither a WCQQ standard nor an MCL is available, then the cleanup level is based on an EPA Regional Screening Level (tap water). Table 8 presents the groundwater cleanup levels, with the applicable cleanup level highlighted.

A review of the NMED TPH Screening Guidelines (dated 2006) indicates that the screening levels were developed based on screening levels and compositional assumptions developed by the Massachusetts Department of Environmental Protection (MADEP). The screening levels used by the NMED in 2006 were developed by the MADEP in 2002 and 2003. A review of current MADEP soil standards from their website (http://www.mass.gov/dep/cleanup/laws/0975_6a.htm) indicates that screening levels have been updated for two of the TPH carbon ranges. The screening level for C11-C22 aromatic hydrocarbons has changed from 200 mg/kg to 1,000 mg/kg and C19-C36 aliphatics has changed from 2,500 mg/kg to 3,000 mg/kg.

The TPH screening concentrations were updated using the 2009 MADEP screening levels and the compositional assumptions from the NMED 2006 TPH Screening Guidelines. The updated soil screening level for "unknown oil" (i.e., 100 % C11-C22 aromatics) is 1,000 mg/kg and this value applies to both residential and industrial land use.

The review of the MADEP and NMED default TPH screening levels revealed that the screening levels are developed to be protective of both the potential for direct contact to impacted soils and the potential for TPH to leach from soils to the underlying groundwater that is used for potable purposes. To evaluate the potential for "direct contact" type exposures (e.g., dermal contact, ingestion, and inhalation of particulates and volatiles) to TPH in surface soils, a screening level was developed for the "direct contact" pathways. This screening level was developed for C11-C22 aromatics as it has one of the highest toxicities of any of the TPH fractions used by NMED to calculate screening levels and is used to compare to "unknown oil." The calculation of the screening level for C11-C22 aromatics is documented in Appendix C. The calculation uses Equation 1 (Combined Exposures to Noncarcinogenic Contaminants in Soil; Residential Scenario) and all provided default exposure values from NMED's August 2009 *Technical Background Document for Development of Soil Screening Levels, Revision 5.0.* The toxicity values are taken from MADEP's Massachusetts Contingency Plan Standards spreadsheets, 2009 (http://www.mass.gov/dep/cleanup/laws/standard.htm). These soil TPH screening levels for "unknown oil" have conservatively been applied to all soil analytical results for all three SWMUs even though the hydrocarbon source at SWMU No. 10 is known to be predominantly diesel, which could potentially support a higher screening level.

The aforementioned Table 4 has soil screening levels for the soil-to-groundwater pathway that are based on a dilution/attenuation factor (DAF) of 1.0. 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 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 this location has the shallowest depth to groundwater. A DAF value of 11.25 was calculated for SWMU No. 2 in the Group No. 2 Investigation Report (dated May 2009, revised March 2010) and although it is overly conservative for the SWMUs investigated under Group 4, 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 D.

The screening levels are not adjusted for potential cumulative risks due to the presence of multiple carcinogenic constituents nor have the hazard quotients been adjusted for the possible presence of multiple non-carcinogenic constituents because; (1) the detected concentrations of some of the potentially naturally occurring constituents may be affected site-specific background levels, and (2) the exposure areas have not yet been defined over which to assess the risk of a potential receptor. Additional information should be collected prior to making any such adjustments.

Section 6
Site Impacts

This section discusses the analyses performed and presents the analytical results that were obtained through the analysis of soil and groundwater samples, which were collected at the Group 4 SWMUs. The results for soils and groundwater are discussed separately for each individual SWMU.

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 collected at SWMU No. 16 (Active Landfill) were analyzed by SW-846 Method 8270 only if the results for motor oil and/or diesel range organics exceeded 200 parts per million.

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
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Soil samples collected at SWMU No 16 (Active Landfill) were also analyzed for the following constituents in addition to those listed above.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

The analytical results are summarized in Table 5 for SWMU No. 7, Table 6 for SWMU No. 10, and Table 7 for SWMU No. 16. The individual results that exceed the applicable cleanup levels are highlighted. The laboratory analytical reports are included in Appendix E and the data validation of the results, which includes the analytical results for the associated QA/QC samples, is included in Appendix F.

SWMU No. 7

The analyses of soil samples from SWMU No. 7 indicate the presence of four constituents at concentrations above their respective residential screening levels. This includes arsenic, cobalt, mercury, and benzo(a)pyrene. Arsenic was detected above the screening level of 0.148 mg/kg in samples SWMU 7-1 (5-7'), SWMU 7-2 (5.75-7'), SWMU 7-2 (7-8'), SWMU 7-3 (11-12'), and SWMU 7-3 (12-14') (Figure 9). In these samples, the arsenic concentration ranged from 2.7 to 4.1 mg/kg.

Cobalt was detected in a single sample [SWMU 7-2 (10-12')] above the residential screening level of 5.51 mg/kg with a concentration of 7.1 mg/kg (Figure 10). Mercury and benzo(a)pyrene were similarly detected above the residential screening levels in a single sample. Mercury was reported at a concentration of 0.64 mg/kg vs. a screening level of 0.33 mg/kg in sample SWMU 7-1 (4-5') (Figure 11). Benzo(a)pyrene was found to be present in the same sample [SWMU 7-1 (4-5')] above the residential screening level of 0.48 mg/kg at a concentration of 1.3 mg/kg (Figure 12).

SWMU No. 10

Three constituents were detected at concentrations above their respective residential screening levels in the soil samples collected at SWMU No. 10. These include arsenic, chloromethane, and diesel range organics. Arsenic was found in one sample [SWMU 10-8 (6-7'] at a concentration (2.7 mg/kg) above the screening level of 0.148 mg/kg (Figure 9). Chloromethane was detected at a concentration of 0.075 mg/kg in sample SWMU 10-9 (16-18') (Figure 13). This reported concentration exceeds the residential screening level of 0.047 mg/kg; however, as described in the laboratory case narrative the detection of chloromethane is attributed to laboratory contamination. Diesel range organics were detected in three samples at concentrations exceeding the screening levels at boring location SWMU 10-8 (Figure 14). These samples included those collected from depths of 0-0.5', 1.5-2', and 6-7'. The reported concentrations in these samples ranged from 1,400 mg/kg to 3,200 mg/kg.

SWMU No. 16

Four metals (arsenic, iron, mercury, and manganese) were found with concentrations exceeding their respective residential screening levels. Arsenic was detected at borings SWMU 16-1 (0-0.5' and 2-4'), SWMU 16-2 (1.5-2' and 8-10'), SWMU 16-3 (1.5-2' and 4-6'), SWMU 16-4 (1.5-2'), and SWMU 16-5 (12-14') at concentrations ranging from 2.9 to 20 mg/kg, all of which exceed their respective screenings levels of 3.59 mg/kg for 0-2' and 0.148 mg/kg for depths greater than two feet (Figure 9). Iron was detected at borings SWMU 16-1 (2-4' and 18-22'), SWMU 16-2 (8-10' and 18-20'), SWMU 16-3 (4-6'), SWMU 16-4 (2-4'), and SWMU 16-5 (12-14' and 16-20') at concentrations exceeding the screening level of 7,267 mg/kg. The reported iron concentrations for these samples ranged from 7,700 to 13,000 mg/kg (Figure 15). Mercury was found to exceed the screening level of 0.33 mg/kg in only one sample [SWMU 16-5 (12-14')] at a concentration of 1.6 mg/kg (Figure 11). Manganese was detected in borings SWMU 16-1 (2-4' and 18-22'), SWMU 16-2 (8-10' and 18-20'), SWMU 16-3 (4-6' and 18-20'), SWMU 16-4 (2-4' and 20-22'), and SWMU 16-5 (12-14' and 16-20') at concentrations in these samples ranging from 56 to 210 mg/kg, which exceed the screening level of 3.04 mg/kg (Figure 16).

Eight organic constituents (1,2,4-trimethylbenzene, 1,3,5-trimethlybenzene, 1-methlynaphthalene, 2-methlynaphthalene, chloromethane, naphthalene, xylenes, and diesel range organics) were detected at concentrations that exceed their respective residential screening levels. 1,2,4-trimethylbenzene was detected in two samples [SWMU 16-4 (2-4') and SWMU 16-5 (12-14')] at concentrations of 0.77 and 7.4 mg/kg, respectively, which both exceed the screening level of 0.27 mg/kg (Figure 17). 1,3,5-trimethlybenzene was detected in three samples [SWMU 16-3 (4-6'), SWMU 16-4 (2-4') and SWMU 16-5 (12-14')] at concentrations of 0.33, 6.1, and 2.6 mg/kg, respectively, which all exceed the screening level of 0.225 mg/kg (Figure 18). Analyses of soil samples collected at borings SWMU 16-1 (2-4'), SWMU 16-2 (8-10'), SWMU 16-3 (4-6'), and SWMU 16-5 (12-14') detected 1-methlynaphthalene at concentrations of 0.78, 0.75, 0.74, and 31 mg/kg, which all exceed the screening level of 0.169 mg/kg (Figure 19). 2-methlynaphthalene was found to exceed the screening level of 10.1 mg/kg in only one sample [SWMU 16-5 (12-14')] at a concentration of 49 mg/kg (Figure 20). Chloromethane was detected in three soil samples [SWMU 16-2 (18-20'), SWMU 16-3 (4-6'), and SWMU 16-4 (20-22)] at concentrations of 0.069, 0.083, and 0.12 mg/kg, respectively, which exceed the screening level of 0.047 mg/kg (Figure 13). As described in the laboratory case narrative, the detection of chloromethane is attributed to laboratory contamination. Analyses of soil samples collected at borings SWMU 16-1 (2-4'), SWMU 16-2 (8-10'), SWMU 16-3 (4-6'), and SWMU 16-5 (12-14') by EPA method 8260 detected naphthalene at concentrations of 0.52, 0.4, 0.51, and 8.8 mg/kg, respectively, which exceed the screening level of 0.0472 mg/kg (Figure 21). Similar results were produced for naphthalene using EPA method 8270 with one additional sample [SWMU 16-4 (2-4')] having a concentration (0.85 mg/kg) that exceeds the screening level. Xylenes were found to exceed the screening level of 1.98 mg/kg in only one sample [SWMU 16-5 (12-14')] at a concentration of 2 mg/kg (Figure 22). Diesel range organics were detected in three samples [SWMU 16-3 (4-6'), SWMU 16-4 (2-4'), and SWMU 16-5 (12-14'), at concentrations of 3,900, 5,100, and 8,400 mg/kg, respectively, which exceed the screening level of 1,000 mg/kg for samples greater than two feet in depth. Diesel range organics were found one sample [SWMU 16-1-W (1.5-2')] with a concentration of 1,900 mg/kg that exceeds the screening level of 1,800 mg/kg for samples less than two feet deep (Figure 14).

6.2 Groundwater Sampling Chemical Analytical Results

The groundwater samples were analyzed for organic constituents 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, diesel, and motor oil range organics.

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

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020

Analyte	Analytical Method
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

In addition, groundwater samples were analyzed for the following general chemistry parameters.

Analyte	Analytical Method
Bicarbonate	SW-846 method 310.1
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	SW-846 method 7140
Magnesium	SW-846 method 7450
Sodium	SW-846 method 7770
Potassium	SW-846 method 7610
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Iron	SW-846 method 6010/6020
Total Dissolved Solids	Method SM 2540

Groundwater samples collected at SWMU No 16 (Active Landfill) were also analyzed for the following constituents in addition to those listed above. The analyses included both total and dissolved results.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020

Analyte	Analytical Method
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

The groundwater analyses were completed as approved in the site investigation work plan with only a couple of exceptions. Separate analyses of nitrate and nitrite were completed for water samples collected from SWMU 16-5 and MW-67 (12/1/2010); however, a total result for nitrate plus nitrite was reported for SWMU 16-2, SWMU 16-3, and MW-67 (9/7/2010). The work plan listed analyses for ferric/ferrous iron but the lab only reported total and dissolved iron. The second groundwater sample collected from MW-67 was originally scheduled to be collected within 75 days of the initial sampling event; however, it was not collected until day 85.

The analytical results and the applicable cleanup levels are presented in Table 9. The individual results that exceed the applicable cleanup levels are highlighted. The results for the associated QA/QC samples and the data validation are provided in Appendix F. The laboratory analytical reports are included in Appendix E

SWMU No. 7

Groundwater samples were not collected at SWMU No. 7 because none of the soil borings encountered groundwater. As per the investigation work plan, no permanent monitoring wells were planned for this SWMU and groundwater samples only would have been collected if the soil borings were drilled to depths sufficient to encounter groundwater.

SWMU No. 10

One permanent monitoring well (MW-67) was installed at SWMU No. 10, at boring location SWMU 10-9 (Figure 23). No temporary well completions were installed in any of the other soil borings at SWMU No. 10 and the only groundwater samples collected at this SWMU came from MW-67. The analyses performed on samples collected on August 25, 2010 and December 1, 2010 indicated the presence of three constituents at concentrations above their respective screening levels, as indicated in Table 6. These constituents include manganese (total and dissolved), sulfate, and total dissolved solids. Maps showing the distribution of these constituents across all Group No. 4 SWMUs are included as Figures 23 and 24. Manganese (total) was detected at concentrations of 0.93 and 0.99 mg/l during the two sampling events vs.

a screening level of 0.88 mg/l. Manganese (dissolved) was detected at concentrations of 0.29 and 0.99 mg/l during the two sampling events vs. a screening level of 0.2 mg/l. During the first sampling event, sulfate (total) was detected at 210 mg/l but increased to 660 mg/l in the second set of samples vs. a screening level of 600 mg/l. The dissolved analyses for sulfate were similar, with an initial analytical result of 200 mg/l and the second event indicating 650 mg/l. The analyses for total dissolved solids indicated results of 897 mg/l on the first sampling event and 1,410 mg/l on the second sampling event vs. a screening level of 1,000 mg/l. The analyses for diesel range organics indicated results of <0.2 mg/l on the first sampling event and 0.37 mg/l on the second sampling event vs. a screening level of 1.72 mg/l. The screening level used for TPH in Table 9 is based on a petroleum product type of diesel #2/crankcase oil because the only sample that had a detected result for DRO or MRO was at SWMU No. 10, where primarily diesel fuel was used.

SWMU No. 16

Groundwater samples were collected at SWMU No. 16 from temporary wells completions at soil borings SWMU 16-2, SWMU 16-3, and SWMU 16-5 on August 25, 2010 and August 26, 2010. Due to a limited volume of groundwater that recharged to the well and thus limited sample collection volume, not all analyses could be performed on sample SWMU 16-5. There was not a sufficient volume to analyze for metals or total petroleum hydrocarbons in the diesel and motor oil ranges in this sample.

The analyses from the groundwater samples collected from the temporary well completions at SWMU No. 16 detected the presence of multiple constituents at concentrations above their respective residential screening levels, as presented in Table 9. The majority of these constituents are metals and inorganic constituents and include; aluminum (total), arsenic, barium, beryllium, chromium, cobalt, iron (total and dissolved), lead, manganese (total and dissolved), nickel, vanadium, chloride, nitrate, sulfate, and total dissolved solids (Figure 23). Organic constituents present above the residential screening levels include 1,2,4-trimethylbenzene, 1-methylnaphthalene, and naphthalene (Figure 24).

The total aluminum values of 920 mg/l and 320 mg/l as reported for the samples collected at SWMU 16-2 and SWMU 16-3, respectively, both exceed the screening level of 37 mg/l. Values for arsenic of 0.29 and 0.061 mg/l were reported for samples collected at SWMU 16-2 and SWMU 16-3, respectively, with both exceeding the screening level of 0.01 mg/l. The reported values for barium of 1.4 mg/l at SWMU 16-2 and 1.5 mg/l at SWMU 16-3 both exceed the screening level of 1.0 mg/l. Similarly, the reported values of beryllium of 0.026 and 0.0093 mg/l both exceed the screening level of 0.004 mg/l. Chromium was detected at values of 0.71 and 0.17 mg/l at SWMU 16-2 and 16-3, respectively, with both results exceeding the screening level of 0.05 mg/l.

The screening level for cobalt (0.05 mg/l) was exceeded at both SWMU 16-2 and SWMU 16-3 with reported concentrations of 0.25 and 0.088 mg/l, respectively. The total iron values of 800 mg/l and 320 mg/l as reported for the samples collected at SWMU 16-2 and SWMU 16-3, respectively, both exceed the screening level of 26 mg/l. Values for dissolved iron of 2.7 and 45 mg/l were reported for samples collected at SWMU 16-2 and SWMU 16-3, respectively, with both exceeding the screening level of 1.0 mg/l. The reported values for lead of 0.21 mg/l at SWMU 16-2 and 0.56 mg/l at SWMU 16-3 both exceed the screening level of 0.015 mg/l. Similarly, the reported values of total manganese of 19 and 12 mg/l both exceed the screening level of 0.88 mg/l. Dissolved manganese was detected at values of 6.7 and 4.2 mg/l at SWMU 16-2 and 16-3, respectively, with both results exceeding the screening level of 0.2 mg/l.

The nickel values of 1.9 mg/l and 0.53 mg/l as reported for the samples collected at SWMU 16-2 and SWMU 16-3, respectively, both exceed the screening level of 0.2 mg/l. Values for vanadium of 3.6 and 0.59 mg/l were reported for samples collected at SWMU 16-2 and SWMU 16-3, respectively, with both exceeding the screening level of 0.26 mg/l. The reported values for total chloride of 310 mg/l at SWMU 16-2 and 440 mg/l at SWMU 16-3 both exceed the screening level of 250 mg/l. Similarly, the reported values of dissolved chloride of 300 and 470 mg/l both exceed the screening level of 250 mg/l. Sulfate was also detected in both dissolved and total samples at concentrations above the screening level of 600 mg/l. The "dissolved" sulfate values were reported at 1,400 and 2,000 mg/l at SWMU 16-2 and 16-3, respectively. The "total" sulfate values were reported at 1,400 and 1,800 mg/l at SWMU 16-2 and 16-3, respectively. Nitrate exceeded the screening level of 10 mg/l in sample SWMU 16-5 at a concentration of 45 mg/l. The screening level for total dissolved solids of 1,000 mg/l was exceeded in samples collected SWMU 16-2, SWMU 16-3, and SWMU 16-5 with values 2,860, 4,230, and 5,400 mg/l, respectively.

The three organic constituents that exceed their screening levels (1,2,4-trimethylbenzene, 1-methylnaphthalene, and naphthalene) were detected in the groundwater sample collected from SWMU 16-5. 1,2,4-trimethylbenzene and 1-methylnaphthalene were detected at concentrations of 0.028 mg/l and 0.036 mg/l, respectively, vs. screening levels of 0.015 mg/l and 0.0023 mg/l.

Naphthalene was detected at a concentration of 0.023 mg/l vs. a screening level of 0.00014 mg/l.

6.3 General Groundwater Chemistry

The measurement of field purging parameters included measurement of groundwater pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, and temperature. The results of the measurements are included in Table 10 and fluid levels measured prior to purging the wells are presented in Table 11.

Section 7
Conclusions and Recommendations

This section summarizes and provides an evaluation of the impacts as shown in field screening data and analytical data. The investigation of soils and groundwater was conducted at the SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area, and SWMU No. 16 Active Landfill to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil borings and monitoring wells were installed to allow the collection of and chemical analysis of soil and groundwater samples as discussed in Sections 4 and 6, respectively. An evaluation of the results of both field screening and the laboratory analyses follows for each SWMU.

7.1 SWMU No. 7 Raw Water Ponds

The analyses of soil samples from SWMU No. 7 indicate the presence of four constituents (arsenic, cobalt, mercury, and benzo(a)pyrene) at concentrations above their respective residential screening levels. Arsenic was detected above the residential screening level of 0.148 mg/kg in soil samples from each of the three soils borings completed at SWMU No. 7; however, the arsenic concentrations are generally low and ranged from <2.5 to 4.1 mg/kg (Figure 9). Site-specific background concentrations have not yet been determined for arsenic but the values reported at SWMU No. 7 should be compared to background prior to making any conclusions regarding the presence of arsenic at this SWMU.

Cobalt was detected in a single sample [SWMU 7-2 (10-12')] above the residential screening level of 5.51 mg/kg with a concentration of 7.1 mg/kg (Figure 10). This sample was collected from a high plastic, stiff clay without any field evidence (e.g., staining, odor, elevated PID reading) of impacts. The two overlying samples collected from depths of 5.75-7' and 7-8' reported cobalt concentrations of 2.7 and 1.3 mg/kg, respectively. It appears that the single detection of cobalt above the screening level may not be representative of cobalt concentrations in soils across SWMU No. 7 and further evaluation in a risk assessment should be performed prior to conducting remediation based on this single detection.

Mercury and benzo(a)pyrene were detected above the residential screening levels in a single sample [SWMU 7-1 (4-5')]. Mercury was reported at a concentration of 0.64 mg/kg vs. a screening level of 0.33 mg/kg and Benzo(a)pyrene was found to be present at a concentration of 1.3 mg/kg vs. the screening level of 0.48 mg/kg (Figures 11 and 12). Field screening of this sample indicated a slightly elevated PID reading (9.5 ppm vs. 3.0 ppm for overlying intervals) and black stains with a hydrocarbon odor. The sample collected from directly beneath this sample at a depth of 5-7' did not contain any constituents at concentrations above their respective screening levels except arsenic, which was detected at only 3.1 mg/kg. This boring (SWMU 7-1) is located close to the inlet pipe for the former South Evaporation Pond and it is possible that the elevated readings of mercury and benz(a)pyrene may be associated with historic operations of the evaporation pond. Similar to the detection of cobalt at a single location, an evaluation under a risk assessment (e.g., calculation of a representative concentration) should be considered prior to concluding what, if any, actions are warranted.

Groundwater samples were not collected at SWMU No. 7 because none of the soil borings encountered groundwater. As per the investigation work plan, no permanent monitoring wells were planned for this SWMU and groundwater samples only would have been collected if the soil borings were drilled to depths sufficient to encounter groundwater.

7.2 SWMU No. 10 Fire Training Area

Three constituents (arsenic, chloromethane, and diesel range organics) were detected at concentrations above their respective residential screening levels in the soil samples collected at SWMU No. 10. Arsenic was found above the screening level in one sample at a concentration 2.7 mg/kg. This is a similarly low concentration of arsenic as found at SWMU No. 7 and should also be evaluated in comparison to a site-specific background concentration. Chloromethane was detected at a concentration of 0.075 mg/kg in sample SWMU 10-9 (16-18'), which was collected at the top of saturation (Figure 13). This concentration slightly exceeds the residential screening level of 0.047 mg/kg and there is no field evidence of impacts in this sample or any of the overlying soils. Chloromethane was also detected in the surface sample collected from boring SWMU 10-9 at 0-0.5' but was non-detect at 1.5-2'. Chloromethane was not detected in the groundwater samples collected from nearby MW-67 and its presence in the soil analyses is attributed to laboratory contamination as described in the laboratory case narratives and the data validation in Appendix F.

Diesel range organics were detected in three samples at concentrations exceeding the screening levels at boring location SWMU 10-8 (Figure 14). The concentration at 0-0.5' was 2,800 mg/kg and it increased to 3,200 mg/kg at 1.5-2' but decreased to 1,400 mg/kg at 6-7'. The concentration further decreased to 12 mg/kg at 10-12'. Field screening information mirrored these results with an odor present throughout the upper seven feet, with the highest

PID reading of 10 ppm occurring in the 2-4' interval. Diesel range organics were detected in the nearby MW-67 in one of the two sampling events. This boring is located in a manmade depression, which was constructed to contain surface water flowing across the fire training area or any surface spills that may have occurred in the area. Therefore, it is in the location most likely to have impacts from historical operations in this area and the analytical results appear to confirm the presence of hydrocarbon impacted soils at this location.

One permanent monitoring well (MW-67) was installed at boring location SWMU 10-9 (Figure 23). The analyses performed on groundwater samples collected on August 25, 2010 and December 1, 2010 indicate the presence of three constituents at concentrations above their respective screening levels, as indicated in Table 9. These constituents include manganese (total and dissolved), sulfate, and total dissolved solids. Maps showing the distribution of these constituents across all Group No. 4 SWMUs are included as Figures 23 and 24. Based on the use of this area for training fire fighters and the constituents that were detected in soil above screening levels, diesel range organics would appear to be the only constituent of the four likely to be associated with the SWMU. Manganese could be associated with natural degradation of organics present in groundwater. As a site-specific background concentration has not yet been established for naturally occurring constituents in groundwater (e.g., sulfate and total dissolved soils) it is not yet possible to determine if the concentrations of sulfate and total dissolved solids are representative of naturally occurring concentrations or represent site-related impacts. The vadose zone vapor samples, as discussed in Section 4.7, did not indicate any significant biological activity in area of MW-67. The oxygen levels did not appear to be reduced below what could be expected in non-impacted areas and carbon dioxide levels are low.

7.3 SWMU No. 16 Active Landfill

Five soils borings (SWMU 16-1, SWMU 16-2, SWMU 16-3, SWMU 16-4, and SWMU 16-5) were completed within the footprint of the former "Active Landfill" as described in the investigation work plan. The detection of petroleum hydrocarbons in the upper two feet in boring SWMU 16-1 lead to the installation of four additional borings (SWMU 16-1-N, SWMU 16-1-E, SWMU 16-1-S, and SWMU 16-1-W) surrounding SWMU 16-1 in a effort to define the petroleum hydrocarbons (Figure 14).

As anticipated, elemental sulfur and catalysts, which were approved for disposal in the permitted landfill, were found to be present in all soil borings. Four metals (arsenic, iron, mercury, and manganese) were found with concentrations exceeding their respective residential soil screening levels. Establishment of site-specific background for these naturally constituents will be necessary before it can be determined if the detected concentrations exceed background values. However, it is likely that arsenic (max. concentration of 20 mg/kg) and mercury (max. concentration of 1.6 mg/kg) are present at concentrations above background and screening levels. Seven organic constituents (1,2,4-trimethylbenzene, 1,3,5-trimethlybenzene, 1-methlynaphthalene, 2-methlynaphthalene, naphthalene, xylenes, and diesel range organics) were also detected at concentrations that exceed their respective residential soil screening levels and these constituents may be associated with disposal of the elemental sulfur and catalysts. Chloromethane was also detected in soils at concentrations above the residential screening level, but its presence is attributed to laboratory contamination as described in the laboratory case narratives and the data validation in Appendix F.

Groundwater samples were collected at SWMU No. 16 from temporary wells completions at soil borings SWMU 16-2, SWMU 16-3, and SWMU 16-5 on August 25, 2010 and August 26, 2010. The analyses of the groundwater samples collected from the temporary well completions at SWMU No. 16 detected the presence of multiple constituents at concentrations above their respective residential screening levels, as presented in Table 9. The majority of these constituents are metals and inorganic constituents and include; aluminum (total), arsenic, barium, beryllium, chromium, cobalt, iron (total and dissolved), lead, manganese (total and dissolved), nickel, vanadium, chloride, nitrate, sulfate, and total dissolved solids (Figure 23). As discussed above for SWMU No. 10, establishment of background values for naturally constituents in groundwater will facilitate the evaluation of these detections. Of particular importance is the fact that all of the groundwater samples at SWMU No. 16 were collected from temporary well completions that produced low volumes of water and did not allow removal of sufficient water to remove sediment from the well or the samples. All of the groundwater samples collected from SWMU 16-2, SWMU 16-3, and SWMU 16-5 were described as cloudy, muddy. The presence of entrained sediments in the groundwater samples may have lead to artificially elevated concentrations of metals (e.g., aluminum, arsenic, barium, beryllium, chromium, cobalt, iron, lead, manganese, nickel, and vanadium).

Organic constituents (1,2,4-trimethylbenzene, 1-methylnaphthalene, and naphthalene) were found to be present in the groundwater sample collected from SWMU 16-5 at concentrations above the residential screening levels (Figure 24). All of these constituents were also detected in soils at SWMU No. 16 and may be associated with historical operations of the "Active Landfill."

7.4 Recommendations

SWMU No. 7

The investigation at SWMU No. 7 appears to have identified historical impacts from the operation of the former South Evaporation Pond in the area of boring SWMU 7-1. This is demonstrated by the detection of mercury and benzo(a)pyrene above the residential screening levels in a single sample [SWMU 7-1 (4-5')]. A risk assessment should be performed for these two constituents to determine what, if any, additional actions are necessary. Cobalt was similarly detected in a single sample and should also be evaluated in the risk assessment. Site-specific soil background concentrations should be established for arsenic and other naturally occurring constituents of interest.

SWMU No. 10

Impacted soils were located in the surface drainage feature, which was constructed to capture and control surface water that flows across the fire training area (Figure 4). Additional investigation of soils is recommended in the area of soil boring SWMU 10-8 to define the hydrocarbon impacted soils.

Background concentrations in groundwater should be established for naturally occurring constituents, if possible, to facilitate an evaluation of the concentration levels of sulfate and total dissolved solids detected at MW-67. Monitoring well MW-67 will be added to the Facility-Wide Groundwater Monitoring Plan as directed by NMED.

SWMU No. 16

Impacted soils were documented within the interior of the former "Active Landfill." Some of the constituents (e.g., iron and manganese) may be representative of background concentrations and a site-specific background concentration should be developed for comparison prior to making any final determinations regarding impacts for the potentially naturally occurring metals. The presence of organic constituents above screening levels in soils requires that further investigation be conducted to define the limits of the landfill. The sampling and analysis of soils within the main portion of the landfill has provided a good characterization of the potential constituents that can be used to facilitate lateral delineation. Vertical delineation was defined at soil boring SWMU 16-1, where process catalyst was found to extend to a depth of 18 feet or approximately two feet above saturation.

Although there appears to be very limited groundwater present at SWMU No.16, a permanent monitoring well should be installed at SWMU No. 16 to provide more reliable information regarding the detection of the many inorganic constituents in groundwater at SWMU 16-2 and SWMU 16-3. This well should be added to the Facility-Wide Groundwater Monitoring Plan to allow an on-going evaluation of the organic constituents detected at SWMU 16-5.

Section 8
References

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Stone,W.J., Lyford, F.P., Frenzel, P.F., Mizell, N.H., and Padgett, E.T., 1983, Hydrogeology and water resources of San Juan Basin, New Mexico; New Mexico Bureau of Mines and Minerals Hydrologic Report 6, p. 70.

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Tables

Table 1
Historical Groundwater Analytical Results
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Analyte	WQCC 20NMAC 6.2.3103	SWMU2-1 GW	SWMU 2-2 GW	SWMU 2-3 GW	SWMU 2-4 GW	SWMU2-5 / MW-50	SWMU 2-6 GW	SWMU 2-7 GW	SWMU 2-8 GW	SWMU 2-9 / MW-51	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
Date		9/29/2008	9/29/2008	9/29/2008	9/30/2008	10/28/2008	9/30/2008	9/30/2008	10/1/2008	10/28/2008	3/3/2003	8/21/2003	3/3/2004	8/23/2004	4/11/2005	8/5/2005	4/5/2006	8/15/2006	4/1/2007	8/28/2007	4/8/2008	8/13/2008	4/1/2009	8/1/2009
Total metals (mg/l)																								
Antimony	0.006 [2]	0.0012	< 0.0010	< 0.0010	< 0.0010	<0.001	< 0.0010	< 0.0010	< 0.0010	<0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Arsenic	0.01 [2]	**0.012**	< 0.0010	0.0028	0.005	**0.012**	0.0039	0.0091	0.0034	**0.012**	NA	<0.02 [1]	NA	<0.02	NA	NA	NA	<0.02	NA	<0.2	NA	<0.02	NA	<0.02
Barium	1.0	**1.5**	0.22	0.24	0.2	0.8	0.53	0.5	0.29	0.2	NA	0.46 [1]	NA	0.052	NA	NA	NA	0.023	NA	0.023	NA	0.15	NA	<0.02
Beryllium	0.004 [2]	0.0024	< 0.0020	< 0.0020	< 0.0020	0.001	0.0021	**0.0076**	0.0021	<0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	0.005 [2]	<0.0050	< 0.0050	< 0.0050	< 0.0050	<0.001	< 0.0050	< 0.0050	< 0.0050	<0.001	NA	<0.002 [1]	NA	<0.002	NA	NA	NA	<0.002	NA	<0.002	NA	<0.002	NA	<0.002
Chromium	0.05	0.46	< 0.010	< 0.010	< 0.010	0.02	0.033	0.023	0.028	<0.01	NA	<0.006 [1]	NA	<0.006	NA	<0.006	NA	<0.006	NA	<0.006	NA	<0.006	NA	<0.006
Cobalt	0.05	0.032	< 0.010	< 0.010	< 0.010	0.01	0.017	**0.058**	0.019	<0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.006 [1]	NA	NA	NA	NA	NA	NA	NA	<0.006	NA	<0.006	NA	<0.006
Cyanide	0.2	< 0.0050	< 0.0050	< 0.0050	< 0.0050	<0.005	< 0.0050	< 0.0050	< 0.0050	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.05	0.034	< 0.0050	< 0.0050	< 0.0050	0.02	0.022	0.033	0.017	<0.01	NA	<0.005 [1]	NA	<0.005	NA	<0.005	NA	<0.005	NA	<0.005	NA	<0.005	NA	<0.005
Mercury	0.002	<0.00020	< 0.00020	< 0.00020	< 0.0020	<0.001	0.00021	0.00052	< 0.00020	<0.001	NA	NA	NA	<0.0002	NA		NA	<0.0002	NA	<0.0002	NA	<0.0002	NA	
Nickel	0.200	0.097	< 0.020	< 0.020	< 0.020	0.03	< 0.020	0.046	0.025	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.05	<0.0010	< 0.0010	< 0.0010	< 0.0010	0.001	< 0.0010	0.0019	0.001	<0.001	NA	0.043 [1]	NA	<0.05	NA	NA	NA	<0.05	NA	<0.05	NA	<0.05	NA	<0.05
Silver	0.05	<0.010	<0.010	<0.010	< 0.010	<0.005	< 0.010	<0.010	<0.010	<0.005	NA	<0.005 [1]	NA	<0.005	NA	NA	NA	<0.005	NA	<0.005	NA	<0.005	NA	<0.005
Uranium	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1 [1]	NA	NA	NA	NA	NA	NA	NA	<0.1	NA	NA	NA	0.002
Vanadium	0.26 [3]	0.044	< 0.010	< 0.010	< 0.010	<0.1	0.04	0.035	0.017	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	10.0	1.6	1.2	1.4	0.55	0.12	0.14	0.18	0.15	0.05	NA	0.12 [1]	NA	NA	NA	NA	NA	NA	NA	<0.05	NA	<0.05	NA	<0.05
Volatiles (ug/l)																								
1,1,1,2-Tetrachloroethane	0.52 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,1,1-Trichloroethane	60	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,1,2,2-Tetrachloroethane	10	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0	NA	< 2.0
1,1,2-Trichloroethane	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,1-Dichloroethane	25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,1-Dichloropropene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,2,3-Trichlorobenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,2,3-Trichloropropane	0.0096 [3]	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0	NA	< 2.0
1,2,4-Trichlorobenzene	70.0 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,2,4-Trimethylbenzene	15.0 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,2-Dibromo-3-chloropropane	0.2 [2]	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0	NA	< 2.0
1,2-Dibromoethane (EDB)	0.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,2-Dichlorobenzene	600.0 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,2-Dichloroethane (EDC)	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,2-Dichloropropane	5.0 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,3,5-Trimethylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,3-Dichlorobenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,3-Dichloropropane	730 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1,4-Dichlorobenzene	75.0 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
1-Methylnaphthalene	Ne	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 4.0	NA	< 4.0	NA	< 4.0
2,2-Dichloropropane	Ne	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0	NA	< 2.0
2-Butanone	7,100.0 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2-Chlorotoluene	730.0 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
2-Hexanone	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2-Methylnaphthalene	Ne	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 4.0	NA	< 4.0	NA	< 4.0
4-Chlorotoluene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
4-Isopropyltoluene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
4-Methyl-2-pentanone	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Acetone	22,000 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Benzene	5 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	1.1	1.3	<0.5	<0.5	<1.0	<0.5	< 1.0	<1.0	< 1.0	<1.0	<1.0
Bromobenzene	20.0 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Bromodichloromethane	0.12 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Bromoform	8.5 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0

Table 1
Historical Groundwater Analytical Results
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Analyte	WQCC 20NMAC 6.2.3103	SWMU2-1 GW	SWMU 2-2 GW	SWMU 2-3 GW	SWMU 2-4 GW	SWMU2-5 / MW-50	SWMU 2-6 GW	SWMU 2-7 GW	SWMU 2-8 GW	SWMU 2-9 / MW-51	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
Date		9/29/2008	9/29/2008	9/29/2008	9/30/2008	10/28/2008	9/30/2008	9/30/2008	10/1/2008	10/28/2008	3/3/2003	8/21/2003	3/3/2004	8/23/2004	4/11/2005	8/5/2005	4/5/2006	8/15/2006	4/1/2007	8/28/2007	4/8/2008	8/13/2008	4/1/2009	8/1/2009
Bromomethane	8.7 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Carbon disulfide	1,000 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Carbon Tetrachloride	5.0 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Chlorobenzene	100.0 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Chloroethane	Ne	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0	NA	< 2.0
Chloroform	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Chloromethane	190 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
cis-1,2-DCE	70 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
cis-1,3-Dichloropropene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Dibromochloromethane	0.15 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Dibromomethane	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Dichlorodifluoromethane	390 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Ethylbenzene	700 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<0.5	<1.0	0.65	< 1.0	2.3	< 1.0	<1.0	<1.0
Hexachlorobutadiene	0.86 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Isopropylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Methyl tert-butyl ether (MTBE)	12 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.5	<1.5	<2.5	<1.0	<2.5	<2.5	<2.5	<1.0	<2.5	< 1.0	<1.5	< 1.0	<1.0	< 1.0
Methylene Chloride	5.0 [3]	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 3.0	NA	< 3.0	NA	< 3.0
Naphthalene	0.14	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0	NA	< 2.0
n-Butylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
n-Propylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
sec-Butylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Styrene	100 2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
tert-Butylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Tetrachloroethene (PCE)	5 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Toluene	750	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<0.5	<1.0	0.63	< 1.0	<1.0	< 1.0	<1.0	< 1.0
trans-1,2-DCE	100 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
trans-1,3-Dichloropropene	0.4 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Trichloroethene (TCE)	5 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Trichlorofluoromethane	1,300 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Vinyl chloride	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA	< 1.0
Xylenes, Total	620	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	<2.0	<3.0	<3.0	<1.0	1.1	<0.5	<0.5	<1.0	4.3	< 1.5	16	< 1.5	<1.5	<2.0
Semivolatiles (ug/l)																								
1,2,4-Trichlorobenzene	70 [2]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
1,2-Dichlorobenzene	600 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
1,3-Dichlorobenzene	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
1,4-Dichlorobenzene	75 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2,4,5-Trichlorophenol	3,700 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2,4,6-Trichlorophenol	6.1 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2,4-Dichlorophenol	110 [3]	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	NA	< 20	NA	< 20
2,4-Dimethylphenol	730 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2,4-Dinitrophenol	73 [3]	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	NA	< 20	NA	< 20
2,4-Dinitrotoluene	0.22 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2,6-Dinitrotoluene	37 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2-Chloronaphthalene	2,900 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2-Chlorophenol	180 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2-Methylnaphthalene	150 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2-Methylphenol	1,800 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2-Nitroaniline	110 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
2-Nitrophenol	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
3,3'-Dichlorobenzidine	0.15 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
3+4-Methylphenol	180 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
3-Nitroaniline	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
4,6-Dinitro-2-methylphenol	Ne	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	NA	< 20	NA	< 20
4-Bromophenyl phenyl ether	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
4-Chloro-3-methylphenol	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10

Table 1
Historical Groundwater Analytical Results
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Analyte	WQCC 20NMAC 6.2.3103	SWMU2-1 GW	SWMU 2-2 GW	SWMU 2-3 GW	SWMU 2-4 GW	SWMU2-5 / MW-50	SWMU 2-6 GW	SWMU 2-7 GW	SWMU 2-8 GW	SWMU 2-9 / MW-51	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
Date		9/29/2008	9/29/2008	9/29/2008	9/30/2008	10/28/2008	9/30/2008	9/30/2008	10/1/2008	10/28/2008	3/3/2003	8/21/2003	3/3/2004	8/23/2004	4/11/2005	8/5/2005	4/5/2006	8/15/2006	4/1/2007	8/28/2007	4/8/2008	8/13/2008	4/1/2009	8/1/2009
4-Chloroaniline	0.34 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
4-Chlorophenyl phenyl ether	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
4-Nitroaniline	3.4 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
4-Nitrophenol	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Acenaphthene	2,200 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Acenaphthylene	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Aniline	12 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Anthracene	11,000 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Azobenzene	0.12 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Benz(a)anthracene	0.029 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Benzo(a)pyrene	0.2 [2]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Benzo(b)fluoranthene	0.029 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Benzo(g,h,i)perylene	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Benzo(k)fluoranthene	0.29 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Benzoic acid	150,000 [3]	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	NA	< 20	NA	< 20
Benzyl alcohol	18,000 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Bis(2-chloroethoxy)methane	110 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Bis(2-chloroethyl)ether	0.012 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Bis(2-chloroisopropyl)ether	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Bis(2-ethylhexyl)phthalate	6 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Butyl benzyl phthalate	35 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Carbazole	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Chrysene	2.9 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Dibenz(a,h)anthracene	0.0029 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Dibenzofuran	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Diethyl phthalate	29,000 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Dimethyl phthalate	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Di-n-butyl phthalate	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Di-n-octyl phthalate	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Fluoranthene	1,500 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Fluorene	1,500 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Hexachlorobenzene	1.0 [2]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Hexachlorobutadiene	0.86 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Hexachlorocyclopentadiene	50 [2]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Hexachloroethane	4.8 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Indeno(1,2,3-cd)pyrene	0.029 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Isophorone	71 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Naphthalene	30	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Nitrobenzene	0.12 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
N-Nitrosodimethylamine	0.00042 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
N-Nitrosodi-n-propylamine	0.0096 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
N-Nitrosodiphenylamine	14 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Pentachlorophenol	1 [2]	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	NA	< 20	NA	< 20
Phenanthrene	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Phenol	5 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Pyrene	1,100 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
Pyridine	37 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10	NA	< 10
total petroleum hydrocarbons (mg/l)																								
Gasoline Range Organics (GRO)	0.2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.21	<0.05	<0.05	<0.05
Diesel Range Organics (DRO)	0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0
Motor Oil Range Organics (MRO)	0.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	<5.0	<5.0	<5.0
general chemistry (mg/l)																								
Alkalinity, Total (As CaCO3)	Ne	370	330	240	230	240	240	240	250	280	NA	NA	NA	NA	NA	NA	NA	NA	NA	290	NA	280	NA	NA
Bicarbonate	Ne	370	330	240	230	240	240	240	250	280	NA	NA	NA	NA	NA	NA	NA	NA	NA	290	NA	280	NA	NA

Table 1
Historical Groundwater Analytical Results
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Analyte	WQCC 20NMAC 6.2.3103	Tank #33														
Sample Date		2/23/2005	3/7/2005	4/27/2005	5/4/2005	6/8/2005	7/6/2005	8/24/2005	9/21/2005	10/19/2005	11/9/2005	12/5/2005	1/30/2006	6/15/2006	9/13/2006	10/17/2006
Benzene	5[1]	**50**	**38**	4.5	1.8	1.2	<0.5	<0.5	0.84	0.93	0.61	<0.5	<1	<1	<1	<1
Ethylbenzene	700[1]	<5	4.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Toluene	750	20	7.9	2.4	1.1	0.63	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Xylenes, Total	620	22	20	2.4	1.4	1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<3	<3	<3

Analyte	WQCC 20NMAC 6.2.3103	Tank #33														
Sample Date		1/3/2007	4/25/2007	7/5/2007	10/9/2007	3/24/2008	4/10/2008	4/15/2008	4/21/2008	4/28/2008	5/5/2008	5/12/2008	5/19/2008	5/27/2008	6/2/2008	6/9/2008
Benzene	5[1]	<1.0	<1.0	3.0	<1.0	**760**	**130**	**130**	**140**	**190**	**160**	**100**	**93**	**49**	**130**	**91**
Ethylbenzene	700[1]	<1.0	<1.0	<1.0	<1.0	**1600**	360	200	220	170	150	42	25	21	84	110
Toluene	750	<1.0	<1.0	<1.0	<1.0	170	56	<1.0	30	6.7	7.9	<1.0	<1.0	<1.0	6.8	25
Xylenes, Total	620	<3.0	<2.0	<2.0	<3.0	**4700**	**1200**	**1100**	**1200**	**1600**	**1600**	**1100**	**970**	**790**	**1100**	**2100**
Methyl tertbutyl ether (MTBE)	12.0[2]	NA	NA	NA	NA	<1.0	NA	<1.0	<1.0	3.6	3.6	<1.0	8.5	<1.0	<1.0	<1.0

Analyte	WQCC 20NMAC 6.2.3103	Tank #33														
Sample Date		6/16/2008	6/26/2008	7/2/2008	7/7/2008	7/16/2008	7/22/2008	7/31/2008	8/5/2008	8/14/2008	8/19/2008	8/25/2008	9/9/2008	9/18/2008	9/25/2008	10/1/2008
Benzene	5[1]	**11**	**31**	4.9	**41**	**56**	**75**	**71**	**25**	**110**	3.6	**25**	**10**	**8.2**	4.6	3.2
Ethylbenzene	700[1]	6.1	17	5.1	42	43	54	39	19	120	2.2	10	2.3	14	<1.0	<1.0
Toluene	750	<1.0	<1.0	4.9	2.8	<1.0	<1.0	<1.0	<1.0	6.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	620	140	180	55	410	380	450	430	210	540	24	**790**	16	6.7	<2.0	<2.0
Methyl tertbutyl ether (MTBE)	12.0[2]	1.0	<1.0	1.9	2.3	<1.0	<1.0	<1.0	1.6	1.9	2.0	1.7	1.8	1.7	1.7	1.5

Analyte	WQCC 20NMAC 6.2.3103	Tank #33														
Sample Date		10/8/2008	10/15/2008	10/22/2008	10/27/2008	11/3/2008	12/2/2008	1/5/2009	2/2/2009	3/5/2009	4/1/2009	5/5/2009	6/1/2009	7/1/2009	8/3/2009	9/7/2009
Benzene	5[1]	2.5	2.2	2.2	2.3	1.5	1.7	5.9	1.2	1.1	<1.0	1.4	<1.0	1.1	<1.0	1.3
Ethylbenzene	700[1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	750	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	620	<2.0	<2.0	<2.0	<2.0	<2.0	2.6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Methyl tertbutyl ether (MTBE)	12.0[2]	1.5	1.6	2.2	2.4	2.4	<1.0	3.7	3.4	4.1	3.8	3.2	2.4	2.2	1.5	<1.0

Analyte	WQCC 20NMAC 6.2.3103	Tank #33			
Sample Date		10/1/2009	11/17/2009	12/2/2009	1/4/2010
Benzene	5[1]	<1.0	<1.0	<1.0	**54000**
Ethylbenzene	700[1]	<1.0	<1.0	<1.0	**4400**
Toluene	750	<1.0	<1.0	<1.0	**76000**
Xylenes, Total	620	<2.0	<2.0	<2.0	**29000**
Methyl tertbutyl ether (MTBE)	12.0[2]	<1.0	1.7	<1.0	<50

130 - bolded value exceeds applicable standard
units - micrograms/liter (ug/l)
1 - Federal Maximum Contaminant Level
2 - EPA Regional Screening Level (April 2009)

Table 1
Historical Groundwater Analytical Results
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Analyte	WQCC 20NMAC 6.2.3103	River Terrace Groundwater Remediation System Effluent																		
Sample Date		01/18/06	03/01/06	06/08/06	09/13/06	12/13/06	02/20/07	02/27/07	03/13/07	04/02/07	04/16/07	04/25/07	6/20/087	07/12/07	08/14/07	09/10/07	10/09/07	3/6/2008	4/15/2008	7/2/2008
volatiles (ug/l)																				
Benzene	5 [1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	700 [1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	750	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	620	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<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
total petroleum hydrocarbons (mg/l)																				
Diesel Range Organics (DRO)	0.2 [2]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0
Gasoline Range Organics (GRO)	0.2 [2]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050

units - micrograms/liter (ug/l), milligrams/liter (mg/l)
NA - not analyzed
1 - Federal Maximum Contaminant Level
2 - NMED TPH Screening Guidelines October 2006 - Unknown oil

Table 2
Historical Soil Analytical Results Summary
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

			Parameters																
			Acetone	Benzene	Toluene	Ethylbenzene	m.p-Xylene	o-Xylene	Methylene chloride	Semi-Volatile Organics	Total Petroleum Hydrocarbons	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Thallium	Zinc
Soil Screening Levels 2-10' (mg/kg):			43.25	0.02	15.56	0.16	1.98	1.98	0.12	Ne	Ne	156.31 [1]	15.46	113200.91 [1]	579.38	400.00	536.17	1.94	7672.94
Soil Screening Levels >10' (mg/kg):			43.25	0.02	15.56	0.16	1.98	1.98	0.12	Ne	Ne	649.02	15.46	1108687677	579.38	Ne	536.17	1.94	7672.94
Sample No.	Sample Location	Date Sampled																	
B-5 (2-4')	at SWMU No. 7	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.3	7.2	6.5	ND	5.9	**16**	26
B-6 (2-4')	at SWMU No. 7	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54	3.2	8.1	9.1	ND	6.8	**20**	33
B-7 (6-8')	at SWMU No. 7 & 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	5.7	5.3	ND	4.8	**14**	21
B-8 (6-8')	at SWMU No. 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.57	3.2	9.3	7.1	ND	7	**21**	33
B-9 (2-4')	at SWMU No. 7 & 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.77	ND	ND	ND	1.6	ND	8
B-10 (10-12')	at SWMU No. 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	2.3	6	ND	ND	4.7	**13**	22

Notes:
units milligrams per kilogram (mg/kg)
ND - not detected, quantitation limit not provided in 1994 RFI Investigation Report
Ne - not established
NMED residential screening levels from - Technical Background Document for Development of Soil Screening Levels - Revision 5.0 (August 2009); SoilGW DAF = 11.25
(1) Residential Soil NMED based on direct contact
14 Bolded value exceeds screening level

Table 2
Historical Soil Analytical Results Summary
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

			Parameters																
			Acetone	Benzene	Toluene	Ethylbenzene	m.p-Xylene	o-Xylene	Methylene chloride	Semi-Volatile Organics	Total Petroleum Hydrocarbons	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Thallium	Zinc
Soil Screening Levels 2-10' (mg/kg):			43.25	0.02	15.56	0.16	1.98	1.98	0.12	Ne	Ne	156.31 [1]	15.46	113200.91 [1]	579.38	400.00	536.17	1.94	7672.94
Soil Screening Levels >10' (mg/kg):			43.25	0.02	15.56	0.16	1.98	1.98	0.12	Ne	Ne	649.02	15.46	1108687677	579.38	Ne	536.17	1.94	7672.94
Sample No.	Sample Location	Date Sampled																	
B-5 (2-4')	at SWMU No. 7	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.3	7.2	6.5	ND	5.9	**16**	26
B-6 (2-4')	at SWMU No. 7	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54	3.2	8.1	9.1	ND	6.8	**20**	33
B-7 (6-8')	at SWMU No. 7 & 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	5.7	5.3	ND	4.8	**14**	21
B-8 (6-8')	at SWMU No. 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.57	3.2	9.3	7.1	ND	7	**21**	33
B-9 (2-4')	at SWMU No. 7 & 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.77	ND	ND	ND	1.6	ND	8
B-10 (10-12')	at SWMU No. 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	2.3	6	ND	ND	4.7	**13**	22

Notes:
units milligrams per kilogram (mg/kg)
ND - not detected, quantitation limit not provided in 1994 RFI Investigation Report
Ne - not established
NMED residential screening levels from - Technical Background Document for Development of Soil Screening Levels - Revision 5.0 (August 2009); SoilGW DAF = 11.25
(1) Residential Soil NMED based on direct contact
14 Bolded value exceeds screening level

TABLE 3
Soil Sample Vapor Screening Results
Bloomfield Refinery - Bloomfield, New Mexico

Sample Interval Depth	SWMU 7-1	SWMU 7-2	SWMU 7-3	SWMU 10-1	SWMU 10-2	SWMU 10-3	SWMU 10-4	SWMU 10-5	SWMU 10-6	SWMU 10-7	SWMU 10-8	SWMU 10-9	SWMU 16-1	SWMU 16-1-E	SWMU 16-1-N	SWMU 16 1-S	SWMU 16-1-W	SWMU 16-2	SWMU 16-3	SWMU 16-4	SWMU 16-5
0 – 2'	2.2	10.2	5.2	0.5	0.4																
0 – 1'						0.5	2.0	1.2	0.3	0.2	2.9	0.7	12.4	2.6	1.4	2.3	2.6	1.5	2.4	3.2	0.4
1 – 2'						0.7	2.4	2.0	0.4	0.3	7.1	0.7	70.0	7.5	1.7	2.3	25.5	3.9	2.6	2.5	1.8
2 – 4'	3.0	20.2	33.0	4.0	0.5	1.3	4.8	4.4	0.6	0.3	10.0	0.8						3.9	38.5	77.2	1.3
2 – 3'													6.9								
3 – 4'													5.8								
4 – 6'		23.1	30.0	0.6	0.5	1.8	2.9	0.9	0.9	0.3	3.1	1.0	5.0					1.5	97.4	24.8	6.2
4 – 5'	9.5																				
5 – 6'	3.6																				
6 – 7'		26.6									3.7										
6 – 8'	3.1		36.0	0.5	0.4	1.3	0.6	0.2	1.0	0.4		3.0	3.2					1.7	13.8	27.9	7.5
7 – 8'		15.6									1.8										
8 –10'	3.4	11.9	2.7	0.5	0.3	1.5	0.7	0.2	0.5	0.3	1.8	0.7	2.5					2.0	3.1	16.8	4.0
10 – 11'			2.4																		
10 – 12'	2.0	10.4									1.1	0.3	1.3					2.0	5.9	42.5	5.9
11 – 12'			1.9																		
12 – 14'	2.1	4.4	1.8									0.5	1.2					2.1	1.3	3.1	38.3
14 – 16'	2.0	4.2	1.2									0.5	1.3					2.3	3.2	2.5	8.7
16 – 18'												1.0	0.6					1.8		4.6	6.2
18 – 20'													0.3					2.2	2.7	2.4	2.8
19 – 20'																					1.7
20 – 22'													0.3						2.3	1.9	
22 – 24'																					
24 – 26'																					
26 – 28'																					
28 – 30'																					
30 – 32'																					
32 – 34'																					
34 – 36'																					
36 – 38'																					
38 – 40'																					
40 – 42'																					

Units - ppm

TABLE 4
Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

Analyte	NMED		EPA		Cross Media Soil-to-Ground Water		
					NMED	EPA	
	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)
Applicable depth interval	0-10'		0-10'		>2'		
Acenaphthene	3.44E+03	ns	3.40E+03	n	2.05E+01	2.70E+01	-
Acenaphthylene	-	-	-	-	-	-	-
Acetone	6.75E+04	n	6.10E+04	n	3.84E+00	4.40E+00	-
Aluminum	7.81E+04	n	7.70E+04	n	5.48E+04	5.50E+04	
Aniline	-	-	8.50E+01	c	-	3.40E-03	-
Anthracene	1.72E+04	ns	1.70E+04	n	3.37E+02	4.50E+02	-
Antimony	3.13E+01	n	3.10E+01	n	6.61E-01	6.60E-01	2.70E-01
Arsenic	3.90E+00	c	3.90E-01	c	1.31E-02	1.30E-03	2.90E-01
Azobenzene	-	-	4.90E+00	c	-	5.10E-04	-
Barium	1.56E+04	n	1.50E+04	n	3.01E+02	3.00E+02	8.20E+01
Benz(a)anthracene	4.81E+00	c	1.50E-01	c	3.20E-01	1.40E-02	-
Benzene	1.55E+01	c	1.10E+00	c	1.85E-03	2.30E-04	2.80E-03
Benzo(a)pyrene	4.81E-01	c	1.50E-02	c	1.09E-01	4.60E-03	3.10E-01
Benzo(b)fluoranthene	4.81E+00	c	1.50E-01	c	1.11E+00	4.70E-02	-
Benzo(g,h,i)perylene	-	-	-	-	-	-	-
Benzo(k)fluoranthene	4.81E+01	c	1.50E+00	c	1.09E+01	4.60E-01	-
Benzoic acid	-	-	2.40E+05	nm	-	3.30E+01	-
Benzyl alcohol	-	-	3.10E+04	n	-	4.20E+00	-
Beryllium	1.56E+02	n	1.60E+02	n	5.77E+01	5.80E+01	3.20E+00
Bis(2-chloroethoxy)methane	-	-	1.80E+02	n	-	2.30E-02	-
Bis(2-chloroethyl)ether	2.56E+00	c	1.90E-01	c	2.33E-05	2.70E-06	-
Bis(2-chloroisopropyl)ether	9.15E+01	c	-	-	2.56E-03	-	-
Bis(2-ethylhexyl)phthalate	2.80E+02	c	3.50E+01	c	1.19E+01	1.60E+00	2.00E+00
Boron	1.56E+04	n	1.60E+04	n	2.40E+01	2.30E+01	
Bromobenzene	-	-	9.40E+01	n	-	1.50E-02	-
Bromodichloromethane	5.25E+00	c	2.80E-01	c	2.76E-04	3.30E-05	-
Bromoform	-	-	6.10E+01	c	-	2.30E-03	-
Bromomethane	2.23E+01	n	7.90E+00	n	1.94E-03	2.20E-03	-
4-Bromophenyl phenyl ether	-	-	-	-	-	-	-
2-Butanone (MEK)	3.96E+04	n	2.80E+04	ns	1.27E+00	1.50E+00	-
Butyl benzyl phthalate	-	-	2.60E+02	c	-	6.70E-01	-
Cadmium	7.79E+01	n	7.00E+01	n	1.37E+00	1.40E+00	3.80E-01
Carbazole	-	-	-	-	-	-	-
Carbon disulfide	1.94E+03	ns	6.70E+02	ns	2.52E-01	2.70E-01	-
Carbon tetrachloride	4.38E+00	c	2.50E-01	c	7.39E-04	7.90E-05	2.00E-03
Chlorobenzene	5.08E+02	ns	3.10E+02	n	5.38E-02	6.80E-02	7.50E-02
Chloroethane	-	-	-	-	-	-	-
Chloroform	5.72E+00	c	3.00E-01	c	4.68E-04	5.50E-05	-
Chloromethane	3.56E+01	c	1.20E+02	n	4.18E-03	4.90E-02	-
4-Chloro-3-methylphenol	-	-	-	-	-	-	-
4-Chloroaniline	-	-	2.40E+00	c	-	1.20E-04	-
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	-
4-Chlorotoluene	-	-	5.50E+03	ns	-	2.80E+00	-
2-Chloronaphthalene	6.26E+03	ns	6.30E+03	ns	1.35E+01	1.80E+01	-
2-Chlorophenol	3.91E+02	n	3.90E+02	n	1.53E-01	2.00E-01	-
2-Chlorotoluene	1.56E+03	ns	1.60E+03	ns	6.24E-01	8.00E-01	-
Chromium	1.13E+05	nl	1.20E+05	nm	9.86E+07	9.90E+07	-

TABLE 4
Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

Analyte	NMED Residential Soil (mg/kg)	NMED Endpoint	EPA Residential Soil (mg/kg)	EPA ResSoil key	Cross Media Soil-to-Ground Water NMED DAF1 (mg/kg)	Cross Media Soil-to-Ground Water EPA GW_Risk-based SSL (mgkg)	Cross Media Soil-to-Ground Water EPA GW_MCL-based SSL (mg/kg)
Applicable depth interval	0-10'		0-10'		>2'		
Chrysene	4.81E+02	c	1.50E+01	c	3.26E+01	1.40E+00	-
cis-1,2-DCE	7.82E+02	n	7.80E+02	n	9.43E-02	1.10E-01	2.10E-02
cis-1,3-Dichloropropene	2.35E+01	c	1.70E+00	c	1.35E-03	1.60E-04	-
Cobalt	-	-	2.30E+01	n	-	4.90E-01	-
Copper	3.13E+03	n	3.10E+03	n	5.15E+01	5.10E+01	4.60E+01
Cyanide	1.56E+03	n	1.60E+03	n	7.44E+00	7.40E+00	2.00E+00
1,1-Dichloroethane	6.29E+01	c	3.40E+00	c	6.09E-03	7.00E-04	-
1,1-Dichloroethene	6.18E+02	n	2.50E+02	n	1.19E-01	1.20E-01	2.60E-03
1,1-Dichloropropene	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	1.94E-01	c	5.60E-03	c	2.97E-06	1.50E-07	9.20E-05
1,2-Dibromoethane (EDB)	5.74E-01	c	3.40E-02	c	1.58E-05	1.90E-06	1.50E-05
1,2-Dichlorobenzene	3.01E+03	ns	2.00E+03	ns	3.13E-01	4.00E-01	6.60E-01
3,3′-Dichlorobenzidine	8.71E+00	c	1.10E+00	c	1.70E-02	2.30E-03	-
1,2-Dichloroethane (EDC)	7.74E+00	c	4.50E-01	c	3.65E-04	4.40E-05	1.50E-03
1,2-Dichloropropane	1.47E+01	c	9.30E-01	c	1.11E-03	1.30E-04	1.70E-03
1,3-Dichlorobenzene	-	-	-	-	-	-	-
1,3-Dichloropropane	-	-	1.60E+03	n	-	2.70E-01	-
1,4-Dichlorobenzene	3.21E+01	c	2.60E+00	c	3.57E-03	4.60E-04	8.10E-02
2,2-Dichloropropane	-	-	-	-	-	-	-
2,4-Dichlorophenol	1.83E+02	n	1.80E+02	n	1.37E-01	1.80E-01	-
2,4-Dimethylphenol	1.22E+03	n	1.20E+03	n	9.12E-01	1.20E+00	-
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	-
2,4-Dinitrophenol	1.22E+02	n	1.20E+02	n	5.25E-02	6.80E-02	-
2,4-Dinitrotoluene	1.26E+01	c	1.60E+00	c	1.56E-03	2.00E-04	-
2,6-Dinitrotoluene	6.12E+01	n	6.10E+01	n	2.67E-02	3.40E-02	-
Dibenz(a,h)anthracene	4.81E-01	c	1.50E-02	c	3.62E-01	1.50E-02	-
Dibenzofuran	-	-	-	-	-	-	-
Dibromochloromethane	1.13E+01	c	7.00E-01	c	3.38E-04	4.00E-05	-
Dibromomethane	-	-	7.80E+02	n	-	9.10E-02	-
Dichlorodifluoromethane	4.81E+02	n	1.90E+02	n	7.23E-01	6.10E-01	-
Diethyl phthalate	4.89E+04	n	4.90E+04	n	1.06E+01	1.30E+01	-
Dimethyl phthalate	6.11E+05	nl	-	-	8.36E+01	-	-
Di-n-butyl phthalate	6.11E+03	n	-	-	8.63E+00	-	-
Di-n-octyl phthalate	-	-	-	-	-	-	-
Ethylbenzene	6.97E+01	c	5.70E+00	c	1.46E-02	1.90E-03	8.90E-01
Fluoranthene	2.29E+03	n	2.30E+03	n	1.55E+02	2.10E+02	-
Fluorene	2.29E+03	ns	2.30E+03	n	2.50E+01	3.30E+01	-
Hexachlorobenzene	2.45E+00	c	3.00E-01	c	2.21E-03	2.90E-04	7.00E-03
Hexachlorobutadiene	-	-	6.20E+00	c	-	1.90E-03	-
Hexachlorocyclopentadiene	3.67E+02	n	3.70E+02	n	6.13E-01	8.00E-01	1.80E-01
Hexachloroethane	6.11E+01	n	3.50E+01	c	1.93E-02	3.20E-03	-
2-Hexanone	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	4.81E+00	c	1.50E-01	c	3.70E+00	1.60E-01	-
Iron	5.48E+04	n	5.50E+04	n	6.46E+02	6.40E+02	
Isophorone	4.13E+03	c	5.10E+02	c	1.85E-01	2.20E-02	-
Isopropylbenzene (cumene)	3.21E+03	ns	2.20E+03	ns	9.86E-01	1.30E+00	-
4-Isopropyltoluene	-	-	-	-	-	-	-

TABLE 4
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	
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)
Applicable depth interval	0-10'		0-10'		>2'		
Lead	4.00E+02	IEUBK	4.00E+02	nL	-	-	-
Manganese	1.07E+04	n	1.80E+03	n	2.70E-01	5.70E+01	
Mercury	7.71E+00	ns	4.30E+00	ns	2.93E-02	3.00E-02	1.00E-01
Methyl tert-butyl ether (MTBE)	8.62E+02	c	3.90E+01	c	2.29E-02	2.70E-03	-
Methylene chloride	1.99E+02	c	1.10E+01	c	1.07E-02	1.20E-03	1.30E-03
1-Methylnaphthalene	-	-	2.20E+01	c	-	1.50E-02	-
2-Methylnaphthalene	-	-	3.10E+02	n	-	9.00E-01	-
2-Methylphenol	-	-	3.10E+03	n	-	2.00E+00	-
3+4-Methylphenol	-	-	3.10E+02	n	-	1.90E-01	-
4-Methyl-2-pentanone	-	-	-	-	-	-	-
Molybdenum	3.91E+02	n	3.90E+02	n	3.70E+00	3.70E+00	
2-Nitroaniline	-	-	1.80E+02	n	-	3.30E-02	-
3-Nitroaniline	-	-	-	-	-	-	-
4-Nitroaniline	-	-	2.40E+01	c	-	1.00E-03	-
2-Nitrophenol	-	-	-	-	-	-	-
4-Nitrophenol	-	-	-	-	-	-	-
Naphthalene	4.50E+01	c	3.90E+00	c	4.19E-03	5.50E-04	-
n-Butylbenzene	-	-	-	-	-	-	-
Nickel	1.56E+03	n	1.40E+04	c	4.77E+01	4.80E+01	-
Nitrobenzene	4.94E+01	c	4.40E+00	c	6.86E-03	7.10E-05	-
N-Nitrosodi-n-propylamine	-	-	6.90E-02	c	-	1.10E-05	-
N-Nitrosodiphenylamine	8.00E+02	c	9.90E+01	c	1.29E+00	1.70E-01	-
n-Propylbenzene	-	-	-	-	-	-	-
Pentachlorophenol	2.07E+01	c	3.00E+00	c	2.94E-02	3.90E-03	7.00E-03
Phenanthrene	1.83E+03	ns	-	-	8.34E+01	-	-
Phenol	1.83E+04	n	1.80E+04	n	6.30E+00	8.10E+00	-
Pyrene	1.72E+03	ns	1.70E+03	n	1.12E+02	1.50E+02	-
Pyridine	-	-	7.80E+01	n	-	9.70E-03	-
sec-Butylbenzene	-	-	-	-	-	-	-
Selenium	3.91E+02	n	3.90E+02	n	9.65E-01	9.50E-01	2.60E-01
Silver	3.91E+02	n	3.90E+02	n	1.57E+00	1.60E+00	-
Styrene	8.97E+03	ns	6.50E+03	ns	1.56E+00	2.00E+00	1.20E-01
1,2,3-Trichlorobenzene	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	2.92E+01	c	2.00E+00	c	1.73E-03	2.10E-04	-
1,1,1-Trichloroethane	2.18E+04	ns	9.00E+03	ns	2.98E+00	3.30E+00	7.20E-02
1,1,2,2-Tetrachloroethane	7.97E+00	c	5.90E-01	c	2.25E-04	2.80E-05	-
1,1,2-Trichloroethane	1.72E+01	c	1.10E+00	c	6.74E-04	8.20E-05	1.70E-03
2,4,5-Trichlorophenol	6.11E+03	n	6.10E+03	n	7.13E+00	9.40E+00	-
2,4,6-Trichlorophenol	6.11E+01	n	4.40E+01	c	7.13E-02	1.60E-02	-
1,2,3-Trichloropropane	9.15E-01	c	9.10E-02	c	3.56E-05	4.40E-06	-
1,2,4-Trichlorobenzene	1.43E+02	ns	8.70E+01	n	1.02E-02	1.30E-02	1.10E-01
1,2,4-Trimethylbenzene	-	-	6.70E+01	n	-	2.40E-02	-
1,3,5-Trimethylbenzene	-	-	4.70E+01	n	-	2.00E-02	-
tert-Butylbenzene	-	-	-	-	-	-	-
Tetrachloroethene (PCE)	6.99E+00	c	5.70E-01	c	4.49E-04	5.20E-05	2.40E-03
Thallium	5.16E+00	n	-	-	1.72E-01	-	1.40E-01
Toluene	5.57E+03	ns	5.00E+03	ns	1.38E+00	1.70E+00	7.60E-01

TABLE 4
Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

	NMED		EPA		Cross Media Soil-to-Ground Water 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)
Applicable depth interval	0-10'		0-10'		>2'		
trans-1,2-DCE	2.73E+02	n	1.10E+02	n	3.01E-02	3.40E-02	3.20E-02
trans-1,3-Dichloropropene	2.35E+01	c	1.70E+00	c	1.35E-03	1.60E-04	-
Trichloroethene (TCE)	4.57E+01	c	2.80E+00	c	5.30E-03	6.10E-04	1.90E-03
Trichlorofluoromethane	2.01E+03	ns	8.00E+02	n	9.01E-01	8.40E-01	-
Uranium	2.35E+02	n	2.30E+02	n	-	4.90E+01	
Vanadium	3.91E+02	n	5.50E+02	n	1.83E+02	2.60E+02	-
Vinyl chloride	8.65E-01	c	6.00E-02	c	2.88E-04	5.60E-06	7.00E-04
Xylenes, Total	1.09E+03	ns	6.00E+02	ns	1.76E-01	2.30E-01	1.10E+01
Zinc	2.35E+04	n	2.30E+04	n	6.82E+02	6.80E+02	-

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 - Technical Background Document for Development of Soil Screening Levels - Revision 5.0 (August 2009)
EPA - Regional Screening Levels (April 2009)

Table 5
SWMU No. 7 Soil Analytical Results Summary
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 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 7-2 (0-0.5')	SWMU 7-2 (10-12')	SWMU 7-2 (12-14')	SWMU 7-2 (14-16')	SWMU 7-2 (5.75-7.0')	SWMU 7-2 (7-8.0')	SWMU 7-3 (0-0.5')	SWMU 7-3 (11-12')	SWMU 7-3 (12-14')	SWMU 7-3 (6-8')	SWMU 7-3 (8-10')
							Lab Sample ID	1008693-01	1008693-04	1008693-02	1008693-03	1008693-05	1008693-08	1008696-01	1008696-02	1008693-06	1008693-07	1008696-03	1008696-07	1008696-08	1008696-05	1008696-06
							Sample Date	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010
Metals (mg/kg)																						
Aluminum	7.81E+04	(1)	7.81E+04	(1)	6.17E+05	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	3.13E+01	(1)	7.44E+00	(4)	7.44E+00	(4)	mg/Kg	<5.0	<5.0	<5.0	<2.5	<2.5	<13	<5.0	<5.0	<2.5	<2.5	<5.0	<2.5	<2.5	<5.0	<2.5
Arsenic	3.90E+00	(1)	1.48E-01	(4)	1.48E-01	(4)	mg/Kg	<5.0	<5.0	<5.0	3.1	3.1	<13	<5.0	<5.0	3.8	2.8	<5.0	4.1	2.7	<5.0	<2.5
Barium	1.56E+04	(1)	3.39E+03	(4)	3.39E+03	(4)	mg/Kg	120	200	150	110	150	52	170	230	160	130	140	700	120	120	86
Beryllium	1.56E+02	(1)	1.56E+02	(1)	6.49E+02	(4)	mg/Kg	0.37	0.42	0.42	0.29	0.38	0.98	0.47	0.54	0.33	0.21	0.41	0.64	0.28	0.42	0.23
Boron	1.56E+04	(1)	2.70E+02	(4)	2.70E+02	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7.79E+01	(1)	1.55E+01	(4)	1.55E+01	(4)	mg/Kg	<0.20	<0.20	<0.20	<0.10	<0.10	<0.50	<0.20	<0.20	<0.10	<0.10	<0.20	<0.10	<0.10	<0.20	<0.10
Chromium	1.13E+05	(1)	1.13E+05	(1)	1.11E+09	(4)	mg/Kg	6.3	6.6	14	4.2	6.4	15	6.6	8	6.2	3	6	9.6	4.7	7.4	3.3
Cobalt	2.30E+01	(2)	5.51E+00	(5)	5.51E+00	(5)	mg/Kg	3.2	3.9	3.5	1.8	3.1	7.1	4	4.3	2.7	1.3	3.4	4.3	2.6	3.3	1.7
Cyanide	1.56E+03	(1)	8.37E+01	(4)	8.37E+01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Copper	3.13E+03	(1)	5.79E+02	(4)	5.79E+02	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	5.48E+04	(1)	7.27E+03	(4)	7.27E+03	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	4.00E+02	(1)	4.00E+02	(4)	--		mg/Kg	4.7	4	5	1.4	15	8.5	4.7	5.6	3.4	1.9	9.1	3.7	2.8	4.1	2.1
Mercury	7.71E+00	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	<0.17	<0.033	0.64	<0.033	<0.033	0.033	<0.033	<0.033	0.15	<0.033	<0.033	<0.033	<0.033	0.086	<0.033
Manganese	1.07E+04	(1)	3.04E+00	(4)	3.04E+00	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	3.91E+02	(1)	4.16E+01	(4)	4.16E+01	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	1.56E+03	(1)	5.36E+02	(4)	5.36E+02	(4)	mg/Kg	4.7	5.1	6.1	3	5.8	13	6.5	7.4	4.9	2.4	4.7	7.5	3.6	5.2	2.8
Selenium	3.91E+02	(1)	1.09E+01	(4)	1.09E+01	(4)	mg/Kg	<5.0	<5.0	<5.0	<2.5	<2.5	<13	<5.0	<5.0	<2.5	<2.5	<5.0	<2.5	<2.5	<5.0	<5.0
Silver	3.91E+02	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.25	<0.25	<1.3	<0.50	<0.50	<0.25	<0.25	<0.50	<0.25	<0.25	<0.50	<0.25
Thallium	5.16E+00	(1)	1.94E+00	(4)	1.94E+00	(4)	mg/Kg	<5.0	<5.0	<5.0	<2.5	<2.5	<13	<5.0	<5.0	<2.5	<2.5	<5.0	<2.5	<2.5	<5.0	<5.0
Uranium	2.35E+02	(1)	2.35E+02	(1)	5.51E+02	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	3.91E+02	(1)	3.91E+02	(1)	2.05E+03	(4)	mg/Kg	17	24	18	12	14	42	23	27	16	9.7	17	29	19	17	9.3
Zinc	2.35E+04	(1)	7.67E+03	(4)	7.67E+03	(4)	mg/Kg	28	24	69	13	22	59	28	34	48	12	24	31	17	32	12
Volatile Organic Compounds - (EPA Method 8260) mg/kg																						
1,1,1,2-Tetrachloroethane	2.92E+01	(1)	1.94E-02	(4)	1.94E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,1,1-Trichloroethane	2.18E+04	(1)	3.35E+01	(4)	3.35E+01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,1,2,2-Tetrachloroethane	7.97E+00	(1)	2.53E-03	(4)	2.53E-03	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,1,2-Trichloroethane	1.72E+01	(1)	7.58E-03	(4)	7.58E-03	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,1-Dichloroethane	6.29E+01	(1)	6.85E-02	(4)	6.85E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,1-Dichloroethene	6.18E+02	(1)	1.34E+00	(4)	1.34E+00	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,1-Dichloropropene	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,2,3-Trichlorobenzene	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,2,3-Trichloropropane	9.15E-01	(1)	4.01E-04	(4)	4.01E-04	(4)	mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,2,4-Trichlorobenzene	1.43E+02	(1)	1.15E-01	(4)	1.15E-01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.70E-01	(5)	2.70E-01	(5)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,2-Dibromo-3-chloropropane	1.94E-01	(1)	3.35E-05	(4)	3.35E-05	(4)	mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,2-Dibromoethane (EDB)	5.74E-01	(1)	1.78E-04	(4)	1.78E-04	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,2-Dichloroethane (EDC)	7.74E+00	(1)	4.11E-03	(4)	4.11E-03	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,2-Dichloropropane	1.47E+01	(1)	1.25E-02	(4)	1.25E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.25E-01	(5)	2.25E-01	(5)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,3-Dichlorobenzene	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,3-Dichloropropane	1.60E+03	(2)	3.04E+00	(5)	3.04E+00	(5)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
1-Methylnaphthalene	2.20E+02	(3)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.1	<0.1	<0.20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2-Dichloropropane	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
2-Butanone (MEK)	3.96E+04	(1)	1.43E+01	(4)	1.43E+01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.50	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
2-Chlorotoluene	1.56E+03	(1)	7.02E+00	(4)	7.02E+00	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
2-Hexanone	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.50	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	--	--	<0.20	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	5.50E+03	(2)	3.15E+01	(5)	3.15E+01	(5)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
4-Isopropyltoluene	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
4-Methyl-2-pentanone							mg/Kg	<0.0009232	<0.0010426	<0.50	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Acetone	6.75E+04	(1)	4.32E+01	(4)	4.32E+01	(4)	mg/Kg	0.00342	0.0115	<0.75	<0.0017296	<0.0018278	0.00681	<0.0018578	0.0184	0.0418	0.0137	0.00513	0.01	0.00905	0.0215	0.0147
Benzene	1.55E+01	(1)	2.08E-02	(4)	2.08E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Bromobenzene	9.40E+01	(2)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Bromodichloromethane	5.25E+00	(1)	3.11E-03	(4)	3.11E-03	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Bromoform	6.10E+02	(3)	2.59E-02	(5)	2.59E-02	(5)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708

Table 5
SWMU No. 7 Soil Analytical Results Summary
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 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 7-2 (0-0.5')	SWMU 7-2 (10-12')	SWMU 7-2 (12-14')	SWMU 7-2 (14-16')	SWMU 7-2 (5.75-7.0')	SWMU 7-2 (7-8.0')	SWMU 7-3 (0-0.5')	SWMU 7-3 (11-12')	SWMU 7-3 (12-14')	SWMU 7-3 (6-8')	SWMU 7-3 (8-10')
Bromomethane	2.23E+01	(1)	2.18E-02	(4)	2.18E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Carbon disulfide	1.94E+03	(1)	2.84E+00	(4)	2.84E+00	(4)	mg/Kg	<0.0009232	<0.0010426	<0.50	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Carbon tetrachloride	4.38E+00	(1)	8.32E-03	(4)	8.32E-03	(4)	mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Chlorobenzene	5.08E+02	(1)	6.06E-01	(4)	6.06E-01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Chloroethane	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Chloroform	5.72E+00	(1)	5.27E-03	(4)	5.27E-03	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Chloromethane	3.56E+01	(1)	4.70E-02	(4)	4.70E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
cis-1,2-DCE	7.82E+02	(1)	1.06E+00	(4)	1.06E+00	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
cis-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Dibromochloromethane	1.13E+01	(1)	3.80E-03	(4)	3.80E-03	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Dibromomethane	7.80E+02	(2)	1.02E+00	(5)	1.02E+00	(5)	mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Dichlorodifluoromethane	4.81E+02	(1)	8.14E+00	(4)	8.14E+00	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Ethylbenzene	6.97E+01	(1)	1.64E-01	(4)	1.64E-01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Isopropylbenzene	3.21E+03	(1)	1.11E+01	(4)	1.11E+01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Methyl tert-butyl ether (MTBE)	8.62E+02	(1)	2.58E-01	(4)	2.58E-01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	**0.0029**	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	**0.00131**	<0.0009443	<0.0009862	<0.0008708
Methylene chloride	1.99E+02	(1)	1.21E-01	(4)	1.21E-01	(4)	mg/Kg	**0.0266**	**0.0303**	<0.15	**0.0294**	**0.0282**	**0.0276**	**0.00246**	**0.0233**	**0.0275**	**0.0273**	**0.0237**	**0.0255**	**0.0245**	**0.0273**	**0.0277**
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
n-Butylbenzene	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
n-Propylbenzene	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
sec-Butylbenzene	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Styrene	8.97E+03	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
tert-Butylbenzene	--		--		--		mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Tetrachloroethene (PCE)	6.99E+00	(1)	5.05E-03	(4)	5.05E-03	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Toluene	5.57E+03	(1)	1.56E+01	(4)	1.56E+01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
trans-1,2-DCE	2.73E+02	(1)	3.39E-01	(4)	3.39E-01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
trans-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Trichloroethene (TCE)	4.57E+01	(1)	5.96E-02	(4)	5.96E-02	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Trichlorofluoromethane	2.01E+03	(1)	1.01E+01	(4)	1.01E+01	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Vinyl chloride	8.65E-01	(1)	3.24E-03	(4)	3.24E-03	(4)	mg/Kg	<0.0009232	<0.0010426	<0.050	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
Xylenes, Total	1.09E+03	(1)	1.98E+00	(4)	1.98E+00	(4)	mg/Kg	<0.0009232	<0.0010426	<0.10	<0.0008648	<0.0009139	<0.0009899	<0.0009289	<0.0010624	<0.000972	<0.00095	<0.0008966	<0.0009412	<0.0009443	<0.0009862	<0.0008708
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	<0.20	<0.20	<1.0	<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	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	--		--		--		mg/Kg	<0.20	<0.20	<1.0	<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	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	8.02E+01	(4)	8.02E+01	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	8.02E-01	(4)	8.02E-01	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	1.54E+00	(4)	1.54E+00	(4)	mg/Kg	<0.40	<0.40	<2.0	<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)	1.03E+01	(4)	1.03E+01	(4)	mg/Kg	<0.30	<0.30	<1.5	<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)	5.91E-01	(4)	5.91E-01	(4)	mg/Kg	<0.40	<0.40	<2.0	<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	1.26E+01	(1)	1.75E-02	(4)	1.75E-02	(4)	mg/Kg	<0.50	<0.50	<2.5	<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	6.12E+01	(1)	3.00E-01	(4)	3.00E-01	(4)	mg/Kg	<0.50	<0.50	<2.5	<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)	1.52E+02	(4)	1.52E+02	(4)	mg/Kg	<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	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.72E+00	(4)	1.72E+00	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	<0.20	<0.20	<1.0	<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)	2.25E+01	(5)	2.25E+01	(5)	mg/Kg	<0.50	<0.50	<2.5	<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)	3.71E-01	(5)	3.71E-01	(5)	mg/Kg	<0.20	<0.20	<1.0	<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	--		--		--		mg/Kg	<0.20	<0.20	<1.0	<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	8.71E+00	(1)	1.92E-01	(4)	1.92E-01	(4)	mg/Kg	<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	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	2.14E+00	(5)	2.14E+00	(5)	mg/Kg	<0.20	<0.20	<1.0	<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	--		--		--		mg/Kg	<0.20	<0.20	<1.0	<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	--		--		--		mg/Kg	<0.50	<0.50	<2.5	<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	--		--		--		mg/Kg	<0.20	<0.20	<1.0	<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	--		--		--		mg/Kg	<0.50	<0.50	<2.5	<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+01	(3)	1.35E-03	(5)	1.35E-03	(5)	mg/Kg	<0.50	<0.50	<2.5	<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	--		--		--		mg/Kg	<0.20	<0.20	<1.0	<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+02	(3)	1.13E-02	(5)	1.13E-02	(5)	mg/Kg	<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	<0.25	<0.25
4-Nitrophenol	--		--		--		mg/Kg	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthene	3.44E+03	(1)	2.31E+02	(4)	2.31E+02	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	--		--		--		mg/Kg	<0.20	<0.20	<1.0	<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+02	(3)	3.83E-02	(5)	3.83E-02	(5)	mg/Kg	<0.20	<0.20	<1.0	<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 5
SWMU No. 7 Soil Analytical Results Summary
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 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 7-2 (0-0.5')	SWMU 7-2 (10-12')	SWMU 7-2 (12-14')	SWMU 7-2 (14-16')	SWMU 7-2 (5.75-7.0')	SWMU 7-2 (7-8.0')	SWMU 7-3 (0-0.5')	SWMU 7-3 (11-12')	SWMU 7-3 (12-14')	SWMU 7-3 (6-8')	SWMU 7-3 (8-10')
Anthracene	1.72E+04	(1)	3.79E+03	(4)	3.79E+03	(4)	mg/Kg	<0.20	<0.20	<1.0	<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+01	(3)	5.74E-03	(5)	5.74E-03	(5)	mg/Kg	<0.20	<0.20	<1.0	<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	4.81E+00	(1)	3.59E+00	(4)	3.59E+00	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	4.81E-01	(1)	4.81E-01	(1)	1.22E+00	(4)	mg/Kg	<0.20	<0.20	**1.3**	<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	4.81E+00	(1)	4.81E+00	(1)	1.25E+01	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	--		--		--		mg/Kg	<0.20	<0.20	<1.0	<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	4.81E+01	(1)	4.81E+01	(1)	1.22E+02	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	3.71E+02	(5)	3.71E+02	(5)	mg/Kg	<0.50	<0.50	<2.5	<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)	4.73E+01	(5)	4.73E+01	(5)	mg/Kg	<0.20	<0.20	<1.0	<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)	2.59E-01	(5)	2.59E-01	(5)	mg/Kg	<0.20	<0.20	<1.0	<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	2.56E+00	(1)	2.62E-04	(4)	2.62E-04	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	2.88E-02	(4)	2.88E-02	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	2.80E+02	(1)	1.34E+02	(4)	1.34E+02	(4)	mg/Kg	<0.50	<0.50	<2.5	<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+03	(3)	7.54E+00	(5)	7.54E+00	(5)	mg/Kg	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Carbazole	--		--		--		mg/Kg	<0.20	<0.20	<1.0	<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	4.81E+02	(1)	3.67E+02	(4)	3.67E+02	(4)	mg/Kg	<0.20	<0.20	**1.7**	<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	4.81E-01	(1)	4.81E-01	(1)	4.07E+00	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	--		--		--		mg/Kg	<0.20	<0.20	<1.0	<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)	1.19E+02	(4)	1.19E+02	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	9.40E+02	(4)	9.40E+02	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	9.70E+01	(4)	9.70E+01	(4)	mg/Kg	<0.50	<0.50	<2.5	<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	--		--		--		mg/Kg	<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	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	1.75E+03	(4)	1.75E+03	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	2.81E+02	(4)	2.81E+02	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	2.45E+00	(1)	2.48E-02	(4)	2.48E-02	(4)	mg/Kg	<0.20	<0.20	<1.0	<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+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<0.20	<0.20	<1.0	<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)	6.90E+00	(4)	6.90E+00	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	6.11E+01	(1)	2.17E-01	(4)	2.17E-01	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	4.81E+00	(1)	4.81E+00	(1)	4.16E+01	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	4.13E+03	(1)	2.08E+00	(4)	2.08E+00	(4)	mg/Kg	<0.50	<0.50	<2.5	<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	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	4.94E+01	(1)	7.72E-02	(4)	7.72E-02	(4)	mg/Kg	<0.50	<0.50	<2.5	<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-01	(3)	1.24E-04	(5)	1.24E-04	(5)	mg/Kg	<0.20	<0.20	<1.0	<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	8.00E+02	(1)	1.45E+01	(4)	1.45E+01	(4)	mg/Kg	<0.20	<0.20	<1.0	<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	2.07E+01	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	<0.40	<0.40	<2.0	<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)	9.39E+02	(4)	9.39E+02	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	7.09E+01	(4)	7.09E+01	(4)	mg/Kg	<0.20	<0.20	<1.0	<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)	1.26E+03	(4)	1.26E+03	(4)	mg/Kg	<0.20	<0.20	**1.9**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.09E-01	(5)	1.09E-01	(5)	mg/Kg	<0.50	<0.50	<2.5	<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)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	**18**	<10	**470**	<10	**53**	<10	<10	<10	**100**	<10	**50**	<10	<10	**47**	**56**
Motor Oil Range Organics (MRO)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	**81**	<50	**530**	<50	<50	<50	<50	<50	**160**	<50	<50	<50	<50	**62**	**69**
Gasoline Range Organics (GRO)	--		--		--		mg/Kg	<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

-- 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
$\boxed{4.2}$ Above soil screening level

Table 6
SWMU No. 10 Soil Analytical Results Summary
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 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')	SWMU 10-2 (1.5-2.0')	SWMU 10-3 (0-0.5')	SWMU 10-3 (1.5-2.0')	SWMU 10-4 (0-0.5')	SWMU 10-4 (1.5-2.0')	SWMU 10-5 (0-0.5')	SWMU 10-5 (1.5-2.0)	SWMU 10-6 (0-0.5')	SWMU 10-6 (1.5-2.0')	SWMU 10-7 (0-0.5')	SWMU 10-7 (1.5-2.0')
							Lab Sample ID	1008759-01	1008759-02	1008759-03	1008759-04	1008759-05	1008759-06	1008759-07	1008759-08	1008763-01	1008763-02	1008763-03	1008763-04	1008763-05	1008763-06
							Sample Date	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/18/2010
Metals (mg/kg)																					
Aluminum	7.81E+04	(1)	7.81E+04	(1)	6.17E+05	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	3.13E+01	(1)	7.44E+00	(4)	7.44E+00	(4)	mg/Kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5
Arsenic	3.90E+00	(1)	1.48E-01	(4)	1.48E-01	(4)	mg/Kg	<2.5	<2.5	2.7	2.6	<5.0	<2.5	2.9	2.8	3.5	<2.5	3.2	<5.0	<5.0	<2.5
Barium	1.56E+04	(1)	3.39E+03	(4)	3.39E+03	(4)	mg/Kg	75	59	61	60	56	61	130	180	180	140	170	93	160	78
Beryllium	1.56E+02	(1)	1.56E+02	(1)	6.49E+02	(4)	mg/Kg	0.29	0.17	0.22	0.22	0.18	0.28	0.27	0.3	0.42	0.22	0.29	0.35	0.39	0.26
Boron	1.56E+04	(1)	2.70E+02	(4)	2.70E+02	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7.79E+01	(1)	1.55E+01	(4)	1.55E+01	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10
Chromium	1.13E+05	(1)	1.13E+05	(1)	1.11E+09	(4)	mg/Kg	4.2	2.7	3.1	3	2.7	4.3	3.7	4.7	5.4	3.2	4.6	5.3	7.6	3.8
Cobalt	2.30E+01	(2)	5.51E+00	(5)	5.51E+00	(5)	mg/Kg	2.2	1.5	1.9	1.8	1.7	2.4	2.4	2.7	3	1.7	2.5	3.4	3.5	2.1
Cyanide	1.56E+03	(1)	8.37E+01	(4)	8.37E+01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Copper	3.13E+03	(1)	5.79E+02	(4)	5.79E+02	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	5.48E+04	(1)	7.27E+03	(4)	7.27E+03	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	4.00E+02	(1)	4.00E+02	(4)	--		mg/Kg	2.6	2.3	2.3	2.1	2.5	2.8	3.2	3	3.2	1.9	2.9	3.8	8.7	3.3
Mercury	7.71E+00	(1)	3.30E-01	(4)	3.30E-01	(4)	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	0.036	<0.033
Manganese	1.07E+04	(1)	3.04E+00	(4)	3.04E+00	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	3.91E+02	(1)	4.16E+01	(4)	4.16E+01	(4)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	1.56E+03	(1)	5.36E+02	(4)	5.36E+02	(4)	mg/Kg	3.5	2.9	2.8	2.7	2.8	3.8	3.7	4.2	5.6	2.8	4.2	5.1	7.2	3.5
Selenium	3.91E+02	(1)	1.09E+01	(4)	1.09E+01	(4)	mg/Kg	<2.5	<2.5	<2.5	<2.5	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5
Silver	3.91E+02	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.50	<0.50	<0.25
Thallium	5.16E+00	(1)	1.94E+00	(4)	1.94E+00	(4)	mg/Kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5
Uranium	2.35E+02	(1)	2.35E+02	(4)	5.51E+02	(5)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	3.91E+02	(1)	3.91E+02	(1)	2.05E+03	(4)	mg/Kg	13	8.5	9.3	9.2	9.4	12	13	15	20	10	14	15	20	12
Zinc	2.35E+04	(1)	7.67E+03	(4)	7.67E+03	(4)	mg/Kg	16	11	12	11	15	16	16	17	21	11	20	21	47	16
Volatile Organic Compounds - (EPA Method 8260) mg/kg																					
1,1,1,2-Tetrachloroethane	2.92E+01	(1)	1.94E-02	(4)	1.94E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,1,1-Trichloroethane	2.18E+04	(1)	3.35E+01	(4)	3.35E+01	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,1,2,2-Tetrachloroethane	7.97E+00	(1)	2.53E-03	(4)	2.53E-03	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,1,2-Trichloroethane	1.72E+01	(1)	7.58E-03	(4)	7.58E-03	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,1-Dichloroethane	6.29E+01	(1)	6.85E-02	(4)	6.85E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
1,1-Dichloroethene	6.18E+02	(1)	1.34E+00	(4)	1.34E+00	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,1-Dichloropropene	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
1,2,3-Trichlorobenzene	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
1,2,3-Trichloropropane	9.15E-01	(1)	4.01E-04	(4)	4.01E-04	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
1,2,4-Trichlorobenzene	1.43E+02	(1)	1.15E-01	(4)	1.15E-01	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.70E-01	(5)	2.70E-01	(5)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,2-Dibromo-3-chloropropane	1.94E-01	(1)	3.35E-05	(4)	3.35E-05	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
1,2-Dibromoethane (EDB)	5.74E-01	(1)	1.78E-04	(4)	1.78E-04	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,2-Dichloroethane (EDC)	7.74E+00	(1)	4.11E-03	(4)	4.11E-03	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,2-Dichloropropane	1.47E+01	(1)	1.25E-02	(4)	1.25E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.25E-01	(5)	2.25E-01	(5)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,3-Dichlorobenzene	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,3-Dichloropropane	1.60E+03	(2)	3.04E+00	(5)	3.04E+00	(5)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
1-Methylnaphthalene	2.20E+02	(3)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.20	<0.1
2,2-Dichloropropane	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
2-Butanone (MEK)	3.96E+04	(1)	1.43E+01	(4)	1.43E+01	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.50	<0.0009561
2-Chlorotoluene	1.56E+03	(1)	7.02E+00	(4)	7.02E+00	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
2-Hexanone	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.50	<0.0009561
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	<0.20	--
4-Chlorotoluene	5.50E+03	(2)	3.15E+01	(5)	3.15E+01	(5)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
4-Isopropyltoluene	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
4-Methyl-2-pentanone	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.50	<0.0009561
Acetone	6.75E+04	(1)	4.32E+01	(4)	4.32E+01	(4)	mg/Kg	<0.0018836	0.00567	<0.0020788	<0.002202	<0.002028	<0.0018536	<0.0018776	<0.0018346	<0.0018394	<0.0020316	<0.0019682	<0.0020384	<0.75	<0.0019122
Benzene	1.55E+01	(1)	2.08E-02	(4)	2.08E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Bromobenzene	9.40E+01	(2)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Bromodichloromethane	5.25E+00	(1)	3.11E-03	(4)	3.11E-03	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Bromoform	6.10E+02	(3)	2.59E-02	(5)	2.59E-02	(5)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Bromomethane	2.23E+01	(1)	2.18E-02	(4)	2.18E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561

Table 6
SWMU No. 10 Soil Analytical Results Summary
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 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')	SWMU 10-2 (1.5-2.0')	SWMU 10-3 (0-0.5')	SWMU 10-3 (1.5-2.0')	SWMU 10-4 (0-0.5')	SWMU 10-4 (1.5-2.0')	SWMU 10-5 (0-0.5')	SWMU 10-5 (1.5-2.0)	SWMU 10-6 (0-0.5')	SWMU 10-6 (1.5-2.0')	SWMU 10-7 (0-0.5')	SWMU 10-7 (1.5-2.0')
Carbon disulfide	1.94E+03	(1)	2.84E+00	(4)	2.84E+00	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.50	<0.0009561
Carbon tetrachloride	4.38E+00	(1)	8.32E-03	(4)	8.32E-03	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
Chlorobenzene	5.08E+02	(1)	6.06E-01	(4)	6.06E-01	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Chloroethane	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
Chloroform	5.72E+00	(1)	5.27E-03	(4)	5.27E-03	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Chloromethane	3.56E+01	(1)	4.70E-02	(4)	4.70E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	**0.086**	<0.0009561
cis-1,2-DCE	7.82E+02	(1)	1.06E+00	(4)	1.06E+00	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
cis-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Dibromochloromethane	1.13E+01	(1)	3.80E-03	(4)	3.80E-03	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Dibromomethane	7.80E+02	(2)	1.02E+00	(5)	1.02E+00	(5)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
Dichlorodifluoromethane	4.81E+02	(1)	8.14E+00	(4)	8.14E+00	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Ethylbenzene	6.97E+01	(1)	1.64E-01	(4)	1.64E-01	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
Isopropylbenzene	3.21E+03	(1)	1.11E+01	(4)	1.11E+01	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Methyl tert-butyl ether (MTBE)	8.62E+02	(1)	2.58E-01	(4)	2.58E-01	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Methylene chloride	1.99E+02	(1)	1.21E-01	(4)	1.21E-01	(4)	mg/Kg	**0.0037**	**0.00687**	**0.00338**	**0.00494**	**0.00584**	**0.00628**	**0.00458**	**0.00693**	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.15	<0.0009561
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
n-Butylbenzene	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
n-Propylbenzene	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
sec-Butylbenzene	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Styrene	8.97E+03	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
tert-Butylbenzene	--		--		--		mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Tetrachloroethene (PCE)	6.99E+00	(1)	5.05E-03	(4)	5.05E-03	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Toluene	5.57E+03	(1)	1.56E+01	(4)	1.56E+01	(4)	mg/Kg	<0.0009418	<0.000931	**0.00115**	<0.001101	<0.001014	**0.0016**	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
trans-1,2-DCE	2.73E+02	(1)	3.39E-01	(4)	3.39E-01	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
trans-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Trichloroethene (TCE)	4.57E+01	(1)	5.96E-02	(4)	5.96E-02	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Trichlorofluoromethane	2.01E+03	(1)	1.01E+01	(4)	1.01E+01	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Vinyl chloride	8.65E-01	(1)	3.24E-03	(4)	3.24E-03	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.050	<0.0009561
Xylenes, Total	1.09E+03	(1)	1.98E+00	(4)	1.98E+00	(4)	mg/Kg	<0.0009418	<0.000931	<0.0010394	<0.001101	<0.001014	<0.0009268	<0.0009388	<0.0009173	<0.0009197	<0.0010158	<0.0009841	<0.0010192	<0.10	<0.0009561
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	<0.20	<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
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<0.20	<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
1,3-Dichlorobenzene	--		--		--		mg/Kg	<0.20	<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
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<0.20	<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
2,4,5-Trichlorophenol	6.11E+03	(1)	8.02E+01	(4)	8.02E+01	(4)	mg/Kg	<0.20	<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
2,4,6-Trichlorophenol	6.11E+01	(1)	8.02E-01	(4)	8.02E-01	(4)	mg/Kg	<0.20	<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
2,4-Dichlorophenol	1.83E+02	(1)	1.54E+00	(4)	1.54E+00	(4)	mg/Kg	<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
2,4-Dimethylphenol	1.22E+03	(1)	1.03E+01	(4)	1.03E+01	(4)	mg/Kg	<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
2,4-Dinitrophenol	1.22E+02	(1)	5.91E-01	(4)	5.91E-01	(4)	mg/Kg	<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
2,4-Dinitrotoluene	1.26E+01	(1)	1.75E-02	(4)	1.75E-02	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
2,6-Dinitrotoluene	6.12E+01	(1)	3.00E-01	(4)	3.00E-01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
2-Chloronaphthalene	6.26E+03	(1)	1.52E+02	(4)	1.52E+02	(4)	mg/Kg	<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
2-Chlorophenol	3.91E+02	(1)	1.72E+00	(4)	1.72E+00	(4)	mg/Kg	<0.20	<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
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	<0.20	<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
2-Methylphenol	3.10E+03	(2)	2.25E+01	(5)	2.25E+01	(5)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
2-Nitroaniline	1.80E+02	(2)	3.71E-01	(5)	3.71E-01	(5)	mg/Kg	<0.20	<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
2-Nitrophenol	--		--		--		mg/Kg	<0.20	<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
3,3'-Dichlorobenzidine	8.71E+00	(1)	1.92E-01	(4)	1.92E-01	(4)	mg/Kg	<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
3+4-Methylphenol	3.10E+02	(2)	2.14E+00	(5)	2.14E+00	(5)	mg/Kg	<0.20	<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
3-Nitroaniline	--		--		--		mg/Kg	<0.20	<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
4,6-Dinitro-2-methylphenol	--		--		--		mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
4-Bromophenyl phenyl ether	--		--		--		mg/Kg	<0.20	<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
4-Chloro-3-methylphenol	--		--		--		mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
4-Chloroaniline	2.40E+01	(3)	1.35E-03	(5)	1.35E-03	(5)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
4-Chlorophenyl phenyl ether	--		--		--		mg/Kg	<0.20	<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
4-Nitroaniline	2.40E+02	(3)	1.13E-02	(5)	1.13E-02	(5)	mg/Kg	<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
4-Nitrophenol	--		--		--		mg/Kg	<0.20	<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
Acenaphthene	3.44E+03	(1)	2.31E+02	(4)	2.31E+02	(4)	mg/Kg	<0.20	<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
Acenaphthylene	--		--		--		mg/Kg	<0.20	<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

Table 6
SWMU No. 10 Soil Analytical Results Summary
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 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')	SWMU 10-2 (1.5-2.0')	SWMU 10-3 (0-0.5')	SWMU 10-3 (1.5-2.0')	SWMU 10-4 (0-0.5')	SWMU 10-4 (1.5-2.0')	SWMU 10-5 (0-0.5')	SWMU 10-5 (1.5-2.0)	SWMU 10-6 (0-0.5')	SWMU 10-6 (1.5-2.0')	SWMU 10-7 (0-0.5')	SWMU 10-7 (1.5-2.0')
Aniline	8.50E+02	(3)	3.83E-02	(5)	3.83E-02	(5)	mg/Kg	<0.20	<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
Anthracene	1.72E+04	(1)	3.79E+03	(4)	3.79E+03	(4)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	**0.23**	<0.20	<0.40	<0.20
Azobenzene	4.90E+01	(3)	5.74E-03	(5)	5.74E-03	(5)	mg/Kg	<0.20	<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
Benz(a)anthracene	4.81E+00	(1)	3.59E+00	(4)	3.59E+00	(4)	mg/Kg	<0.20	<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
Benzo(a)pyrene	4.81E-01	(1)	4.81E-01	(1)	1.22E+00	(4)	mg/Kg	<0.20	<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
Benzo(b)fluoranthene	4.81E+00	(1)	4.81E+00	(1)	1.25E+01	(4)	mg/Kg	<0.20	<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
Benzo(g,h,i)perylene	--		--		--		mg/Kg	<0.20	<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
Benzo(k)fluoranthene	4.81E+01	(1)	4.81E+01	(1)	1.22E+02	(4)	mg/Kg	<0.20	<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
Benzoic acid	2.40E+05	(2)	3.71E+02	(5)	3.71E+02	(5)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
Benzyl alcohol	3.10E+04	(2)	4.73E+01	(5)	4.73E+01	(5)	mg/Kg	<0.20	<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
Bis(2-chloroethoxy)methane	1.80E+02	(2)	2.59E-01	(5)	2.59E-01	(5)	mg/Kg	<0.20	<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
Bis(2-chloroethyl)ether	2.56E+00	(1)	2.62E-04	(4)	2.62E-04	(4)	mg/Kg	<0.20	<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
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	2.88E-02	(4)	2.88E-02	(4)	mg/Kg	<0.20	<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
Bis(2-ethylhexyl)phthalate	2.80E+02	(1)	1.34E+02	(4)	1.34E+02	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
Butyl benzyl phthalate	2.60E+03	(3)	7.54E+00	(5)	7.54E+00	(5)	mg/Kg	<0.20	<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
Carbazole	--		--		--		mg/Kg	<0.20	<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
Chrysene	4.81E+02	(1)	3.67E+02	(4)	3.67E+02	(4)	mg/Kg	<0.20	<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
Dibenz(a,h)anthracene	4.81E-01	(1)	4.81E-01	(1)	4.07E+00	(4)	mg/Kg	<0.20	<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
Dibenzofuran	--		--		--		mg/Kg	<0.20	<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
Diethyl phthalate	4.89E+04	(1)	1.19E+02	(4)	1.19E+02	(4)	mg/Kg	<0.20	<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
Dimethyl phthalate	6.11E+05	(1)	9.40E+02	(4)	9.40E+02	(4)	mg/Kg	<0.20	<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
Di-n-butyl phthalate	6.11E+03	(1)	9.70E+01	(4)	9.70E+01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
Di-n-octyl phthalate	--		--		--		mg/Kg	<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
Fluoranthene	2.29E+03	(1)	1.75E+03	(4)	1.75E+03	(4)	mg/Kg	<0.20	<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
Fluorene	2.29E+03	(1)	2.81E+02	(4)	2.81E+02	(4)	mg/Kg	<0.20	<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
Hexachlorobenzene	2.45E+00	(1)	2.48E-02	(4)	2.48E-02	(4)	mg/Kg	<0.20	<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
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<0.20	<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
Hexachlorocyclopentadiene	3.67E+02	(1)	6.90E+00	(4)	6.90E+00	(4)	mg/Kg	<0.20	<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
Hexachloroethane	6.11E+01	(1)	2.17E-01	(4)	2.17E-01	(4)	mg/Kg	<0.20	<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
Indeno(1,2,3-cd)pyrene	4.81E+00	(1)	4.81E+00	(1)	4.16E+01	(4)	mg/Kg	<0.20	<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
Isophorone	4.13E+03	(1)	2.08E+00	(4)	2.08E+00	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	<0.20	<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
Nitrobenzene	4.94E+01	(1)	7.72E-02	(4)	7.72E-02	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
N-Nitrosodi-n-propylamine	6.90E-01	(3)	1.24E-04	(5)	1.24E-04	(5)	mg/Kg	<0.20	<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
N-Nitrosodiphenylamine	8.00E+02	(1)	1.45E+01	(4)	1.45E+01	(4)	mg/Kg	<0.20	<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
Pentachlorophenol	2.07E+01	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	<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
Phenanthrene	1.83E+03	(1)	9.39E+02	(4)	9.39E+02	(4)	mg/Kg	<0.20	<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
Phenol	1.83E+04	(1)	7.09E+01	(4)	7.09E+01	(4)	mg/Kg	<0.20	<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
Pyrene	1.72E+03	(1)	1.26E+03	(4)	1.26E+03	(4)	mg/Kg	<0.20	<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
Pyridine	7.80E+01	(2)	1.09E-01	(5)	1.09E-01	(5)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
Fluoride	4.70E+03		4.70E+03		0.00E+00		mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	-		0.00E+00		0.00E+00		mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	-		0.00E+00		0.00E+00		mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																					
Diesel Range Organics (DRO)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	<10	**19**	**280**	**46**	**44**	<10	**120**	**23**	**31**	**19**	**240**	<10	**1400**	**89**
Gasoline Range Organics (GRO)	--		--		--		mg/Kg	<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)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<500	<50	<500	<50

Table 6
SWMU No. 10 Soil Analytical Results Summary
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 10-8 (0-0.5')	SWMU 10-8 (1.5-2.0')	SWMU 10-8 (6-7')	SWMU 10-8 (10-12')	SWMU 10-9 (0-0.5')	SWMU 10-9 (1.5-2.0')	SWMU 10-9 (16-18')
							Lab Sample ID	1008763-07	1008763-08	1008763-10	1008763-11	1008B56-01	1008B56-03	1008B56-04
							Sample Date	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/26/2010	8/26/2010	8/26/2010
Metals (mg/kg)														
Aluminum	7.81E+04	(1)	7.81E+04	(1)	6.17E+05	(4)	mg/Kg	--	--	--	--	--	--	--
Antimony	3.13E+01	(1)	7.44E+00	(4)	7.44E+00	(4)	mg/Kg	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<13
Arsenic	3.90E+00	(1)	1.48E-01	(4)	1.48E-01	(4)	mg/Kg	<5.0	**3.6**	**2.7**	<2.5	<2.5	<2.5	<13
Barium	1.56E+04	(1)	3.39E+03	(4)	3.39E+03	(4)	mg/Kg	**170**	**150**	**150**	**110**	**83**	**84**	**450**
Beryllium	1.56E+02	(1)	1.56E+02	(1)	6.49E+02	(4)	mg/Kg	**0.44**	**0.33**	**0.28**	<0.15	**0.21**	**0.23**	<0.75
Boron	1.56E+04	(1)	2.70E+02	(4)	2.70E+02	(4)	mg/Kg	--	--	--	--	--	--	--
Cadmium	7.79E+01	(1)	1.55E+01	(4)	1.55E+01	(4)	mg/Kg	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.50
Chromium	1.13E+05	(1)	1.13E+05	(1)	1.11E+09	(4)	mg/Kg	**11**	**10**	**7**	**1.5**	**3.2**	**3.5**	**10**
Cobalt	2.30E+01	(2)	5.51E+00	(5)	5.51E+00	(5)	mg/Kg	**3.8**	**2.6**	**2.6**	**2**	**1.9**	**2**	**4.4**
Cyanide	1.56E+03	(1)	8.37E+01	(4)	8.37E+01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Copper	3.13E+03	(1)	5.79E+02	(4)	5.79E+02	(4)	mg/Kg	--	--	--	--	--	--	--
Iron	5.48E+04	(1)	7.27E+03	(4)	7.27E+03	(4)	mg/Kg	--	--	--	--	--	--	--
Lead	4.00E+02	(1)	4.00E+02	(4)	--		mg/Kg	**5.8**	**4**	**3.8**	**1.7**	**2.3**	**2.6**	**2.6**
Mercury	7.71E+00	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	**0.051**	**0.036**	**0.042**	<0.033	<0.033	<0.033	<0.033
Manganese	1.07E+04	(1)	3.04E+00	(4)	3.04E+00	(4)	mg/Kg	--	--	--	--	--	--	--
Molybdenum	3.91E+02	(1)	4.16E+01	(4)	4.16E+01	(4)	mg/Kg	--	--	--	--	--	--	--
Nickel	1.56E+03	(1)	5.36E+02	(4)	5.36E+02	(4)	mg/Kg	**9.1**	**7.1**	**5.4**	**1.4**	**2.9**	**3.1**	<2.5
Selenium	3.91E+02	(1)	1.09E+01	(4)	1.09E+01	(4)	mg/Kg	<5.0	<2.5	<2.5	<5.0	<2.5	<2.5	<13
Silver	3.91E+02	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3
Thallium	5.16E+00	(1)	1.94E+00	(4)	1.94E+00	(4)	mg/Kg	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<13
Uranium	2.35E+02	(1)	2.35E+02	(4)	5.51E+02	(5)	mg/Kg	--	--	--	--	--	--	--
Vanadium	3.91E+02	(1)	3.91E+02	(1)	2.05E+03	(4)	mg/Kg	**26**	**23**	**18**	**10**	**10**	**11**	**29**
Zinc	2.35E+04	(1)	7.67E+03	(4)	7.67E+03	(4)	mg/Kg	**93**	**43**	**40**	**11**	**14**	**14**	**30**
Volatile Organic Compounds - (EPA Method 8260) mg/kg														
1,1,1,2-Tetrachloroethane	2.92E+01	(1)	1.94E-02	(4)	1.94E-02	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,1,1-Trichloroethane	2.18E+04	(1)	3.35E+01	(4)	3.35E+01	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,1,2,2-Tetrachloroethane	7.97E+00	(1)	2.53E-03	(4)	2.53E-03	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,1,2-Trichloroethane	1.72E+01	(1)	7.58E-03	(4)	7.58E-03	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,1-Dichloroethane	6.29E+01	(1)	6.85E-02	(4)	6.85E-02	(4)	mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10
1,1-Dichloroethene	6.18E+02	(1)	1.34E+00	(4)	1.34E+00	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,1-Dichloropropene	--		--		--		mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10
1,2,3-Trichlorobenzene	--		--		--		mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10
1,2,3-Trichloropropane	9.15E-01	(1)	4.01E-04	(4)	4.01E-04	(4)	mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10
1,2,4-Trichlorobenzene	1.43E+02	(1)	1.15E-01	(4)	1.15E-01	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.70E-01	(5)	2.70E-01	(5)	mg/Kg	<0.050	<0.0010128	**0.00128**	<0.0011282	<0.050	<0.000966	<0.050
1,2-Dibromo-3-chloropropane	1.94E-01	(1)	3.35E-05	(4)	3.35E-05	(4)	mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10
1,2-Dibromoethane (EDB)	5.74E-01	(1)	1.78E-04	(4)	1.78E-04	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,2-Dichloroethane (EDC)	7.74E+00	(1)	4.11E-03	(4)	4.11E-03	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,2-Dichloropropane	1.47E+01	(1)	1.25E-02	(4)	1.25E-02	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.25E-01	(5)	2.25E-01	(5)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,3-Dichlorobenzene	--		--		--		mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,3-Dichloropropane	1.60E+03	(2)	3.04E+00	(5)	3.04E+00	(5)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
1-Methylnaphthalene	2.20E+02	(3)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.20	<0.1	<0.1	<0.1	<0.20	<0.1	<0.20
2,2-Dichloropropane	--		--		--		mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10
2-Butanone (MEK)	3.96E+04	(1)	1.43E+01	(4)	1.43E+01	(4)	mg/Kg	<0.50	**0.00512**	**0.011**	<0.0011282	<0.50	<0.000966	<0.50
2-Chlorotoluene	1.56E+03	(1)	7.02E+00	(4)	7.02E+00	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
2-Hexanone	--		--		--		mg/Kg	<0.50	<0.0010128	<0.000923	<0.0011282	<0.50	<0.000966	<0.50
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	<0.20	--	--	--	<0.20	--	<0.20
4-Chlorotoluene	5.50E+03	(2)	3.15E+01	(5)	3.15E+01	(5)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
4-Isopropyltoluene	--		--		--		mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
4-Methyl-2-pentanone	--		--		--		mg/Kg	<0.50	<0.0010128	<0.000923	<0.0011282	<0.50	<0.000966	<0.50
Acetone	6.75E+04	(1)	4.32E+01	(4)	4.32E+01	(4)	mg/Kg	<0.75	**0.0108**	**0.0408**	<0.0022564	<0.75	<0.001931	<0.75
Benzene	1.55E+01	(1)	2.08E-02	(4)	2.08E-02	(4)	mg/Kg	<0.050	**0.00141**	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Bromobenzene	9.40E+01	(2)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Bromodichloromethane	5.25E+00	(1)	3.11E-03	(4)	3.11E-03	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Bromoform	6.10E+02	(3)	2.59E-02	(5)	2.59E-02	(5)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Bromomethane	2.23E+01	(1)	2.18E-02	(4)	2.18E-02	(4)	mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10

Table 6
SWMU No. 10 Soil Analytical Results Summary
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 10-8 (0-0.5')	SWMU 10-8 (1.5-2.0')	SWMU 10-8 (6-7')	SWMU 10-8 (10-12')	SWMU 10-9 (0-0.5')	SWMU 10-9 (1.5-2.0')	SWMU 10-9 (16-18')
Carbon disulfide	1.94E+03	(1)	2.84E+00	(4)	2.84E+00	(4)	mg/Kg	<0.50	<0.0010128	<0.000923	<0.0011282	<0.50	<0.000966	<0.50
Carbon tetrachloride	4.38E+00	(1)	8.32E-03	(4)	8.32E-03	(4)	mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10
Chlorobenzene	5.08E+02	(1)	6.06E-01	(4)	6.06E-01	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Chloroethane	--		--		--		mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10
Chloroform	5.72E+00	(1)	5.27E-03	(4)	5.27E-03	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Chloromethane	3.56E+01	(1)	4.70E-02	(4)	4.70E-02	(4)	mg/Kg	**0.077**	<0.0010128	<0.000923	<0.0011282	**0.087**	<0.000966	**0.075**
cis-1,2-DCE	7.82E+02	(1)	1.06E+00	(4)	1.06E+00	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
cis-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Dibromochloromethane	1.13E+01	(1)	3.80E-03	(4)	3.80E-03	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Dibromomethane	7.80E+02	(2)	1.02E+00	(5)	1.02E+00	(5)	mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10
Dichlorodifluoromethane	4.81E+02	(1)	8.14E+00	(4)	8.14E+00	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Ethylbenzene	6.97E+01	(1)	1.64E-01	(4)	1.64E-01	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<0.10	<0.0010128	<0.000923	<0.0011282	<0.10	<0.000966	<0.10
Isopropylbenzene	3.21E+03	(1)	1.11E+01	(4)	1.11E+01	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Methyl tert-butyl ether (MTBE)	8.62E+02	(1)	2.58E-01	(4)	2.58E-01	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Methylene chloride	1.99E+02	(1)	1.21E-01	(4)	1.21E-01	(4)	mg/Kg	<0.15	**0.00208**	**0.00325**	**0.00378**	<0.15	**0.00221**	<0.15
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	<0.10	<0.0010128	**0.00147**	<0.0011282	<0.10	<0.000966	<0.10
n-Butylbenzene	--		--		--		mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
n-Propylbenzene	--		--		--		mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
sec-Butylbenzene	--		--		--		mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Styrene	8.97E+03	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
tert-Butylbenzene	--		--		--		mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Tetrachloroethene (PCE)	6.99E+00	(1)	5.05E-03	(4)	5.05E-03	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Toluene	5.57E+03	(1)	1.56E+01	(4)	1.56E+01	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
trans-1,2-DCE	2.73E+02	(1)	3.39E-01	(4)	3.39E-01	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
trans-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Trichloroethene (TCE)	4.57E+01	(1)	5.96E-02	(4)	5.96E-02	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Trichlorofluoromethane	2.01E+03	(1)	1.01E+01	(4)	1.01E+01	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Vinyl chloride	8.65E-01	(1)	3.24E-03	(4)	3.24E-03	(4)	mg/Kg	<0.050	<0.0010128	<0.000923	<0.0011282	<0.050	<0.000966	<0.050
Xylenes, Total	1.09E+03	(1)	1.98E+00	(4)	1.98E+00	(4)	mg/Kg	<0.10	<0.0010128	**0.00126**	<0.0011282	<0.10	<0.000966	<0.10
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	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
1,3-Dichlorobenzene	--		--		--		mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	8.02E+01	(4)	8.02E+01	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	8.02E-01	(4)	8.02E-01	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	1.54E+00	(4)	1.54E+00	(4)	mg/Kg	<0.80	<0.80	<0.80	<0.40	<0.40	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	1.03E+01	(4)	1.03E+01	(4)	mg/Kg	<0.60	<0.60	<0.60	<0.30	<0.30	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	5.91E-01	(4)	5.91E-01	(4)	mg/Kg	<0.80	<0.80	<0.80	<0.40	<0.40	<0.40	<0.40
2,4-Dinitrotoluene	1.26E+01	(1)	1.75E-02	(4)	1.75E-02	(4)	mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
2,6-Dinitrotoluene	6.12E+01	(1)	3.00E-01	(4)	3.00E-01	(4)	mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
2-Chloronaphthalene	6.26E+03	(1)	1.52E+02	(4)	1.52E+02	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.72E+00	(4)	1.72E+00	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	2.25E+01	(5)	2.25E+01	(5)	mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	3.71E-01	(5)	3.71E-01	(5)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
2-Nitrophenol	--		--		--		mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
3,3´-Dichlorobenzidine	8.71E+00	(1)	1.92E-01	(4)	1.92E-01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.25	<0.25	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	2.14E+00	(5)	2.14E+00	(5)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
3-Nitroaniline	--		--		--		mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
4,6-Dinitro-2-methylphenol	--		--		--		mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
4-Bromophenyl phenyl ether	--		--		--		mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
4-Chloro-3-methylphenol	--		--		--		mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
4-Chloroaniline	2.40E+01	(3)	1.35E-03	(5)	1.35E-03	(5)	mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
4-Chlorophenyl phenyl ether	--		--		--		mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
4-Nitroaniline	2.40E+02	(3)	1.13E-02	(5)	1.13E-02	(5)	mg/Kg	<0.50	<0.50	<0.50	<0.25	<0.25	<0.25	<0.25
4-Nitrophenol	--		--		--		mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Acenaphthene	3.44E+03	(1)	2.31E+02	(4)	2.31E+02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	--		--		--		mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20

Table 6
SWMU No. 10 Soil Analytical Results Summary
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 10-8 (0-0.5')	SWMU 10-8 (1.5-2.0')	SWMU 10-8 (6-7')	SWMU 10-8 (10-12')	SWMU 10-9 (0-0.5')	SWMU 10-9 (1.5-2.0')	SWMU 10-9 (16-18')
Aniline	8.50E+02	(3)	3.83E-02	(5)	3.83E-02	(5)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Anthracene	1.72E+04	(1)	3.79E+03	(4)	3.79E+03	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Azobenzene	4.90E+01	(3)	5.74E-03	(5)	5.74E-03	(5)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Benz(a)anthracene	4.81E+00	(1)	3.59E+00	(4)	3.59E+00	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	4.81E-01	(1)	4.81E-01	(1)	1.22E+00	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluoranthene	4.81E+00	(1)	4.81E+00	(1)	1.25E+01	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	--		--		--		mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(k)fluoranthene	4.81E+01	(1)	4.81E+01	(1)	1.22E+02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	3.71E+02	(5)	3.71E+02	(5)	mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	4.73E+01	(5)	4.73E+01	(5)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	2.59E-01	(5)	2.59E-01	(5)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethyl)ether	2.56E+00	(1)	2.62E-04	(4)	2.62E-04	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	2.88E-02	(4)	2.88E-02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	2.80E+02	(1)	1.34E+02	(4)	1.34E+02	(4)	mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
Butyl benzyl phthalate	2.60E+03	(3)	7.54E+00	(5)	7.54E+00	(5)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Carbazole	--		--		--		mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Chrysene	4.81E+02	(1)	3.67E+02	(4)	3.67E+02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	4.81E-01	(1)	4.81E-01	(1)	4.07E+00	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Dibenzofuran	--		--		--		mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.19E+02	(4)	1.19E+02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	9.40E+02	(4)	9.40E+02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Di-n-butyl phthalate	6.11E+03	(1)	9.70E+01	(4)	9.70E+01	(4)	mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
Di-n-octyl phthalate	--		--		--		mg/Kg	<0.50	<0.50	<0.50	<0.25	<0.25	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	1.75E+03	(4)	1.75E+03	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Fluorene	2.29E+03	(1)	2.81E+02	(4)	2.81E+02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachlorobenzene	2.45E+00	(1)	2.48E-02	(4)	2.48E-02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	6.90E+00	(4)	6.90E+00	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachloroethane	6.11E+01	(1)	2.17E-01	(4)	2.17E-01	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	4.81E+00	(1)	4.81E+00	(1)	4.16E+01	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Isophorone	4.13E+03	(1)	2.08E+00	(4)	2.08E+00	(4)	mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Nitrobenzene	4.94E+01	(1)	7.72E-02	(4)	7.72E-02	(4)	mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-01	(3)	1.24E-04	(5)	1.24E-04	(5)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
N-Nitrosodiphenylamine	8.00E+02	(1)	1.45E+01	(4)	1.45E+01	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	2.07E+01	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	<0.80	<0.80	<0.80	<0.40	<0.40	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	9.39E+02	(4)	9.39E+02	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Phenol	1.83E+04	(1)	7.09E+01	(4)	7.09E+01	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Pyrene	1.72E+03	(1)	1.26E+03	(4)	1.26E+03	(4)	mg/Kg	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.09E-01	(5)	1.09E-01	(5)	mg/Kg	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<0.50
Fluoride	4.70E+03		4.70E+03		0.00E+00		mg/Kg	--	--	--	--	--	--	--
Chloride	-		0.00E+00		0.00E+00		mg/Kg	--	--	--	--	--	--	--
Sulfate	-		0.00E+00		0.00E+00		mg/Kg	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg														
Diesel Range Organics (DRO)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	**2800**	**3200**	**1400**	12	<10	<10	<10
Gasoline Range Organics (GRO)	--		--		--		mg/Kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	<500	<500	<500	<50	<50	<50	<50

-- 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 Above soil screening level

Table 7
SWMU No. 16 Soil Analytical Results Summary
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 16-1 (0-0.5')	SWMU 16-1 (1.5-2.0')	SWMU 16-1 (2-4')	SWMU 16-1 (18-22')	SWMU 16-2 (0-0.5')	SWMU 16-2 (1.5-2.0')	SWMU 16-2 (8-10')	SWMU 16-2 (18-20')	SWMU 16-3 (0-0.5')	SWMU 16-3 (1.5-2.0')	SWMU 16-3 (4-6')	SWMU 16-3 (18-20')	SWMU 16-4 (0-0.5')	SWMU 16-4 (1.5-2.0')	SWMU 16-4 (2-4')	SWMU 16-4 (20-22')	SWMU 16-5 (0-0.5')
							Lab Sample ID	1008811-01	1008811-02	1008811-03	1008811-04	1008B15-01	1008B15-02	1008B15-03	1008B15-04	1008B32-01	1008B32-02	1008B32-03	1008B32-04	1008B31-01	1008B31-02	1008B31-03	1008B31-04	1008B21-01
							Sample Date	8/18/2010	8/18/2010	8/18/2010	8/18/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/26/2010
Metals (mg/kg)																								
Aluminum	7.81E+04	(1)	7.81E+04	(2)	6.17E+05	(4)	mg/Kg	6400	1100	9100	5100	9700	14000	22000	7600	12000	10000	7200	5600	11000	10000	6100	4800	8800
Antimony	3.13E+01	(1)	7.44E+00	(4)	7.44E+00	(4)	mg/Kg	<2.5	<2.5	<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	<2.5
Arsenic	3.90E+00	(1)	1.48E-01	(4)	1.48E-01	(4)	mg/Kg	4.7	<5.0	4.4	2.6	2.7	20	9.4	<2.5	<13	3.7	2.9	<2.5	2.7	5.9	<2.5	<2.5	3.5
Barium	1.56E+04	(1)	3.39E+03	(4)	3.39E+03	(4)	mg/Kg	60	26	120	86	130	210	180	140	160	160	120	100	160	270	120	88	100
Beryllium	1.56E+02	(1)	1.56E+02	(1)	6.49E+02	(4)	mg/Kg	0.19	<0.15	0.19	0.16	0.31	<0.75	0.28	0.24	<0.75	0.29	0.23	0.19	0.33	0.36	0.21	<0.15	0.3
Boron	1.56E+04	(1)	2.70E+02	(4)	2.70E+02	(4)	mg/Kg	<2.0	<2.0	2.9	<2.0	<2.0	<10	<2.0	<10	<10	2.8	2.6	<2.0	2.6	3.3	2.1	<2.0	<2.0
Cadmium	7.79E+01	(1)	1.55E+01	(4)	1.55E+01	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium	1.13E+05	(1)	1.13E+05	(1)	1.11E+09	(4)	mg/Kg	3.7	2.1	5.1	3.8	7.7	11	39	5.1	11	7.3	4.1	3	7.6	6.4	4.4	2.5	5.4
Cobalt	2.30E+01	(2)	5.51E+00	(5)	5.51E+00	(5)	mg/Kg	1.5	0.64	1.6	2.1	2.7	3.9	3.7	2.6	4.3	2.5	1.9	1.6	3	3.1	2.1	2.3	2.3
Cyanide	1.56E+03	(1)	8.37E+01	(4)	8.37E+01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Copper	3.13E+03	(1)	5.79E+02	(4)	5.79E+02	(4)	mg/Kg	5.6	4.7	6.1	4.6	6.2	18	23	5.2	8.5	6.9	4.7	2.4	7.3	7.7	4.6	2.2	5.5
Iron	54800.00	(1)	7267.50	(4)	7267.50	(4)	mg/Kg	7700	4200	8500	8500	9700	11000	13000	9200	13000	10000	8700	6100	12000	9700	7900	6200	8400
Lead	4.00E+02	(1)	400.00	(4)	--		mg/Kg	2.5	0.87	3.4	2.1	3.2	4.6	8.4	2.7	6.1	3.8	2.4	2	4.7	3.8	2.1	1.6	2.7
Mercury	7.71E+00	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.16	0.034	<0.033	<0.033	<0.033	0.074	<0.033	<0.033	<0.033	<0.033
Manganese	1.80E+03	(2)	3.04E+00	(4)	3.04E+00	(4)	mg/Kg	93	43	93	150	200	220	210	190	230	180	150	110	220	180	160	150	180
Molybdenum	3.90E+02	(2)	4.16E+01	(4)	4.16E+01	(4)	mg/Kg	0.52	0.49	1.8	0.55	0.58	4.4	10	0.52	<2.0	0.86	0.77	<0.40	0.7	1.9	0.69	<0.40	0.58
Nickel	1.56E+03	(1)	5.36E+02	(4)	5.36E+02	(4)	mg/Kg	9.6	2.2	7.3	4.1	6	41	82	4.3	7.3	10	4.7	4.4	5.3	11	4.4	2.1	5.9
Selenium	3.91E+02	(1)	1.09E+01	(4)	1.09E+01	(4)	mg/Kg	<2.5	<2.5	<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	<2.5
Silver	3.91E+02	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Thallium	5.16E+00	(1)	1.94E+00	(4)	1.94E+00	(4)	mg/Kg	<2.5	<2.5	<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	<2.5
Uranium	2.35E+02	(1)	2.35E+02	(1)	5.51E+02	(5)	mg/Kg	<980	<490	<1000	<1000	<2500	<2400	<5000	<2500	<2500	<2500	<2500	<1000	<2500	<2500	<2500	<2500	<2400
Vanadium	3.91E+02	(1)	3.91E+02	(1)	2.05E+03	(4)	mg/Kg	15	3.7	22	21	20	330	160	15	24	32	13	10	26	91	14	9.8	21
Zinc	2.35E+04	(1)	7.67E+03	(4)	7.67E+03	(4)	mg/Kg	140	28	80	17	42	660	290	20	42	160	94	15	36	150	45	11	46
Volatile Organic Compounds - (EPA Method 8260) mg/kg																								
1,1,1,2-Tetrachloroethane	2.92E+01	(1)	1.94E-02	(4)	1.94E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,1,1-Trichloroethane	2.18E+04	(1)	3.35E+01	(4)	3.35E+01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,1,2,2-Tetrachloroethane	7.97E+00	(1)	2.53E-03	(4)	2.53E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,1,2-Trichloroethane	1.72E+01	(1)	7.58E-03	(4)	7.58E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,1-Dichloroethane	6.29E+01	(1)	6.85E-02	(4)	6.85E-02	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
1,1-Dichloroethene	6.18E+02	(1)	1.34E+00	(4)	1.34E+00	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,1-Dichloropropene	--		--		--		mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
1,2,3-Trichlorobenzene	--		--		--		mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
1,2,3-Trichloropropane	9.15E-01	(1)	4.01E-04	(4)	4.01E-04	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
1,2,4-Trichlorobenzene	1.43E+02	(1)	1.15E-01	(4)	1.15E-01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.70E-01	(5)	2.70E-01	(5)	mg/Kg	0.13	0.56	0.22	<0.0009744	<0.0009237	<0.050	0.15	<0.050	<0.050	<0.050	0.19	<0.050	<0.050	<0.0009422	0.77	<0.050	<0.0010463
1,2-Dibromo-3-chloropropane	1.94E-01	(1)	3.35E-05	(4)	3.35E-05	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
1,2-Dibromoethane (EDB)	5.74E-01	(1)	1.78E-04	(4)	1.78E-04	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,2-Dichloroethane (EDC)	7.74E+00	(1)	4.11E-03	(4)	4.11E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,2-Dichloropropane	1.47E+01	(1)	1.25E-02	(4)	1.25E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.25E-01	(5)	2.25E-01	(5)	mg/Kg	0.12	0.57	0.079	<0.0009744	<0.0009237	<0.050	0.067	<0.050	<0.050	<0.050	0.33	<0.050	<0.050	<0.0009422	6.1	<0.050	<0.0010463
1,3-Dichlorobenzene	--		--		--		mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,3-Dichloropropane	1.60E+03	(2)	3.04E+00	(5)	3.04E+00	(5)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
1-Methylnaphthalene	2.20E+02	(3)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	1.1	3.3	0.78	<0.1	<0.1	0.31	0.75	<0.20	<0.20	<0.20	0.74	<0.20	<0.20	<0.1	6.4	<0.20	<0.1
2,2-Dichloropropane	--		--		--		mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
2-Butanone (MEK)	3.96E+04	(1)	1.43E+01	(4)	1.43E+01	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.0009744	<0.0009237	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.0009422	<5.0	<0.50	<0.0010463
2-Chlorotoluene	1.56E+03	(1)	7.02E+00	(4)	7.02E+00	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
2-Hexanone	--		--		--		mg/Kg	<0.50	<0.50	<0.50	<0.0009744	<0.0009237	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.0009422	<5.0	<0.50	<0.0010463
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	0.51	1.4	0.8	<0.1	<0.1	0.23	0.99	<0.20	<0.20	<0.20	1.1	<0.20	<0.20	<0.1	2.4	<0.20	<0.1
4-Chlorotoluene	5.50E+03	(2)	3.15E+01	(5)	3.15E+01	(5)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
4-Isopropyltoluene	--		--		--		mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	0.13	<0.050	<0.050	<0.0009422	0.92	<0.050	<0.0010463
4-Methyl-2-pentanone	--		--		--		mg/Kg	<0.50	<0.50	<0.50	<0.0009744	<0.0009237	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.00102	<5.0	<0.50	0.00115
Acetone	6.75E+04	(1)	4.32E+01	(4)	4.32E+01	(4)	mg/Kg	<0.75	<0.75	<0.75	<0.0019488	<0.0018474	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.0018844	<7.5	<0.75	<0.0020926
Benzene	1.55E+01	(1)	2.08E-02	(4)	2.08E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Bromobenzene	9.40E+01	(2)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Bromodichloromethane	5.25E+00	(1)	3.11E-03	(4)	3.11E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Bromoform	6.10E+02	(3)	2.59E-02	(5)	2.59E-02	(5)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Bromomethane	2.23E+01	(1)	2.18E-02	(4)	2.18E-02	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463

Table 7
SWMU No. 16 Soil Analytical Results Summary
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 16-1 (0-0.5')	SWMU 16-1 (1.5-2.0')	SWMU 16-1 (2-4')	SWMU 16-1 (18-22')	SWMU 16-2 (0-0.5')	SWMU 16-2 (1.5-2.0')	SWMU 16-2 (8-10')	SWMU 16-2 (18-20')	SWMU 16-3 (0-0.5')	SWMU 16-3 (1.5-2.0')	SWMU 16-3 (4-6')	SWMU 16-3 (18-20')	SWMU 16-4 (0-0.5')	SWMU 16-4 (1.5-2.0')	SWMU 16-4 (2-4')	SWMU 16-4 (20-22')	SWMU 16-5 (0-0.5')
Carbon disulfide	1.94E+03	(1)	2.84E+00	(4)	2.84E+00	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.0009744	<0.0009237	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.0009422	<5.0	<0.50	<0.0010463
Carbon tetrachloride	4.38E+00	(1)	8.32E-03	(4)	8.32E-03	(4)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
Chlorobenzene	5.08E+02	(1)	6.06E-01	(4)	6.06E-01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Chloroethane	--		--		--		mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
Chloroform	5.72E+00	(1)	5.27E-03	(4)	5.27E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Chloromethane	3.56E+01	(1)	4.70E-02	(4)	4.70E-02	(4)	mg/Kg	**0.067**	**0.078**	**0.055**	<0.0009744	<0.0009237	<0.050	<0.050	**0.069**	**0.088**	**0.11**	**0.083**	**0.091**	**0.099**	<0.0009422	<0.50	**0.12**	<0.0010463
cis-1,2-DCE	7.82E+02	(1)	1.06E+00	(4)	1.06E+00	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
cis-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Dibromochloromethane	1.13E+01	(1)	3.80E-03	(4)	3.80E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Dibromomethane	7.80E+02	(2)	1.02E+00	(5)	1.02E+00	(5)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
Dichlorodifluoromethane	4.81E+02	(1)	8.14E+00	(4)	8.14E+00	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Ethylbenzene	6.97E+01	(1)	1.64E-01	(4)	1.64E-01	(4)	mg/Kg	<0.050	**0.14**	**0.059**	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<0.10	<0.10	<0.10	<0.0009744	<0.0009237	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
Isopropylbenzene	3.21E+03	(1)	1.11E+01	(4)	1.11E+01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Methyl tert-butyl ether (MTBE)	8.62E+02	(1)	2.58E-01	(4)	2.58E-01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Methylene chloride	1.99E+02	(1)	1.21E-01	(4)	1.21E-01	(4)	mg/Kg	<0.15	<0.15	<0.15	<0.0009744	<0.0009237	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.0009422	<1.5	<0.15	<0.0010463
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	**0.22**	**0.75**	**0.52**	<0.0009744	<0.0009237	**0.13**	**0.40**	<0.10	<0.10	<0.10	**0.51**	<0.10	<0.10	<0.0009422	<1.0	<0.10	<0.0010463
n-Butylbenzene	--		--		--		mg/Kg	<0.050	**0.12**	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	**0.43**	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
n-Propylbenzene	--		--		--		mg/Kg	<0.050	**0.064**	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
sec-Butylbenzene	--		--		--		mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Styrene	8.97E+03	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
tert-Butylbenzene	--		--		--		mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Tetrachloroethene (PCE)	6.99E+00	(1)	5.05E-03	(4)	5.05E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Toluene	5.57E+03	(1)	1.56E+01	(4)	1.56E+01	(4)	mg/Kg	**0.055**	**0.39**	**0.12**	<0.0009744	<0.0009237	**0.10**	**0.052**	<0.050	<0.050	<0.050	**0.15**	<0.050	<0.050	<0.0009422	<0.50	<0.050	**0.00197**
trans-1,2-DCE	2.73E+02	(1)	3.39E-01	(4)	3.39E-01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
trans-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Trichloroethene (TCE)	4.57E+01	(1)	5.96E-02	(4)	5.96E-02	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Trichlorofluoromethane	2.01E+03	(1)	1.01E+01	(4)	1.01E+01	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Vinyl chloride	8.65E-01	(1)	3.24E-03	(4)	3.24E-03	(4)	mg/Kg	<0.050	<0.050	<0.050	<0.0009744	<0.0009237	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0009422	<0.50	<0.050	<0.0010463
Xylenes, Total	1.09E+03	(1)	1.98E+00	(4)	1.98E+00	(4)	mg/Kg	**0.13**	**0.86**	**0.42**	<0.0009744	<0.0009237	<0.10	**0.13**	<0.10	<0.10	<0.10	**0.37**	<0.10	<0.10	<0.0009422	<1.0	<0.10	**0.00128**
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	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
1,3-Dichlorobenzene	--		--		--		mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
2,4,5-Trichlorophenol	6.11E+03	(1)	8.02E+01	(4)	8.02E+01	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
2,4,6-Trichlorophenol	6.11E+01	(1)	8.02E-01	(4)	8.02E-01	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
2,4-Dichlorophenol	1.83E+02	(1)	1.54E+00	(4)	1.54E+00	(4)	mg/Kg	<2.0	<2.0	--	--	--	--	--	--	<0.80	--	<0.80	--	<0.80	--	<0.80	--	--
2,4-Dimethylphenol	1.22E+03	(1)	1.03E+01	(4)	1.03E+01	(4)	mg/Kg	<1.5	<1.5	--	--	--	--	--	--	<0.60	--	<0.60	--	<0.60	--	<0.60	--	--
2,4-Dinitrophenol	1.22E+02	(1)	5.91E-01	(4)	5.91E-01	(4)	mg/Kg	<2.0	<2.0	--	--	--	--	--	--	<0.80	--	<0.80	--	<0.80	--	<0.80	--	--
2,4-Dinitrotoluene	1.26E+01	(1)	1.75E-02	(4)	1.75E-02	(4)	mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
2,6-Dinitrotoluene	6.12E+01	(1)	3.00E-01	(4)	3.00E-01	(4)	mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
2-Chloronaphthalene	6.26E+03	(1)	1.52E+02	(4)	1.52E+02	(4)	mg/Kg	<1.3	<1.3	--	--	--	--	--	--	<0.50	--	<0.50	--	<0.50	--	<0.50	--	--
2-Chlorophenol	3.91E+02	(1)	1.72E+00	(4)	1.72E+00	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	**3.7**	**12**	--	--	--	--	--	--	<0.40	--	**3.8**	--	<0.40	--	**2.4**	--	--
2-Methylphenol	3.10E+03	(2)	2.25E+01	(5)	2.25E+01	(5)	mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
2-Nitroaniline	1.80E+02	(2)	3.71E-01	(5)	3.71E-01	(5)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
2-Nitrophenol	--		--		--		mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
3,3'-Dichlorobenzidine	8.71E+00	(1)	1.92E-01	(4)	1.92E-01	(4)	mg/Kg	<1.3	<1.3	--	--	--	--	--	--	<0.50	--	<0.50	--	<0.50	--	<0.50	--	--
3+4-Methylphenol	3.10E+02	(2)	2.14E+00	(5)	2.14E+00	(5)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
3-Nitroaniline	--		--		--		mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
4,6-Dinitro-2-methylphenol	--		--		--		mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
4-Bromophenyl phenyl ether	--		--		--		mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
4-Chloro-3-methylphenol	--		--		--		mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
4-Chloroaniline	2.40E+01	(3)	1.35E-03	(5)	1.35E-03	(5)	mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
4-Chlorophenyl phenyl ether	--		--		--		mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
4-Nitroaniline	2.40E+02	(3)	1.13E-02	(5)	1.13E-02	(5)	mg/Kg	<1.3	<1.3	--	--	--	--	--	--	<0.50	--	<0.50	--	<0.50	--	<0.50	--	--
4-Nitrophenol	--		--		--		mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Acenaphthene	3.44E+03	(1)	2.31E+02	(4)	2.31E+02	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Acenaphthylene	--		--		--		mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Aniline	8.50E+02	(3)	3.83E-02	(5)	3.83E-02	(5)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Anthracene	1.72E+04	(1)	3.79E+03	(4)	3.79E+03	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--

Table 7
SWMU No. 16 Soil Analytical Results Summary
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 16-1 (0-0.5')	SWMU 16-1 (1.5-2.0')	SWMU 16-1 (2-4')	SWMU 16-1 (18-22')	SWMU 16-2 (0-0.5')	SWMU 16-2 (1.5-2.0')	SWMU 16-2 (8-10')	SWMU 16-2 (18-20')	SWMU 16-3 (0-0.5')	SWMU 16-3 (1.5-2.0')	SWMU 16-3 (4-6')	SWMU 16-3 (18-20')	SWMU 16-4 (0-0.5')	SWMU 16-4 (1.5-2.0')	SWMU 16-4 (2-4')	SWMU 16-4 (20-22')	SWMU 16-5 (0-0.5')
Azobenzene	4.90E+01	(3)	5.74E-03	(5)	5.74E-03	(5)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Benz(a)anthracene	4.81E+00	(1)	3.59E+00	(4)	3.59E+00	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Benzo(a)pyrene	4.81E-01	(1)	4.81E-01	(1)	1.22E+00	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Benzo(b)fluoranthene	4.81E+00	(1)	4.81E+00	(1)	1.25E+01	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Benzo(g,h,i)perylene	--		--		--		mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Benzo(k)fluoranthene	4.81E+01	(1)	4.81E+01	(1)	1.22E+02	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Benzoic acid	2.40E+05	(2)	3.71E+02	(5)	3.71E+02	(5)	mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
Benzyl alcohol	3.10E+04	(2)	4.73E+01	(5)	4.73E+01	(5)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Bis(2-chloroethoxy)methane	1.80E+02	(2)	2.59E-01	(5)	2.59E-01	(5)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Bis(2-chloroethyl)ether	2.56E+00	(1)	2.62E-04	(4)	2.62E-04	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	2.88E-02	(4)	2.88E-02	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Bis(2-ethylhexyl)phthalate	2.80E+02	(1)	1.34E+02	(4)	1.34E+02	(4)	mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
Butyl benzyl phthalate	2.60E+03	(3)	7.54E+00	(5)	7.54E+00	(5)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Carbazole	--		--		--		mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Chrysene	4.81E+02	(1)	3.67E+02	(4)	3.67E+02	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Dibenz(a,h)anthracene	4.81E-01	(1)	4.81E-01	(1)	4.07E+00	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Dibenzofuran	--		--		--		mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Diethyl phthalate	4.89E+04	(1)	1.19E+02	(4)	1.19E+02	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Dimethyl phthalate	6.11E+05	(1)	9.40E+02	(4)	9.40E+02	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Di-n-butyl phthalate	6.11E+03	(1)	9.70E+01	(4)	9.70E+01	(4)	mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
Di-n-octyl phthalate	--		--		--		mg/Kg	<1.3	<1.3	--	--	--	--	--	--	<0.50	--	<0.50	--	<0.50	--	<0.50	--	--
Fluoranthene	2.29E+03	(1)	1.75E+03	(4)	1.75E+03	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Fluorene	2.29E+03	(1)	2.81E+02	(4)	2.81E+02	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	**0.68**	--	--
Hexachlorobenzene	2.45E+00	(1)	2.48E-02	(4)	2.48E-02	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Hexachlorocyclopentadiene	3.67E+02	(1)	6.90E+00	(4)	6.90E+00	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Hexachloroethane	6.11E+01	(1)	2.17E-01	(4)	2.17E-01	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Indeno(1,2,3-cd)pyrene	4.81E+00	(1)	4.81E+00	(1)	4.16E+01	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Isophorone	4.13E+03	(1)	2.08E+00	(4)	2.08E+00	(4)	mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	**3.3**	**7.3**	--	--	--	--	--	--	<0.40	--	**1.8**	--	<0.40	--	**0.85**	--	--
Nitrobenzene	4.94E+01	(1)	7.72E-02	(4)	7.72E-02	(4)	mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
N-Nitrosodi-n-propylamine	6.90E-01	(3)	1.24E-04	(5)	1.24E-04	(5)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
N-Nitrosodiphenylamine	8.00E+02	(1)	1.45E+01	(4)	1.45E+01	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Pentachlorophenol	2.07E+01	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	<2.0	<2.0	--	--	--	--	--	--	<0.80	--	<0.80	--	<0.80	--	<0.80	--	--
Phenanthrene	1.83E+03	(1)	9.39E+02	(4)	9.39E+02	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	**0.6**	--	<0.40	--	**0.56**	--	--
Phenol	1.83E+04	(1)	7.09E+01	(4)	7.09E+01	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Pyrene	1.72E+03	(1)	1.26E+03	(4)	1.26E+03	(4)	mg/Kg	<1.0	<1.0	--	--	--	--	--	--	<0.40	--	<0.40	--	<0.40	--	<0.40	--	--
Pyridine	7.80E+01	(2)	1.09E-01	(5)	1.09E-01	(5)	mg/Kg	<2.5	<2.5	--	--	--	--	--	--	<1.0	--	<1.0	--	<1.0	--	<1.0	--	--
Fluoride	4.69E+03	(1)	4.69E+03	(1)	-		mg/Kg	<3.0	<6.0	<3.0	**1.1**	**2.3**	**3**	**2.7**	**3.5**	**2.7**	**2**	<3.0	**2.6**	**3.4**	**4.2**	**3.1**	**0.67**	**2.1**
Chloride	-		0.00E+00		-		mg/Kg	**30**	**79**	**96**	**52**	**27**	**39**	**110**	**150**	**43**	**60**	**60**	**69**	**9.6**	**67**	**65**	**5.5**	**5**
Sulfate	-		0.00E+00		-		mg/Kg	**6900**	**6600**	**9500**	**780**	**5700**	**11000**	**12000**	**2100**	**3000**	**3500**	**6500**	**2800**	**1700**	**5900**	**6400**	**180**	**6400**
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																								
Diesel Range Organics (DRO)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	**1300**	**1400**	**85**	<10	**32**	**41**	**94**	**19**	**110**	<10	**3900**	<10	**91**	<10	**5100**	<10	**24**
Motor Oil Range Organics (MRO)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	<500	<500	**53**	<50	**60**	<50	**89**	<50	**160**	<50	**800**	<50	**120**	<50	<2500	<50	<50
Gasoline Range Organics (GRO)	--		--		--		mg/Kg	<5.0	**7.2**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**7.4**	<5.0	<5.0	<5.0	<100	<5.0	<5.0

Table 7
SWMU No. 16 Soil Analytical Results Summary
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 16-5 (1.5-2.0')	SWMU 16-5 (12-14')	SWMU 16-5 (16-20')	SWMU 16-1-N (0-0.5')	SWMU-16-1-N (1.5-2.0')	SWMU-16-1-S (0-0.5')	SWMU-16-1-S (1.5-2.0')	SWMU-16-1-E- (0-0.5')	SWMU-16-1-E (1.5-2.0')	SWMU-16-1-W (0-0.5')	SWMU-16-1-W (1.5-2.0')
							Lab Sample ID	1008B21-02	1008B21-04	1008B21-05	1008C01-01	1008C01-02	1008C01-05	1008C01-06	1008C01-03	1008C01-04	1008C01-07	1008C01-08
							Sample Date	8/26/2010	8/26/2010	8/26/2010	8/18/2010	8/30/2010	8/30/2010	8/30/2010	8/30/2010	8/30/2010	8/30/2010	8/30/2010
Metals (mg/kg)																		
Aluminum	7.81E+04	(1)	7.81E+04	(2)	6.17E+05	(4)	mg/Kg	**8900**	**15000**	**7000**	--	--	--	--	--	--	--	--
Antimony	3.13E+01	(1)	7.44E+00	(4)	7.44E+00	(4)	mg/Kg	<2.5	**3.3**	<2.5	--	--	--	--	--	--	--	--
Arsenic	3.90E+00	(1)	1.48E-01	(4)	1.48E-01	(4)	mg/Kg	**2.7**	**15**	<2.5	--	--	--	--	--	--	--	--
Barium	1.56E+04	(1)	3.39E+03	(4)	3.39E+03	(4)	mg/Kg	**100**	**38**	**99**	--	--	--	--	--	--	--	--
Beryllium	1.56E+02	(1)	1.56E+02	(1)	6.49E+02	(4)	mg/Kg	**0.29**	<0.15	**0.24**	--	--	--	--	--	--	--	--
Boron	1.56E+04	(1)	2.70E+02	(4)	2.70E+02	(4)	mg/Kg	**2.1**	<2.0	**2**	--	--	--	--	--	--	--	--
Cadmium	7.79E+01	(1)	1.55E+01	(4)	1.55E+01	(4)	mg/Kg	<0.10	**1.5**	<0.10	--	--	--	--	--	--	--	--
Chromium	1.13E+05	(1)	1.13E+05	(1)	1.11E+09	(4)	mg/Kg	**5.4**	**12**	**5**	--	--	--	--	--	--	--	--
Cobalt	2.30E+01	(2)	5.51E+00	(5)	5.51E+00	(5)	mg/Kg	**2.5**	**1.5**	**2.4**	--	--	--	--	--	--	--	--
Cyanide	1.56E+03	(1)	8.37E+01	(4)	8.37E+01	(4)	mg/Kg	<0.50	<0.50	<0.50	--	--	--	--	--	--	--	--
Copper	3.13E+03	(1)	5.79E+02	(4)	5.79E+02	(4)	mg/Kg	**5.3**	**28**	**4.2**	--	--	--	--	--	--	--	--
Iron	54800.00	(1)	7267.50	(4)	7267.50	(4)	mg/Kg	**8900**	**8400**	**7700**	--	--	--	--	--	--	--	--
Lead	4.00E+02	(1)	400.00	(4)	--		mg/Kg	**2.7**	**12**	**2.3**	--	--	--	--	--	--	--	--
Mercury	7.71E+00	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	<0.033	**1.6**	<0.033	--	--	--	--	--	--	--	--
Manganese	1.80E+03	(2)	3.04E+00	(4)	3.04E+00	(4)	mg/Kg	**200**	**56**	**110**	--	--	--	--	--	--	--	--
Molybdenum	3.90E+02	(2)	4.16E+01	(4)	4.16E+01	(4)	mg/Kg	**0.5**	**6.7**	**0.56**	--	--	--	--	--	--	--	--
Nickel	1.56E+03	(1)	5.36E+02	(4)	5.36E+02	(4)	mg/Kg	**5.5**	**83**	**4**	--	--	--	--	--	--	--	--
Selenium	3.91E+02	(1)	1.09E+01	(4)	1.09E+01	(4)	mg/Kg	<2.5	<2.5	<2.5	--	--	--	--	--	--	--	--
Silver	3.91E+02	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.25	<0.25	<0.25	--	--	--	--	--	--	--	--
Thallium	5.16E+00	(1)	1.94E+00	(4)	1.94E+00	(4)	mg/Kg	<2.5	<2.5	<2.5	--	--	--	--	--	--	--	--
Uranium	2.35E+02	(1)	2.35E+02	(1)	5.51E+02	(5)	mg/Kg	<2500	<2500	<2400	--	--	--	--	--	--	--	--
Vanadium	3.91E+02	(1)	3.91E+02	(1)	2.05E+03	(4)	mg/Kg	**19**	**220**	**15**	--	--	--	--	--	--	--	--
Zinc	2.35E+04	(1)	7.67E+03	(4)	7.67E+03	(4)	mg/Kg	**29**	**170**	**17**	--	--	--	--	--	--	--	--
Volatile Organic Compounds - (EPA Method 8260) mg/kg																		
1,1,1,2-Tetrachloroethane	2.92E+01	(1)	1.94E-02	(4)	1.94E-02	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	2.18E+04	(1)	3.35E+01	(4)	3.35E+01	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	7.97E+00	(1)	2.53E-03	(4)	2.53E-03	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	1.72E+01	(1)	7.58E-03	(4)	7.58E-03	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,1-Dichloroethane	6.29E+01	(1)	6.85E-02	(4)	6.85E-02	(4)	mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--
1,1-Dichloroethene	6.18E+02	(1)	1.34E+00	(4)	1.34E+00	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,1-Dichloropropene	--		--		--		mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	--		--		--		mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	9.15E-01	(1)	4.01E-04	(4)	4.01E-04	(4)	mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	1.43E+02	(1)	1.15E-01	(4)	1.15E-01	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.70E-01	(5)	2.70E-01	(5)	mg/Kg	<0.0010005	**7.4**	<0.050	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	1.94E-01	(1)	3.35E-05	(4)	3.35E-05	(4)	mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	5.74E-01	(1)	1.78E-04	(4)	1.78E-04	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	7.74E+00	(1)	4.11E-03	(4)	4.11E-03	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,2-Dichloropropane	1.47E+01	(1)	1.25E-02	(4)	1.25E-02	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.25E-01	(5)	2.25E-01	(5)	mg/Kg	<0.0010005	**2.6**	<0.050	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	--		--		--		mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,3-Dichloropropane	1.60E+03	(2)	3.04E+00	(5)	3.04E+00	(5)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
1-Methylnaphthalene	2.20E+02	(3)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.1	**31**	<0.20	--	--	--	--	--	--	--	--
2,2-Dichloropropane	--		--		--		mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--
2-Butanone (MEK)	3.96E+04	(1)	1.43E+01	(4)	1.43E+01	(4)	mg/Kg	<0.0010005	<0.50	<0.50	--	--	--	--	--	--	--	--
2-Chlorotoluene	1.56E+03	(1)	7.02E+00	(4)	7.02E+00	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
2-Hexanone	--		--		--		mg/Kg	<0.0010005	<0.50	<0.50	--	--	--	--	--	--	--	--
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	<0.1	**49**	<0.20	--	--	--	--	--	--	--	--
4-Chlorotoluene	5.50E+03	(2)	3.15E+01	(5)	3.15E+01	(5)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
4-Isopropyltoluene	--		--		--		mg/Kg	<0.0010005	**0.29**	<0.050	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	--		--		--		mg/Kg	**0.00117**	<0.50	<0.50	--	--	--	--	--	--	--	--
Acetone	6.75E+04	(1)	4.32E+01	(4)	4.32E+01	(4)	mg/Kg	**0.0037**	<0.75	<0.75	--	--	--	--	--	--	--	--
Benzene	1.55E+01	(1)	2.08E-02	(4)	2.08E-02	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Bromobenzene	9.40E+01	(2)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Bromodichloromethane	5.25E+00	(1)	3.11E-03	(4)	3.11E-03	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Bromoform	6.10E+02	(3)	2.59E-02	(5)	2.59E-02	(5)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Bromomethane	2.23E+01	(1)	2.18E-02	(4)	2.18E-02	(4)	mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--

Table 7
SWMU No. 16 Soil Analytical Results Summary
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 16-5 (1.5-2.0')	SWMU 16-5 (12-14')	SWMU 16-5 (16-20')	SWMU 16-1-N (0-0.5')	SWMU-16-1-N (1.5-2.0')	SWMU-16-1-S (0-0.5')	SWMU-16-1-S (1.5-2.0')	SWMU-16-1-E- (0-0.5')	SWMU-16-1-E (1.5-2.0')	SWMU-16-1-W (0-0.5')	SWMU-16-1-W (1.5-2.0')
Carbon disulfide	1.94E+03	(1)	2.84E+00	(4)	2.84E+00	(4)	mg/Kg	<0.0010005	<0.50	<0.50	--	--	--	--	--	--	--	--
Carbon tetrachloride	4.38E+00	(1)	8.32E-03	(4)	8.32E-03	(4)	mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--
Chlorobenzene	5.08E+02	(1)	6.06E-01	(4)	6.06E-01	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Chloroethane	--		--		--		mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--
Chloroform	5.72E+00	(1)	5.27E-03	(4)	5.27E-03	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Chloromethane	3.56E+01	(1)	4.70E-02	(4)	4.70E-02	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
cis-1,2-DCE	7.82E+02	(1)	1.06E+00	(4)	1.06E+00	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Dibromochloromethane	1.13E+01	(1)	3.80E-03	(4)	3.80E-03	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Dibromomethane	7.80E+02	(2)	1.02E+00	(5)	1.02E+00	(5)	mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	4.81E+02	(1)	8.14E+00	(4)	8.14E+00	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Ethylbenzene	6.97E+01	(1)	1.64E-01	(4)	1.64E-01	(4)	mg/Kg	<0.0010005	**0.14**	<0.050	--	--	--	--	--	--	--	--
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<0.0010005	<0.10	<0.10	--	--	--	--	--	--	--	--
Isopropylbenzene	3.21E+03	(1)	1.11E+01	(4)	1.11E+01	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	8.62E+02	(1)	2.58E-01	(4)	2.58E-01	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Methylene chloride	1.99E+02	(1)	1.21E-01	(4)	1.21E-01	(4)	mg/Kg	<0.0010005	<0.15	<0.15	--	--	--	--	--	--	--	--
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	<0.0010005	**8.8**	<0.10	--	--	--	--	--	--	--	--
n-Butylbenzene	--		--		--		mg/Kg	<0.0010005	**1.7**	<0.050	--	--	--	--	--	--	--	--
n-Propylbenzene	--		--		--		mg/Kg	<0.0010005	**0.23**	<0.050	--	--	--	--	--	--	--	--
sec-Butylbenzene	--		--		--		mg/Kg	<0.0010005	**0.22**	<0.050	--	--	--	--	--	--	--	--
Styrene	8.97E+03	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
tert-Butylbenzene	--		--		--		mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	6.99E+00	(1)	5.05E-03	(4)	5.05E-03	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Toluene	5.57E+03	(1)	1.56E+01	(4)	1.56E+01	(4)	mg/Kg	**0.00247**	**0.37**	<0.050	--	--	--	--	--	--	--	--
trans-1,2-DCE	2.73E+02	(1)	3.39E-01	(4)	3.39E-01	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	4.57E+01	(1)	5.96E-02	(4)	5.96E-02	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Trichlorofluoromethane	2.01E+03	(1)	1.01E+01	(4)	1.01E+01	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Vinyl chloride	8.65E-01	(1)	3.24E-03	(4)	3.24E-03	(4)	mg/Kg	<0.0010005	<0.050	<0.050	--	--	--	--	--	--	--	--
Xylenes, Total	1.09E+03	(1)	1.98E+00	(4)	1.98E+00	(4)	mg/Kg	**0.00116**	**2**	<0.10	--	--	--	--	--	--	--	--
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	--	<0.40	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	--		--		--		mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	6.11E+03	(1)	8.02E+01	(4)	8.02E+01	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	6.11E+01	(1)	8.02E-01	(4)	8.02E-01	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	1.83E+02	(1)	1.54E+00	(4)	1.54E+00	(4)	mg/Kg	--	<0.80	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	1.22E+03	(1)	1.03E+01	(4)	1.03E+01	(4)	mg/Kg	--	<0.60	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	1.22E+02	(1)	5.91E-01	(4)	5.91E-01	(4)	mg/Kg	--	<0.80	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	1.26E+01	(1)	1.75E-02	(4)	1.75E-02	(4)	mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	6.12E+01	(1)	3.00E-01	(4)	3.00E-01	(4)	mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	6.26E+03	(1)	1.52E+02	(4)	1.52E+02	(4)	mg/Kg	--	<0.50	--	--	--	--	--	--	--	--	--
2-Chlorophenol	3.91E+02	(1)	1.72E+00	(4)	1.72E+00	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	--	**16**	--	--	--	--	--	--	--	--	--
2-Methylphenol	3.10E+03	(2)	2.25E+01	(5)	2.25E+01	(5)	mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
2-Nitroaniline	1.80E+02	(2)	3.71E-01	(5)	3.71E-01	(5)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
2-Nitrophenol	--		--		--		mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
3,3´-Dichlorobenzidine	8.71E+00	(1)	1.92E-01	(4)	1.92E-01	(4)	mg/Kg	--	<0.50	--	--	--	--	--	--	--	--	--
3+4-Methylphenol	3.10E+02	(2)	2.14E+00	(5)	2.14E+00	(5)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
3-Nitroaniline	--		--		--		mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	--		--		--		mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	--		--		--		mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	--		--		--		mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
4-Chloroaniline	2.40E+01	(3)	1.35E-03	(5)	1.35E-03	(5)	mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	--		--		--		mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
4-Nitroaniline	2.40E+02	(3)	1.13E-02	(5)	1.13E-02	(5)	mg/Kg	--	<0.50	--	--	--	--	--	--	--	--	--
4-Nitrophenol	--		--		--		mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Acenaphthene	3.44E+03	(1)	2.31E+02	(4)	2.31E+02	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Acenaphthylene	--		--		--		mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Aniline	8.50E+02	(3)	3.83E-02	(5)	3.83E-02	(5)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Anthracene	1.72E+04	(1)	3.79E+03	(4)	3.79E+03	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--

Table 7
SWMU No. 16 Soil Analytical Results Summary
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 16-5 (1.5-2.0')	SWMU 16-5 (12-14')	SWMU 16-5 (16-20')	SWMU 16-1-N (0-0.5')	SWMU-16-1-N (1.5-2.0')	SWMU-16-1-S (0-0.5')	SWMU-16-1-S (1.5-2.0')	SWMU-16-1-E- (0-0.5')	SWMU-16-1-E (1.5-2.0')	SWMU-16-1-W (0-0.5')	SWMU-16-1-W (1.5-2.0')
Azobenzene	4.90E+01	(3)	5.74E-03	(5)	5.74E-03	(5)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Benz(a)anthracene	4.81E+00	(1)	3.59E+00	(4)	3.59E+00	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	4.81E-01	(1)	4.81E-01	(1)	1.22E+00	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	4.81E+00	(1)	4.81E+00	(1)	1.25E+01	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	--		--		--		mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	4.81E+01	(1)	4.81E+01	(1)	1.22E+02	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Benzoic acid	2.40E+05	(2)	3.71E+02	(5)	3.71E+02	(5)	mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
Benzyl alcohol	3.10E+04	(2)	4.73E+01	(5)	4.73E+01	(5)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	1.80E+02	(2)	2.59E-01	(5)	2.59E-01	(5)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Bis(2-chloroethyl)ether	2.56E+00	(1)	2.62E-04	(4)	2.62E-04	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	2.88E-02	(4)	2.88E-02	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl)phthalate	2.80E+02	(1)	1.34E+02	(4)	1.34E+02	(4)	mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	2.60E+03	(3)	7.54E+00	(5)	7.54E+00	(5)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Carbazole	--		--		--		mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Chrysene	4.81E+02	(1)	3.67E+02	(4)	3.67E+02	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	4.81E-01	(1)	4.81E-01	(1)	4.07E+00	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Dibenzofuran	--		--		--		mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Diethyl phthalate	4.89E+04	(1)	1.19E+02	(4)	1.19E+02	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	6.11E+05	(1)	9.40E+02	(4)	9.40E+02	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	6.11E+03	(1)	9.70E+01	(4)	9.70E+01	(4)	mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	--		--		--		mg/Kg	--	<0.50	--	--	--	--	--	--	--	--	--
Fluoranthene	2.29E+03	(1)	1.75E+03	(4)	1.75E+03	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Fluorene	2.29E+03	(1)	2.81E+02	(4)	2.81E+02	(4)	mg/Kg	--	**1.9**	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	2.45E+00	(1)	2.48E-02	(4)	2.48E-02	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	3.67E+02	(1)	6.90E+00	(4)	6.90E+00	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Hexachloroethane	6.11E+01	(1)	2.17E-01	(4)	2.17E-01	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	4.81E+00	(1)	4.81E+00	(1)	4.16E+01	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Isophorone	4.13E+03	(1)	2.08E+00	(4)	2.08E+00	(4)	mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	--	**4.2**	--	--	--	--	--	--	--	--	--
Nitrobenzene	4.94E+01	(1)	7.72E-02	(4)	7.72E-02	(4)	mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	6.90E-01	(3)	1.24E-04	(5)	1.24E-04	(5)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	8.00E+02	(1)	1.45E+01	(4)	1.45E+01	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Pentachlorophenol	2.07E+01	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	--	<0.80	--	--	--	--	--	--	--	--	--
Phenanthrene	1.83E+03	(1)	9.39E+02	(4)	9.39E+02	(4)	mg/Kg	--	**6.9**	--	--	--	--	--	--	--	--	--
Phenol	1.83E+04	(1)	7.09E+01	(4)	7.09E+01	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Pyrene	1.72E+03	(1)	1.26E+03	(4)	1.26E+03	(4)	mg/Kg	--	<0.40	--	--	--	--	--	--	--	--	--
Pyridine	7.80E+01	(2)	1.09E-01	(5)	1.09E-01	(5)	mg/Kg	--	<1.0	--	--	--	--	--	--	--	--	--
Fluoride	4.69E+03	(1)	4.69E+03	(1)	-		mg/Kg	**2.7**	<1.5	**3.3**	--	--	--	--	--	--	--	--
Chloride	-		0.00E+00		-		mg/Kg	**10**	**100**	**410**	--	--	--	--	--	--	--	--
Sulfate	-		0.00E+00		-		mg/Kg	**6300**	**8100**	**1000**	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																		
Diesel Range Organics (DRO)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	**35**	**8400**	**48**	**20**	**52**	<10	<10	**140**	**98**	**17**	**1900**
Motor Oil Range Organics (MRO)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	**58**	<5000	**53**	<50	<50	<50	<50	**200**	**76**	<50	<500
Gasoline Range Organics (GRO)	--		--		--		mg/Kg	<5.0	<25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10

-- 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,
(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

TABLE 8
Groundwater Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

	NMED	EPA		
Analyte	New Mexico WQCC Standards (ug/L)	EPA Screening Levels.Tap Water (ug/L)	TapW_key	MCL (ug/L)
Acenaphthene	-	**2200**	n	-
Acenaphthylene	-	-	-	-
Acetone	-	**22000**	n	-
Aluminum	-	**37000**	n	-
Aluminum, Dissolved	**5000**	37000	n	-
Aniline	-	**12**	c*	-
Anthracene	-	**11000**	n	-
Antimony	-	15	n	**6**
Arsenic	100	0.045	c	**10**
Azobenzene	-	**0.12**	c	-
Barium	**1000**	7300	n	2000
Benz(a)anthracene	-	**0.029**	c	-
Benzene	10	0.41	c	**5**
Benzo(a)pyrene	0.7	0.0029	c	**0.2**
Benzo(b)fluoranthene	-	**0.029**	c	-
Benzo(g,h,i)perylene	-	-	-	-
Benzo(k)fluoranthene	-	**0.29**	c	-
Benzoic acid	-	**150000**	n	-
Benzyl alcohol	-	**18000**	n	-
Beryllium	-	73	n	**4**
Bis(2-chloroethoxy)methane	-	**110**	n	-
Bis(2-chloroethyl)ether	-	**0.012**	c	-
Bis(2-chloroisopropyl)ether	-	-	-	-
Bis(2-ethylhexyl)phthalate	-	4.8	c	**6**
Boron	-	**7300**	n	-
Boron, Dissolved	**750**	7300	n	-
Bromobenzene	-	**20**	n	-
Bromodichloromethane	-	**0.12**	c	-
Bromoform	-	**8.5**	c*	-
Bromomethane	-	**8.7**	n	-
4-Bromophenyl phenyl ether	-	-	-	-
Butyl benzyl phthalate	-	**35**	c	-
2-Butanone (MEK)	-	**7100**	n	-
Cadmium	10	18	n	**5**
Carbazole	-	-	-	-
Carbon disulfide	-	**1000**	n	-
Carbon tetrachloride	10	0.2	c	**5**
Chlorobenzene	-	91	n	**100**
Chloroethane	-	-	-	-
Chloroform	**100**	0.19	c	-
Chloromethane	-	**190**	c	-
4-Chloro-3-methylphenol	-	-	-	-
4-Chloroaniline	-	**0.34**	c	-
4-Chlorophenyl phenyl ether	-	-	-	-
4-Chlorotoluene	-	**2600**	n	-
2-Chloronaphthalene	-	**2900**	n	-
2-Chlorophenol	-	**180**	n	-
2-Chlorotoluene	-	**730**	n	-
Chromium	**50**	55000	n	-
Chrysene	-	**2.9**	c	-

TABLE 8
Groundwater Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

Analyte	NMED	EPA		
	New Mexico WQCC Standards (ug/L)	EPA Screening Levels.Tap Water (ug/L)	TapW_key	MCL (ug/L)
Cobalt	**50**	11	n	-
Copper	-	1500	n	**1300**
Copper, Dissolved	**1000**	1500	n	1300
Cyanide	**200**	730	n	200
Dibenz(a,h)anthracene	-	**0.0029**	c	-
Dibenzofuran	-	-	-	-
Dibromochloromethane	-	**0.15**	c	-
cis-1,2-DCE	-	370	n	**70**
trans-1,2-DCE	-	110	n	**100**
cis-1,3-Dichloropropene	-	-	-	-
trans-1,3-Dichloropropene	-	**0.43**	c	-
Dibromomethane	-	**370**	n	-
1,2-Dibromo-3-chloropropane	-	0.00032	c	**0.2**
1,2-Dibromoethane (EDB)	0.1	0.0065	c	**0.05**
1,2-Dichlorobenzene	-	370	n	**600**
1,3-Dichlorobenzene	-	-	-	-
1,4-Dichlorobenzene	-	0.43	c	**75**
3,3´-Dichlorobenzidine	-	**0.15**	c	-
Dichlorodifluoromethane	-	**390**	n	-
1,1-Dichloroethane	**25**	2.4	c	-
1,2-Dichloroethane (EDC)	10	0.15	c	**5**
1,1-Dichloroethene	**5**	340	n	7
2,4-Dichlorophenol	-	**110**	n	-
1,2-Dichloropropane	-	0.39	c*	**5**
2,2-Dichloropropane	-	-	-	-
1,3-Dichloropropane	-	**730**	n	-
1,1-Dichloropropene	-	-	-	-
Diethyl phthalate	-	**29000**	n	-
Dimethyl phthalate	-	-	-	-
2,4-Dimethylphenol	-	**730**	n	-
4,6-Dinitro-2-methylphenol	-	-	-	-
2,4-Dinitrophenol	-	**73**	n	-
2,4-Dinitrotoluene	-	**0.22**	n	-
2,6-Dinitrotoluene	-	**37**	n	-
Di-n-butyl phthalate	-	-	-	-
Di-n-octyl phthalate	-	-	-	-
Ethylbenzene	750	1.5	c	**700**
Fluoranthene	-	**1500**	n	-
Fluorene	-	**1500**	n	-
Hexachlorobenzene	-	0.042	c	**1**
Hexachlorobutadiene	-	**0.86**	c*	-
Hexachlorocyclopentadiene	-	220	n	**50**
Hexachloroethane	-	**4.8**	c**	-
2-Hexanone	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	**0.029**	c	-
Iron, Total	-	**26000**	n	-
Iron, Dissolved	**1000**	26000	n	-
Isophorone	-	**71**	c	-
Isopropylbenzene (Cumene)	-	**680**	n	-
4-Isopropyltoluene	-	-	-	-

TABLE 8
Groundwater Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

	NMED	EPA		
Analyte	New Mexico WQCC Standards (ug/L)	EPA Screening Levels.Tap Water (ug/L)	TapW_key	MCL (ug/L)
Lead	50	-	-	**15**
Magnesium	-	-	-	-
Manganese, Total	-	**880**	n	-
Manganese, Dissolved	**200**	880	n	-
Mercury	**2**	0.57	n	2
Methyl tert-butyl ether (MTBE)	-	**12**	c	-
Methylene chloride	100	4.8	c	**5**
1-Methylnaphthalene	-	**2.3**	c	-
2-Methylnaphthalene	-	**150**	n	-
2-Methylphenol	-	**1800**	n	-
3+4-Methylphenol	-	**180**	n	-
4-Methyl-2-pentanone	-	-	-	-
Molybdenum, Total	-	**0.18**	n	-
Molybdenum, Dissolved	**1**	0.18	n	-
Naphthalene	-	**0.14**	c*	-
n-Butylbenzene	-	-	-	-
Nickel	**200**	730	n	-
2-Nitroaniline	-	**110**	n	-
3-Nitroaniline	-	-	-	-
4-Nitroaniline	-	**3.4**	c*	-
2-Nitrophenol	-	-	-	-
4-Nitrophenol	-	-	-	-
Nitrobenzene	-	**0.12**	c	-
N-Nitrosodimethylamine	-	**0.00042**	c	
N-Nitrosodi-n-propylamine	-	**0.0096**	c	-
N-Nitrosodiphenylamine	-	**14**	c	-
n-Propylbenzene	-	-	-	-
Pentachlorophenol	-	0.56	c	**1**
Phenanthrene	-	-	-	-
Phenol	**5**	11000	n	-
Pyrene	-	**1100**	n	-
Pyridine	-	**37**	n	-
sec-Butylbenzene	-	-	-	-
Selenium	**50**	180	n	50
Silver	**50**	180	n	-
Styrene	-	1600	n	**100**
tert-Butylbenzene	-	-	-	-
Tetrachloroethene (PCE)	20	0.11	c	**5**
1,1,1,2-Tetrachloroethane	-	**0.52**	c	-
Thallium	-	2.4	n	**2**
Toluene	**750**	2300	n	1000
1,2,3-Trichlorobenzene	-	-	-	-
1,2,4-Trichlorobenzene	-	8.2	n	**70**
2,4,5-Trichlorophenol	-	**3700**	n	-
2,4,6-Trichlorophenol	-	**6.1**	c**	-
1,2,3-Trichloropropane	-	**0.0096**	c	-
1,2,4-Trichlorobenzene	-	8.2	n	**70**
1,2,4-Trimethylbenzene	-	**15**	n	-
1,1,1-Trichloroethane	**60**	9100	n	200
1,1,2,2-Tetrachloroethane	**10**	0.067	c	-

TABLE 8
Groundwater Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

Analyte	NMED New Mexico WQCC Standards (ug/L)	EPA EPA Screening Levels.Tap Water (ug/L)	TapW_key	MCL (ug/L)
1,1,2-Trichloroethane	10	0.24	c	**5**
Trichloroethene (TCE)	100	1.7	c	**5**
Trichlorofluoromethane	-	**1300**	n	-
1,3,5-Trimethylbenzene	-	**12**	n	-
Uranium, Total	-	**110**	n	-
Uranium, Dissolved	**30**	110	n	-
Vanadium	-	**260**	n	-
Vinyl chloride	**1**	0.016	c	2
Xylenes, Total	**620**	200	n	10000
Zinc	**10000**	11000	n	-
General Chemistry				
Alkalinity	-	-	-	-
Bicarbonate	-	-	-	-
Carbonate	-	-	-	-
Calcium	-	-	-	-
Chloride	**250000**			
Fluoride	**1600**			
Nitrite	-	3700	n	**1000**
Nitrate (NO3 as N)	10000	58000	n	**10000**
Potassium	-	-	-	-
Sodium	-	-	-	-
Sulfate	**600000**	-	-	-
Total Dissolved Solids	**1000000**			
Motor Oil Range Organics (MRO)	**200**	-	-	-
Diesel Range Organics (DRO)	**200**	-	-	-
Gasoline Range Organics (GRO)	-	-	-	-

c - cancer, * = where n SL < 100X c SL, ** = where n SL < 10X c SL
n - noncancer
620 - Bolded value is applicable screening level
- no screenig value currently available
EPA - Regional Screening Levels (April 2009)
MCL - Maximum Contaminant Level from 40 CFR 141, Subpart b
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
ug/l - micrograms per liter

Table 9
Groundwater Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	SWMU 16-2 (GW)	SWMU 16-2 (GW) Dissolved	SWMU 16-3 (GW)	SWMU 16-3 (GW) Dissolved	SWMU 16-5 (GW)	MW-67	MW-67 (Dissolved)	MW-67	MW-67 (Dissolved)
			Lab Sample ID	1008B15-05	1008B15-05I	1008B32-05	1008B32-05H	1008B56-05	1009346-01	1009346-01I	1012113-01	1012113-01I
			Sample Date	8/25/2010	8/25/2010	8/26/2010	8/26/2010	8/26/2010	9/7/2010	9/7/2010	12/1/2010	12/1/2010
Metals												
Aluminum	37	(1)	mg/L	**920**	--	**320**	--	--	**15**	--	**0.78**	--
Aluminum, Dissolved	5	(3)	mg/L	**0.038**	--	**0.02**	--	--	<0.020		<0.020	
Antimony	0.006	(2)	mg/L	<0.010	--	<0.010	--	--	<0.0010	--	<0.005	--
Arsenic	0.01	(2)	mg/L	**0.29**	--	**0.061**	--	--	**0.0024**	--	<0.005	--
Barium	1	(3)	mg/L	**1.4**	--	**1.5**	--	--	**0.2**	--	**0.055**	--
Beryllium	0.004	(2)	mg/L	**0.026**	--	**0.0093**	--	--	<0.0030	--	<0.0030	--
Boron	7.3	(1)	mg/L	**0.46**	--	**0.55**	--	--	**0.14**	--	**0.15**	--
Boron, Dissolved	0.75	(3)	mg/L	**0.29**	--	**0.66**	--	--	**0.14**	--	**0.12**	
Cadmium	0.005	(2)	mg/L	<0.010	--	<0.0020	--	--	<0.0020	--	<0.0020	--
Calcium	-	-	mg/L	**740**	--	**860**	--	--	**180**	--	**160**	--
Chromium	0.05	(3)	mg/L	**0.71**	--	**0.17**	--	--	**0.0076**	--	<0.0060	--
Cobalt	0.05	(3)	mg/L	**0.25**	--	**0.088**	--	--	**0.0073**	--	<0.0060	--
Cyanide, Total	0.2	(3)	mg/L	<0.010	--	<0.020	--	--	<0.020	--	<0.005	--
Copper	1.3	(2)	mg/L	**0.73**	--	**0.17**	--	--	**0.0089**	--	<0.0060	--
Copper, Dissolved	1	(3)	mg/L	<0.0060	--	<0.00070	--	--	<0.0060		<0.0060	
Iron, Total	26	(1)	mg/L	**800**	--	**320**	--	--	**10**	--	**0.67**	--
Iron, Dissolved	1	(3)	mg/L	**2.7**	--	**45**	--	--	<0.020	--	<0.020	--
Lead	0.015	(2)	mg/L	**0.21**	--	**0.056**	--	--	<0.0050	--	<0.0050	--
Magnesium	-	-	mg/L	**200**	--	**170**	--	--	**37**	--	**35**	--
Manganese, Total	0.88	(1)	mg/L	**19**	--	**12**	--	--	**0.93**	--	**0.99**	--
Manganese, Dissolved	0.2	(3)	mg/L	**6.7**	--	**4.2**	--	--	**0.29**	--	**0.99**	--
Mercury	0.002	(3)	mg/L	**0.00081**	--	<0.0010	--	--	<0.00020	--	<0.00020	--
Molybdenum, Total	0.18	(1)	mg/L	**0.14**	--	**0.038**	--	--	<0.0080	--	<0.0080	--
Molybdenum, Dissolved	1	(3)	mg/L	**0.026**	--	**0.016**	--	--	<0.0080	--	<0.0080	--
Nickel	0.2	(3)	mg/L	**1.9**	--	**0.53**	--	--	<0.010	--	<0.010	--
Potassium, Dissolved	-	-	mg/L	**78**	--	**50**	--	--	**6.8**	--	**3.4**	--
Selenium	0.05	(3)	mg/L	**0.04**	--	<0.010	--	--	**0.0042**	--	<0.005	--
Silver	0.05	(3)	mg/L	<0.025	--	<0.0050	--	--	<0.0050	--	<0.0050	--
Sodium, Dissolved	-	-	mg/L	**340**	--	**630**	--	--	**87**	--	**76**	--
Thallium	0.002	(2)	mg/L	<0.010	--	<0.010	--	--	<0.0010	--	<0.005	--
Uranium, Total	0.11	(1)	mg/L	**0.056**	--	**0.012**	--	--	**0.012**	--	**0.01**	--
Uranium, Dissolved	0.03	(3)	mg/L	**0.0032**	--	**0.0041**	--	--	**0.012**	--	**0.013**	--
Vanadium	0.26	(1)	mg/L	**3.6**	--	**0.59**	--	--	<0.050	--	<0.050	--
Zinc	10	(3)	mg/L	**7.1**	--	**1.5**	--	--	**0.043**	--	<0.020	--
Volatile Organic Compounds - (EPA Method 8260)												
1,1,1,2-Tetrachloroethane	0.52	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,1,1-Trichloroethane	60	(3)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,1,2,2-Tetrachloroethane	10	(3)	µg/L	<2.0	--	<2.0	--	<10	<2.0	--	<2.0	--
1,1,2-Trichloroethane	5	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,1-Dichloroethane	25	(3)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,1-Dichloroethene	5	(3)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,1-Dichloropropene	-	-	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,2,3-Trichlorobenzene	-	-	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,2,3-Trichloropropane	0.0096	(1)	µg/L	<2.0	--	<2.0	--	<10	<2.0	--	<2.0	--
1,2,4-Trichlorobenzene	70	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,2,4-Trimethylbenzene	15	(1)	µg/L	<1.0	--	<1.0	--	**28**	<1.0	--	<1.0	--
1,2-Dibromo-3-chloropropane	0.2	(2)	µg/L	<2.0	--	<2.0	--	<10	<2.0	--	<2.0	--
1,2-Dibromoethane (EDB)	0.05	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,2-Dichlorobenzene	600	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,2-Dichloroethane (EDC)	5	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,2-Dichloropropane	5	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,3,5-Trimethylbenzene	12	(1)	µg/L	<1.0	--	<1.0	--	**8.9**	<1.0	--	<1.0	--

Table 9
Groundwater Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	SWMU 16-2 (GW)	SWMU 16-2 (GW) Dissolved	SWMU 16-3 (GW)	SWMU 16-3 (GW) Dissolved	SWMU 16-5 (GW)	MW-67	MW-67 (Dissolved)	MW-67	MW-67 (Dissolved)
			Lab Sample ID	1008B15-05	1008B15-05I	1008B32-05	1008B32-05H	1008B56-05	1009346-01	1009346-01I	1012113-01	1012113-01I
			Sample Date	8/25/2010	8/25/2010	8/26/2010	8/26/2010	8/26/2010	9/7/2010	9/7/2010	12/1/2010	12/1/2010
1,3-Dichlorobenzene	-	-	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,3-Dichloropropane	730	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1,4-Dichlorobenzene	75	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
1-Methylnaphthalene	2.3	(1)	µg/L	<4.0	--	<4.0	--	**36**	<4.0	--	<4.0	--
2,2-Dichloropropane	-	-	µg/L	<2.0	--	<2.0	--	<10	<2.0	--	<2.0	--
2-Butanone	7100	(1)	µg/L	<10	--	<10	--	<50	<10	--	<10	--
2-Chlorotoluene	730	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
2-Hexanone	-	-	µg/L	<10	--	<10	--	<50	<10	--	<10	--
2-Methylnaphthalene	150	(1)	µg/L	<4.0	--	<4.0	--	**66**	<4.0	--	<4.0	--
4-Chlorotoluene	2600	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
4-Isopropyltoluene	-	-	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
4-Methyl-2-pentanone	-	-	µg/L	<10	--	<10	--	<50	<10	--	<10	--
Acetone	22000	(1)	µg/L	**10**	--	<10	--	<50	<10	--	<10	--
Benzene	5	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Bromobenzene	20	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Bromodichloromethane	0.12	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Bromoform	8.5	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Bromomethane	8.7	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<3.0	--
Carbon disulfide	1000	(1)	µg/L	<10	--	<10	--	<50	<10	--	<10	--
Carbon Tetrachloride	5	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Chlorobenzene	100	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Chloroethane	-	-	µg/L	<2.0	--	<2.0	--	<10	<2.0	--	<2.0	--
Chloroform	100	(3)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Chloromethane	190	(1)	µg/L	<1.0	--	<1.0	--	**10**	<1.0	--	<3.0	--
cis-1,2-DCE	70	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
cis-1,3-Dichloropropene	-	-	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Dibromochloromethane	0.15	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Dibromomethane	370	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Dichlorodifluoromethane	390	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Ethylbenzene	700	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Hexachlorobutadiene	0.86	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Isopropylbenzene (Cumene)	680	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Methyl tert-butyl ether (MTBE)	12	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Methylene Chloride	5	(2)	µg/L	<3.0	--	<3.0	--	<15	<3.0	--	<3.0	--
Naphthalene	0.14	(1)	µg/L	<2.0	--	<2.0	--	**23**	<2.0	--	<2.0	--
n-Butylbenzene	-	-	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
n-Propylbenzene	-	-	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
sec-Butylbenzene	-	-	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Styrene	100	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
tert-Butylbenzene	-	-	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Tetrachloroethene (PCE)	5	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Toluene	750	(3)	µg/L	**1.7**	--	**1.2**	--	**8.3**	<1.0	--	<1.0	--
trans-1,2-DCE	100	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
trans-1,3-Dichloropropene	0.43	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Trichloroethene (TCE)	5	(2)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Trichlorofluoromethane	1300	(1)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Vinyl chloride	1	(3)	µg/L	<1.0	--	<1.0	--	<5.0	<1.0	--	<1.0	--
Xylenes, Total	620	(3)	µg/L	<1.5	--	**1.9**	--	**17**	<1.5	--	<1.5	--
Semi Volatile Organics - (EPA Method 8270)												
1,2,4-Trichlorobenzene	70	(2)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
1,2-Dichlorobenzene	600	(2)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
1,3-Dichlorobenzene	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
1,4-Dichlorobenzene	75	(2)	µg/L	<10	--	<10	--	<10	<10	--	<10	--

Table 9
Groundwater Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	SWMU 16-2 (GW)	SWMU 16-2 (GW) Dissolved	SWMU 16-3 (GW)	SWMU 16-3 (GW) Dissolved	SWMU 16-5 (GW)	MW-67	MW-67 (Dissolved)	MW-67	MW-67 (Dissolved)
			Lab Sample ID	1008B15-05	1008B15-05I	1008B32-05	1008B32-05H	1008B56-05	1009346-01	1009346-01I	1012113-01	1012113-01I
			Sample Date	8/25/2010	8/25/2010	8/26/2010	8/26/2010	8/26/2010	9/7/2010	9/7/2010	12/1/2010	12/1/2010
2,4,5-Trichlorophenol	3700	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
2,4,6-Trichlorophenol	6.1	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
2,4-Dichlorophenol	110	(1)	µg/L	<20	--	<20	--	<20	<20	--	<20	--
2,4-Dimethylphenol	730	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
2,4-Dinitrophenol	73	(1)	µg/L	<20	--	<20	--	<20	<20	--	<20	--
2,4-Dinitrotoluene	0.22	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
2,6-Dinitrotoluene	37	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
2-Chloronaphthalene	2900	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
2-Chlorophenol	180	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
2-Methylnaphthalene	150	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
2-Methylphenol	1800	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
2-Nitroaniline	110	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
2-Nitrophenol	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
3,3´-Dichlorobenzidine	0.15	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
3+4-Methylphenol	180	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
3-Nitroaniline	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
4,6-Dinitro-2-methylphenol	-	-	µg/L	<20	--	<20	--	<20	<20	--	<20	--
4-Bromophenyl phenyl ether	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
4-Chloro-3-methylphenol	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
4-Chloroaniline	0.34	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
4-Chlorophenyl phenyl ether	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
4-Nitroaniline	3.4	(1)	µg/L	<10	--	<10	--	<20	<20	--	<20	--
4-Nitrophenol	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Acenaphthene	2200	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Acenaphthylene	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Aniline	12	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Anthracene	11000	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Azobenzene	0.12	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Benz(a)anthracene	0.029	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Benzo(a)pyrene	0.2	(2)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Benzo(b)fluoranthene	0.029	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Benzo(g,h,i)perylene	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Benzo(k)fluoranthene	0.29	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Benzoic acid	150000	(1)	µg/L	<20	--	<20	--	<20	<20	--	<20	--
Benzyl alcohol	18000	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Bis(2-chloroethoxy)methane	110	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Bis(2-chloroethyl)ether	0.012	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Bis(2-chloroisopropyl)ether	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Bis(2-ethylhexyl)phthalate	6	(2)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Butyl benzyl phthalate	35	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Carbazole	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Chrysene	2.9	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Dibenz(a,h)anthracene	0.0029	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Dibenzofuran	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Diethyl phthalate	29000	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Dimethyl phthalate	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Di-n-butyl phthalate	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Di-n-octyl phthalate	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Fluoranthene	1500	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Fluorene	1500	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Hexachlorobenzene	1	(2)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Hexachlorobutadiene	0.86	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Hexachlorocyclopentadiene	50	(2)	µg/L	<10	--	<10	--	<10	<10	--	<10	--

Table 9
Groundwater Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	SWMU 16-2 (GW)	SWMU 16-2 (GW) Dissolved	SWMU 16-3 (GW)	SWMU 16-3 (GW) Dissolved	SWMU 16-5 (GW)	MW-67	MW-67 (Dissolved)	MW-67	MW-67 (Dissolved)
			Lab Sample ID	1008B15-05	1008B15-05I	1008B32-05	1008B32-05H	1008B56-05	1009346-01	1009346-01I	1012113-01	1012113-01I
			Sample Date	8/25/2010	8/25/2010	8/26/2010	8/26/2010	8/26/2010	9/7/2010	9/7/2010	12/1/2010	12/1/2010
Hexachloroethane	4.8	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Indeno(1,2,3-cd)pyrene	0.029	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Isophorone	71	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Naphthalene	0.14	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Nitrobenzene	0.12	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
N-Nitrosodimethylamine	0.00042	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
N-Nitrosodi-n-propylamine	0.0096	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
N-Nitrosodiphenylamine	14	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Pentachlorophenol	1	(2)	µg/L	<20	--	<20	--	<20	<20	--	<20	--
Phenanthrene	-	-	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Phenol	5	(3)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Pyrene	1100	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Pyridine	37	(1)	µg/L	<10	--	<10	--	<10	<10	--	<10	--
Inorganics												
Chloride	250	(3)	mg/L	**310**	**300**	**440**	**470**	**200**	**20**	**19**	**32**	**31**
Fluoride	1.6	(3)	mg/L	**0.11**	**0.11**	**1.3**	**1.1**	**0.16**	**0.9**	**0.9**	**0.93**	**0.74**
Nitrate (As N)+Nitrite (As N)	-		mg/L	**16**	--	**3**	--	--	**8.3**	--	--	--
Nitrogen, Nitrate (As N)	10	(3)	mg/L	--	--	--	--	**49**	--	--	**5.5**	--
Nitrogen, Nitrite (As N)	1	(2)	mg/L	--	--	--	--	<2.0	--	--	**0.33**	--
Sulfate	600	(3)	mg/L	**1400**	**1400**	**1800**	**2000**	**2700**	**210**	**200**	**660**	**650**
Alkalinity, Total (As CaCO3)	-	-	mg/L CaCO3	**440**	--	**830**	--	**390**	**460**	--	**420**	--
Bicarbonate	-	-	mg/L CaCO3	**440**	--	**830**	--	**390**	**460**	--	**420**	--
Carbonate	-	-	mg/L CaCO3	<2.0	--	<2.0	--	<2.0	<2.0	--	<2.0	--
Total Dissolved Solids	1000	(3)	mg/L	**2860**	--	**4230**	--	**5400**	**897**	--	**1410**	--
Total Petroleum Hydrocarbons												--
Diesel Range Organics (DRO)	1.72	(4)	mg/L	<0.20	--	<0.20	--	--	<0.20	--	**0.37**	--
Motor Oil Range Organics (MRO)	1.72	(4)	mg/L	<2.5	--	<2.5	--	--	<2.5	--	<2.5	--
Gasoline Range Organics (GRO)	-	-	mg/L	<0.050	--	<0.050	--	**0.46**	<0.050	--	<0.050	--

(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
(4) NMED TPH Screening Guidelines Oct. 2006 - "diesel #2/crankcase oil"
-- No screening level or analytical result available
4.2 highlighted value exceeds screening level

Table 10
General Groundwater Chemistry Parameters
Bloomfield Refinery - Bloomfield, New Mexico

Groundwater Data										Vapor Data		
Well	**Date**	**Well Volume**	**Temp (degrees C)**	**Specific Conductivity (umhos/cm)**	**Dissolved Oxygen (mg/L)**	**Dissolved Oxygen (%)**	**pH**	**ORP**	**TDS (ppm)**	**O_2 (%)**	**CO_2 (%)**	**PID (ppm)**
SWMU 16-2 (GW)	8/25/2010	0	17.17	3.102	1.82	17	6.77	14.4	NA	NA	NA	NA
SWMU 16-3 (GW)	8/26/2010	0	15.67	5.354	20.9	22	6.56	-2.3	NA	NA	NA	NA
SWMU 16-5 (GW)	8/26/2010	0	NM	NM	NM	NM	NM	NM	NA	NA	NA	NA
MW-67	9/7/2010	0	14.92	1.791	3.29	38	7.43	126.1	1196.1	18.2	1.4	0.9
		1	15.38	1.319	1.73	16.1	7.18	134.6	1051.5			
		2	15.21	1.28	2.71	33	7.11	129.6	896.3			
		3	15.23	1.241	2.6	23	7.07	119.1	889.1			
		4	15.2	1.257	2.71	27.8	7.01	123.1	890.2			
	12/1/2010	0	15.4	1.623	4.011	45.16	7.16	271	1182	18.6	0.9	0.2
		1	14.7	1.324	3.31	38.49	6.94	279	951.2			
		2	15.2	1.226	3.251	34.1	6.95	274	877.3			
		3	15.5	1.222	2.851	29.2	7.02	262	874.5			
		4	15.4	1.223	2.781	30.15	7.01	268	876.1			

ORP - oxidation-reduction potential

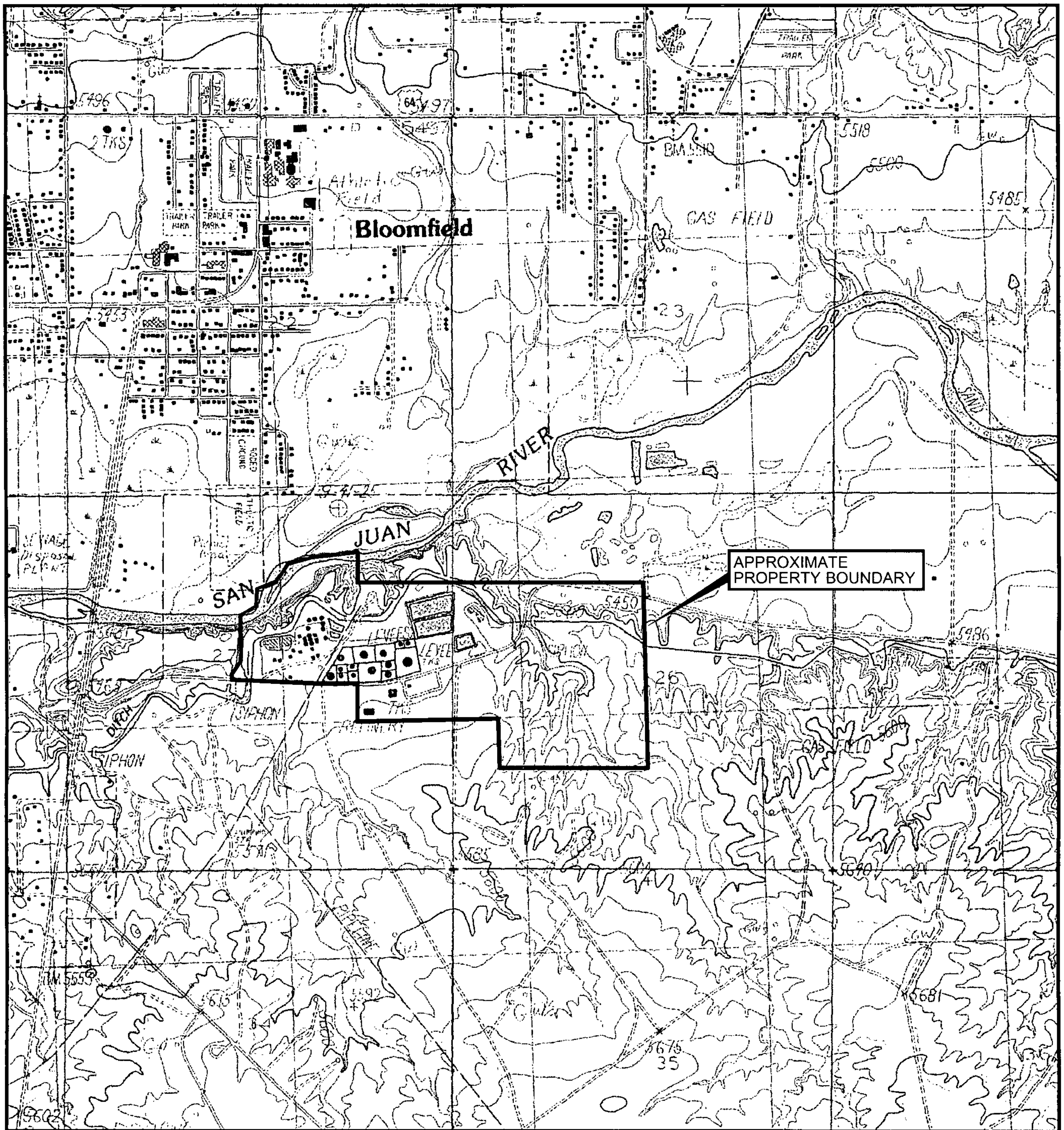
NM - not measured as insufficient water wolume to collect all required samples

Table 11
Water Level Measurements
Bloomfield Refinery - Bloomfield, New Mexico

Well	Date	Top of Casing [1]	Depth to Bottom (ft)	Depth to Water (ft)	Groundwater Elevation (ft/msl)
SWMU 16-2 (GW)	8/25/2010	5527.666	28	26.44	5501.226
SWMU 16-3 (GW)	8/26/2010	5527.314	28.26	25.5	5501.814
SWMU 16-5	8/26/2010	5523.499	23.45	22.15	5501.349
MW-67	9/7/2010	5523.312	26.27	20.98	5502.332
	12/1/2010	5523.312	26.31	21.41	5501.902

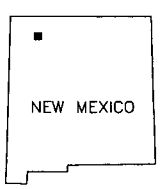
1 - Top of casing measured at ground level plus stickup for SWMU 16-2 (2.5'), 16-3 (3.0'), & 16-5 (2.75')

Figures



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

0 2000
SCALE IN FEET



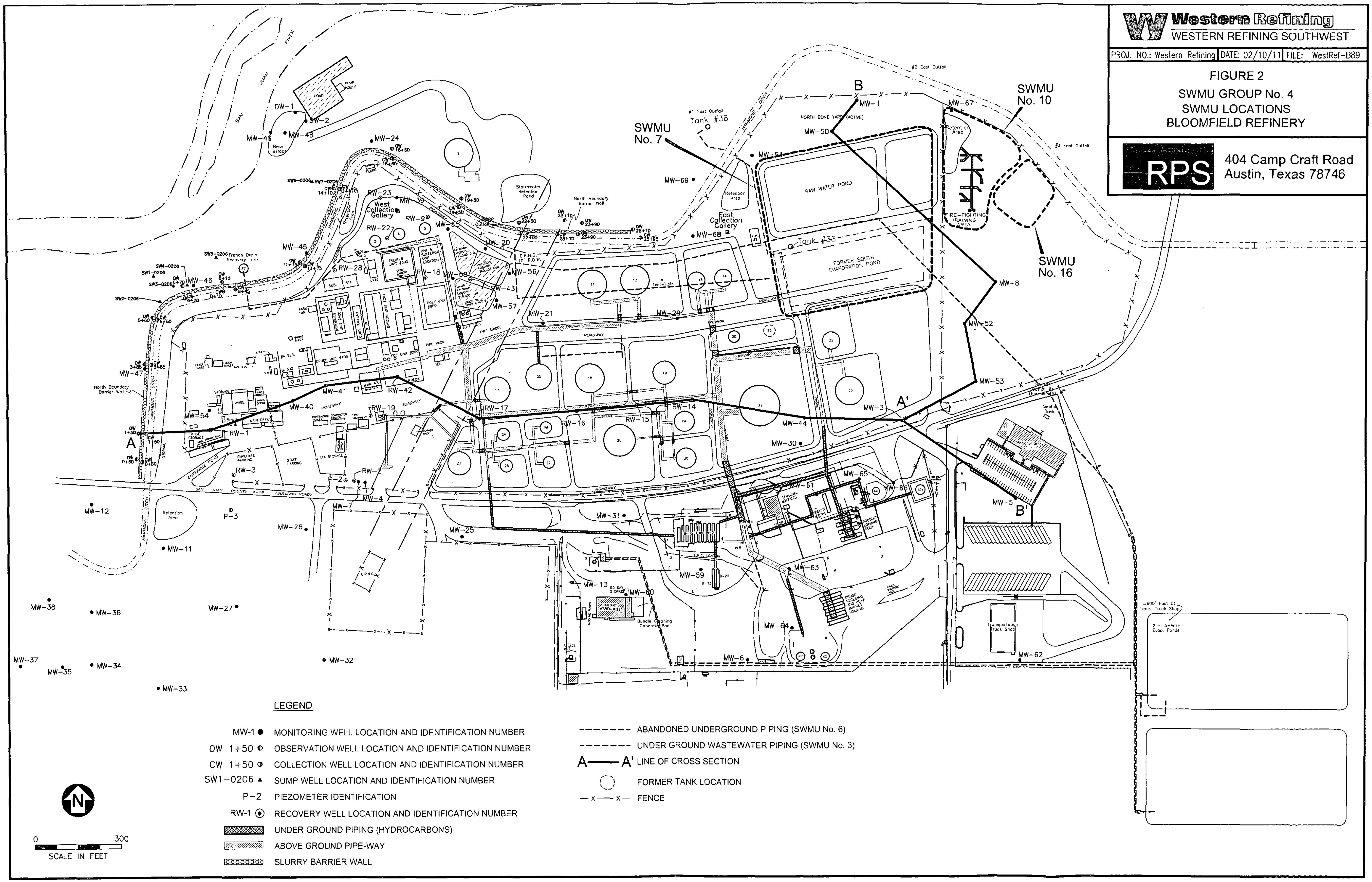
QUADRANGLE LOCATION

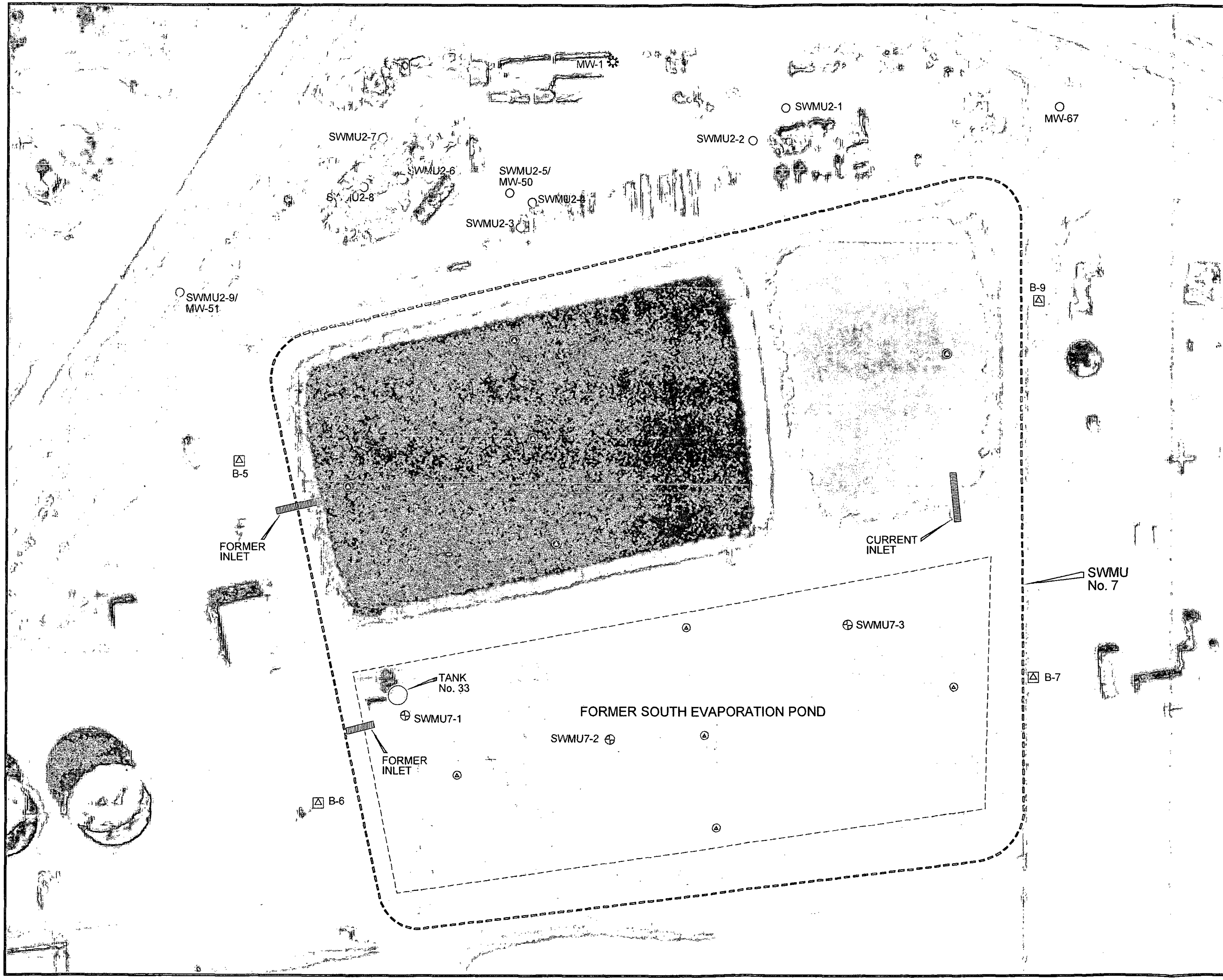
Western Refining
WESTERN REFINING SOUTHWEST

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

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746


Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining DATE: 02/10/11 FILE: WestRef-B89
FIGURE 2
SWMU GROUP No. 4
SWMU LOCATIONS
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746
SWMU No. 7
SWMU No. 10
SWMU No. 16
RAW WATER POND
FORMER SOUTH EVAPORATION POND
Tank #33
Tank #38
East Collection Gallery
West Collection Gallery
Stormwater Retention Pond
North Boundary Barrier Wall
SAN JUAN RIVER
HAMMOND DITCH
FIRE-FIGHTING TRAINING AREA
NORTH BONE YARD (ACTIVE)
Retention Area
River Terrace
#1 East Outfall
#2 East Outfall
#3 East Outfall
SAN JUAN COUNTY A-78 (SULLIVAN ROAD)
ROADWAY
PIPE BRIDGE
Transportation Truck Shop
±500' East Of Trans. Truck Shop
2 ~ 5-Acre Evap. Ponds
Bundle Cleaning Concrete Pad
A
A'
B
B'
LEGEND
MW-1 ● MONITORING 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
RW-1 RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
UNDER GROUND PIPING (HYDROCARBONS)
ABOVE GROUND PIPE-WAY
SLURRY BARRIER WALL
ABANDONED UNDERGROUND PIPING (SWMU No. 6)
UNDER GROUND WASTEWATER PIPING (SWMU No. 3)
A—A' LINE OF CROSS SECTION
FORMER TANK LOCATION
—x—x— FENCE
0 300
SCALE IN FEET



Aerial Map Source: Google Maps, 2008 DigitalGlobe.

N

0 80
SCALE IN FEET

LEGEND

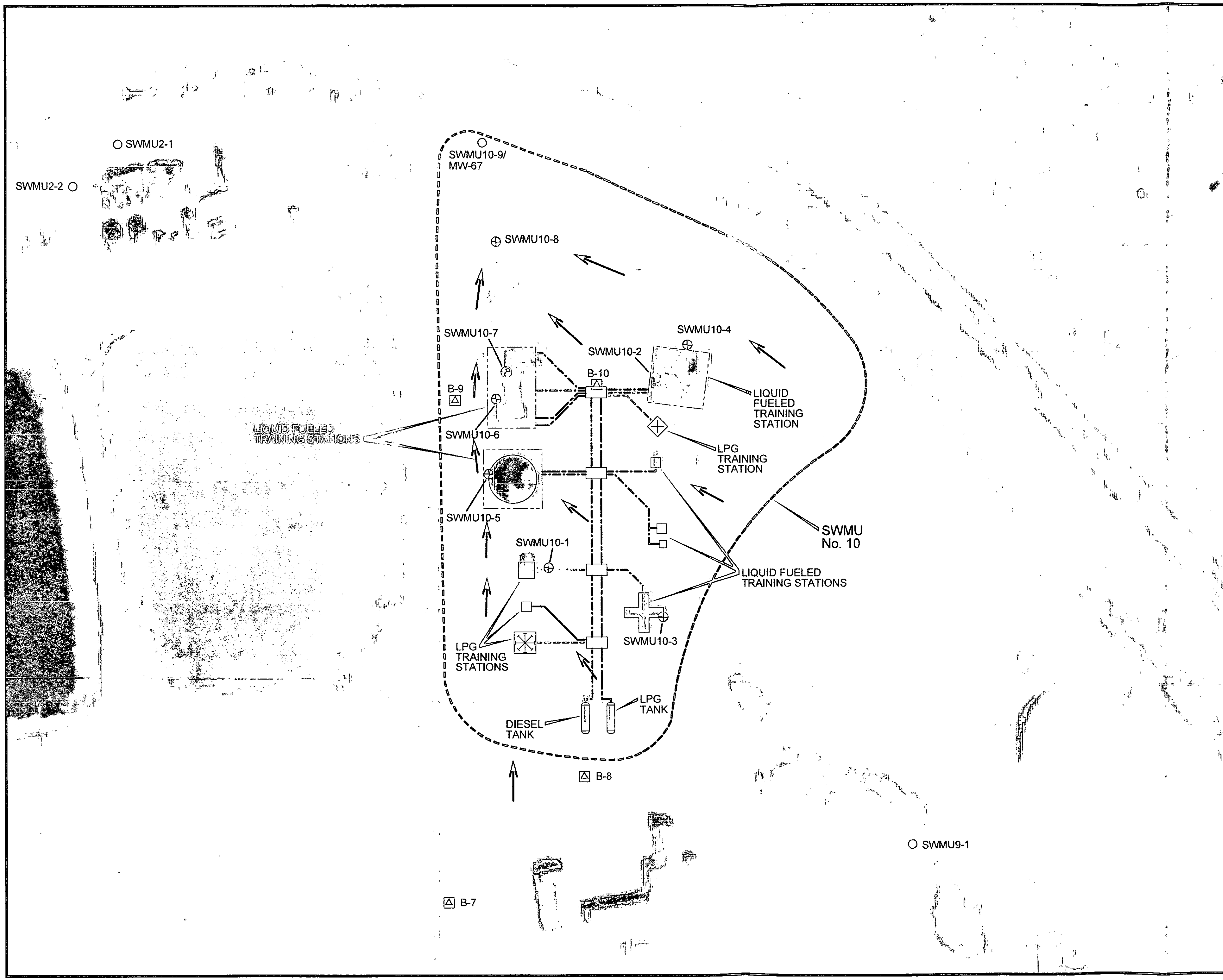
MW-1 PRE-RFI MONITORING WELL LOCATION
SWMU2-1 2008 RFI SAMPLE LOCATION
1996 SURFACE SOIL SAMPLE LOCATION
B-5 1994 RFI SOIL BORING LOCATION
SWMU7-1 2010 SOIL BORING LOCATION
EXTENT OF FORMER SOUTH EVAPORATION POND

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 02/10/11	FILE: WestRef-B90

FIGURE 3
SWMU No. 7
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Aerial Map Source: Google Maps, 2008 DigitalGlobe.

N

0 60
SCALE IN FEET

LEGEND

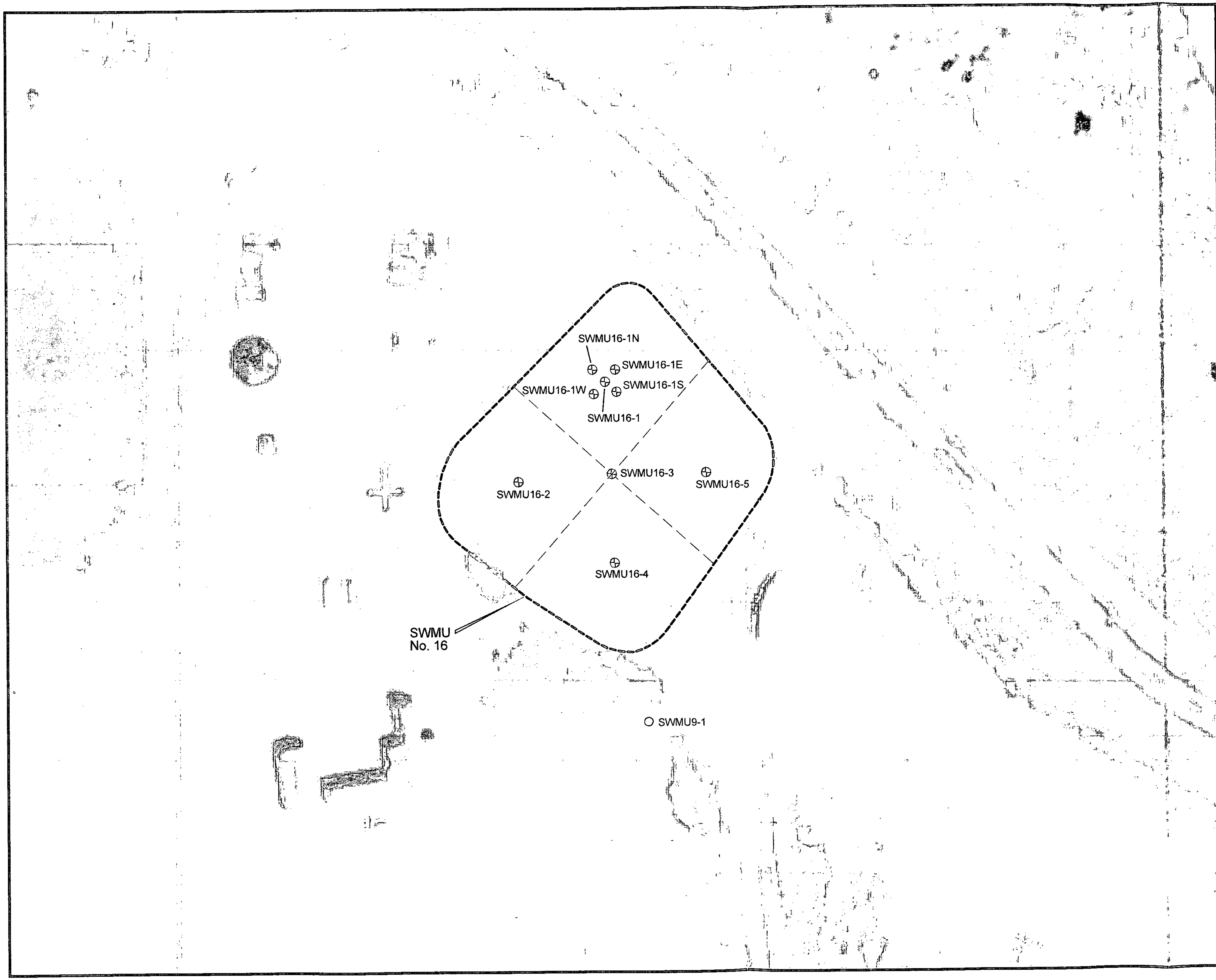
SWMU9-1 ○ 2008 RFI SAMPLE LOCATION
B-7 ◬ 1994 RFI SOIL BORING LOCATION
SWMU10-1 ⊕ 2010 SOIL BORING LOCATION
MW-67 ○ MONITORING WELL LOCATION
SURFACE WATER DRAINAGE
DIESEL PIPLINE
LPG PIPELINE
LPG/ DIESEL MIX PIPELINE

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/10/11 | FILE: WestRef-B91

FIGURE 4
SWMU No. 10
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Aerial Map Source: Google Maps, 2008 DigitalGlobe.

N

0 60
SCALE IN FEET

LEGEND

SWMU9-1 ○ 2008 RFI SAMPLE LOCATION

SWMU16-1 ⊕ 2010 SOIL BORING LOCATION

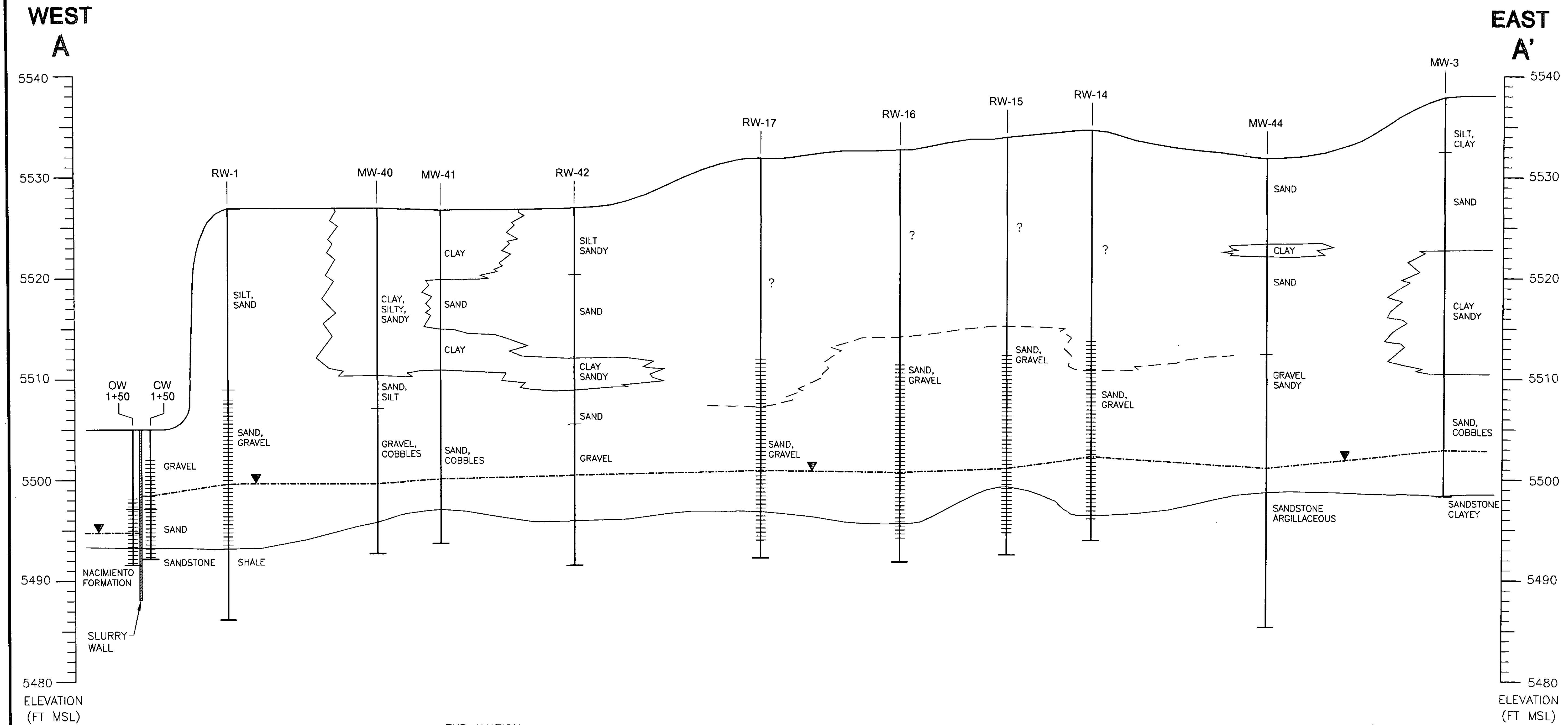
— — — — — QUADRANT DIVIDING LINE

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 02/10/11	FILE: WestRef–B92

FIGURE 5
SWMU No. 16
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



EXPLANATION

MW-3 ← WELL IDENTIFICATION

WELL

SCREEN INTERVAL

LITHOLOGIC CONTACTS

- POTENTIOMETRIC SURFACE MEASURED APRIL 12, 2010 (RECOVERY PUMPS OFF)

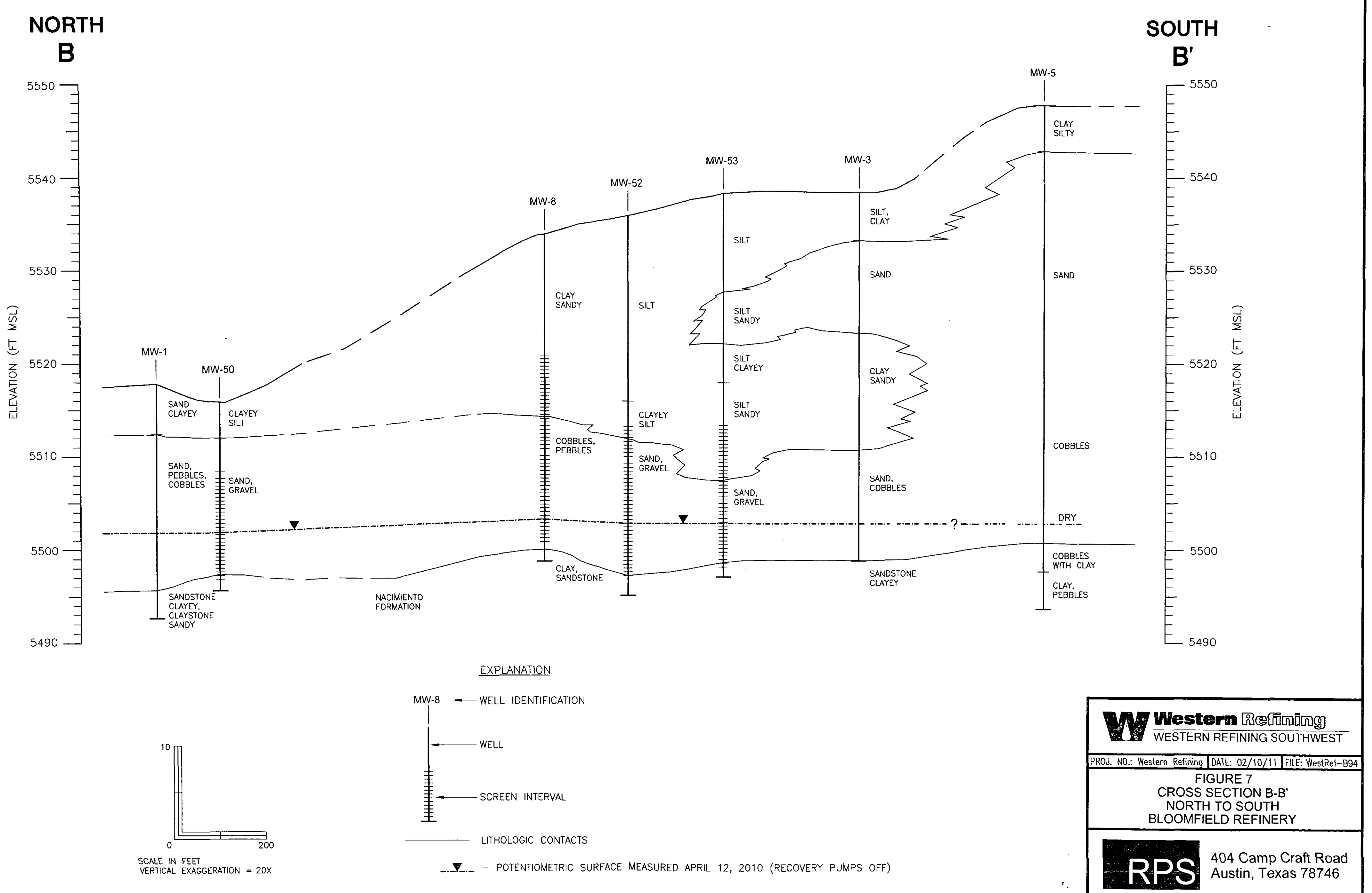
10
0
200
SCALE IN FEET
VERTICAL EXAGGERATION = 20X

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 02/10/11	FILE: WestRef-B93

FIGURE 6
CROSS SECTION A-A'
WEST TO EAST
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

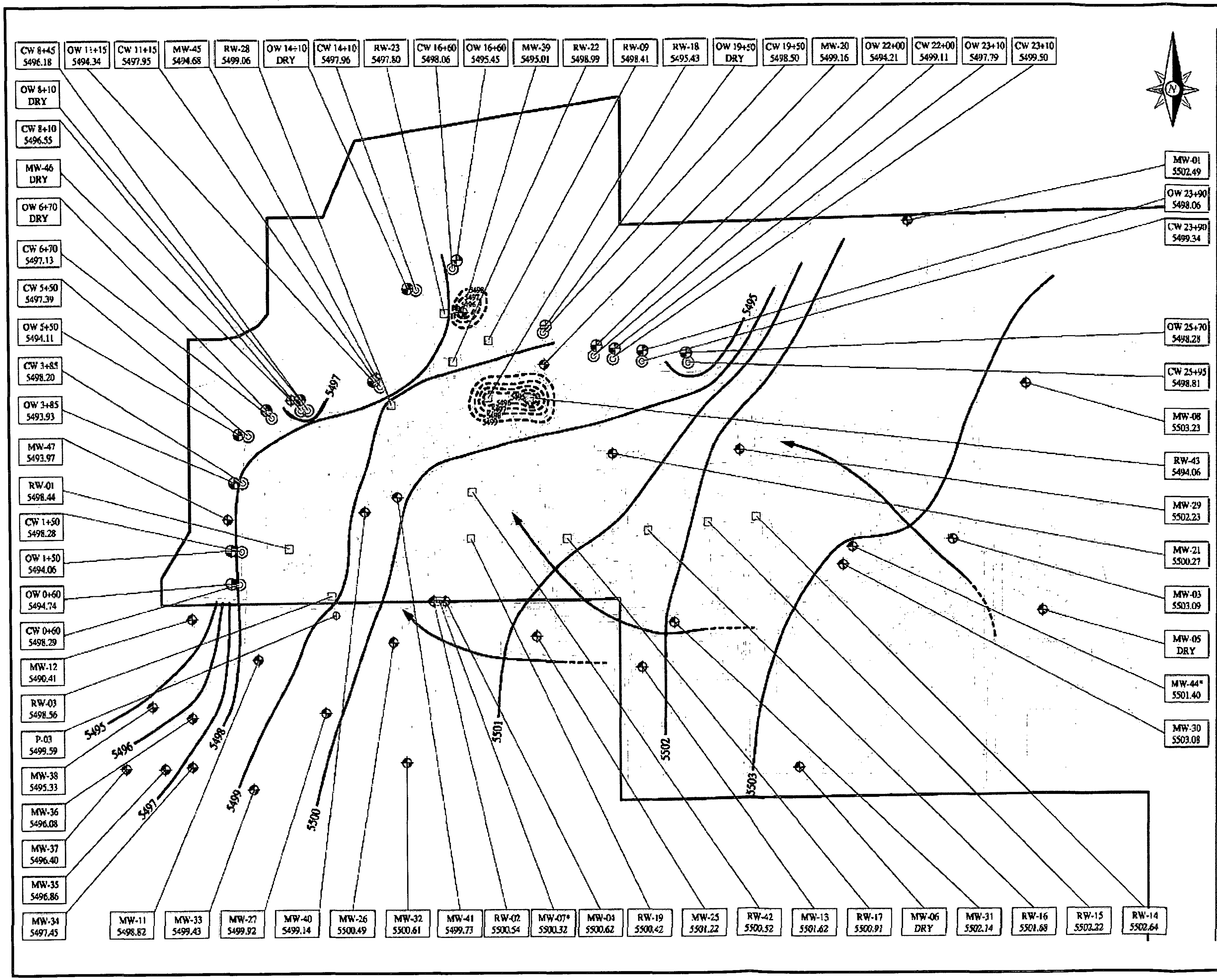


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 02/10/11	FILE: WestRef-B94

FIGURE 7
CROSS SECTION B-B'
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

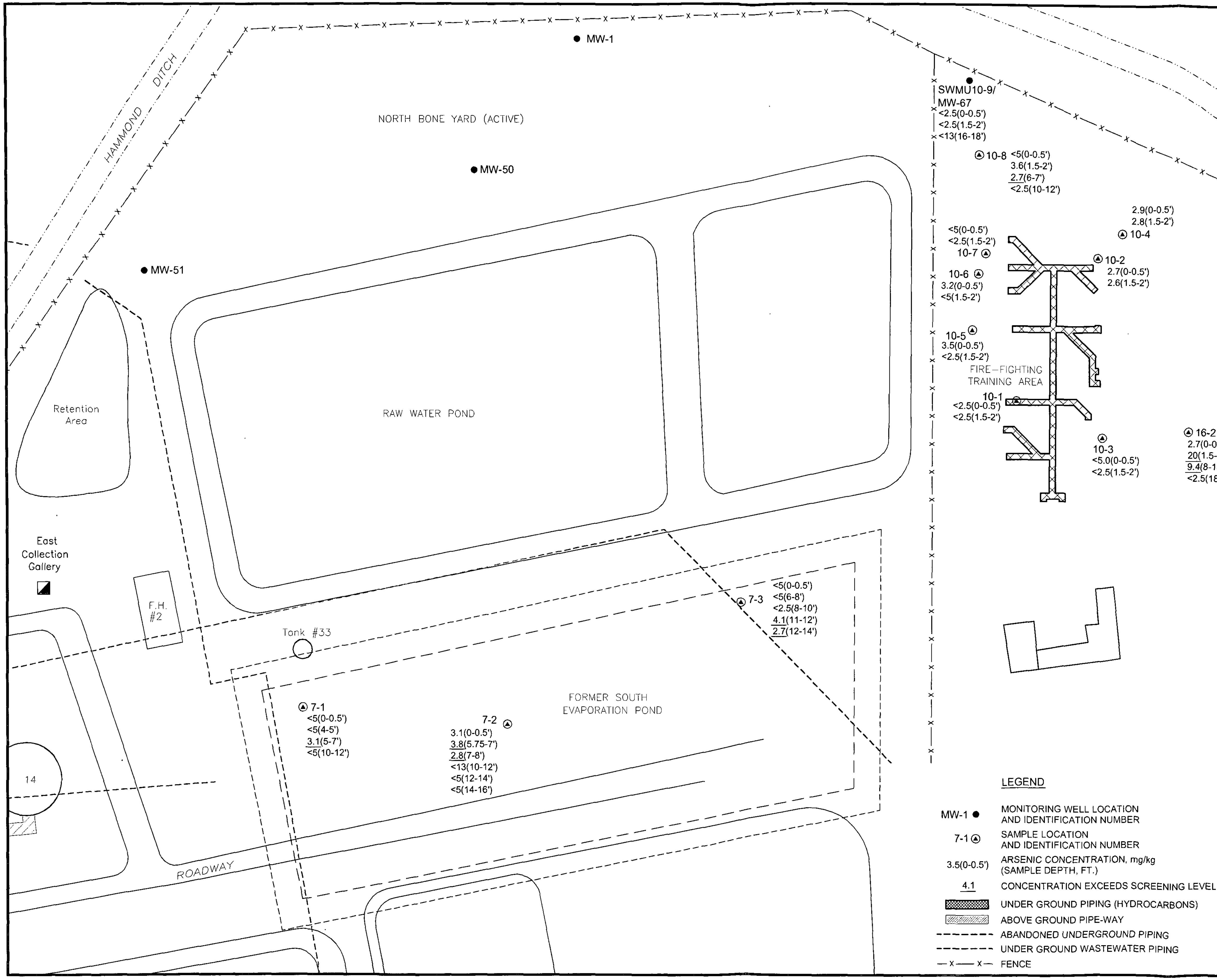
Western Refining
WESTERN REFINING SOUTHWEST

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

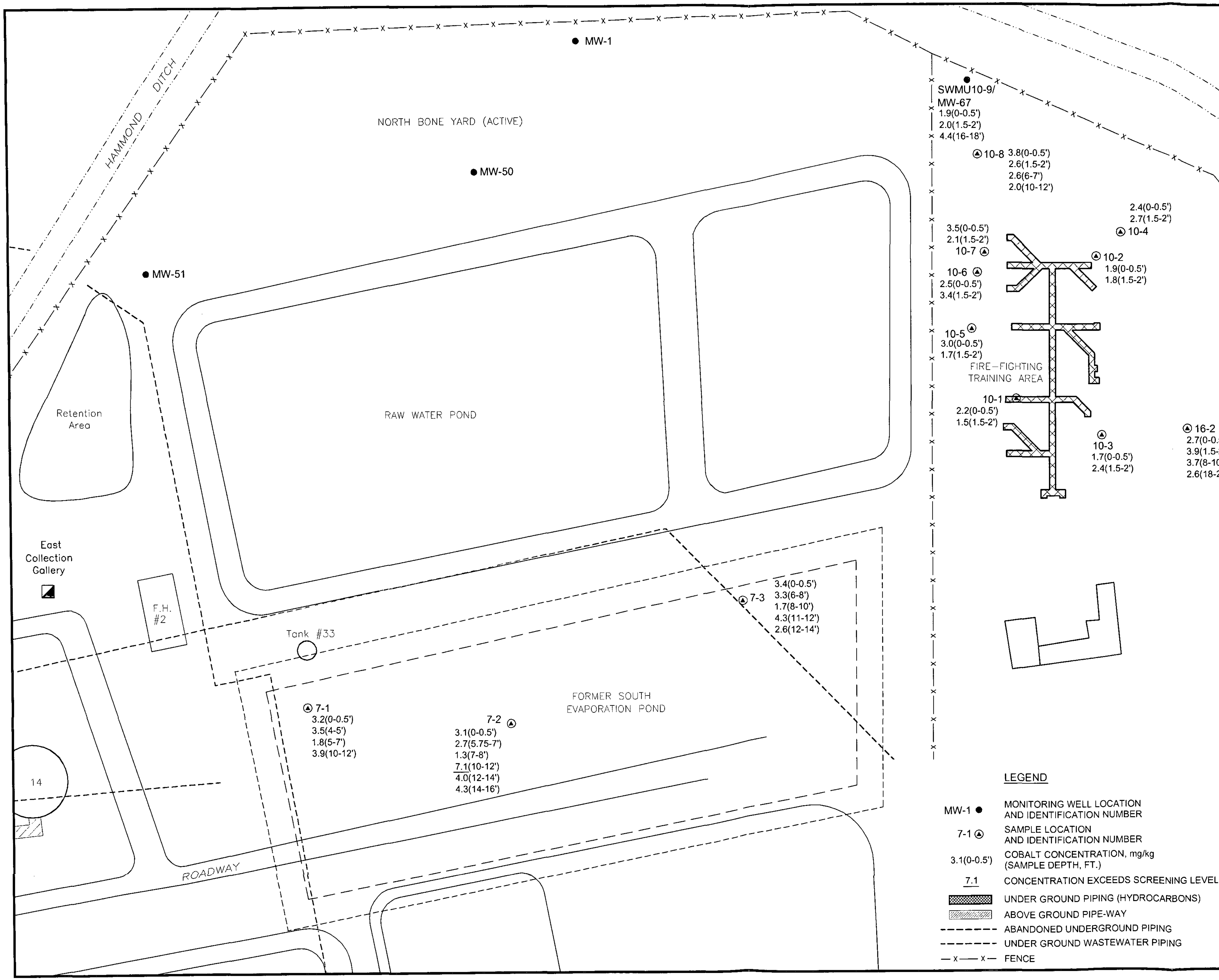


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 02/06/11	FILE: WestRef-B77

FIGURE 9
GROUP No. 4
ARSENIC SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

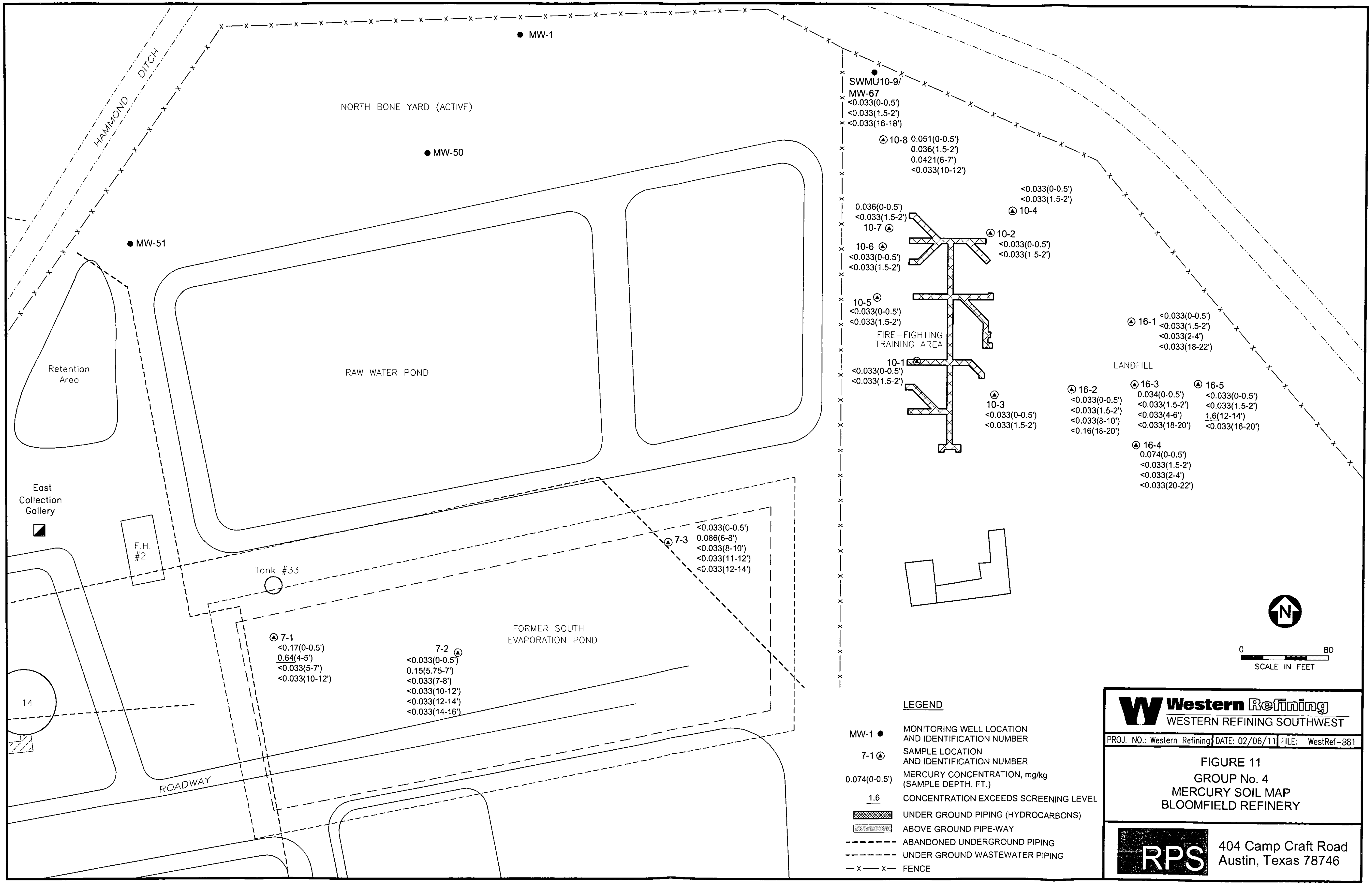


Western Refining
WESTERN REFINING SOUTHWEST

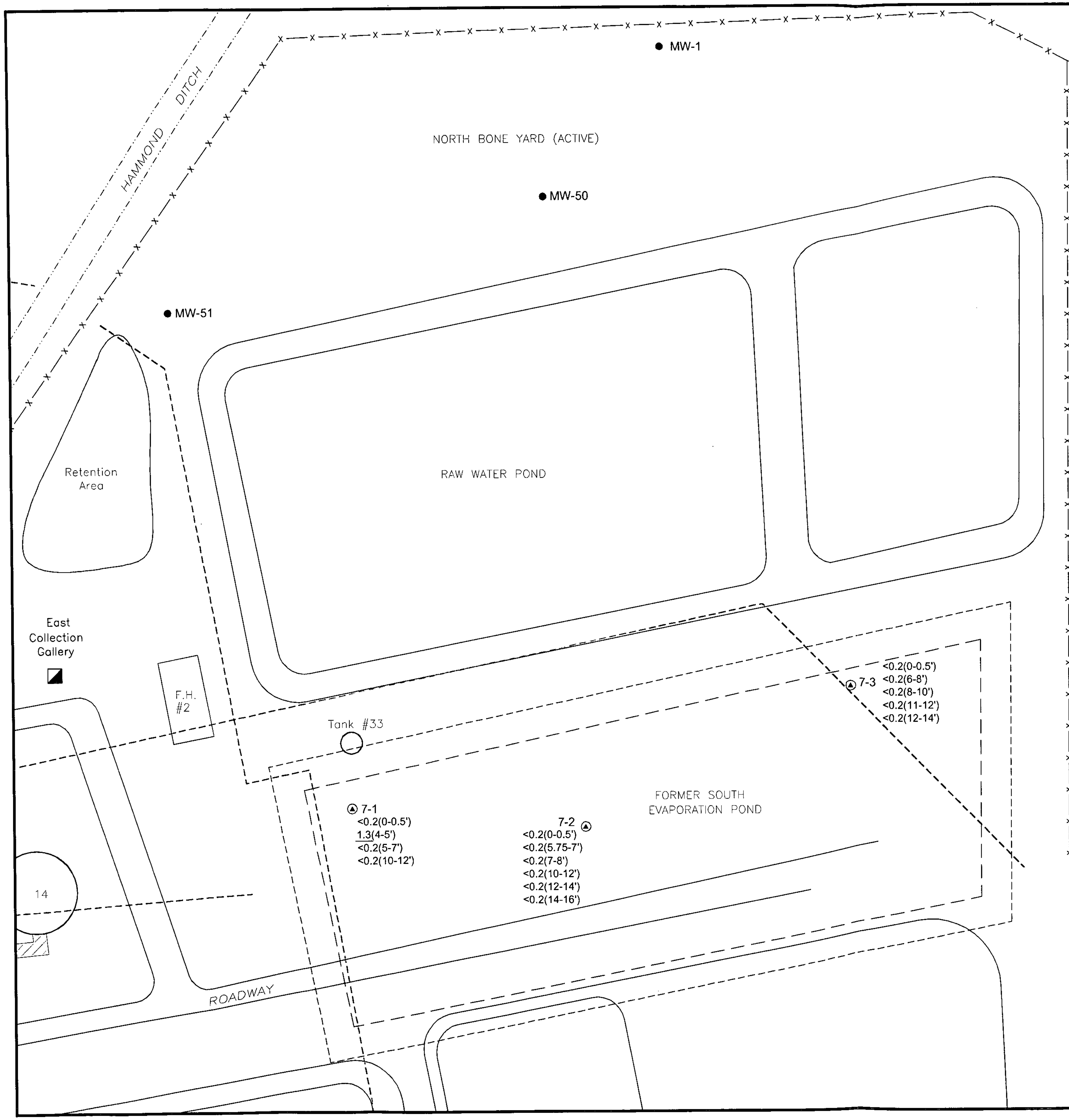
PROJ. NO.: Western Refining | DATE: 02/06/11 | FILE: WestRef-B78

FIGURE 10
GROUP No. 4
COBALT SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



MW-1
HAMMOND DITCH
NORTH BONE YARD (ACTIVE)
MW-50
MW-51
RAW WATER POND
Retention Area
East Collection Gallery
F.H. #2
Tank #33
14
ROADWAY
FORMER SOUTH EVAPORATION POND
7-1 <0.17(0-0.5') 0.64(4-5') <0.033(5-7') <0.033(10-12')
7-2 <0.033(0-0.5') 0.15(5.75-7') <0.033(7-8') <0.033(10-12') <0.033(12-14') <0.033(14-16')
7-3 <0.033(0-0.5') 0.086(6-8') <0.033(8-10') <0.033(11-12') <0.033(12-14')
SWMU10-9/ MW-67 <0.033(0-0.5') <0.033(1.5-2') <0.033(16-18')
10-8 0.051(0-0.5') 0.036(1.5-2') 0.0421(6-7') <0.033(10-12')
10-7 0.036(0-0.5') <0.033(1.5-2')
10-6 <0.033(0-0.5') <0.033(1.5-2')
10-5 <0.033(0-0.5') <0.033(1.5-2')
10-1 <0.033(0-0.5') <0.033(1.5-2')
10-4 <0.033(0-0.5') <0.033(1.5-2')
10-2 <0.033(0-0.5') <0.033(1.5-2')
10-3 <0.033(0-0.5') <0.033(1.5-2')
FIRE-FIGHTING TRAINING AREA
LANDFILL
16-1 <0.033(0-0.5') <0.033(1.5-2') <0.033(2-4') <0.033(18-22')
16-2 <0.033(0-0.5') <0.033(1.5-2') <0.033(8-10') <0.16(18-20')
16-3 0.034(0-0.5') <0.033(1.5-2') <0.033(4-6') <0.033(18-20')
16-5 <0.033(0-0.5') <0.033(1.5-2') 1.6(12-14') <0.033(16-20')
16-4 0.074(0-0.5') <0.033(1.5-2') <0.033(2-4') <0.033(20-22')
N
0 80
SCALE IN FEET
LEGEND
MW-1 MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 SAMPLE LOCATION AND IDENTIFICATION NUMBER
0.074(0-0.5') MERCURY CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
1.6 CONCENTRATION EXCEEDS SCREENING LEVEL
UNDER GROUND PIPING (HYDROCARBONS)
ABOVE GROUND PIPE-WAY
ABANDONED UNDERGROUND PIPING
UNDER GROUND WASTEWATER PIPING
FENCE
Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining DATE: 02/06/11 FILE: WestRef-B81
FIGURE 11
GROUP No. 4
MERCURY SOIL MAP
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

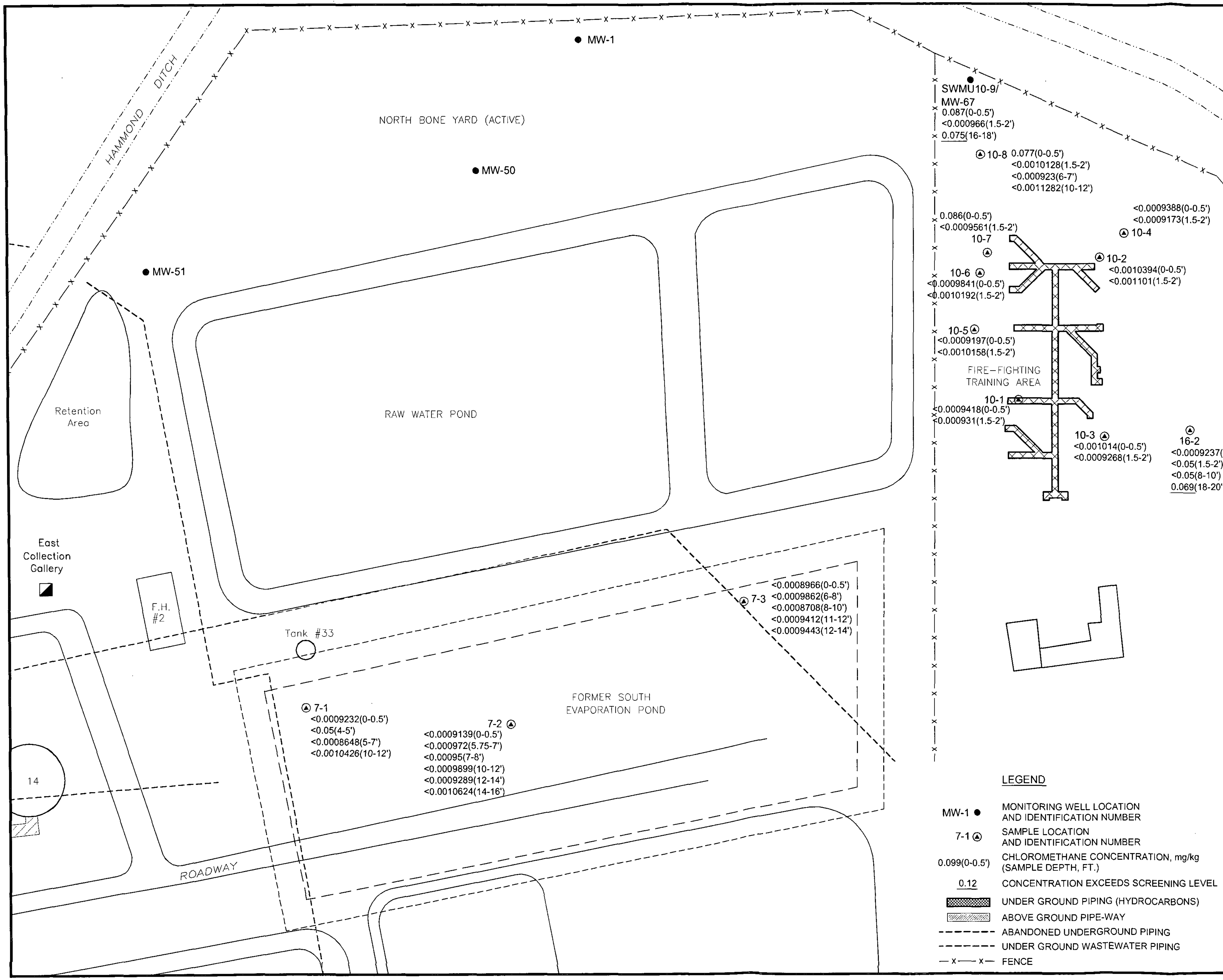
MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 ⊛	SAMPLE LOCATION AND IDENTIFICATION NUMBER
<0.2(0-0.5')	BENZO(A)PYRENE CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
1.3	CONCENTRATION EXCEEDS SCREENING LEVEL
NA	NOT ANALYZED
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
- - - - -	ABANDONED UNDERGROUND PIPING
- - - - -	UNDER GROUND WASTEWATER PIPING
—x—x—	FENCE

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/06/11 | FILE: WestRef-B85

FIGURE 12
GROUP No. 4
BENZO(A)PYRENE SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

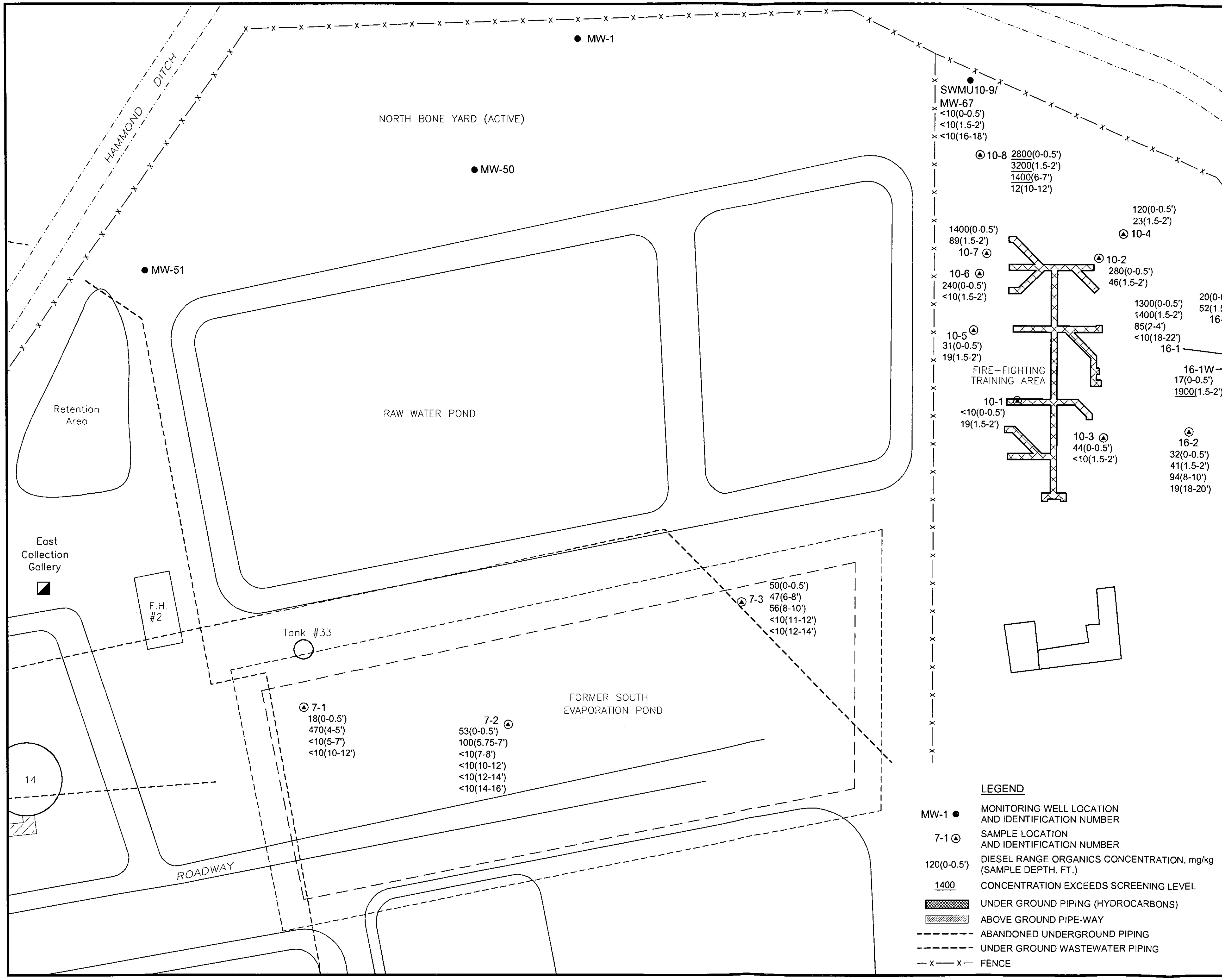


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/10/11 | FILE: WestRef-B96

FIGURE 13
GROUP No. 4
CHLOROMETHANE SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

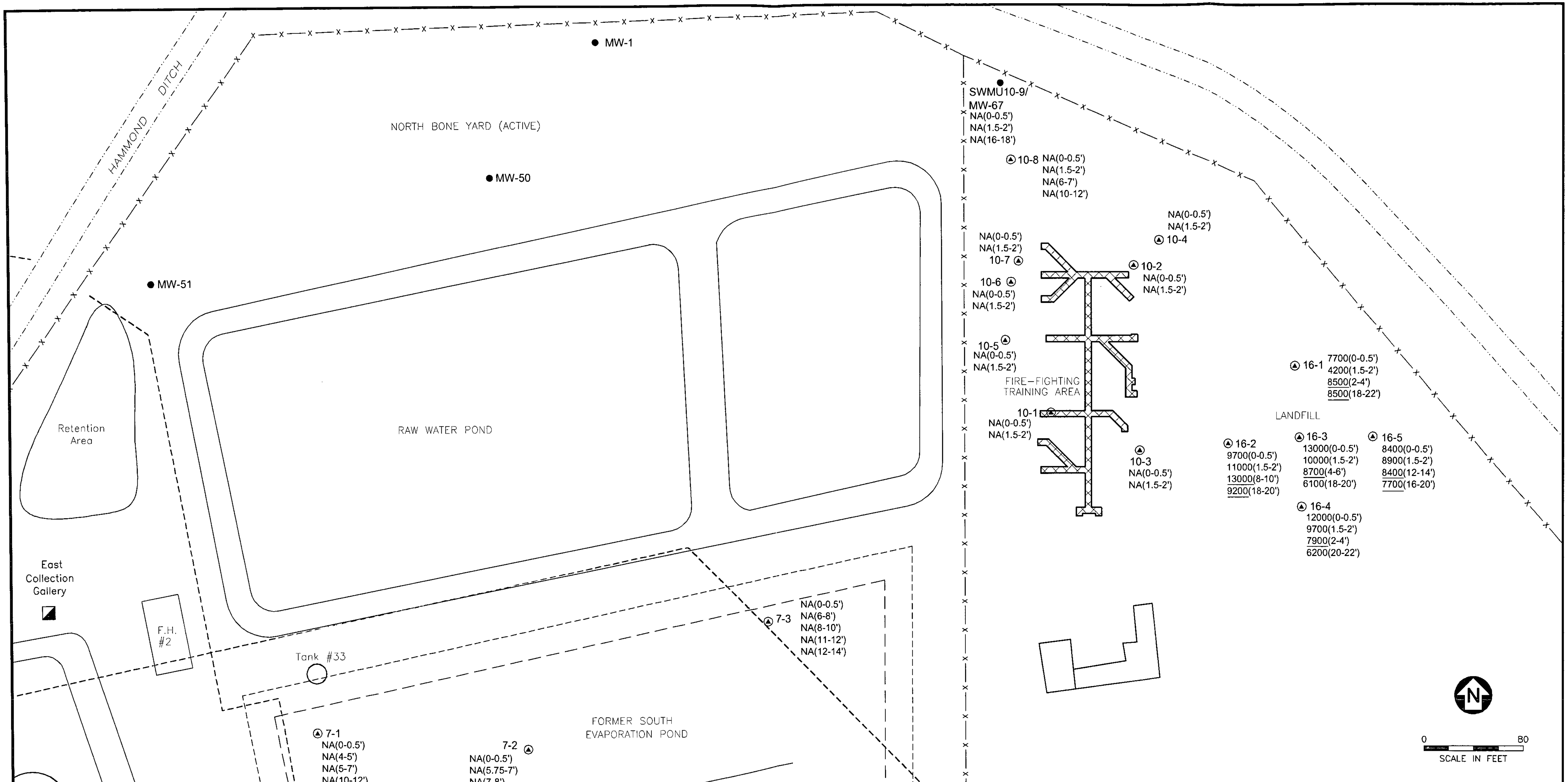
MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1	SAMPLE LOCATION AND IDENTIFICATION NUMBER
120(0-0.5')	DIESEL RANGE ORGANICS CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
1400	CONCENTRATION EXCEEDS SCREENING LEVEL
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
	ABANDONED UNDERGROUND PIPING
	UNDER GROUND WASTEWATER PIPING
—x—x—	FENCE

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/06/11 | FILE: WestRef-BB6

FIGURE 14
GROUP No. 4
DIESEL RANGE ORGANICS SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

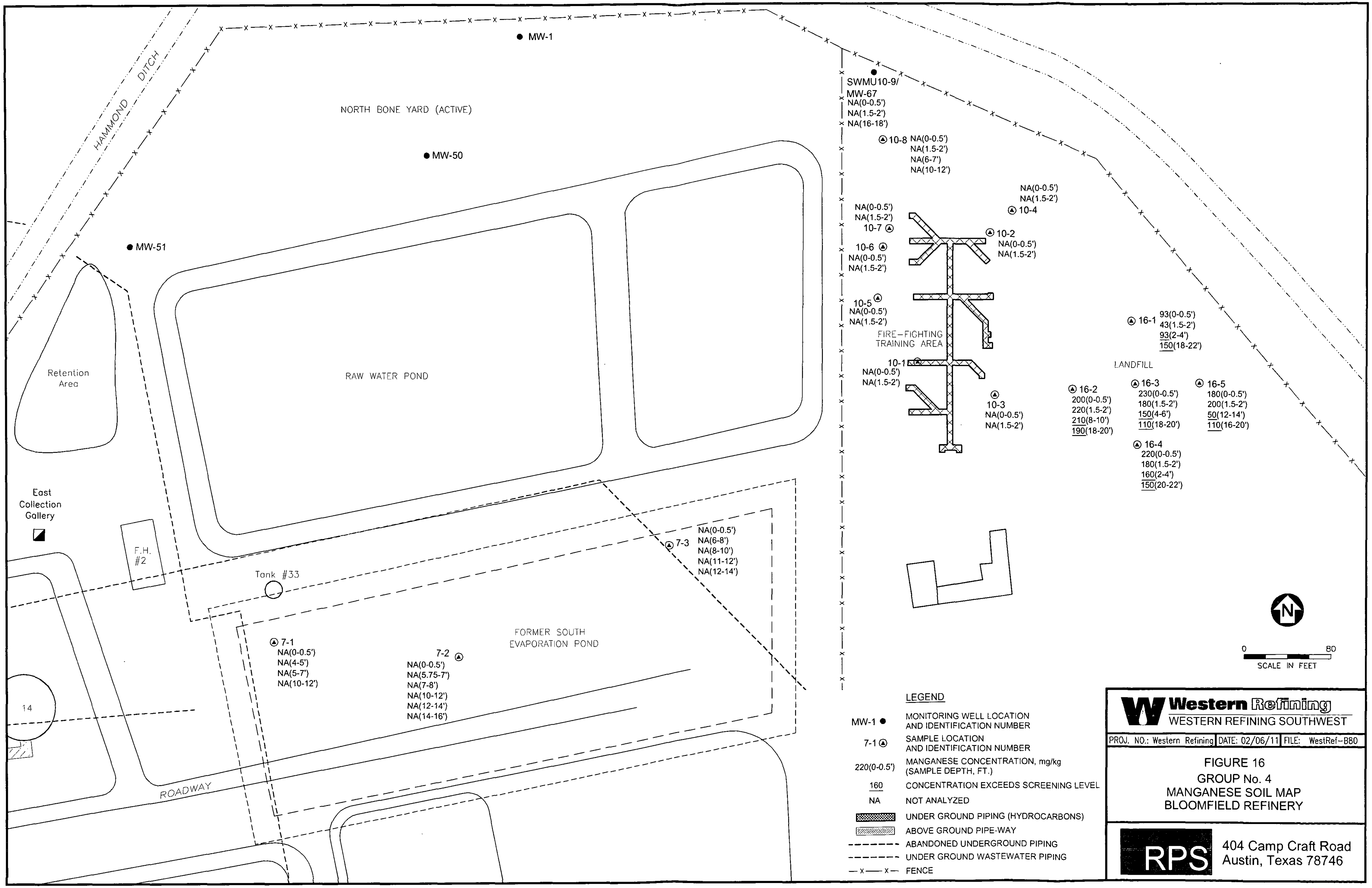
MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1	SAMPLE LOCATION AND IDENTIFICATION NUMBER
7700(0-0.5')	IRON CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
8500	CONCENTRATION EXCEEDS SCREENING LEVEL
NA	NOT ANALYZED
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
	ABANDONED UNDERGROUND PIPING
	UNDER GROUND WASTEWATER PIPING
—x—x—	FENCE

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/06/11 | FILE: WestRef-B79

FIGURE 15
GROUP No. 4
IRON SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

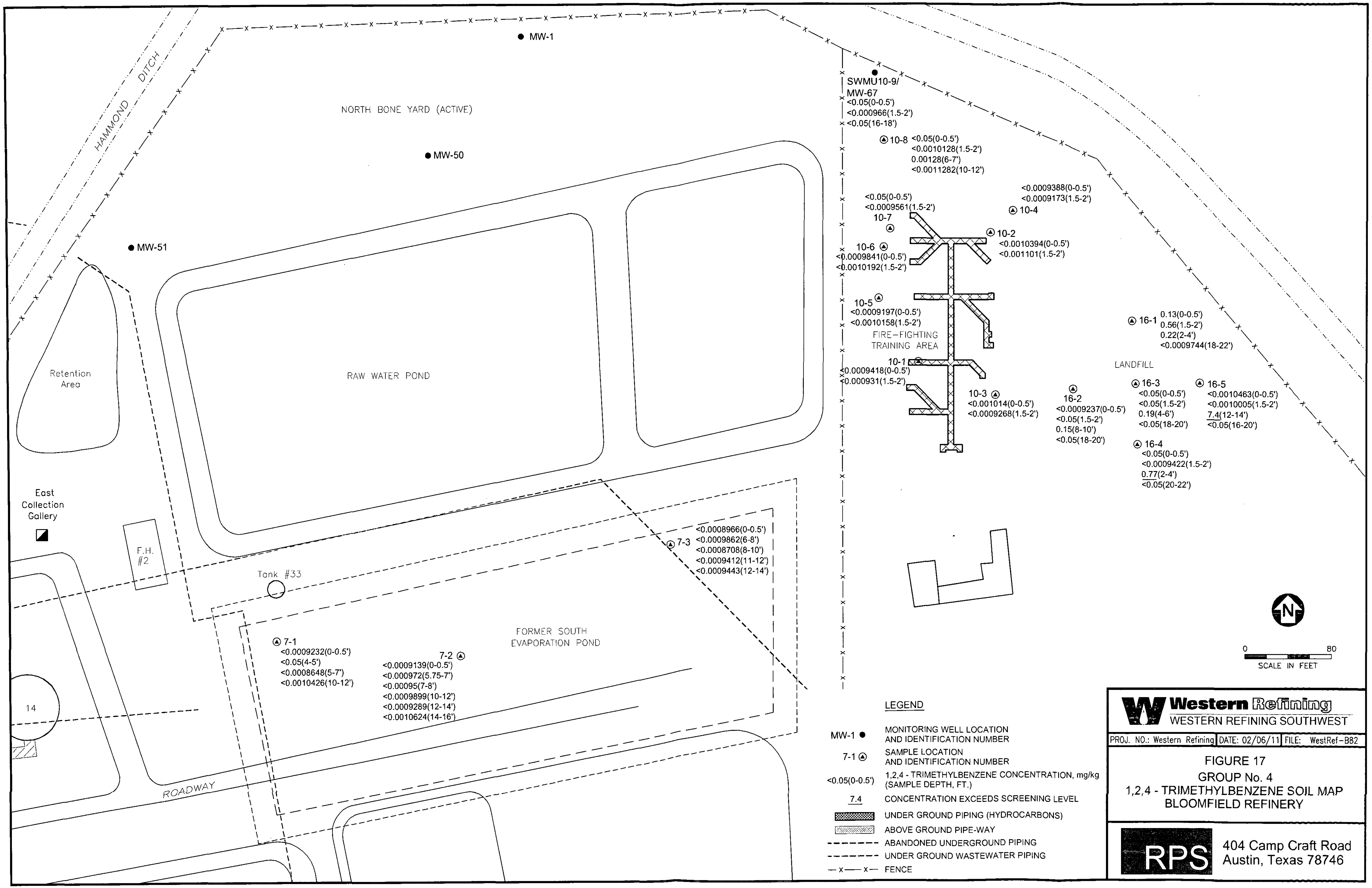
MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 ⊙	SAMPLE LOCATION AND IDENTIFICATION NUMBER
220(0-0.5')	MANGANESE CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
160	CONCENTRATION EXCEEDS SCREENING LEVEL
NA	NOT ANALYZED
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
-------	ABANDONED UNDERGROUND PIPING
-------	UNDER GROUND WASTEWATER PIPING
—x—x—	FENCE

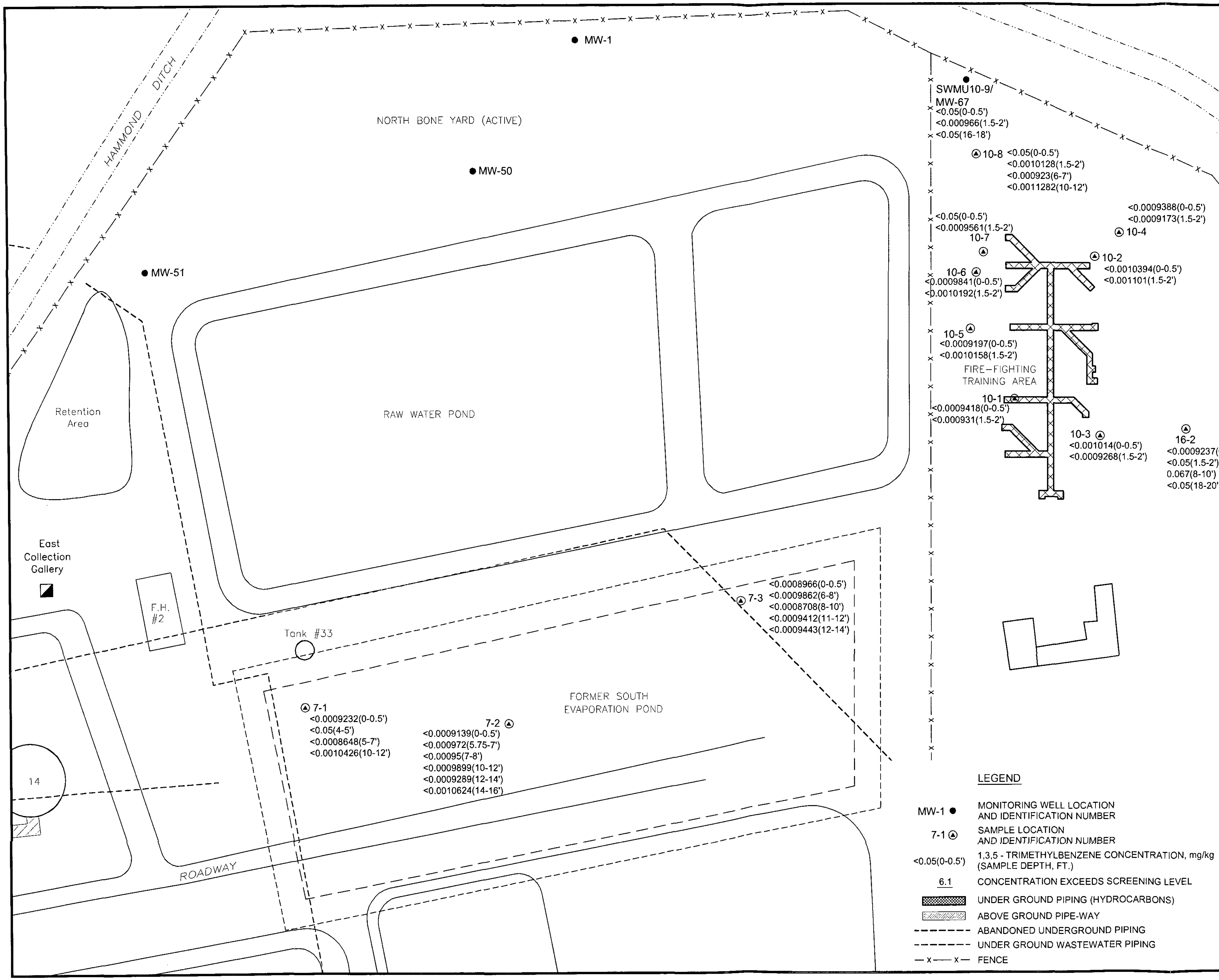
Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/06/11 | FILE: WestRef-BB0

FIGURE 16
GROUP No. 4
MANGANESE SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746


HAMMOND DITCH
MW-1
NORTH BONE YARD (ACTIVE)
MW-50
MW-51
Retention Area
RAW WATER POND
East Collection Gallery
F.H. #2
Tank #33
14
ROADWAY
FORMER SOUTH EVAPORATION POND
7-1
<0.0009232(0-0.5')
<0.05(4-5')
<0.0008648(5-7')
<0.0010426(10-12')
7-2
<0.0009139(0-0.5')
<0.000972(5.75-7')
<0.00095(7-8')
<0.0009899(10-12')
<0.0009289(12-14')
<0.0010624(14-16')
7-3
<0.0008966(0-0.5')
<0.0009862(6-8')
<0.0008708(8-10')
<0.0009412(11-12')
<0.0009443(12-14')
SWMU10-9/
MW-67
<0.05(0-0.5')
<0.000966(1.5-2')
<0.05(16-18')
10-8
<0.05(0-0.5')
<0.0010128(1.5-2')
0.00128(6-7')
<0.0011282(10-12')
<0.05(0-0.5')
<0.0009561(1.5-2')
10-7
<0.0009388(0-0.5')
<0.0009173(1.5-2')
10-4
10-2
<0.0010394(0-0.5')
<0.001101(1.5-2')
10-6
<0.0009841(0-0.5')
<0.0010192(1.5-2')
10-5
<0.0009197(0-0.5')
<0.0010158(1.5-2')
FIRE-FIGHTING TRAINING AREA
10-1
<0.0009418(0-0.5')
<0.000931(1.5-2')
10-3
<0.001014(0-0.5')
<0.0009268(1.5-2')
16-2
<0.0009237(0-0.5')
<0.05(1.5-2')
0.15(8-10')
<0.05(18-20')
16-1
0.13(0-0.5')
0.56(1.5-2')
0.22(2-4')
<0.0009744(18-22')
LANDFILL
16-3
<0.05(0-0.5')
<0.05(1.5-2')
0.19(4-6')
<0.05(18-20')
16-5
<0.0010463(0-0.5')
<0.0010005(1.5-2')
7.4(12-14')
<0.05(16-20')
16-4
<0.05(0-0.5')
<0.0009422(1.5-2')
0.77(2-4')
<0.05(20-22')
N
0
80
SCALE IN FEET
LEGEND
MW-1 MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 SAMPLE LOCATION AND IDENTIFICATION NUMBER
<0.05(0-0.5') 1,2,4 - TRIMETHYLBENZENE CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
7.4 CONCENTRATION EXCEEDS SCREENING LEVEL
UNDER GROUND PIPING (HYDROCARBONS)
ABOVE GROUND PIPE-WAY
ABANDONED UNDERGROUND PIPING
UNDER GROUND WASTEWATER PIPING
FENCE
Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining
DATE: 02/06/11
FILE: WestRef-B82
FIGURE 17
GROUP No. 4
1,2,4 - TRIMETHYLBENZENE SOIL MAP
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746

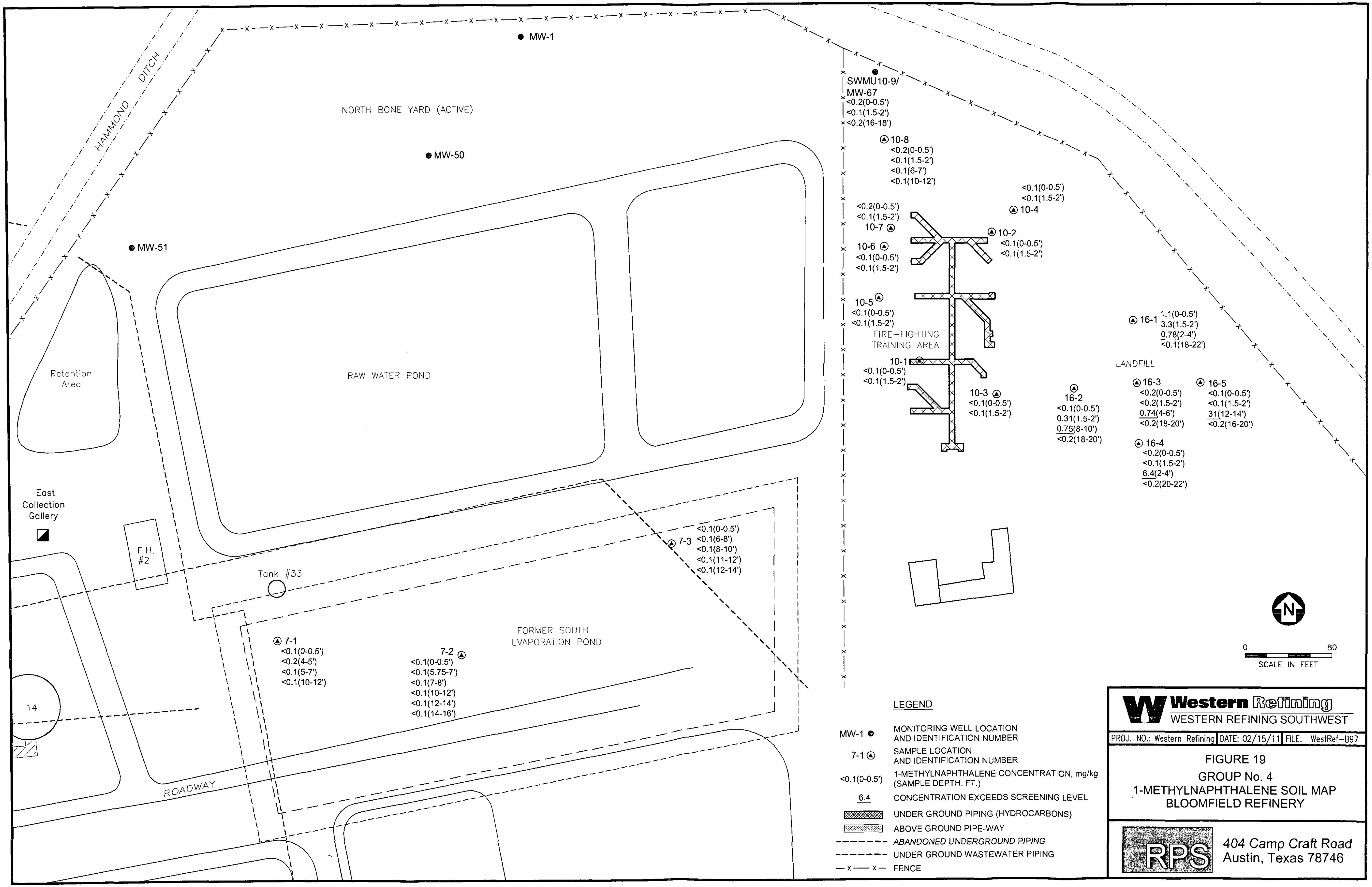


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 02/06/11	FILE: WestRef-B83

FIGURE 18
GROUP No. 4
1,3,5 - TRIMETHYLBENZENE SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

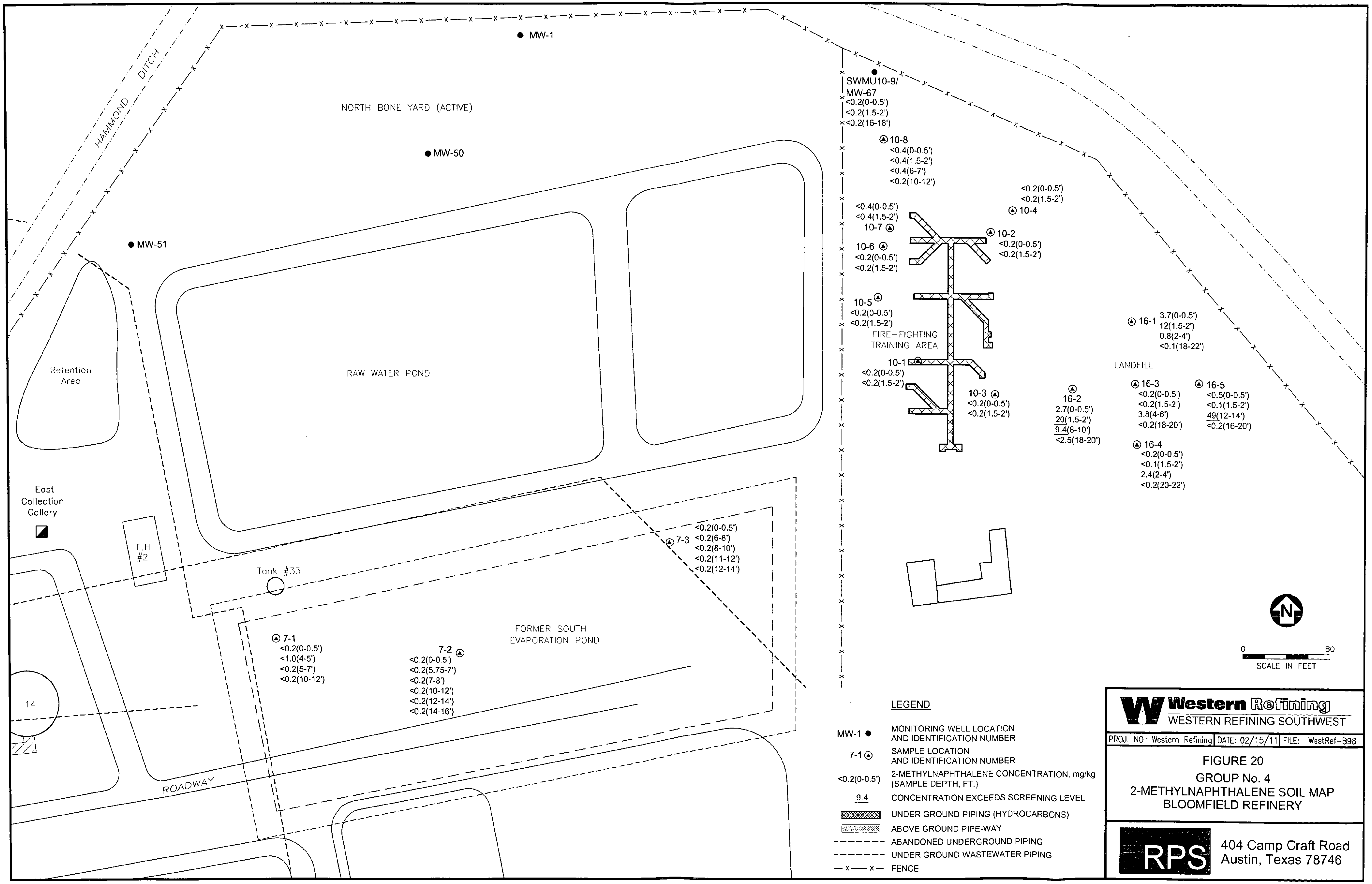
MW-1	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1	SAMPLE LOCATION AND IDENTIFICATION NUMBER
<0.1(0-0.5')	1-METHYLNAPHTHALENE CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
6.4	CONCENTRATION EXCEEDS SCREENING LEVEL
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
	ABANDONED UNDERGROUND PIPING
	UNDER GROUND WASTEWATER PIPING
—x—x—	FENCE

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/15/11 | FILE: WestRef-B97

FIGURE 19
GROUP No. 4
1-METHYLNAPHTHALENE SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

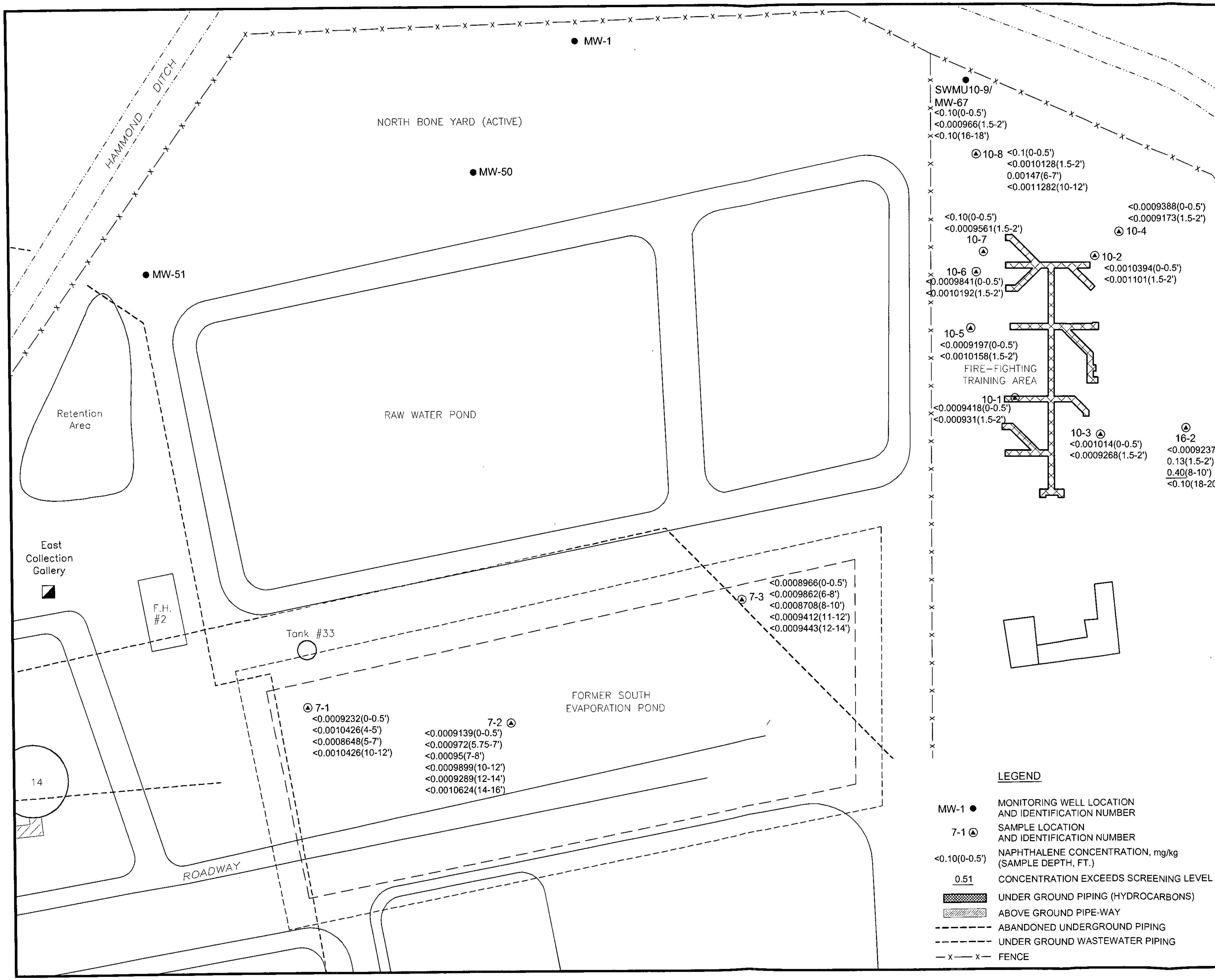


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/15/11 | FILE: WestRef-B98

FIGURE 20
GROUP No. 4
2-METHYLNAPHTHALENE SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

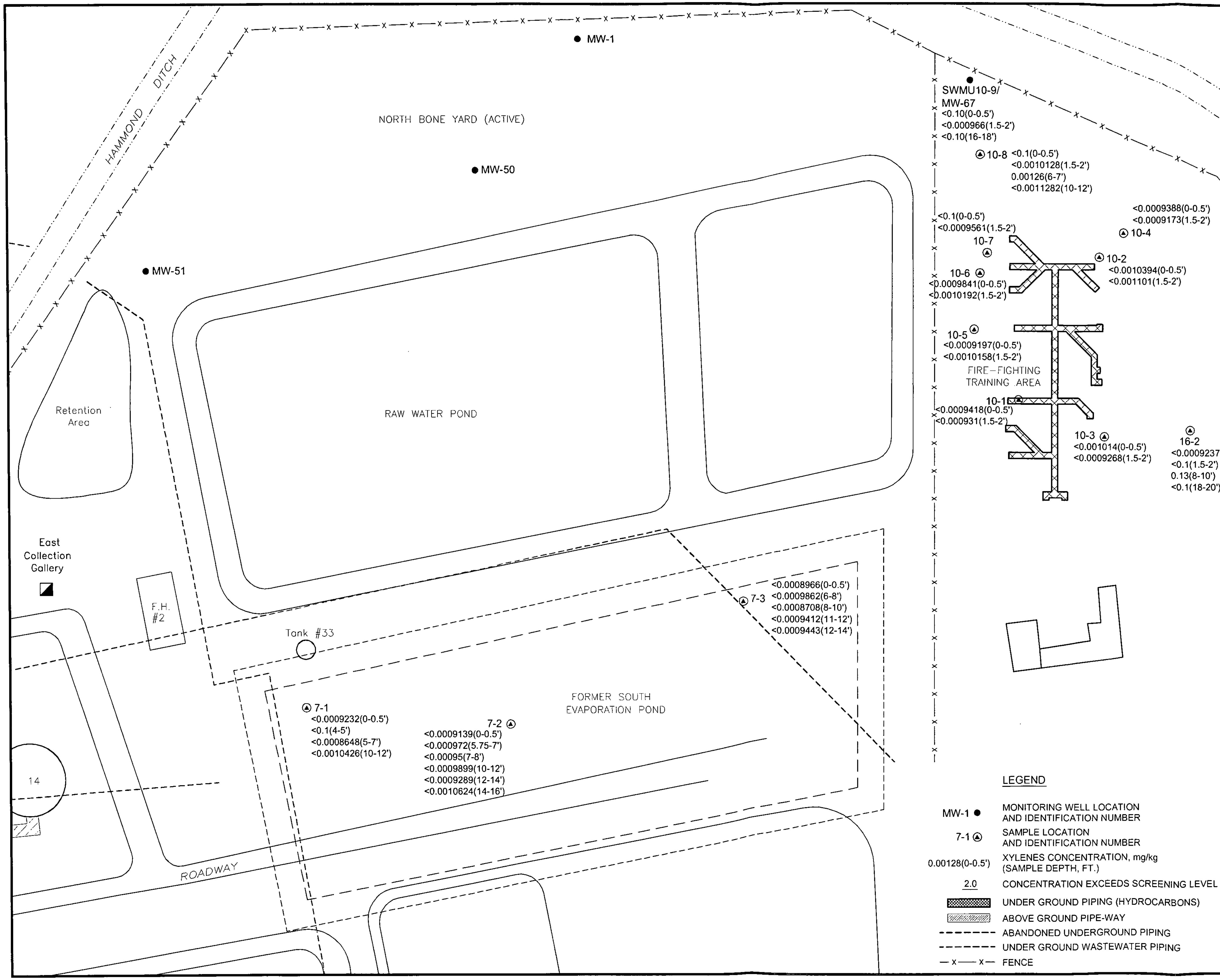
MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 ⓐ	SAMPLE LOCATION AND IDENTIFICATION NUMBER
<0.10(0-0.5')	NAPHTHALENE CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
0.51	CONCENTRATION EXCEEDS SCREENING LEVEL
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
-------	ABANDONED UNDERGROUND PIPING
-------	UNDER GROUND WASTEWATER PIPING
—x—x—	FENCE

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/06/11 | FILE: WestRef-B84

FIGURE 21
GROUP No. 4
NAPHTHALENE SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

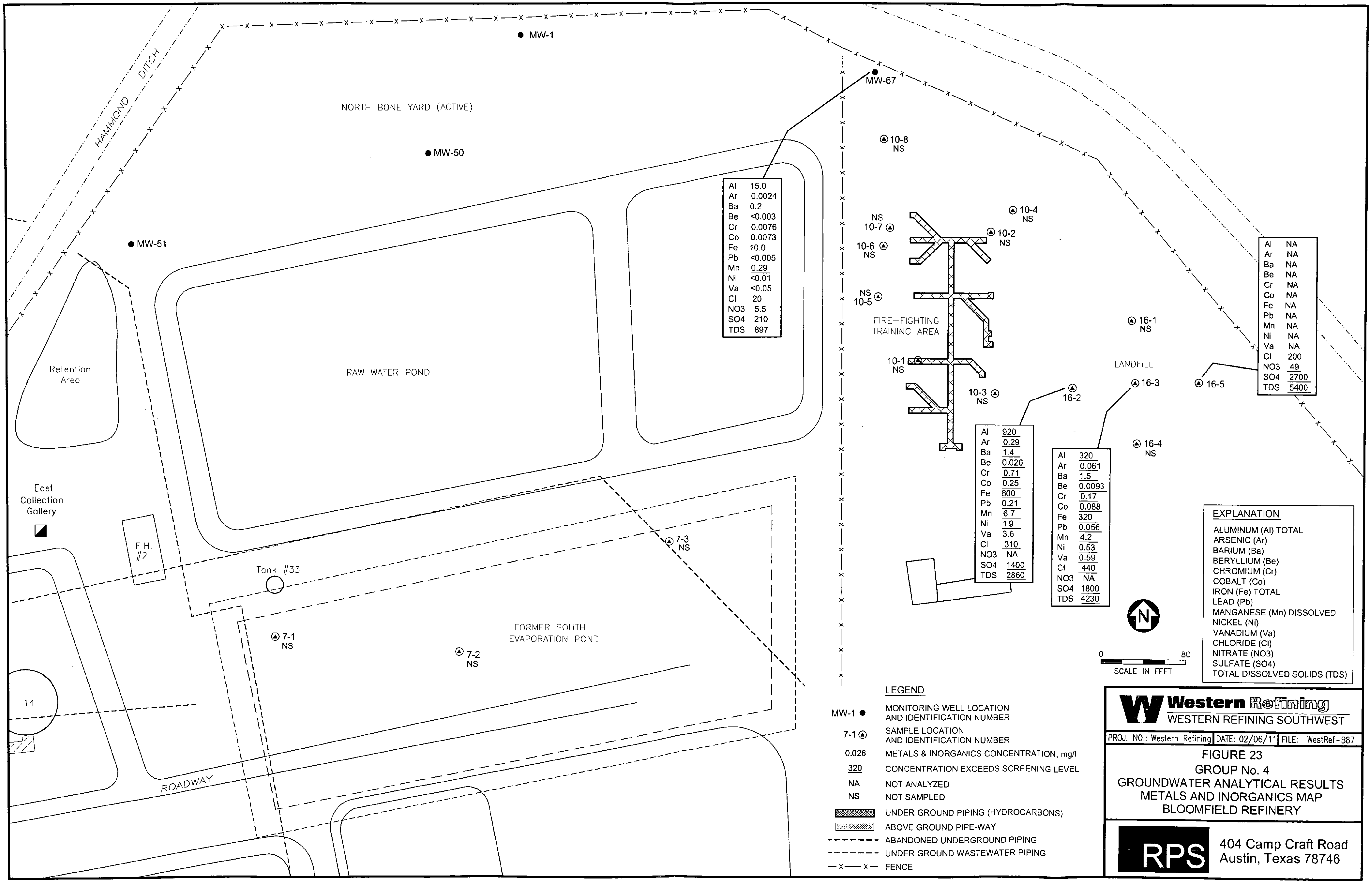
MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 ⊛	SAMPLE LOCATION AND IDENTIFICATION NUMBER
0.00128(0-0.5')	XYLENES CONCENTRATION, mg/kg (SAMPLE DEPTH, FT.)
2.0	CONCENTRATION EXCEEDS SCREENING LEVEL
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
- - - - - -	ABANDONED UNDERGROUND PIPING
- - - - - -	UNDER GROUND WASTEWATER PIPING
—x—x—	FENCE

Western Refining
WESTERN REFINING SOUTHWEST

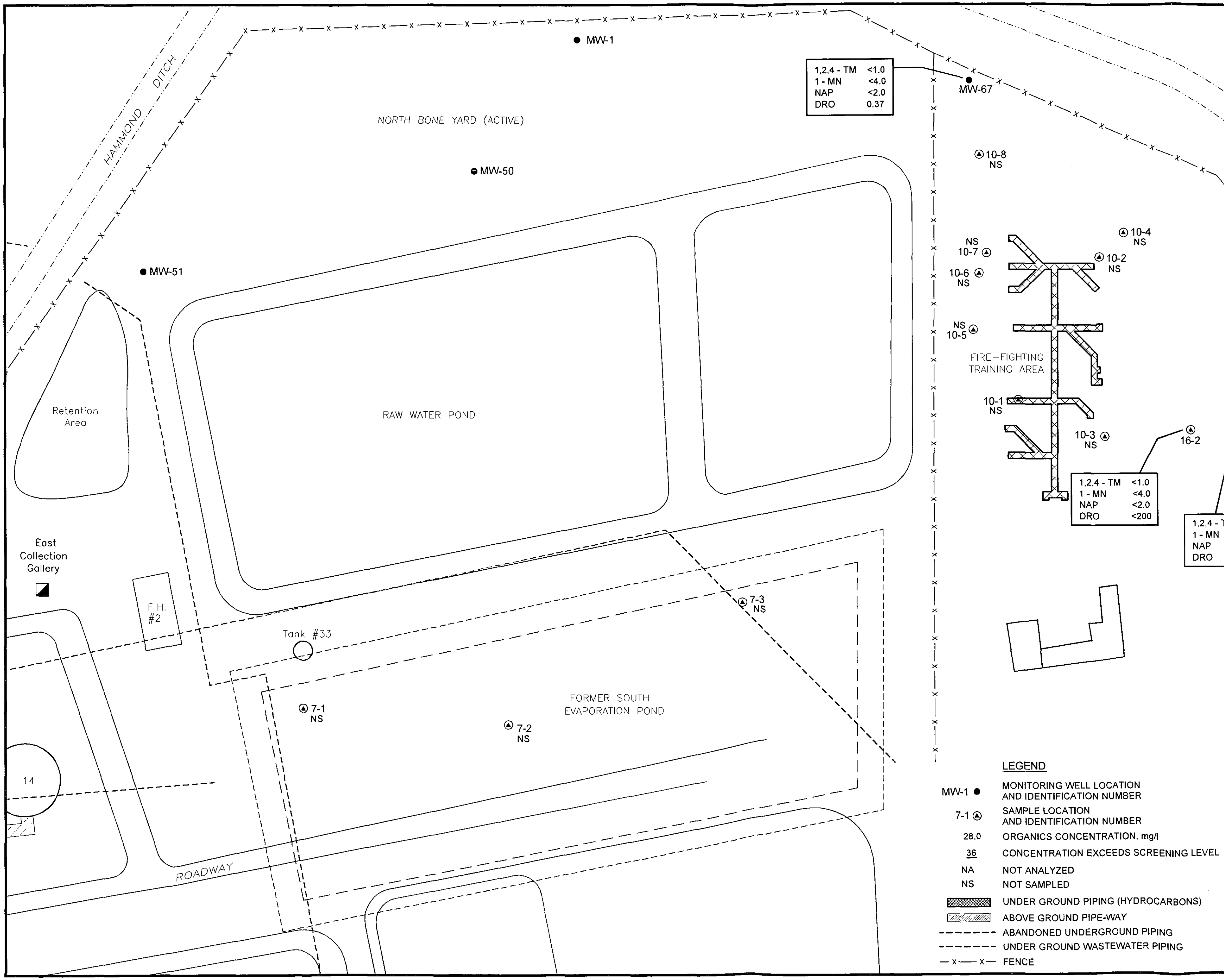
PROJ. NO.: Western Refining | DATE: 02/10/11 | FILE: WestRef-B95

FIGURE 22
GROUP No. 4
XYLENES SOIL MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



HAMMOND DITCH
MW-1
MW-67
NORTH BONE YARD (ACTIVE)
MW-50
MW-51
Retention Area
RAW WATER POND
East Collection Gallery
F.H. #2
Tank #33
FORMER SOUTH EVAPORATION POND
7-1 NS
7-2 NS
7-3 NS
14
ROADWAY
Al 15.0
Ar 0.0024
Ba 0.2
Be <0.003
Cr 0.0076
Co 0.0073
Fe 10.0
Pb <0.005
Mn 0.29
Ni <0.01
Va <0.05
Cl 20
NO3 5.5
SO4 210
TDS 897
10-8 NS
10-7 NS
10-6 NS
10-5 NS
10-4 NS
10-2 NS
10-1 NS
10-3 NS
FIRE-FIGHTING TRAINING AREA
16-1 NS
LANDFILL
16-2
16-3
16-4 NS
16-5
Al 920
Ar 0.29
Ba 1.4
Be 0.026
Cr 0.71
Co 0.25
Fe 800
Pb 0.21
Mn 6.7
Ni 1.9
Va 3.6
Cl 310
NO3 NA
SO4 1400
TDS 2860
Al 320
Ar 0.061
Ba 1.5
Be 0.0093
Cr 0.17
Co 0.088
Fe 320
Pb 0.056
Mn 4.2
Ni 0.53
Va 0.59
Cl 440
NO3 NA
SO4 1800
TDS 4230
Al NA
Ar NA
Ba NA
Be NA
Cr NA
Co NA
Fe NA
Pb NA
Mn NA
Ni NA
Va NA
Cl 200
NO3 49
SO4 2700
TDS 5400
EXPLANATION
ALUMINUM (Al) TOTAL
ARSENIC (Ar)
BARIUM (Ba)
BERYLLIUM (Be)
CHROMIUM (Cr)
COBALT (Co)
IRON (Fe) TOTAL
LEAD (Pb)
MANGANESE (Mn) DISSOLVED
NICKEL (Ni)
VANADIUM (Va)
CHLORIDE (Cl)
NITRATE (NO3)
SULFATE (SO4)
TOTAL DISSOLVED SOLIDS (TDS)
N
0 80
SCALE IN FEET
LEGEND
MW-1 MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 SAMPLE LOCATION AND IDENTIFICATION NUMBER
0.026 METALS & INORGANICS CONCENTRATION, mg/l
320 CONCENTRATION EXCEEDS SCREENING LEVEL
NA NOT ANALYZED
NS NOT SAMPLED
UNDER GROUND PIPING (HYDROCARBONS)
ABOVE GROUND PIPE-WAY
ABANDONED UNDERGROUND PIPING
UNDER GROUND WASTEWATER PIPING
FENCE
Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining
DATE: 02/06/11
FILE: WestRef-887
FIGURE 23
GROUP No. 4
GROUNDWATER ANALYTICAL RESULTS
METALS AND INORGANICS MAP
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746



EXPLANATION

1,2,4 - TRIMETHYLBENZENE (1,2,4 - TM)
1 - METHYLNAPHTHALENE (1 - MN)
NAPHTHALENE (NAP)
DIESEL RANGE ORGANICS (DRO)

LEGEND

MW-1	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1	SAMPLE LOCATION AND IDENTIFICATION NUMBER
28.0	ORGANICS CONCENTRATION, mg/l
36	CONCENTRATION EXCEEDS SCREENING LEVEL
NA	NOT ANALYZED
NS	NOT SAMPLED
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
	ABANDONED UNDERGROUND PIPING
	UNDER GROUND WASTEWATER PIPING
—x—x—	FENCE

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 02/06/11 | FILE: WestRef-B88

FIGURE 24
GROUP No. 4
GROUNDWATER ANALYTICAL RESULTS
ORGANICS MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

Appendix A

Boring Logs

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring B-05

See Site Map
For Boring Location

Project *Bloomfield Refining Company* Owner *Bloomfield Refining Company*
Location *West of Evaporation Pond #2* Proj. No. *023353014*
Surface Elev. ____ Total Hole Depth *8 ft.* Diameter ____
Top of Casing ____ Water Level Initial ____ Static ____
Screen: Dia ____ Length ____ Type/Size ____
Casing: Dia ____ Length ____ Type ____
Fill Material ____ Rig/Core *B55*
Drill Co. *Western Technology* Method *Split Spoon/Hollow Stem Auger (7")*
Driller *Rob* Log By *Tim Busby* Date *02/23/94* Permit # ____
Checked By ____ License No. ____

COMMENTS:

Posthole to 2'. Hit cobble layer @ 5'. Poor recovery @ 6'. No sample collected at 6'. Terminated boring. No groundwater encountered. Boring backfilled with cement-bentonite.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						0-5': Light brown to brown Silty Sand, some clay, moist, no odor
2	0		2/2/5		ML	
4	0		26/34/31			
						Light brown to gray Sand and gravel and cobbles, moist, no odor
6	0		40/37/39		GW	
8						Total Depth @ 8 feet.
10						
12						
14						
16						
18						
20						
22						
24						

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring B-06

Project: Bloomfield Refining Company Owner: Bloomfield Refining Company
Location: West of Evaporation Pond #1 Proj. No. 023353014
Surface Elev. ______ Total Hole Depth: 10 ft. Diameter ______
Top of Casing ______ Water Level Initial ______ Static ______
Screen: Dia. ______ Length ______ Type/Size ______
Casing: Dia ______ Length ______ Type ______
Fill Material ______ Rig/Core: B55
Drill Co. Western Technology Method: Split Spoon/Hollow Stem Auger (7")
Driller: Rob Log By: Tim Busby Date: 02/23/94 Permit # ______
Checked By ______ License No. ______

See Site Map For Boring Location

COMMENTS:

Shelby sample collected @ 4-5'; Cobble layer @ ~ 5.5'. Cuttings collected @ 6'. Try to sample @ 8 because driller thinks we're thru layer. 9" into sample blow count=27, bouncing on cobble. No groundwater encountered. Boring filled with cement/bentonite.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						0-5.5': Light brown to brown Silty Sand, trace clay, moist, no odor
2	0		12/8/8		ML	
4	4		10/11			
5.5						5.5-10': Light brown to tan, Sand and gravel and cobbles, very coarse, poorly graded, moist, no odor
6	2					
8	0				GW	
10	0					Total Depth @ 10 feet.
12						
14						
16						
18						
20						
22						
24						

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring B-07

Project *Bloomfield Refining Company* Owner *Bloomfield Refining Company*
Location *Southwestern section of Fire Training Area* Proj. No. *023353014*
Surface Elev. ____ Total Hole Depth *12 ft.* Diameter ____
Top of Casing ____ Water Level Initial ____ Static ____
Screen: Dia ____ Length ____ Type/Size ____
Casing: Dia ____ Length ____ Type ____
Fill Material ____ Rig/Core *B55*
Drill Co. *Western Technology* Method *Split Spoon/Hollow Stem Auger (7")*
Driller *Rob* Log By *Tim Busby* Date *02/23/94* Permit # ____
Checked By ____ License No. ____

See Site Map For Boring Location

COMMENTS:

Post hole to 2'. No groundwater encountered. Boring backfilled with cement/bentonite.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						0-7': Light brown to brown Sandy Silt, moist, no odor
2	0		2/2/1			
4	0		6/5/4		ML	
6	0		12/13/12			
7						7-12': Light brown to brown Silty Sand, trace silt, moist, no odor
8	0					
10	0		5/6/7		SM	
12						Total Depth @ 12 feet.
14						
16						
18						
20						
22						
24						

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring **B-08**

See Site Map For Boring Location

COMMENTS:

Post hole to 2'. No groundwater encountered. Boring backfilled with cement/bentonite.

Project Bloomfield Refining Company Owner Bloomfield Refining Company
Location Southeastern section of Fire Training Area Proj. No. 023353014
Surface Elev. ____ Total Hole Depth 12 ft. Diameter ____
Top of Casing ____ Water Level Initial ____ Static ____
Screen: Dia ____ Length ____ Type/Size ____
Casing: Dia ____ Length ____ Type ____
Fill Material ____ Rig/Core B55
Drill Co. Western Technology Method Split Spoon/Hollow Stem Auger (7")
Driller Rob Log By Tim Busby Date 02/23/94 Permit # ____
Checked By ____ License No. ____

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						0-7.5': Light brown to brown Sandy Silt, moist, no odor
2	0		3/3/4			
4	0		6/5/7		ML	
6	1		8/13/16			
					CL	7.5-8': Clay, trace sand, brown, moist, no odor
8	0		8/8/9			8-12': Silty Sand, light brown to brown, moist, no odor
10	0		6/10/13		SM	
12						Total Depth @ 12 feet.
14						
16						
18						
20						
22						
24						

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring B-09

See Site Map For Boring Location

COMMENTS:

Post hole to 2'. No groundwater encountered. Bag samples only @ 8 & 10'. No odor. Boring backfilled with cement/bentonite.

Project Bloomfield Refining Company Owner Bloomfield Refining Company
Location Northeastern section of Fire Training Area Proj. No. 023353014
Surface Elev. ______ Total Hole Depth 10 ft. Diameter ______
Top of Casing ______ Water Level Initial ______ Static ______
Screen: Dia ______ Length ______ Type/Size ______
Casing: Dia ______ Length ______ Type ______
Fill Material ______ Rig/Core B55
Drill Co. Western Technology Method Split Spoon/Hollow Stem Auger (7")
Driller Rob Log By Tim Busby Date 02/23/94 Permit # ______
Checked By ______ License No. ______

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						0-7.5': Silty Sand, light brown to brown, moist, no odor
2	0		4/3/3			
4	0		4/6/5		ML	
6	0		5/4/12			
8	0				CL	7.5-8': Clay, brown, moist, no odor, cobbles from 8-10'
					SW	8-10': Cobbles
10	0					Total Depth @ 10 feet.
12						
14						
16						
18						
20						
22						
24						

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring B-10

Project Bloomfield Refining Company Owner Bloomfield Refining Company
Location Northwestern section of Fire Training Area Proj. No. 023353014
Surface Elev. ____ Total Hole Depth 12 ft. Diameter ____
Top of Casing ____ Water Level Initial ____ Static ____
Screen: Dia ____ Length ____ Type/Size ____
Casing: Dia ____ Length ____ Type ____
Fill Material ____ Rig/Core B55
Drill Co. Western Technology Method Split Spoon/Hollow Stem Auger (7")
Driller Rob Log By Tim Busby Date 02/23/94 Permit # ____
Checked By ____ License No. ____

See Site Map For Boring Location

COMMENTS:

Post hole to 2'. No groundwater encountered. Boring backfilled with cement/bentonite.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						0-11': Silty Sand, light brown to brown, moist, no odor
2	0					
4	0		6/7/7			
6	0		4/5/7		ML	
8	0		5/7/4			
10	0		6/6/23			
12					CL	11-12': Clay and cobbles, brown, moist, no odor Total Depth @ 12 feet.
14						
16						
18						
20						
22						
24						

LOG OF BORING

RPS

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.)	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'	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
					3.6 75ºF		80	**Clayey Sand (SC)** Similar to above, no staining, dark brown, faint odor	
6	5-7'	0950	G/2V/ 2E/3J		3.1 75ºF		80	**Silty Sand (SM)** Fine grain, loose, brown, damp, trace silty clay, no odor	6
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

RPS
3833 S. Staples, Suite N-229
Corpus Christi, TX 78411
361/855-7335
361/855-7410 fax

LOG OF BORING

RPS

Boring No.: SWMU 7-2
Start Date: 8/17/2010 1045
Finish Date: 8/17/2010 1300

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 36º41.941' W107º58.272'

Total Depth: 16' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5525.363
Site Coordinates: N 36º41'56.48809" W 107º58'16.23843"

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'	1145	G/2V/ 2E/3J		10.2 85ºF		80	**Clayey Sand/Silty Sand (SM/SC)** Fine grain, loose to compact, brown, damp, gravel present, well rounded, no odor	0
2					20.2 85ºF		80	**Clayey Sand/Silty Sand (SM/SC)** Similar to above, no gravel, no odor	2
4					23.1 85ºF		80	**Clayey Sand/Silty Sand (SM/SC)** Similar to above, no odor	4
6	5.75-7'	1155	G/2V/ 2E/3J		26.6 85ºF		80	**Clayey Silt/Sand (SC/ML)** Fine grain, compact, black to dark brown, damp, odor	6
	7-8'	1205	G/2V/ 2E/3J		15.6 85ºF			**Clayey Silt/Clayey Sand (SC/ML)** Similar to above, black, odor	
8					11.9 85ºF		80	**Silty Sand (SM)** Fine grain, loose, damp, light brown, very faint odor	8
								Silty Sand (SM) Similar to above, high plasticity clay at base, 1-inch thick	
10	10-12'	1215	G/2V/ 2E/3J		10.4 85ºF		90	**Clay (CH)** High plasticity, stiff, damp, brown	10
12	12-14'	1225	G/2V/ 2E/3J		4.4 85ºF		80	**Silty Sand (SM)** Fine grain, loose, damp, brown	12
14	14-16'	1235	G/2V/ 2E/3J		4.2 85ºF		80	**Sandy Silt (ML)** Very fine grain, compact, damp to very damp, brown, trace sand/gravel at base	14
16								Total Depth = 16' BGL	16

RPS
3833 S. Staples, Suite N-229
Corpus Christi, TX 78411
361/855-7335
361/855-7410 fax

LOG OF BORING

Boring No.: SWMU 7-3
Start Date: 8/17/2010 1300
Finish Date: 8/17/2010 1500

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 36°41.959' W107°58.231'

Total Depth: 16' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5526.593
Site Coordinates: N 36°41'57.48590" W 107°58'13.84689"

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' & Dup	1350	G/4V/ 4E/6J		5.2 86°F	SM	80	**Silty Sand (SM)** Fine grain, loose, damp, brown, trace gravel, no odor	0
2					33 86°F	SM	80	**Silty Sand (SM)** Similar to above, no odor	2
4					30 86°F	SM	80	**Silty Sand (SM)** Similar to above, no odor	4
6	6-8'	1410	G/2V/ 2E/3J		36 86°F	CL	80	**Silty Clay (CL)** Low to moderate plasticity, soft to firm, damp to moist, dark brown, no odor	6
8	8-10'	1420	G/2V/ 2E/3J		2.7 86°F	SM	80	**Silty Sand (SM)** Fine grain, loose, compact, damp, brown, no odor	8
10	11-12'	1430	G/2V/ 2E/3J		2.4 86°F 1.9 86°F	SM / CH	80	**Silty Sand (SM)** Similar to above **Clay (CH)** High plasticity, stiff, damp, brown, no odor	10
12	12-14'	1440	G/2V/ 2E/3J		1.8 86°F	SM	80	**Silty Sand (SM)** Fine grain, loose, damp, brown, no odor	12
14					1.2 86°F	SP	80	**Sand (SP)** Fine grain, loose, damp, tan, no odor	14
16								Total Depth = 16' BGL	16

LOG OF BORING

RPS

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.)	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' 1.5-2'	1540 1545	G/2V/2E/3J G/2V/2E/3J		0.5 91ºF		70	**Silty Sand (SM)** Fine grain, loose, brown, damp, no odor	0
2					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

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

LOG OF BORING

Boring No.: SWMU 10-3
Start Date: 8/18/2010 0730
Finish Date: 8/18/2010 0800

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 36º41.981' W107º58.170'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5526.345
Site Coordinates: N 36º41'58.83651"
W 107º58'10.16051"

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'	0750	G/2V/2E/3J		0.5 65ºF	SM	80	**Silty Sand (SM)** Fine grain, loose, damp, brown, no odor	0
	1.5-2'	0800	G/2V/2E/3J		0.7 65ºF				
2					1.3 65ºF	SM	90	**Silty Sand (SM)** Similar to above, no odor	2
4					1.8 65ºF	SM	90	**Silty Sand (SM)** Similar to above, no odor	4
6					1.3 65ºF	SP	90	**Sand (SP)** Fine grain, loose, damp, brown, no odor	6
8					1.5 65ºF	SP	90	**Sand (SP)** Similar to above, no odor	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16

LOG OF BORING

RPS

Boring No.: SWMU 10-4
Start Date: 8/18/2010 0800
Finish Date: 8/18/2010 0845

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 36º42.009' W107º58.166'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5524.781
Site Coordinates: **N** 36º42'00.50906"
W 107º58'09.96200"

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'	0835	G/2V/2E/3J		2 73ºF		80	**Silty Sand (SM)** Fine grain, loose, damp, brown, no odor	0
	1.5-2'	0845	G/2V/2E/3J		2.4 73ºF				
2					4.8 73ºF		90	**Silty Sand (SM)** Similar to above, no odor	2
4					2.9 73ºF		90	**Silty Sand (SM)** Similar to above, no odor	4
6					0.6 73ºF		80	**Sand (SP)** Fine grain, loose, damp, brown, no odor	6
8					0.7 73ºF		80	**Sand (SP)** Similar to above, no odor	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16

RPS

LOG OF BORING

Boring No.: SWMU 10-5
Start Date: 8/18/2010 0845
Finish Date: 8/18/2010 0925

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 36º41.995' W107º58.192'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5522.455
Site Coordinates: N 36º41'59.71607" W 107º58'11.48194"

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'	0915	G/2V/ 2E/3J		1.2 77ºF		80	**Silty Sand (SM)** Fine grain, loose, damp, brown, no odor	0
	1.5-2'	0925	G/2V/ 2E/3J		2.0 77ºF				
2					4.4 77ºF		90	**Silty Sand (SM)** Similar to above, no odor	2
4					0.9 77ºF		90	**Silty Sand (SM)** Similar to above, no odor	4
6					0.2 77ºF		80	**Silty Sand (SM)** Similar to above, no odor; **Silt (ML)** Very fine grain, compact, damp, brown, no odor	6
8					0.2 77ºF		90	**Gravelly Sand (SW)** Fine to medium grain, loose, damp, gray, subrounded 1/4-inch to 1/2-inch gravel, no odor	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16

LOG OF BORING

RPS

Boring No.: SWMU 10-6
Start Date: 8/18/2010 0925
Finish Date: 8/18/2010 1000

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 36º42.003' W107º58.190'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5521.873
Site Coordinates: N 36º42'00.17613"
W 107º58'11.43910"

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'	0950	G/2V/2E/3J		0.3 81ºF		80	**Silty Sand (SM)** Fine grain, loose, damp, brown, no odor	0
	1.5-2'	1000	G/2V/2E/3J		0.4 81ºF				
2					0.6 81ºF		80	**Silty Sand (SM)** Similar to above, no odor	2
4					0.9 81ºF		80	**Silty Sand (SM)** Similar to above, no odor	4
6					1.0 81ºF		80	**Sandy Silt (ML)** Very fine grain, compact, damp, brown, no odor	6
8					0.5 81ºF		80	**Sandy Silt (ML)** Similar to above, no odor **Gravelly Sand (SW)** Fine to medium grain, loose, damp, gray, subrounded 1/4-inch to 1/2-inch gravel, no odor	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16

LOG OF BORING

Boring No.: SWMU 10-7
Start Date: 8/18/2010 1000
Finish Date: 8/18/2010 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 36º42.007' W107º58.189'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5521.902
Site Coordinates: N 36º42'00.33842" W 107º58'11.36630"

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	0-0.5'	1025	G/2V/2E/3J		0.2 85ºF	SM	80	**Silty Sand (SM)** Fine grain, loose, damp, brown, no odor	
	1.5-2'	1035	G/2V/2E/3J		0.3 85ºF				
2–4					0.3 85ºF	SM	80	**Silty Sand (SM)** Similar to above, no odor	2
4–6					0.3 85ºF	SM	80	**Silty Sand (SM)** Similar to above, no odor	4
6–8					0.4 85ºF	SM	80	**Silty Sand (SM)** Similar to above, no odor	6
8–10					0.3 85ºF	ML / SW	80	**Sandy Silt (ML)** Very fine grain, compact, damp, brown, no odor. **Gravelly Sand (SW)** Fine to medium grain, loose, damp, gray, subrounded 1/4-inch to 1/2-inch gravel, no odor	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16

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3833 S. Staples, Suite N-229
Corpus Christi, TX 78411
361/855-7335
361/855-7410 fax

LOG OF BORING

Boring No.: SWMU 10-8
Start Date: 8/18/2010 1125
Finish Date: 8/18/2010 1300

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 36º42.019' W107º58.190'

Total Depth: 12' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5518.366
Site Coordinates: N 36º42'01.13638"
W 107º58'11.43181"

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'	1215	G/2V/2E/3J		2.9 91ºF		80	**Clayey Sand (SC)** Fine grain, compact, soft, damp, brown, odor, becomes dark brown to black at base	0
2	1.5-2' & Dup	1225	G/4V/4E/6J		7.1 91ºF; 10 91ºF		100	**Clayey Sand (SC)** Similar to above, dark brown to black, odor	2
4					3.1 91ºF		40	**Clayey Sand (SC)** Similar to above, dark brown to gray, odor	4
6	6-7'	1245	G/2V/2E/3J		3.7 91ºF; 1.8 91ºF		80	**Clayey Sand (SC)** Similar to above, gray, odor; **Gravelly Sand (SW)** Fine to medium grain, loose, damp, brown to gray, no odor	6
8					1.8 91ºF		80	**Gravelly Sand (SW)** Similar to above, no odor	8
10	10-12'	1255	G/2V/2E/3J		1.1 91ºF		80	**Gravelly Sand (SW)** Similar to above, no odor	10
12								Total Depth = 12' BGL	12
14									14
16									16

WELL CONSTRUCTION

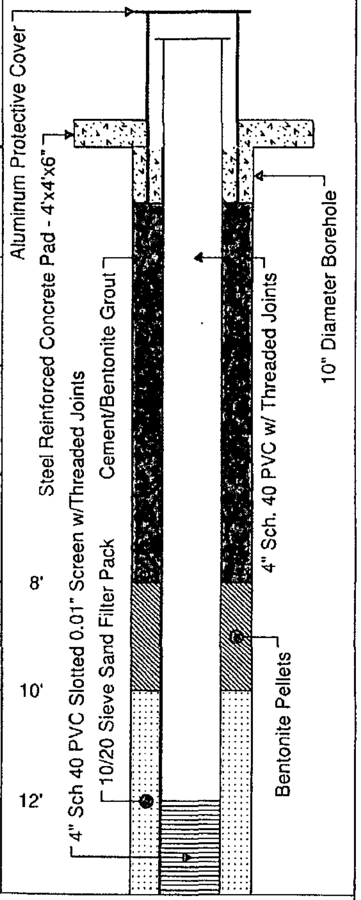
Well No.: MW-67 (SWMU10-9)
Start Date: 8/26/2010 1230
Finish Date: 8/26/2010 1630

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 36º42.029' W107º58.194'

Total Depth: 23' bgl
Ground Water: Saturated @ 18' bgl
Elev., TOC (ft. msl): 5523.312
Elev., PAD (ft. msl): 5520.676
Elev., GL (ft. msl): 5520.542
Site Coordinates:
N 36º42'01.73369"
W 107º58'11.54409"

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
-3								
-1								Ground Surface
1	0-0.5' & Dup 1.5-2'	1345 1400	G/4V/4E/6J G/2V/2E/3J		0.7 88ºF 0.7 88ºF		80	**Silty Sand (SM)** Very fine grain, loose, dry, brown
3					0.8 88ºF		80	**Silty Sand (SM)** Similar to above
5					1.0 88ºF		90	**Silty Sand (SM)** Similar to above, no odor
7					3.0 88ºF		40	**Gravelly Sand (SC)** Fine to medium grain, loose, damp, gray, no odor
9					0.7 88ºF		20	**Gravelly Sand (SW)** Similar to above, no odor
11					0.3 88ºF		30	**Gravelly Sand (SW)** Similar to above, no odor
13					0.5 88ºF		80	**Gravelly Sand (SW)** Similar to above, no odor

Completion Results



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3833 S. Staples, Suite N-229
Corpus Christi, Texas 78411

361/855-7335
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WELL CONSTRUCTION

RPS

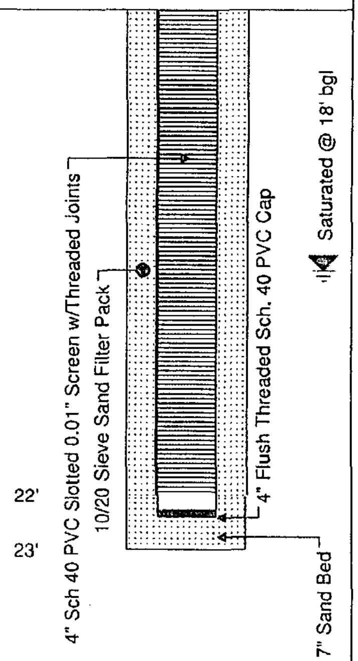
Well No.: MW-67 (SWMU10-9)
Start Date: 8/26/2010 1230
Finish Date: 8/26/2010 1630

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 36°42.029' W107°58.194'

Total Depth: 23' bgl
Ground Water: Saturated @ 18' bgl
Elev., TOC (ft. msl): 5523.312
Elev., PAD (ft. msl): 5520.676
Elev., GL (ft. msl): 5520.542
Site Coordinates:
N 36°42'01.73369"
W 107°58'11.54409"

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
15					0.5 88°F	SW	60	**Gravelly Sand (SW)** Fine to medium grain, loose, damp, gray, no odor
17	16-18'	1410	G/2V/2E/3J		1.0 93°F	SW	10	**Gravelly Sand (SW)** Similar to above, no odor
19				18'	--	SW	20	**Gravelly Sand (SW)** Similar to above, clayey, saturated, no odor
21						SW		**Gravelly Sand (SW)** Similar to above, saturated, no odor
23						CH	20	**Clay (CH)** High plasticity, very stiff, damp to dry, yellowish brown, no odor
25								Total Depth = 23' BGL
27								
29								

Completion Results



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3833 S. Staples, Suite N-229
Corpus Christi, Texas 78411
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361/855-7410 fax

LOG OF BORING

RPS

Boring No.: SWMU 16-1
Start Date: 8/18/2010 1500
Finish Date: 8/25/2010 1830

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 36º41.993' W107º58.143'

Total Depth: 24' bgl
Ground Water: Saturated @ 22' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5523.239
Site Coordinates: N 36º41'59.50904" W 107º58'08.60416"

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'	1800	G/2V/2E/3J		12.4 91ºF		70	**Silty Sand (SM)** Fine grain, loose, brown, damp	
	1.5-2'	1810	G/2V/2E/3J		70 91ºF			**Process Sulfur** Mixed with silty sand, light tan to light yellow to beige, odor	
2								**Process Catalyst** Light pink to fine grain, similar to silt	2
	2-4'	1820	G/2V/2E/3J		6.9 91ºF		100	**Silty Sand (SM)** Fine grain, loose, damp, brown, 1-inch sulfur lense at 3 feet bgl	
4					5.8 91ºF			**Process Sulfur and Catalyst**	4
					5.0 91ºF		80	**Process Catalyst** With trace of sulfur material	
6					3.2 91ºF		80	**Process Catalyst** Similar to above	6
8					2.5 91ºF		80	**Process Catalyst** Similar to above	8
10					1.3 91ºF		50	**Process Catalyst** Similar to above	10
12					1.2 91ºF		80	**Process Catalyst** Similar to above	12
14					1.3 91ºF		80	**Process Catalyst** Similar to above	14
16					0.6 91ºF		80	**Process Catalyst** Similar to above	16

RPS

LOG OF BORING

Boring No.: SWMU 16-1
Start Date: 8/18/2010 1500
Finish Date: 8/25/2010 1830

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 36º41.993' W107º58.143'

Total Depth: 24' bgl
Ground Water: Saturated @ 22' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5523.239
Site Coordinates: N 36º41'59.50904"
W 107º58'08.60416"

Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
19	18-22'	1830	G/2V/ 2E/3J		0.3 91ºF	SW	60	**Gravelly Sand (SW)** Fine to medium grain, loose, damp, gray	19
21				22'	0.3 91ºF	SW	70	**Gravelly Sand (SW)** Similar to above, moist to saturated	21
23						CH	--	**Clay (CH)** High plasticity, very stiff, damp to dry, gray and reddish brown, no odor, Nacimiento, trace calcareous crystals	23
25								Total Depth = 24' BGL	25
27									27
29									29
31									31
33									33
35									35

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3833 S. Staples, Suite N-229
Corpus Christi, TX 78411

361/855-7335
361/855-7410 fax

LOG OF BORING

RPS

Boring No.: SWMU 16-1-E
Start Date: 8/30/2010 0825
Finish Date: 8/30/2010 0840

Client: Western Refining Southwest, Inc.
Site: SWMU Group #4, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments:

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5522.760
Site Coordinates: N 36º41'59.58054"
W 107º58'08.52166"

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'	0830	G/2V/ 2J		2.6 67ºF	SM	100	**Silty Sand (SM)** Fine grain, loose, brown, dry to damp, process sulfur present, odor, gravelly	0
	1.5-2'	0840	G/2V/ 2J		7.5 67ºF				
2								Total Depth = 2' BGL	2
4									4
6									6
8									8
10									10
12									12
14									14
16									16

LOG OF BORING

Boring No.: SWMU 16-1-N
Start Date: 8/30/2010 0800
Finish Date: 8/30/2010 0810

Client: Western Refining Southwest, Inc.
Site: SWMU Group #4, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments:

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5523.538
Site Coordinates: **N** 36º41'59.57791"
W 107º58'08.69429"

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'	0800	G/2V/ 2J		1.4 66ºF	SM	100	**Silty Sand (SM)** Fine grain, loose, brown, dry to damp, trace process sulfur, faint odor	0
2	1.5-2'	0810	G/2V/ 2J		1.7 66ºF			Total Depth = 2' BGL	2
4									4
6									6
8									8
10									10
12									12
14									14
16									16

RPS

LOG OF BORING

Boring No.: SWMU 16-1-S
Start Date: 8/30/2010 0850
Finish Date: 8/30/2010 0910

Client: Western Refining Southwest, Inc.
Site: SWMU Group #4, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments:

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5522.988
Site Coordinates: **N** 36°41'59.43900"
W 107°58'08.51756"

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'	0900	G/2V/ 2J		2.3 68°F		100	**Silty Sand (SM)** Fine grain, loose, brown, dry, process sulfur present, odor, gravelly	0
	1.5-2'	0910	G/2V/ 2J		2.3 68°F				
2								Total Depth = 2' BGL	2
4									4
6									6
8									8
10									10
12									12
14									14
16									16

LOG OF BORING

Boring No.: SWMU 16-1-W
Start Date: 8/30/2010 0915
Finish Date: 8/30/2010 0930

Client: Western Refining Southwest, Inc.
Site: SWMU Group #4, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments:

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5523.930
Site Coordinates: N 36°41'59.43800" W 107°58'08.68525"

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'	0920	G/2V/ 2J		2.6 69°F		100	**Silty Sand (SM)** Fine grain, loose, brown, dry, process sulfur present, odor, gravelly	0
2	1.5-2'	0930	G/2V/ 2J		25.5 69°F			**Process Sulfur** Soft, damp, beige, odor	2
								Total Depth = 2' BGL	

RPS
3833 S. Staples, Suite N-229
Corpus Christi, TX 78411

361/855-7335
361/855-7410 fax

LOG OF BORING

Boring No.: SWMU 16-2
Start Date: 8/25/2010 0835
Finish Date: 8/25/2010 1130

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 36°41.983' W107°58.154'

Total Depth: 26' bgl
Ground Water: Saturated @ 24' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5525.166
Site Coordinates: N 36°41'58.89879" W 107°58'09.27725"

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'	1005	G/2V/ 2E/3J		1.5 63°F		60	**Silty Sand (SM)** Fine grain, loose, brown, damp, no odor	0
	1.5-2'	1015	G/2V/ 2E/3J		3.9 63°F		80	**Silty Sand (SM)** Similar to above, mixed with process sulfur, light tan to beige, odor	
2					3.9 63°F		50	**Process Sulfur** Light tan to beige, odor	2
4					1.5 63°F		10	**Silty Sand (SM)** Fine grain, loose, brown, damp, no odor	4
6					1.7 63°F		70	**Silty Sand (SM)** Similar to above, mixed with process sulfur and process catalyst, red, odor	6
8	8-10'	1020	G/2V/ 2E/3J		2.0 63°F		70	**Silty Sand (SM)** Similar to above, mixed with process catalyst and process sulfur, odor	8
10					2.0 64°F		60	**Process Catalyst and Process Sulfur** Odor	10
12					2.1 64°F		70	**Process Catalyst and Process Sulfur** Odor	12
14					2.3 65°F		80	**Process Catalyst and Process Sulfur** Odor	14
16					1.8 66°F		70	**Silty Sand (SM)** Fine grain, loose, brown, damp, odor, process sulfur and process catalyst	16

LOG OF BORING

RPS

Boring No.: SWMU 16-2
Start Date: 8/25/2010 0835
Finish Date: 8/25/2010 1130

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 36º41.983' W107º58.154'

Total Depth: 26' bgl
Ground Water: Saturated @ 24' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5525.166
Site Coordinates: N 36º41'58.89879"
W 107º58'09.27725"

Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
19	18-20'	1035	G/2V/2E/3J		2.2 68ºF	SM	70	**Silty Sand (SM)** Fine grain, loose, damp, brown, no odor	19
						SW		**Gravelly Sand (SW)** Fine to medium grain, loose, damp, gray, no odor	
21						SW	--	Similar to above, no recovery	21
23				24'		SW	--	Similar to above, no recovery	23
						SW	90	**Gravelly Sand (SW)** Similar to above, 1-inch gravel, saturated	
25						CH		**Clay (CH)** High plasticity, very stiff, damp to dry, yellowish brown to reddish brown, no odor, Nacimiento	25
27								Total Depth = 26' BGL	27
29									29
31									31
33									33
35									35

LOG OF BORING

RPS

Boring No.: SWMU 16-3
Start Date: 8/25/2010 1130
Finish Date: 8/25/2010 1340

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 36º41.983' W107º58.143'

Total Depth: 26' bgl
Ground Water: Saturated @ 22' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5524.314
Site Coordinates: N 36º41'58.93875"
W 107º58'08.56987"

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'	1315	G/2V/ 2E/3J		2.4 80ºF		90	**Silt (ML)** Very fine grain, compact to loose, damp to dry, tan, no odor	0
	1.5-2'	1325	G/2V/ 2E/3J		2.6 80ºF				
2					38.5 80ºF		80	**Silty Sand (SM)** Fine grain, loose, damp, brown, odor, mixed with process sulfur, light tan	2
4	4-6'	1335	G/2V/ 2E/3J		97.4 80ºF		80	**Process Sulfur/Silty Sand (SM)** Similar to above, odor	4
6					13.8 80ºF		10	**Process Sulfur/Silty Sand (SM)** Similar to above, odor	6
8					3.1 80ºF		80	**Silty Sand (SM)/Process Sulfur** Similar to above, odor	8
10					5.9 80ºF		80	**Silty Sand (SM)/Process Catalyst/Process Sulfur** Similar to above, odor	10
							80	**Process Sulfur**	
12					1.3 80ºF		20	**Silty Sand (SM)/Process Catalyst/Process Sulfur** Damp, odor	12
14					3.2 80ºF		60	**Silty Sand (SM)/Process Catalyst/Process Sulfur** Damp, odor	14
16							--	No recovery	16

LOG OF BORING

RPS

Boring No.: SWMU 16-3
Start Date: 8/25/2010 1130
Finish Date: 8/25/2010 1340

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 36º41.983' W107º58.143'

Total Depth: 26' bgl
Ground Water: Saturated @ 22' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5524.314
Site Coordinates: N 36º41'58.93875"
W 107º58'08.56987"

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
19	18-20'	1345	G/2V/2E/3J		2.7 79ºF		80	**Silty Sand (SM)** Fine grain, loose, damp, brown, no odor	19
21				22'	2.3 79ºF		70	**Silty Sand (SM)** Similar to above, moist to very moist	21
23							90	**Gravelly Sand (SW)** Fine to medium grain, loose, saturated, brown, no odor	23
25							90	**Gravelly Sand (SW)** Similar to above; **Clay (CH)** High plasticity, very stiff, damp to dry, yellowish brown and gray, no odor, Nacimiento	25
27								Total Depth = 26' BGL	27
29									29
31									31
33									33
35									35

RPS

LOG OF BORING

Boring No.: SWMU 16-4
Start Date: 8/25/2010 1450
Finish Date: 8/25/2010 1630

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 36º41.975' W107º58.142'

Total Depth: 22' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5522.309
Site Coordinates: N 36º41'58.39736" W 107º58'08.52726"

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'	1600	G/2V/ 2E/3J		3.2 84ºF		80	**Silty Sand (SM)** Fine grain, compact, damp to moist, trace process sulfur, faint odor	0
	1.5-2'	1610	G/2V/ 2E/3J		2.5 84ºF				
2	2-4'	1620	G/2V/ 2E/3J		77.2 85ºF		80	**Silty Sand (SM)** Similar to above, process sulfur and process catalyst present, odor	2
4					24.8 85ºF		60	**Silty Sand (SM)** Similar to above, process sulfur present, gravel present, odor	4
6					27.9 85ºF		60	**Silty Sand (SM)** Similar to above, process sulfur present, odor	6
8					16.8 85ºF		60	**Silty Sand (SM)** Similar to above, process sulfur and process catalyst present, odor	8
10					42.5 85ºF		70	**Silty Sand (SM)** Similar to above, trace process sulfur and process catalyst present, odor	10
12					3.1 86ºF		50	**Process Catalyst/Process Sulfur**	12
14					2.5 86ºF		60	**Silty Sand (SM)/Process Catalyst/Process Sulfur** Moist in process catalyst, odor	14
16					4.6 86ºF		80	**Silty Sand (SM)** Fine grain, loose, damp, brown, no odor	16

RPS

LOG OF BORING

Boring No.: SWMU 16-4
Start Date: 8/25/2010 1450
Finish Date: 8/25/2010 1630

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 36º41.975' W107º58.142'

Total Depth: 22' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5522.309
Site Coordinates: N 36º41'58.39736"
W 107º58'08.52726"

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
19					2.4 86ºF		10	**Sandy Gravel (GW)** Fine grain sand with 1/4-inch to 1-inch gravel, gray, damp, no odor	19
21	20-22'	1630	G/2V/2E/3J		1.9 86ºF		80	**Sandy Gravel (GW)** Similar to above, damp to moist	21
23								Total Depth = 22' BGL	23
25									25
27									27
29									29
31									31
33									33
35									35

LOG OF BORING

RPS

Boring No.: SWMU 16-5
Start Date: 8/26/2010 0800
Finish Date: 8/26/2010 1000

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 36º41.984' W107º58.130'

Total Depth: 22' bgl
Ground Water: Saturated @ 20' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5520.749
Site Coordinates: N 36º41'58.95029"
W 107º58'07.82215"

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'	0915	G/2V/ 2E/3J		0.4 66ºF		90	**Silty Sand (SM)** Fine grain, loose, dry, brown, odor, mixed with process sulfur, light tan to beige	0
	1.5-2' &Dup	0925	G/4V/ 4E/6J		1.8 66ºF				
2					1.3 68ºF		40	**Silty Sand (SM)/Process Sulfur** Similar to above, damp, odor	2
4					6.2 68ºF		80	**Clayey Sand (SC)/Process Sulfur** Damp, odor	4
6					7.5 68ºF		80	**Silty Sand (SM)/Process Sulfur/Process Catalyst** Fine grain, pink, damp, odor	6
8					4.0 68ºF		80	**Process Sulfur/Silty Sand (SM)** Damp, odor	8
10					5.9 70ºF		70	**Process Sulfur/Silty Clayey Sand (SM)** Damp, odor	10
12	12-14'	0935	G/2V/ 2E/3J		38.3 70ºF		80	**Process Sulfur/Process Catalyst** Damp, odor	12
14					8.7 70ºF		60	**Silty Sand (SM)** Fine grain, compact, damp, brown, odor, trace sulfur	14
16	16-20'	0945	G/2V/ 2E/3J		6.2 70ºF		80	**Silty Sand (SM)** Similar to above	16
					2.8 70ºF		40	**Silty Sand (SM)** Similar to above, black, no odor	

LOG OF BORING

RPS

Boring No.: SWMU 16-5

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 36º41.984' W107º58.130'

Total Depth: 22' bgl
Ground Water: Saturated @ 20' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5520.749
Site Coordinates: N 36º41'58.95029"
W 107º58'07.82215"

Start Date: 8/26/2010 0800
Finish Date: 8/26/2010 1000

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
19				20'	1.7 70ºF		20	**Gravelly Sand (SM)** Fine to medium grain, loose, damp, no odor	19
21							80	**Gravelly Sand (SM)** Similar to above, moist to saturated, dark gray, no odor	21
								Clay (CH) High plasticity, very stiff, damp to dry, trace fine grain sand, reddish brown to tan	
23								Total Depth = 22' BGL	23
25									25
27									27
29									29
31									31
33									33
35									35

Appendix B

Field Methods

Appendix B
Field Methods

Pursuant to Section IV of the Order, an investigation of soils and groundwater was conducted to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil borings and monitoring wells were installed at the SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area, and SWMU No. 16 Active Landfill. 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 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 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 natural 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 2000 portable 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 3. 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. 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.

Monitoring Well Development

Following monitor well completion activities, the new monitor well (MW-67) was developed using a combination of mechanical surging and air-lift techniques. The following well development activities were conducted on September 2, 2010 at MW-67 prior to groundwater sampling activities.

Using a surge block attached to the end of the drill rod, groundwater was forced to flow in and out of the well screen by the repeated upward and downward motion of the surge block along the entire length of the well screen. The repeated plunging motion drew filter pack fines and loosened sediment into the well casing, improving the water quality within the surrounding formation and filter pack.

Once the well was surged for a minimum of 20-minutes, the surge block was removed and the air-lift apparatus was used to remove the loosened sediment and fines from inside the well casing. Using an air compressor and dedicated 1-inch PVC eductor piping, compressed air was injected into the well. The air flow rate was manually adjusted to produce a continuous flow of water/sediment mixture out the top of the well casing via the 1-inch eductor piping. 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. Air lifting ceased once the purge water was relatively clear.

Fluid Level Measurements

The depth to separate phase hydrocarbon, if present, and groundwater was measured prior to purging the wells of potentially stagnant groundwater. A Keck KIR Interface Probe was used to measure fluid levels to 0.01 foot.

Purging of Monitoring Wells/Groundwater Sample Collection

The monitoring well (MW-67) was purged of a minimum of three well volumes prior to sample collection. The well volume is calculated as follows:

Volume (gallons) = water column thickness (ft) x 3.14 x radius of well casing^2 (ft) x 7.48 (gals/ft)

Field measurements of groundwater stabilization parameters included pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, and temperature. These measurements are presented in Table 10. A disposable bailer was used to remove groundwater from the well during the purging procedures.

Sample 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. 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.

Vadose Zone Vapor Sampling

Field vapor monitoring of the vadose zone was completed using a multi-gas Eagle Meter manufactured by RKI Instruments, Inc. The vapor monitoring was completed by sealing the top of the well with a cap containing a sample port. The well was purged of stagnant vapor for 25 minutes at a rate of approximately 1 liter per 10 seconds using a vacuum pump. Polyethylene tubing was inserted through the sample port and attached to a low-velocity pump and the Eagle Meter.

Equipment Calibration

Soil vapor screening was conducted using a MiniRae 2000 portable VOC monitor PGM-7600. 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.

The multi-gas Eagle Meter manufactured by RKI Instruments, Inc. was calibrated with 15% CO_2, 12.0% O_2, and 100 ppm isobutylene each work day. 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 in open top 55-gallon drums and were sealed when not in use. Each drum of soils was labeled and stored in at the 90-day storage area pending waste characterization and disposal.

Appendix C

TPH Screening Level Calculations

Equation 1
Combined Exposures to Noncarcinogenic Contaminants in Soil
Residential Scenario

$$C = \frac{THQ \times BW_c \times AT_n}{EF_r \times ED_c \left[\left(\frac{1}{RfD_o} \times \frac{IRS_c}{10^6\,mg/kg} \right) + \left(\frac{1}{RfD_o} \times \frac{SA_c \times AF_c \times ABS}{10^6\,mg/kg} \right) + \left(\frac{1}{RFD_i} \times \frac{IRA_c}{VF_s + PEF} \right) \right]}$$

Parameter	Definition (units)	NMED Default	TPH C11-C21 Aromatics
C	Contaminant concentration (mg/kg)	--	**1.83E+03**
THQ	Target hazard quotient	1	1
BW_c	Body weight, child (kg)	15	15
AT_n	Averaging time, noncarcinogens, ED x 365 (days)	2190	2190
EF_t	Exposure frequency, resident (days/yr)	350	350
ED_c	Exposure duration, child (yr)	6	6
IRS_c	Soil ingestion rate, child (mg/day)	200	200
RfDo	Oral reference dose (mg/kg-day)	--	**0.03**
SA_c	Dermal surface area, child (cm^2/day)	2800	2800
AF_c	Soil adherance factor, child (mg/cm^2)	0.2	0.2
ABS	Skin absorbtion factor (unitless)	--	**0.1**
IRA_c	Inhalation rate, child (m^3/day)	10	10
RfDi	Inhalation reference dose (mg/kg-day)	--	**0.05**
VFs	Volatilization factor, Equation 14 (mg^3/kg)	--	**8.10E+04**
PEF	Particulate emission factor, Equation 16 (m^3/kg)	--	**6.61E+09**

Ingestion	Dermal	Inhalation
2346.428571	8380.102041	5.17E+08

Equations and Default values from New Mexico Enviroment Department's Technical Background Document for Development of Soil Screening Levels, Revisions 5.0, August 2009

Toxicity factors from Massachusetts Department of Environmental Protection Masschusetts Contingency Plan Standards Spreadsheets 2009 (**bolded values**)

Equation 14
Derivation of the Volatilization Factor for Residential and Commercial/Industrial Scenarios

$$VF_s = \frac{Q/C_{vol} \times (3.14 \times D_A \times T)^{0.5} \times 10^{-4}}{(2 \times \rho_b \times D_A)}$$

$$D_A = \frac{\left[\frac{\Theta_a^{10/3} D_a H' + \Theta_w^{10/3} D_w}{n^2}\right]}{\rho_b K_d + \Theta_w + \Theta_a H'}$$

Parameter	Definition (units)	NMED Default	TPH C11-C21 Aromatics
VF_s	Volatilization factor for soil (m^3/kg)	--	**8.10E+04**
D_A	Apparent diffusivity (cm^2/s)	--	**2.35E-06**
Q/C_{vol}	Inverse of mean concentration at the center of a 0.5 acre square source (g/m^2-s per kg/m^3)	68.18	68.18
T	Exposure interval (s)	9.5E+08	9.50E+08
ρb	Dry bulk soil density (g/cm^3)	1.5	1.5
n	Total soil porosity 1-(ρb/ρs)	0.43	0.43
Θa	Air-filled soil porosity (n-Θ_w)	0.17	0.17
Θw	Water-filled soil porosity	0.26	0.26
ρs	Soil particle density (g/cm^3)	2.65	2.65
D_a	Diffusivity in air (cm^2/s)	--	**0.06**
H'	Dimensionless Henry's Law Constant	--	**0.03**
D_w	Diffusivity in water (cm^2/s)	--	**1.00E-05**
K_d	Soil-water partition coefficient (cm^3/g) = K_{oc} x f_{oc} (organics)	--	**7.518**
K_{oc}	Soil organic carbon partition coefficient (cm^3/g)	--	**5012**
f_{oc}	Fraction organic carbon in soil (g/g)	0.0015	0.0015

Equations and Default values from New Mexico Enviroment Department's Technical Background Document for Development of Soil Screening Levels, Revisions 5.0, August 2009
Physical and chemical properties from Massachusetts Department of Environmental Protection Masschusetts Contingency Plan Standards Spreadsheets 2009 (**bolded values**)

Equation 16
Derivation of the Particulate Emission Factor
Residential and Commercial/Industrial Scenarios

$$PEF = Q/C_{wind} \times \frac{3{,}600\ \sec/hr}{0.036 \times (1-V) \times \left(\frac{U_m}{U_t}\right)^3 \times F(x)}$$

Parameter	Definition (units)	Default
PEF	Particulate emission factor (m^3/kg)	**6.61E+09**
Q/Cwind	Inverse of mean concentration at center of 0.5 acre square source (g/m^2-sec per kg/m^3)	81.85
V	Fraction of vegetative cover (unitless)	0.5
Um	Mean annual windspeed (m/s)	4.02
Ut	Equivalent threshold value of windspeed at 7 m (m/s)	11.32
F(x)	Function dependent on Um/Ut using Cowherd at al. 1985 (unitless)	0.0553

Equations and Default values from New Mexico Enviroment Department's Technical Background Document for Development of Soil Screening Levels, Revisions 5.0, August 2009

Appendix D

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 Atmospheric and Oceanic 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 in - inch
C- Celsius 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

Average
= 0.01 M

NWS Cooperator CLIMATE STATIONS

WEATHER DATA FROM INDIVIDUAL STATIONS AROUND NEW MEXICO

Bloomfield 3-SE-Bloomfield, NM

Climate Data

NO PICTURE AVAILABLE

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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Division of Atmospheric Sciences

DRI
Desert Research Institute

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 × 1kilo/.62miles = 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 E

Analytical Data Reports

Lab Report Number	**Samples**
1008693	SWMU 7-1 (0-0.5', 4-5', 5-7', 10-12'), SWMU 7-2 (0-0.5', 5.75-7', 7-8', 10-12')
1008696	SWMU 7-2 (12-14', 14-16'), SWMU 7-3 (0-0.5', 0-0.5' DUP, 6-8', 8-10', 11-12', 12-14'
1008759	SWMU 10-1 (0-0.5', 1.5-2'), SWMU 10-2 (0-0.5', 1.5-2'), SWMU 10-3 (0-0.5', 1.5-2'), SWMU 10-4 (0-0.5', 1.5-2'),
1008763	SWMU 10-5 (0-0.5', 1.5-2'), SWMU 10-6 (0-0.5', 1.5-2'), SWMU 10-7 (0-0.5', 1.5-2'), SWMU 10-8 (0-0.5', 1.5-2', 1.5-2' DUP, 6-7', 10-12'),
1008811	SWMU 16-1 (0-0.5', 1.5-2', 2-4', 18-22')
1008B15	SWMU 16-2 (0-0.5', 1.5-2', 8-10', 18-20'), SWMU 16-2 (GW)
1008B21	SWMU 16-5 (0-0.5', 1.5-2', 1.5-2' DUP, 12-14', 16-20')
1008B31	SWMU 16-4 (0-0.5', 1.5-2', 2-4', 20-22')
1008B32	SWMU 16-3 (0-0.5', 1.5-2', 4-6', 18-20'), SWMU 16-3 (GW)
1008B56	SWMU 10-9 (0-0.5', 0-0.5 DUP, 1.5-2', 16-18), SWMU 16-5 (GW)
1008C01	SWMU 16-1-N (0-0.5', 1.5-2'), SWMU 16-1-E (0-0.5', 1.5-2'), SWMU 16-1-S (0-0.5', 1.5-2'), SWMU 16-1-W (0-0.5', 1.5-2'),
1009346	MW-67
1012113	MW-67
1012099	field blank only for MW-67 sampling

Chain-of-Custody Record

Client: W[illegible]n Refining - Bloomfield Refinery

Mailing Address 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation:
☐ NELAP ☐ Other
X EDD (Type) Excel

Turn-Around Time:
X Standard ☐ Rush

Project Name:
RCRA Investigation - Group 4

Project #:

Project Manager:
Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson
On Ice: ☒ Yes ☐ No
Sample Temperature: [illegible]

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

(1)

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. [illegible]	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	Air Bubbles (Y or N)
8/17/10	920	Soil	SWMU 7-1 (0-0.5')	2 encore	None	1	X							
↓	↓	↓	↓	2 Vials	MeOH	1	X							
				3 Jars	None	1	X	X	X	X	X	X		
	940	Soil	SWMU 7-1 (4-5')	2 encore	None	2	X							
	↓	↓	↓	2 vials	MeOH	2	X							
				3 Jars	None	2	X	X	X	X	X	X		
	950	Soil	SWMU 7-1 (5-7')	2 encore	None	3	X							
	↓	↓	↓	2 vials	MeOH	3	X							
				3 Jars	None	3	X	X	X	X	X	X		
	1015	Soil	SWMU ~~5~~ 7-1 (10-12)	2 encore	None	4	X							
	↓	↓	↓	2 Vials	MeOH	4	X							
↓				3 jars	None	4	X	X	X	X	X	X		

Date	Time	Relinquished by:	Received by:	Date	Time
8/17/10	1530	[signature]	To UPS		
Date:	Time:	Relinquished by:	Received by: [signature]	8/18/10	1025

Remarks:
See attached for analyte list. Call Kelly if questions

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

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation:
☐ NELAP ☐ Other ______

X EDD (Type) Excel

Turn-Around Time:
X Standard ☐ Rush ______

Project Name:
RCRA Investigation - Group 4

Project #:

Project Manager:
Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: ☒ Yes ☐ No

Sample Temperature: 3

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

2

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1008093	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	Air Bubbles (Y or N)
8/17/10	11:45	Soil	SWMU 7-2 (0-0.5')	2 encores	None	5	X							
				2 VIALS	MeOH	5	X							
				3 jars	None	5	X	X	X	X	X	X		
	11:55		SWMU 7-2 (5.75-7.0')	2 encores	None	6	X							
				2 VIALS	MeOH	6	X							
				3 Jars	None	6	X	X	X	X	X	X		
	12:05		SWMU 7-2 (7-8.0')	2 encores		7	X							
				2 VIALS	MeOH	7	X							
				3 Jars	None	7	X	X	X	X	X	X		
	12:15		SWMU 7-2 (10-12')	2 encores	None	8	X							
				2 vials	MeOH	8	X							
				3 jars	None	8	X	X	X	X	X	X		

Date	Time	Relinquished by	Received by	Date	Time
8/17/10	1530	Kelly Robinson	To UPS		
			[signature]	8/18	1025

Remarks: MeOH blank - 9

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.

GROUP 4 – SWMUs 7, 10 and 16

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.

Groundwater and 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 collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range and/or diesel organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

Groundwater and soil samples will also be analyzed for the following metals using the indicated analytical methods.

Soils Analysis

	Analyte	Analytical Method
1 -	Antimony	SW-846 method 6010/6020
2 -	Arsenic	SW-846 method 6010/6020
3 -	Barium	SW-846 method 6010/6020
4 -	Beryllium	SW-846 method 6010/6020
5 -	Cadmium	SW-846 method 6010/6020
6 -	Chromium	SW-846 method 6010/6020
7 -	Cobalt	SW-846 method 6010/6020
8 -	Cyanide	SW-846 method 335.4/335.2 mod
9 -	Lead	SW-846 method 6010/6020
10 -	Mercury	SW-846 method 7470/7471
11 -	Nickel	SW-846 method 6010/6020
12 -	Selenium	SW-846 method 6010/6020
13 -	Silver	SW-846 method 6010/6020

Metals analytes

Anatek

	Analyte	Analytical Method
14-	Thallium	SW846 method 6010/6020
15-	Vanadium	SW-846 method 6010/6020
16-	Zinc	SW-846 method 6010/6020

Metals analytes

~~Groundwater samples will also be analyzed for the following additional general chemistry parameters.~~

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

~~Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.~~

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

Chain-of-Custody Record

Client: Western Refining - Bloomfield Refinery

Mailing Address: 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation: ☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time: X Standard ☐ Rush

Project Name: RCRA Investigation - Group 4

Project #:

Project Manager: Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: X Yes ☐ No

Sample Temperature: 3.5

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

3

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1008496	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)									Air Bubbles (Y or N)
8/17/10	12:25	Soil	SWMU 7-2 (12-14')	2 encore	None	1	X															
↓	↓	↓	↓	2 VIALS	MeOH	1	X															
↓	↓	↓	↓	3 Jars	None	1	X	X	X	X	X	X										
8/17/10	12:35	Soil	SWMU 7-2 (14-16')	2 encore	None	2	X															
↓	↓	↓	↓	2 VIALS	MeOH	2	X															
↓	↓	↓	↓	3 Jars	None	2	X	X	X	X	X	X										
8/17/10	1350	Soil	SWMU 7-3 (0-0.5')	2 encore	None	3	X															
↓	↓	↓	↓	2 vials	MeOH	3	X															
↓	↓	↓	↓	3 Jars	None	3	X	X	X	X	X	X										
↓	1350	Soil	SWMU 7-3 (0-0.5') DUP	2 encore	None	4	X															
↓	↓	↓	↓	2 vials	MeOH	4	X															
↓	↓	↓	↓	3 Jars	None	4	X	X	X	X	X	X										

Date	Time	Relinquished by	Received by	Date	Time
8/17/10	1530	Kelly Robinson	TO UPS		
			[signature]	8/18	1025

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.

Chain-of-Custody Record

Client: Western Refining - Bloomfield Refinery

Mailing Address: 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation: ☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time: X Standard ☐ Rush

Project Name: RCRA Investigation - Group 4

Project #:

Project Manager: Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: ☒ Yes ☐ No

Sample Temperature: 3.3

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

4

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1008096	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	Air Bubbles (Y or N)
8/17/10	1410	Soil	SWMU 7-3 (6-8')	2 encore	None	5	X							
↓	↓	↓	↓	2 vials	MeOH	5	X							
↓	↓	↓	↓	3 Jars	None	5	X	X	X	X	X	X		
8/17/10	1420	Soil	SWMU 7-3 (8-10')	2 encore	None	6	X							
↓	↓	↓	↓	2 vials	MeOH	6	X							
↓	↓	↓	↓	3 Jars	None	6	X	X	X	X	X	X		
	1430	Soil	SWMU 7-3 (11-12')	2 encore	None	7	X							
	↓	↓	↓	2 vials	MeOH	7	X							
	↓	↓	↓	3 Jars	None	7	X	X	X	X	X	X		
	1440	Soil	SWMU 7-3 (12-14')	2 encore	None	8	X							
			↓	2 vials	MeOH	8	X							
			↓	3 Jars	None	8	X	X	X	X	X	X		

Date	Time	Relinquished by	Received by	Date	Time
8/17/10	1530	Kelly Robinson	TO UPS		
			[signature]	8/18/10	1025

Remarks: MeOH blank ?

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.

GROUP 4 – SWMUs 7, 10 and 16

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.

Groundwater and 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 collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range <u>and/or</u> diesel organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

Groundwater and soil samples will also be analyzed for the following metals using the indicated analytical methods.

Soils Analysis

	Analyte	Analytical Method
1 -	Antimony	SW-846 method 6010/6020
2 -	Arsenic	SW-846 method 6010/6020
3 -	Barium	SW-846 method 6010/6020
4 -	Beryllium	SW-846 method 6010/6020
5 -	Cadmium	SW-846 method 6010/6020
6 -	Chromium	SW-846 method 6010/6020
7 -	Cobalt	SW-846 method 6010/6020
8 -	Cyanide	SW-846 method 335.4/335.2 mod
9 -	Lead	SW-846 method 6010/6020
10 -	Mercury	SW-846 method 7470/7471
11 -	Nickel	SW-846 method 6010/6020
12 -	Selenium	SW-846 method 6010/6020
13 -	Silver	SW-846 method 6010/6020

Metals analytes

	Analyte	Analytical Method
14.	Thallium	SW846 method 6010/6020
15.	Vanadium	SW-846 method 6010/6020
16.	Zinc	SW-846 method 6010/6020

Metals analytes

Groundwater samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

Chain-of-Custody Record

Client: Western Refining - Bloomfield Refinery

Mailing Address 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

QA/QC Package:

☐ Standard X Level 4 (Full Validation)

Accreditation:

☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time:

X Standard ☐ Rush

Project Name:

RCRA Investigation - Group 4

Project #:

Project Manager:

Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: ☑ Yes ☐ No

Sample Temperature: 5.0

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

3

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1008759	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)									Air Bubbles (Y or N)
8/17/10	1545	Soil	SWMU 10-1 (0-0.5')	2 encore	None	1	X															
↓			SWMU 10-1 (0-0.5')	2 vial	MeOH	1	X															
↓	↓	↓	↓	3 Jars	None	1	X	X	X	X	X	X										
↓	15:55	Soil	SWMU 10-1 (1.5-2.0')	2 encore	None	2	X															
↓	↓	↓	↓	2 vials	MeOH	2	X															
↓	↓	↓	↓	3 jars	None	2	X	X	X	X	X	X										
↓	16:30	Soil	SWMU 10-2 (0-0.5')	2 encores	↓	3	X															
↓	↓	↓	↓	2 vials	MeOH	3	X															
↓	↓	↓	↓	3 Jars	None	3	X	X	X	X	X	X										
↓	16:40	Soil	SWMU 10-2 (1.5-2.0')	2 encore	↓	4	X															
↓	↓	↓	↓	2 vials	MeOH	4	X															
↓	↓	↓	↓	3 Jars	None	4	X	X	X	X	X	X										

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/18/10	1500	Kelly Robinson	TO UPS		
Date:	Time:	Relinquished by:	Received by:	Date 8/19/10	Time 1025

Remarks:

See Attached

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

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

QA/QC Package:

☐ Standard X Level 4 (Full Validation)

Accreditation:

☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time:

X Standard ☐ Rush

Project Name:

RCRA Investigation - Group 4

Project #:

Project Manager:

Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: X Yes ☐ No

Sample Temperature: 5.0

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

6

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1008757	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	Air Bubbles (Y or N)
8/18/10	750	Soil	SWMU 10-3 (0-0.5')	2 encore	None	5	X							
↓	↓	↓	↓	2 VIALS	MeOH ~~None~~	5	X							
↓	↓	↓	↓	3 Jars	None	5	X	X	X	X	X	X		
8/18/10	800	Soil	SWMU 10-3 (1.5-2.0')	2 encore	None	6	X							
↓	↓	↓	↓	2 VIALS	MeOH	6	X							
↓	↓	↓	↓	3 Jars	None	6	X	X	X	X	X	X		
8/18/10	835	Soil	SWMU 10-4 (0-0.5')	2 encore	None	7	X							
↓	↓	↓	↓	2 VIALS	MeOH	7	X							
↓	↓	↓	↓	3 Jars	None	7	X	X	X	X	X	X		
8/18/10	845	Soil	SWMU 10-4 (1.5-2.0')	2 encore	None	8	X							
↓	↓	↓	↓	2 VIALS	MeOH	8	X							
↓	↓	↓	↓	3 Jars	None	8	X	X	X	X	X	X		

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/18/10	1500	Kelly Robinson	TO UPS		
Date:	Time:	Relinquished by:	Received by:	Date	Time
			[signature]	8/19/10	1025

Remarks:

See Attached

MeOH Blank - 9 8/18

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

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

QA/QC Package:

☐ Standard X Level 4 (Full Validation)

Accreditation:

☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time:

X Standard ☐ Rush

Project Name:

RCRA Investigation - Group 4

Project #:

Project Manager:

Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice ☑ Yes ☐ No

Sample Temperature 5.0

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

7

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1008743	VOCs - 8260	SVOCs - 8270 (~~See Remarks~~)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	Air Bubbles (Y or N)
8/18/10	915	Soil	SWMU 10-5 (0-0.5')	2 encore	None	1	X							
↓	↓	↓	↓	2 VIALS	MeOH	1	X							
↓	↓	↓	↓	3 Jars	None	1	X	X	X	X	X	X		
↓	925	Soil	SWMU 10-5 (1.5-2.0')	2 encore	None	2	X							
↓	↓	↓	↓	2 VIALS	MeOH	2	X							
↓	↓	↓	↓	3 Jars	None	2	X	X	X	X	X	X		
8/18/10	950	Soil	SWMU 10-6 (0-0.5')	2 encore	None	3	X							
↓	↓	↓	↓	2 VIALS	MeOH	3	X							
↓	↓	↓	↓	3 Jars	None	3	X	X	X	X	X	X		
↓	1000	Soil	SWMU 10-6 (1.5-2.0')	2 encore	↓	4	X							
↓	↓	↓	↓	2 VIALS	MeOH	4	X							
↓	↓	↓	↓	3 Jars	None	4	X	X	X	X	X	X		

Date	Time	Relinquished by	Received by	Date	Time
8/18/10	1500	Kelly Robinson	To UPS		
			[signature]	8/19/10	1015

Remarks: See Attached

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

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation:
☐ NELAP ☐ Other
X EDD (Type) Excel

Turn-Around Time:
X Standard ☐ Rush

Project Name:
RCRA Investigation - Group 4

Project #:

Project Manager:
Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson
On Ice: Yes ☐ No
Sample Temperature: 5.0

HALL ENVIRONMENTAL ANALYSIS LABORATORY
8
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

8

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1008763	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	Air Bubbles (Y or N)
8/18/10	1025	Soil	SWMU 10-7 (0-0.5')			5	X							
↓	↓	↓	↓			5	X							
↓	↓	↓	↓			5	X	X	X	X	X	X		
8/18/10	1035	Soil	SWMU 10-7 (1.5-2.0')			6	X							
↓	↓	↓	↓			6	X							
↓	↓	↓	↓			6	X	X	X	X	X	X		
↓	1215	Soil	SWMU 10-8 (0-0.5')			7	X							
↓	↓	↓	↓			7	X							
↓	↓	↓	↓			7	X	X	X	X	X	X		
↓	1225	Soil	SWMU 10-8 (1.5-2.0')			8	X							
↓	↓	↓				8	X							
↓	↓	↓				8	X	X	X	X	X	X		

Date: 8/18/10 Time: 1500 Relinquished by: [signature] Received by: TO UPS Date Time

Date: Time: Relinquished by: Received by: [signature] Date 8/19/10 Time 1018

Remarks:
See attached

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.

M

Chain-of-Custody Record

Client: Western Refining - Bloomfield Refinery

Mailing Address 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

QA/QC Package:

☐ Standard X Level 4 (Full Validation)

Accreditation:

☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time:

X Standard ☐ Rush

Project Name:

RCRA Investigation - Group 4

Project #:

Project Manager:

Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: ☐ Yes ☐ No

Sample Temperature:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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4901 Hawkins NE - Albuquerque, NM 87109

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

9

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1008703	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	Air Bubbles (Y or N)
8/18/10	1225	Soil	SWMU 10-8 (1.5-2.0')	DUP	None	9	X							
↓	↓	↓	↓	2 VIALS	MeOH	9	X							
				3 Jars	None	9	X	X	X	X	X	X		
8/18/10	1245	Soil	SWMU 10-8 (6-7')	2 encore	None	10	X							
↓	↓	↓	↓	2 vials	MeOH	10	X							
				3 Jars	None	10	X	X	X	X	X	X		
8/18/10	1255	Soil	SWMU 10-8 (10-12')	2 encore	None	11	X							
↓	↓	↓	↓	2 vials	MeOH	11	X							
				3 Jars	None	11	X	X	X	X	X	X		

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/18/10	1500	Kelly Robinson	TO UPS		
Date:	Time:	Relinquished by:	Received by:	Date	Time
				8/19/10	1015

Remarks: See Attached

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

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation: ☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time: X Standard ☐ Rush

Project Name: RCRA Investigation - Group 4

Project #: SWMU 16

Project Manager: Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: X Yes ☐ No

Sample Temperature: 5.3

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

(10)

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1008211	VOCs - 8260	SVOCs - 8270 (See Remarks)*	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	Chloride, Sulfate, Fluoride	Air Bubbles (Y or N)
8/18/10	1800	Soil	SWMU 16-1 (0-0.5')	2 encore	None	1	X								
↓	↓	↓	↓	2 vials	MeOH	1	X								
↓	↓	↓	↓	3 Jars	None	1	X	X	X	X	X	X		X	
8/18/10	1810	Soil	SWMU 16-1 (1.5-2.0')	2 encore	None	2	X								
↓	↓	↓	↓	2 vials	MeOH	2	X								
↓	↓	↓	↓	3 Jars	None	2	X	X	X	X	X	X		X	
8/18/10	1820	Soil	SWMU 16-1 (2-4')	2 encore	None	3	X								
↓	↓	↓	↓	2 vials	MeOH	3	X								
↓	↓	↓	↓	3 Jars	None	3	X	X	X	X	X	X		X	
8/18/10	1830	Soil	SWMU 16-1 (18-22')	2 encore	None	4	X								
↓	↓	↓	↓	2 vials	MeOH	4	X								
↓	↓	↓	↓	3 Jars	None	4	X	X	X	X	X	X		X	

Date	Time	Relinquished by	Received by	Date	Time
8/19/10	1500	Kelly Robinson	To UPS		
			[signature]	8/20/10	10:50

Remarks: Add 8270 to samples #1 & #2 of 8/26. HOLD SVOCs til Results of MRO and DRO are known (See attached). See attached for total metal 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.

GROUP 4 – SWMUs 7, 10 and 16

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.

Groundwater and 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 collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range <u>and/or</u> diesel organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

Groundwater and soil samples will also be 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 335.4/335.2 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

Total Metals analysis

Analyte	Analytical Method
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

TOTAL Metals Analysis

Groundwater samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

N/A

Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.

Special Note

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

Additional analytes for SWMU 16 soils

Chain-of-Custody Record

Client: We[illegible] Refining - Bloomfield Refinery

Mailing Address 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation:
☐ NELAP ☐ Other________

X EDD (Type) Excel

Turn-Around Time:
X Standard ☐ Rush

Project Name:
RCRA Investigation - GROUP 4

Project #:
Swmu No 16- Landfill

Project Manager:
Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: Yes No

Sample Temperature:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109 (23)

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

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	VOCs - 8260	SVOCs - 8270 (See Remarks) *	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attached)								Air Bubbles (Y or N)
8/25/10	1005	Soil	Swmu 16-2 (0-0.5')	2 encore		1008B15-1	X															
↓	↓	↓	↓	2 vials			X															
↓	↓	↓	↓	3 Jars			X	X	X	X	X	X										
↓	1015	Soil	Swmu 16-2 (1.5-2.0')	2 encore		-2	X															
↓	↓	↓	↓	2 vials			X															
↓	↓	↓	↓	3 jars			X	X	X	X	X	X										
↓	1025	Soil	Swmu 16-2 (8-10')	2 encore		-3	X															
↓	↓	↓	↓	2 vials			X															
↓	↓	↓	↓	3 Jars			X	X	X	X	X	X										
↓	1035	Soil	Swmu 16-2 (18-20')	2 encore		-4	X															
↓	↓	↓	↓	2 vials			X															
↓	↓	↓	↓	3 jars			X	X	X	X	X	X										

Date: 8/25/10 Time: 1500 Relinquished by: Kelly Robinson
Received by: M. Walters Date 8/26/10 Time 1015

Date: Time: Relinquished by:
Received by: Date Time

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

HOLD SVOCs for Soils until MRO and DRO results are known. If over 200 ppm, run SVOCs.
See attached for clarification.

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

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

QA/QC Package:

☐ Standard   X Level 4 (Full Validation)

Accreditation:

☐ NELAP   ☐ Other

X EDD (Type) Excel

Turn-Around Time:

X Standard   ☐ Rush

Project Name:

RCRA Investigation - GROUP 4

Project #: SWMU No. 16 - Landfill

Project Manager:

Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

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

24

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attached)	Cyanide	Nitrate/Nitrite	Air Bubbles (Y or N)
8/25/10	1240	GW	SWMU 16-2 (GW)	6 VOAs	HCl	1008B15-5	X			X							
↓	↓	↓	↓	1 amber	None			X	X		X						
				1 Poly	NaOH										X		
				3 Poly	HNO_3							X	X				
				1 Poly	H_2SO_4											X	
				1 Poly	None									X			
	8/30/10		Trip Blank			-6	X			X							
			MeOH Blank			-7											

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/25/10	1500	Kelly Robinson	[signature]	8/26/10	1015
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

For CoC 23-24 – SWMU No. 16

GROUP 4 – SWMUs 7, 10 and 16

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.

Groundwater and 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.

Hold SVOCs until TPH results are known. Then proceed.

* Soil samples collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range and/or diesel organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

Groundwater and soil samples will also be analyzed for the following metals using the indicated analytical methods.

For Soil and Groundwater Samples

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

Total Metals analysis

Soil and Groundwater

Analyte	Analytical Method
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Total Metals

Groundwater samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

Total Metals

Total Metals

For Groundwater analysis

Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.

For Soil and Groundwater Analysis

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

Analyse for Total and Dissolved

Chain-of-Custody Record

Client: Western Refining - Bloomfield Refinery

Mailing Address: 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation: ☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time: X Standard ☐ Rush

Project Name: RCRA Investigation - GROUP 4

Project #: Swmu No. 16

Project Manager: Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

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

28

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attached)	Air Bubbles (Y or N)
8/26/10	915	Soil	SWMU 16-5 (0-0.5')	2 encore	None	1008B21-1	X								
↓	↓	↓	↓	2 vials	MeOH		X								
				3 Jars	None		X	X	X	X	X	X			
	925	Soil	SWMU 16-5 (1.5-2.0')	2 encore	None	-2	X								
	↓	↓	↓	2 vials	MeOH		X								
				3 Jars	None		X	X	X	X	X	X			
	925	Soil	SWMU 16-5 (1.5-2.0') DUP	2 encore	↓	-3	X								
	↓	↓	↓	2 vials	MeOH		X								
				3 Jars	None		X	X	X	X	X	X			
	935	Soil	SWMU 16-5 (12-14')	2 encore	↓	-4	X								
	↓	↓	↓	2 vials	MeOH		X								
↓	↓	↓	↓	3 Jars	None		X	X	X	X	X	X			

Date	Time	Relinquished by	Received by	Date	Time
8/26/10	1500	Kelly Robinson	M. Walters	8/27/10	1030

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

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

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation:
☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time:
X Standard ☐ Rush

Project Name:
RCRA Investigation - GROUP 4

Project #:
SWMU No. 16

Project Manager:
Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: Yes No

Sample Temperature:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109 29

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attached)	Air Bubbles (Y or N)
8/26/10	945	Soil	SWMU 16-5 (16-20')	2 encore	None	1008B21-5	X								
↓	↓	↓	↓	2 vials	MeOH		X								
↓	↓	↓	↓	3 Jars	None		X	X	X	X	X	X			

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/26/10	1500	Kelly Robinson	[signature]	8/27/10	1030
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

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.

GROUP 4 – SWMUs 7, 10 and 16

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.

Groundwater and 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 and Groundwat

Soil samples collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range and/or diesel organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

A special Note for SWMU 16

Groundwater and soil samples will also be analyzed for the following metals using the indicated analytical methods.

Total Metals Analysis Only

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

Total Metals for Soil and groundwat

Analyte	Analytical Method
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Total Metals for Groundwat and Soil

Groundwater samples will also be analyzed for the following additional general chemistry parameters.

Groundwater Only

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

Total Metals Anal Only

Total Metals Analysis Only

Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

For Soil and Groundwater Samples:

- Analyze for Total Metals and Dissolved Metals

Chain-of-Custody Record

Client: Wes[?] Refining - Bloomfield Refinery

Mailing Address 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation:
☐ NELAP ☐ Other
X EDD (Type) Excel

Turn-Around Time:
X Standard ☐ Rush

Project Name:
RCRA Investigation - GROUP 4

Project #:
SWMU No.16

Project Manager:
Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

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

26

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	VOCs - 8260	SVOCs - 8270 (See Remarks)*	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attache	Air Bubbles (Y or N)
8/25/10	1600	Soil	SWMU 16-4 (0-0.5')	2 encore		1008B31-1	X								
↓	↓	↓	↓	2 vials			X								
↓	↓	↓	↓	3 Jars			X	X	X	X	X	X			
↓	1610	Soil	SWMU 16-4 (1.5-2.0')	2 encore		-2									
↓	↓	↓	↓	2 vials											
↓	↓	↓	↓	3 Jars											
↓	1620	Soil	SWMU 16-4 (2-4')	2 encore		-3									
↓	↓	↓	↓	2 vials											
↓	↓	↓	↓	3 Jars											
↓	1630	Soil	SWMU 16-4 (20-22')	2 encore		-4									
↓	↓	↓	↓	2 vials											
↓	↓	↓	↓	3 Jars											

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/26/10	1500	Kelly Robinson	M. Walters	8/27/10	1040
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

See Attachment for full analyte list

*HOLD SVOCs for TPH analysis.

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.

GROUP 4 – SWMUs 7, 10 and 16

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.

Groundwater and 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 collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range and/or diesel organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

Hold SVOCs until TPH results are known, then proceed

Groundwater ~~and~~ soil samples will also be analyzed for the following metals using the indicated analytical methods.

For Soil and Groundwater

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

Total Metals

Groundwater and Soil

Analyte	Analytical Method
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Total Metals

Groundwater samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Total Metals → Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Total Metals → Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.

For Soil and Groundwater

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

Total and Dissolved

Chain-of-Custody Record

Client: W[illegible]n Refining - Bloomfield Refinery

Mailing Address 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

QA/QC Package:

☐ Standard X Level 4 (Full Validation)

Accreditation:

☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time:

X Standard ☐ Rush

Project Name:

RCRA Investigation - GROUP 4

Project #:

Project Manager:

Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: Yes No

Sample Temperature: [illegible]

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

25

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attache	Air Bubbles (Y or N)
8/25/10	1315	Soil	SWMU 16-3 (0-0.5')	2 encore		1008B32-1									
				2 vials											
				3 Jars											
	1325	Soil	SWMU 16-3 (1.5-2.0')	2 encore		-2									
				2 vials											
				3 Jars											
	1335	Soil	SWMU 16-3 (4-6')	2 encore		-3									
				2 vials											
				3 Jars											
	1345	Soil	SWMU 16-3 (18-20')	2 encore		-4									
				2 vials											
				3 Jars											

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/25/10	1500	Kelly Robinson	M. Walters	8/26/10	1000
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

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

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation:
☐ NELAP ☐ Other ______
X EDD (Type) Excel

Turn-Around Time:
X Standard ☐ Rush ______

Project Name:
RCRA Investigation - GROUP 4

Project #: SWMU No. 16

Project Manager:
Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

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

JF

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attached)	Cyanide	Nitrate, Nitrite	Air Bubbles (Y or N)
8/26/10	720	GW	SWMU 16-3 (GW)	6 VOAs	HCl	1008832 -5	X			X							
				1 amber	None			X	X		X						
				1 Poly	NaOH										X		
				3 Poly	HNO_3							X	X				
				1 Poly	H_2SO_4											X	
				1 Poly	None									X			
			TRIP BLANK			-6	X										
			MeOH Blank			-7	X										

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/26/10	1500	Kelly Robinson	David	8/26/10	10:00
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

See attached

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.

For COC 26-27

GROUP 4 – SWMUs 7, 10 and 16

SWMU No. 16

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.

Groundwater and soil samples will be analyzed by the following methods:

GW and soil

- 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 collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range and/or diesel organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

HOLD Soil SVOC until TPH results are known.

Groundwater and soil samples will also be analyzed for the following metals using the indicated analytical methods.

Soil and Groundwater

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

TOTAL Metals Analysis

Groundwater and Soil

Analyte	Analytical Method
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Total Metals Analysis

Groundwater samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

Total Metals

Total Metas

Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.

Groundwater and soil sample analysis

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

Total and Dissolved Metals

Chain-of-Custody Record

Client: W[illegible]rn Refining - Bloomfield Refinery

Mailing Address 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation:
☐ NELAP ☐ Other
X EDD (Type) Excel

Turn-Around Time:
X Standard ☐ Rush

Project Name:
RCRA Investigation - GROUP 4

Project #:
Swmu 10

Project Manager:
Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson
On Ice: X 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.	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attache	Air Bubbles (Y or N)
8/26/10	1345	Soil	Swmu 10-9 (0-0.5')	2 encore	None	1008856-1	X								
				2 vials	MeOH		X								
				3 Jars	None		X	X	X	X	X	X			
	1345	Soil	Swmu 10-9 (0-0.5') Dup	2 encore		-2	X								
				2 vials	MeOH		X								
				3 Jars	None		X	X	X	X	X	X			
	1400	Soil	Swmu 10-9 (1.5-2.0')	2 encore		-3	X								
				2 vials	MeOH		X								
				3 Jars	None		X	X	X	X	X	X			
	1410	Soil	Swmu 10-9 (16-18)	2 encore	None	-4	X								
				2 vials	MeOH		X								
				3 Jars	None		X	X	X	X	X	X			

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/27/10	1200	Kelly Robinson	David [illegible]	8/27/10	9:00
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

Chain-of-Custody Record

Client: W[illegible]n Refining - Bloomfield Refinery

Mailing Address 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

QA/QC Package:

☐ Standard X Level 4 (Full Validation)

Accreditation:

☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time:

X Standard ☐ Rush

Project Name:

RCRA Investigation - GROUP 4

Project #:

SWMU No. 16

Project Manager:

Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: Yes No

Sample Temperature:

HALL ENVIRON ANALYSIS LABOR

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.	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attache	Air Bubbles (Y or N)
8/26/10	1430	GW	SWMU 16-5 (GW)	6 VOAs	HCl	1008856 -5.	X			X					
↓	↓	↓	↓	1 Poly	None								X	X	
			MeOH Blank KR 8/27/10			-6									

Date:	Time:	Relinquished by:	Received by:	Date	Time
8/27/10	1200	Kelly Robinson	[signature]	8/27/10	9
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

Analyze for whats possible with limited groundwater sample.

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.

GROUP 4 – SWMUs 7, 10 and 16

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.

Groundwater and 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 collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range and/or diesel organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

Groundwater and soil samples will also be 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 335.4/335.2 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

Analyte	Analytical Method
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Groundwater samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

Chain-of-Custody Record

Client: Western Refining
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)
- ☐ Other
- ☒ EDD (Type) Excel

Turn-Around Time: ☒ Standard ☐ Rush

Project Name: SWMU No. 16 Confirmation Samples

Project #: —

Project Manager: Kelly Robinson

Sampler: Tracy Payne

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)	8270 (Semi-VOA)	VOCs - Hold Samples				Air Bubbles (Y or N)
8/30/10	800	Soil	SWMU 16-1-N (0-0.5')	2 Jar	None	1			X									X				
↓	↓	↓	↓	2 vials	MeOH	1												X				
	810	Soil	SWMU 16-1-N (1.5-2.0')	2 Jars	None	2			X									X				
	↓	↓	↓	2 vials	MeOH	2												X				
	830	Soil	SWMU 16-1-E (0-0.5')	2 Jars	None	3			X									X				
	↓	↓	↓	2 vials	MeOH	3												X				
	840	Soil	SWMU 16-1-E (1.5-2.0')	2 Jars	None	4			X									X				
	↓	↓	↓	2 vials	MeOH	4												X				
	900	Soil	SWMU 16-1-S (0-0.5')	2 Jars	None	5			X									X				
	↓	↓	↓	2 vials	MeOH	5												X				
	910	Soil	SWMU 16-1-S (1.5-2.0')	2 Jars	None	6			X									X				
	↓	↓	↓	2 vials	MeOH	6												X				

Date	Time	Relinquished by	Received by	Date	Time
~~1500~~ 8/30/10	1500	Kelly Robinson	M. Walters	8/31/10	1045

Remarks: Hold jars and vials for VOC analysis until initial SWMU 16-1 sample results are known.

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: [illegible]stern Refining
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)
- ☐ Other ______
- ☒ EDD (Type) Excel

Turn-Around Time:
- ☒ Standard
- ☐ Rush

Project Name: SWMU No. 16 Confirmation Samples

Project #: ______

Project Manager: Kelly Robinson

Sampler: Tracy Payne

[illegible]

[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	[illegible]	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)	VOCs - Hold Samples				Air Bubbles (Y or N)
8/30/10	920	Soil	SWMU 16-1-W (0-0.5')	2 Jars		7			X									X				
↓	↓	↓	↓	2 vials		7			~~X~~									X				
	930	↓	SWMU 16-1-W (1.5-2.0')	2 Jars		8			X									X				
↓	↓			2 vials		8			~~X~~									X				
			Meth Blank			9																
			@ 8/31																			

Date	Time	Relinquished by	Received by	Date	Time
8/30/10	1500	Kelly Robinson	M. Walters	8/31/10	1045

Remarks: Hold jars and vials for VOC analysis until initial SWMU 16-1 sample results are known.

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.

202

Coc 1 [illegible]

Chain-of-Custody Record

Client: W[illegible]n Refining - Bloomfield Refinery

Mailing Address 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

QA/QC Package:

☐ Standard X Level 4 (Full Validation)

Accreditation:

☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time:

X Standard ☐ Rush

Project Name:

RCRA Investigation - GROUP 4

Project #:

Project Manager:

Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

On Ice: Yes No

Sample Temperature: [illegible]

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1009130	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attached)	Cyanide	Nitrate / Nitrite	Air Bubbles (Y or N)
9/7/10	950	GW	MW-67	6 VOAs	HCl	1	X			X							
↓	↓	↓	↓	1 amber	None	1		X	X		X						
				3 Poly	HNO_3	1						X	X				
				1 Poly	None	1								X			
				1 Poly	NaOH	1									X		
				1 Poly	H_2SO_4	1										X	
—	—	GW	TRIP BLANK			2	X										

Date:	Time:	Relinquished by:	Received by:	Date	Time
9/7/10	1500	Kelly Robinson	TO UPS		

Date:	Time:	Relinquished by:	Received by:	Date	Time
			[signature]	9/8/10	11:05

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

See Attached for analyte list.
Run as a stand-alone report.

GROUP 4 – SWMUs 7, 10 and 16

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.

Groundwater and 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 collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range and/or diesel organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

Groundwater and soil samples will also be 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 335.4/335.2 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

Analyte	Analytical Method
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Groundwater samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

Chain-of-Custody Record

Client: W[illegible]n Refining - Bloomfield Refinery

Mailing Address 50 Road 4990

Phone #: 505-632-4166

email or Fax#: kelly.robinson@wnr.com

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

Accreditation: ☐ NELAP ☐ Other

X EDD (Type) Excel

Turn-Around Time: X Standard ☐ Rush

Project Name: RCRA Investigation - GROUP 4

Project #:

Project Manager: Kelly Robinson

Sampler: Tracy Payne / Kelly Robinson

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.	VOCs - 8260	SVOCs - 8270 (See Remarks)	TPH - DRO (8015B)	TPH - GRO (8015B)	TPH - MRO (8015B)	Total Metals (See Remarks)	Dissolved Metals (See Remarks)	General Chemistry (See Attached)	Cyanide	Nitrate / Nitrite						Air Bubbles (Y or N)
12/1/10	1150	GW	MW-67	6 VOAs	HCl	1012113-1	X		~~X~~	X												
				1 amber	None			X	X		X											
				3 Poly	HNO_3							X	X									
				1 Poly	None									X								
				1 Poly	NaOH										X							
				1 Poly	H_2SO_4											X						
—	—	GW	TRIP BLANK	—	—																	

Date:	Time:	Relinquished by:	Received by:	Date	Time
12/1/10	1500	Kelly Robinson	To UPS		
Date:	Time:	Relinquished by:	Received by:	Date	Time
			[signature]	12/2/10	1000

Remarks: See Attached. Aluminum, Boron, Copper, Manganese, Molybdenum, Iron, Uranium, Chloride, Sulfate, and Fluoride are to be analyzed for TOTALs and DISSOLVED (See Attached).

See attached for analyte list, Run as a stand-alone report

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.

GROUP 4 – SWMUs 7, 10 and 16

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.

Groundwater and 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 collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range and/or diesel organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

Groundwater and soil samples will also be analyzed for the following metals using the indicated analytical methods.

Totals.

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

Analyte	Analytical Method
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Groundwater samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

C00 1 of 1

Chain-of-Custody Record

Client: Western Refining - Bloomfield Refinery

Mailing Address: 50 Road 4990

Phone #: 505-632-4166

email or Fax#:

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

Accreditation: ☐ NELAP ☐ Other ______

☒ EDD (Type) ______

Turn-Around Time: ☒ Standard ☐ Rush

Project Name: RCRA Investigation

Project #:

Project Manager: Kelly Robinson

Sampler: Kelly Robinson

On Ice: ☒ Yes ☐ No

Sample Temperature: 1.4°

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. 1012099	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (~~Method 418.1~~) GRO DRO MRO	EDB (Method 504.1)	8310 (PNA or PAH)	~~RCRA 8~~ Metals (Dissolved)	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Total Metals (See attached)	General Chemistry	Nitrate/Nitrite	Cyanide	Air Bubbles (Y or N)
12/1/10	1430	GW	FB-120110	6 VOAs	HCl	-1				X						X						
				1 amber	None	-1				X							X					
				3 Poly	HNO_3	-1							X					X				
				1 Poly	None	-1													X			
				1 Poly	NaOH	-1															X	
				1 Poly	H_2SO_4	-1														X		

Date	Time	Relinquished by	Received by	Date	Time
12/1/10	1500	Kelly Robinson	TO UPS		
			Michelle Garcia	12/2/10	10:15

Remarks: See Attached

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.

SWMU 15 – TANK FARM

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.

Soil samples collected below a depth of two feet from soils without any indication of impacts, which may be used to determine vertical delineation, will be analyzed only by SW-846 Method 8015B for gasoline range (C5-C10), diesel range (>C10-C28), and motor oil range (>C28-C36) organics. All other soil and all groundwater 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.

Groundwater and 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

In addition, groundwater samples will also be analyzed for the following general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

COC 1 of 1

Chain-of-Custody Record

Client: Western Refining Southwest Inc
Bloomfield Refinery

Mailing Address: PO Box 159
Bloomfield, NM 87413

Phone #: ~~505~~ 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 4 RCRA Investigation

Project #:

Project Manager: Kelly Robinson

Sampler: Kelly Robinson

On Ice: ☒ Yes ☐ No

Sample Temperature: 3.5

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1011444	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 - TCLP	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	BTEX + MTBE (8021B)	PAHs (8310)	TPH-GRO, DRO, MRO		Air Bubbles (Y or N)
11/8/10	1200	Soil	SWMU-10,7-IDW	(2) 8oz Jars	None	1							X					X	X	X		
11/8/10	1220	↓	SWMU 16-IDW	↓	↓	2							X					X	X	X		
—	—	—	TRIP BLANK																			

Date:	Time:	Relinquished by:	Received by:	Date	Time
11/9/10	1500	Kelly Robinson	TO UPS		
Date:	Time:	Relinquished by:	Received by: [signature]	11/10/10	1030

Remarks:
Call Kelly @ 505-632-4166 if there are questions
- Stand alone Report -

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Appendix F

Quality Assurance/Quality Control

1.0 DATA VALIDATION INTRODUCTION

This summary presents data verification results for soil and groundwater samples collected from soil boring and monitoring well installed at the Bloomfield Refinery in accordance with the approved Group 4 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 64 soil samples and 5 groundwater samples were collected between August 2010 and December 2010 in accordance with the Group 4 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:

- 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 (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Copper, Cobalt, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Thallium, Uranium, Vanadium, and Zinc) by SW846 Method 6010/6020;
- Fluoride, Chloride, and Sulfate by method 300.0
- Cyanide by SW-846 method 9012;
- Mercury by EPA Method 7470.

In addition as stated in the approved Group 4 Work Plan, groundwater samples submitted to Hall Environmental Analysis Laboratory were analyzed for the following additional analytes:

- Anions (Chloride, Nitrate/Nitrite, and Sulfate) by USEPA Method 300.0;
- Alkalinity (Total Alkalinity, Carbonate, and Bicarbonate) by USEPA Method 310.1;
- Dissolved metals (Aluminum, Boron, Copper, Iron, Manganese, Molybdenum, Potassium, Sodium, Calcium, and Uranium) by USEPA Method 6010B;
- Total dissolved solids (TDS) by SM-2540C

The soil and groundwater sample analyses were completed as required by the approved Group 4 Site Investigation Work Plan, with the following exceptions:

Soil Sample Exceptions:

- 2-Methylnaphthalene was not reported for soil samples analyzed for low level VOCs.

Groundwater Sample Exceptions:

- SWMU 16-5 (GW) was not analyzed for total metals, TPH-DRO, and TPH-MRO due to limited sample recovery.

Additionally, 14 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 with the exception of the following:

- Cyanide was analyzed past its holding time by 1 day for soil sample SWMU 16-2 (0-0.5'), SWMU 16-2 (1.5-2.0'), SWMU 16-2 (8-10'), SWMU 16-2 (18-20'). Cyanide was also analyzed past it's holding time by 4 days for soil sample SWMU 10-9 (0-0.5'), SWMU 10-9 (0-0.5') DUP, SWMU 10-9 (1.5-2.0'), and SWMU 10-9 (16-18') All the associated samples were non-detect; therefore the associated field results were qualified "UJ"due to the potential low bias.
- Nitrogen as Nitrite and Nitrate ere analyzed past their holding times by 4 days for groundwater sample SWMU 16-5 (GW). The associated field sample results were qualified "UJ" for non-detect results and "J-" for detected field concentrations due to the potential low bias.

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:

- Iron was detected in the method blank associated with analytical batch 23678, 23722, and 23678 at a concentration of 2.252 mg/kg, 1.207 mg/kg, and 2.252 mg/kg, respectively. Data validation was not required since the associated field samples sample results were over 100 times the detected concentration in the method blank.
- Chloromethane was detected in the method blank associated with batch R40684 at a concentration of 1.794 mg/kg. Associated field sample SWMU 16-5 (GW) was qualified "J+" due to the potential high bias.
- Acetone, Methylene Chloride, and Chloromethane were detected in numerous analytical field samples at low concentrations. The associated field sample detections were most likely the result of laboratory contamination, as also stated by the laboratory as part of the narrative descriptions provided in various

laboratory reports. Refer to **Section 2.4.4 Common Laboratory Contaminants** for additional data qualification information.

2.4.2 Trip Blank

Trip blanks were analyzed at the appropriate frequency as specified in the approved Work Plan. Target compounds were not detected in the trip blanks, with the exception of the following:

- Chloromethane was detected in several MeOH trip blanks at a concentration above the laboratory detection limit. Refer to **Section 2.4.4 Common Laboratory Contaminants** for additional data qualification information.

2.4.3 Field Blanks/Equipment Rinsate Blank

Field and equipment rinsate blanks were collected at the appropriate frequency as specified in the approved Group 4 Investigation Work Plan. Target compounds were not detected in the field blanks and equipment rinsate blank.

2.4.4 Common Laboratory Contaminants

Per USEPA guidelines, common laboratory contaminants for VOC analysis are Acetone, 2-Butanone (MEK), Cyclohexane, and Methylene Chloride. Common laboratory contaminants for SVOC analysis include phthalates. Analytical results were qualified if the detected sample concentration is less than 10 times the method reporting limit.

- Acetone was detected in several field samples at low concentrations. As indicated by the laboratory as part of the analytical report narritives, the low detects of acetone should be considered a laboratory contaminant because the detections are partially the result of the low reporting limits. The following samples were qualified "J+" due to the potential high bias:

- SWMU 7-1 (0-0.5')	- SWMU 7-1 (10-12')
- SWMU 7-2 (5.75-7.0')	- SWMU 7-2 (7-8')
- SWMU 7-2 (10-12')	- SWMU 7-2 (14-16')
- SWMU 7-3 (0-0.5')	- SWMU 7-3 (0-0.5') DUP
- SWMU 7-3 (6-8')	- SWMU 7-3 (8-10')
- SWMU 7-3 (11-12')	- SWMU 7-3 (12-14')
- SWMU 10-1 (1.5-2.0')	- SWMU 10-8 (1.5-2.0')
- SWMU 10-8 (1.5-2.0') DUP	- SWMU 10-8 (6-7')

- Chloromethane was detected in several field samples at low concentrations. As indicated by the laboratory as part of the analytical report narratives, the low detects should be considered a laboratory contaminant. This is further supported by the detected concentrations in associated MeOH field blanks and associated method blanks. Therefore, the following samples were qualified "J+" due to the potential high bias:

- SWMU 10-7 (0-0.5')	- SWMU 10-8 (0-0.5')
- SWMU 16-1 (0-0.5')	- SWMU 16-1 (1.5-2.0')
- SWMU 16-1 (2-4')	- SWMU 16-2 (18-20')
- SWMU 16-4 (0-0.5')	- SWMU 16-4 (20-22')
- SWMU 10-9 (0-0.5')	- SWMU 10-9 (0-0.5') DUP
- SWMU 10-9 (0.5-2.0')	- SWMU 10-9 (16-18')
- SWMU 16-3 (0-0.5')	- SWMU 16-3 (1.5-2.0')
- SWMU 16-3 (4-6')	- SWMU 16-3 (18-20')

- Methylene Chloride was detected in several field samples at low concentrations. Methylene Chloride was also detected in several method blanks and field blanks. As indicated by the laboratory as part of the analytical report narratives, Methylene Chloride is considered a laboratory contaminant. Therefore The following associated field samples with detected low level concentrations of Methylene Chloride were qualified "J+" due to the potential high bias:

- SWMU 7-1 (0-0.5')	- SWMU 7-1 (5-7')
- SWMU 7-1 (10-12')	- SWMU 7-2 (0-0.5')
- SWMU 7-2 (5.75-7.0')	- SWMU 7-2 (7-8')
- SWMU 7-2 (10-12')	- SWMU 7-2 (12-14')
- SWMU 7-2 (14-16')	- SWMU 7-3 (0-0.5')
- SWMU 7-3 (0-0.5') DUP	- SWMU 7-3 (6-8')
- SWMU 7-3 (8-10')	- SWMU 7-3 (11-12')
- SWMU 7-3 (12-14')	- SWMU 10-1 (0-0.5')
- SWMU 10-1 (1.5-2.0')	- SWMU 10-2 (0-0.5')
- SWMU 10-2 (1.5-2.0')	- SWMU 10-3 (0-0.5')
- SWMU 10-3 (1.5-2.0')	- SWMU 10-4 (0-0.5')
- SWMU 10-4 (1.5-2.0')	- SWMU 10-8 (1.5-2.0')
- SWMU 10-8 (1.5-2.0') DUP	- SWMU 10-8 (6-7')
- SWMU 10-8 (10-12')	- SWMU 10-9 (1.5-2.0')

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 DNOP (0%) was below the lower acceptance limit of 61.7% for the following field samples:

- SWMU 10-6 (0-0.5')
- SWMU 10-7 (0-0.5')
- SWMU 10-8 (0-0.5')
- SWMU 10-8 (1.5-2.0')
- SWMU 10-8 (1.5-2.0') DUP
- SWMU 10-8 (6-7')
- SWMU 16-1 (0-0.5')
- SWMU 16-1 (1.5-2.0')
- SWMU 16-4 (2-4')
- SWMU 16-5 (12-14')
- SWMU 16-3 (4-6')
- SWMU 16-1-W (1.5-2.0')

Low surrogate recovery was due to required sample dilution for analytical analysis; therefore data qualification was not required.

- Surrogate recovery for 4-Bromofluorobenzene (35.6% and 48.1%) was below the lower acceptance limit of 70% for sample SWMU 10-8 (1.5-2.0') and SWMU 10-8 (1.5-2.0') DUP, respectively. Data qualification was not required because remaining acid and base/neutral fractions were within acceptance limits.
- Surrogate recovery for 2,4,6-Tribromophenol (25.3%) was below the lower acceptance limits of 28.4% for soil sample SWMU 16-5 (12-14'). Data qualification was not required because all other acid and base/neutral fractions were within acceptance limits.
- Surrogate recovery for 4-Bromofluorobenzene (125%) was above the upper acceptance limit of 113% for sample SWMU 16-3 (4-6'). Data qualification was not required because remaining acid and base/neutral fractions were within acceptance limits.
- Surrogate recovery for 2-Fluorobiphenyl (35.1%) and Phenol-d5 (30.4%) was below the lower acceptance limit of 37.4% and 35.3%, respectively for soil sample SWMU 16-3 (4-6'). Data qualification was not required because all other acid and base/neutral fractions were within acceptance limits.
- Surrogate recovery for 4-Bromofluorobenzene (108%) was above the upper acceptance limit of 106% for sample MW-67. Data qualification was not required because 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 account for a potential low bias.

LCS/LCSD percent recoveries and relative percent differences (RPDs) were within acceptance limits except for the following:

- The LCS recovery for 2-Chlorophenol (99.0% and 94.7%) was above the upper acceptance limit of 94.6% for analytical patch 23647 and 23689, respectively. The associated field data was non-detect, therefore data qualification was not 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 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 recoveries for Antimony (32.0% / 34.0%) were below the lower acceptance limit of 75% for analytical batch 23434. Associated field sample results for Antimony were non-detect. Data qualification "UJ" was required for field samples SWMU 7-2 (12-14'), SWMU 7-2 (14-16'), SWMU 7-3 (0-0.5'), SWMU 7-3 (0-0.5') DUP, SWMU 7-3 (6-8'), and SWMU 7-3 (8-10') to indicate a potential bias for the associated samples.
- The MS/MSD recoveries for Antimony (29.6% / 28.9%) and Thallium (60.1% / 56.8%) were below the respective low acceptance limit of 75% for analytical batch 23458. Associated field samples SWMU 10-1 (0-0.5'), SWMU 10-1 (1.5-2.0'), SWMU 10-2 (0-0.5'), SWMU 10-2 (1.5-2.0'), and SWMU 10-3 (0-0.5') with non-detect results were qualified "UJ" to indicate a potential low bias.

- The MS recovery for Barium (131.0%) was above the respective high acceptance limit of 125% for analytical batch 23434. Data qualification was not required because the MS duplicate recovery was within acceptance limits.
- The MS/MSD recoveries for Barium (132.0% / 135%) were above the respective high acceptance limit of 125% for analytical batch 23458. Associated field data SWMU 10-1 (0-0.5'), SWMU 10-1 (1.5-2.0), SWMU 10-2 (0-0.5'), SWMU 10-2 (1.5-2.0'), and SWMU 10-3 (0-0.5') were qualified "J+" to account for the potential high bias.
- The MS/MSD recoveries for Thallium (60.1% / 56.8%) were below the lower acceptance limit of 75% for analytical batch 23458. 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 recovery for Diesel Range Organics (205.0%) was above the respective high acceptance limit of 117% for analytical batch 23465. Data qualification was not required because the MS duplicate recovery was within acceptance limits.
- The MS/MSD recoveries for Antimony (38.7% / 40.5%) and Thallium (0.0% / 3.0%) were below the lower acceptance limit of 75% for analytical batch 23525. Results of associated field sample SWMU 10-5 (0-0.5'), SWMU 10-5 (1.5-2.0'), SWMU 10-6 (0-0.5'), SWMU 10-6 (1.5-2.0'), SWMU 10-7 (0-0.5'), SWMU 10-7 (1.5-2.0'), SWMU 10-8 (0-0.5'), SWMU 10-8 (1.5-2.0'), SWMU 10-8 (1.5-2.0') DUP, SWMU 10-8 (6-7'), and SWMU 10-8 (10-12') were non-detect and were therefore qualified "UJ" due to the potential low bias.
- The MS recovery for Barium (132.0%) was above the respective high acceptance limit of 125% for analytical batch 23525. Data qualification was not required because the MS duplicate recovery was within acceptance limits.
- The MS duplicate recovery for Fluoride (-83.8%) was below the respective low acceptance limit of 13.2% for analytical batch 23593. Data qualification was not required because the MS recovery was within acceptance limits.
- The MS/MSD recoveries for Fluoride (112% / 106%) were above the respective high acceptance limit of 105% for analytical batch R40679. The associated field data for sample SWMU 16-2 (GW) was qualified "J+" to indicate a potential high bias.
- The MS/MSD relative percent difference (RPD) for DRO (25.6%) was above the upper limit of 23% for analytical batch 23623. Data qualification was not required because the MS/MSD recoveries were within acceptance limits.
- The MS/MSD recoveries for Mercury (65.9% / 66.1%) were below the lower acceptance limit of 75% for analytical batch 23606. Associated field samples SWMU 16-2 (0-0.5'), SWMU 16-2 (1.5-2.0'), SWMU 16-2 (8-10'), and SWMU 16-2 (18-20') were non-detect for mercury; therefore the samples were qualified "UJ" to indicate a potential low bias.

- The MS/MSD recoveries for Benzene (124%/124%) were above the upper acceptance limit of 118% for analytical batch R40688. Benzene results for associated field sample SWMU 16-3 (GW) was non-detected, therefore data qualification was not required.
- The MS/MSD recoveries for Total Cyanide (111%/114%) were above the respective high acceptance limit of 110% for analytical batch R158214. Associated field samples were non-detect, therefore data qualification was not needed.

2.8 DUPLICATES

2.8.1 Field Duplicates

Field duplicates were collected at a rate in compliance with the approved Group 4 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 groundwater 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:

- Acetone for field sample SWMU 7-3 (0-0.5');
- Lead for field sample SWMU 7-3 (0-0.5');
- Zinc for field sample SWMU 10-8 (1.5-2.0') and SWMU 10-8 (1.5-2.0');
- Chloride for field sample SWMU 16-5 (1.5-2.0');
- Sulfate for field sample SWMU 16-5 (1.5-2.0');
- Mercury for field sample SWMU 10-8 (1.5-2.0').

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 94 percent for soil analysis and 96 percent for groundwater analysis. The technical completeness attained for Group 4 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 4 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 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Lab ID	Date Collected	Sample Type
SWMU 7-1 (0-0.5')	1008693-1	8/17/2010	N
SWMU 7-1 (4-5')	1008693-2	8/17/2010	N
SWMU 7-1 (5-7')	1008693-3	8/17/2010	N
SWMU 7-1 (10-12')	1008693-4	8/17/2010	N
SWMU 7-2 (0-0.5')	1008693-5	8/17/2010	N
SWMU 7-2 (5.75-7.0')	1008693-6	8/17/2010	N
SWMU 7-2 (7-8.0')	1008693-7	8/17/2010	N
SWMU 7-2 (10-12')	1008693-8	8/17/2010	N
MeOH BLANK	1008693-9	na	MB
SWMU 7-2 (12-14')	1008696-1	8/17/2010	N
SWMU 7-2 (14-16')	1008696-2	8/17/2010	N
SWMU 7-3 (0-0.5')	1008696-3	8/17/2010	N
SWMU 7-3 (0-0.5') DUP	1008696-4	8/17/2010	N
SWMU 7-3 (6-8')	1008696-5	8/17/2010	N
SWMU 7-3 (8-10')	1008696-6	8/17/2010	N
SWMU 7-3 (11-12')	1008696-7	8/17/2010	N
SWMU 7-3 (12-14')	1008696-8	8/17/2010	N
MeOH BLANK	1008696-9	na	MB
SWMU 10-1 (0-0.5')	1008759-1	8/17/2010	N
SWMU 10-1 (1.5-2.0')	1008759-2	8/17/2010	N
SWMU 10-2 (0-0.5')	1008759-3	8/17/2010	N
SWMU 10-2 (1.5-2.0')	1008759-4	8/17/2010	N
SWMU 10-3 (0-0.5')	1008759-5	8/18/2010	N
SWMU 10-3 (1.5-2.0')	1008759-6	8/18/2010	N
SWMU 10-4 (0-0.5')	1008759-7	8/18/2010	N
SWMU 10-4 (1.5-2.0')	1008759-8	8/18/2010	N
MeOH BLANK	1008759-9	na	MB
SWMU 10-5 (0-0.5')	1008763-1	8/18/2010	N
SWMU 10-5 (1.5-2.0)	1008763-2	8/18/2010	N
SWMU 10-6 (0-0.5')	1008763-3	8/18/2010	N
SWMU 10-6 (1.5-2.0')	1008763-4	8/18/2010	N
SWMU 10-7 (0-0.5')	1008763-5	8/18/2010	N
SWMU 10-7 (1.5-2.0')	1008763-6	8/18/2010	N
SWMU 10-8 (0-0.5')	1008763-7	8/18/2010	N
SWMU 10-8 (1.5-2.0')	1008763-8	8/18/2010	N
SWMU 10-8 (1.5-2.0') dup	1008763-9	8/18/2010	N
SWMU 10-8 (6-7')	1008763-10	8/18/2010	N
SWMU 10-8 (10-12')	1008763-11	8/18/2010	N
Meoh Blank	1008763-12	na	MB
SWMU 16-1 (0-0.5')	1008811-1	8/18/2010	N
SWMU 16-1 (1.5-2.0')	1008811-2	8/18/2010	N
SWMU 16-1 (2-4')	1008811-3	8/18/2010	N
SWMU 16-1 (18-22')	1008811-4	8/18/2010	N
Meoh Blank	1008811-5	na	MB
SWMU 16-2 (0-0.5')	1008B15-1	8/25/2010	N
SWMU 16-2 (1.5-2.0')	1008B15-2	8/25/2010	N
SWMU 16-2 (8-10')	1008B15-3	8/25/2010	N
SWMU 16-2 (18-20')	1008B15-4	8/25/2010	N
SWMU 16-2 (GW)	1008B15-5	8/25/2010	N
Trip Blank	1008B15-6	na	TB
Methanol Blank	1008B15-7	na	MB

Table A-1
Sampling and Analysis Schedule
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Lab ID	Date Collected	Sample Type
SWMU 16-4 (0-0.5')	1008B31-1	8/25/2010	N
SWMU 16-4 (1.5-2.0')	1008B31-2	8/25/2010	N
SWMU 16-4 (2-4')	1008B31-3	8/25/2010	N
SWMU 16-4 (20-22')	1008B31-4	8/25/2010	N
SWMU 16-5 (0-0.5')	1008B21-1	8/26/2010	N
SWMU 16-5 (1.5-2.0')	1008B21-2	8/26/2010	N
SWMU 16-5 (1.5-2.0') DUP	1008B21-3	8/26/2010	N
SWMU 16-5 (12-14')	1008B21-4	8/26/2010	N
SWMU 16-5 (16-20')	1008B21-5	8/26/2010	N
SWMU 10-9 (0-0.5')	1008B56-1	8/26/2010	N
SWMU 10-9 (0-0.5') DUP	1008B56-2	8/26/2010	N
SWMU 10-9 (1.5-2.0')	1008B56-3	8/26/2010	N
SWMU 10-9 (16-18')	1008B56-4	8/26/2010	N
SWMU 16-5 (GW)	1008B56-5	8/26/2010	N
MeOH Blank	1008B56-6	na	MB
SWMU 16-3 (0-0.5')	1008B32-1	8/25/2010	N
SWMU 16-3 (1.5-2.0')	1008B32-2	8/25/2010	N
SWMU 16-3 (4-6')	1008B32-3	8/25/2010	N
SWMU 16-3 (18-20')	1008B32-4	8/25/2010	N
SWMU 16-3 (GW)	1008B32-5	8/26/2010	N
Trip blank	1008B32-6	na	TB
Meoh Blank	1008B32-7	na	MB
SWMU 16-1-N (0-0.5')	1008C01-1	8/30/2010	N
SWMU-16-1-N (1.5-2.0')	1008C01-2	8/30/2010	N
SWMU-16-1-E- (0-0.5')	1008C01-3	8/30/2010	N
SWMU-16-1-E (1.5-2.0')	1008C01-4	8/30/2010	N
SWMU-16-1-S (0-0.5')	1008C01-5	8/30/2010	N
SWMU-16-1-S (1.5-2.0')	1008C01-6	8/30/2010	N
SWMU-16-1-W (0-0.5')	1008C01-7	8/30/2010	N
SWMU-16-1-W (1.5-2.0')	1008C01-8	8/30/2010	N
Meoh Blank	1008C01-9	na	MB
MW-67	1009346-1	9/7/2010	N
TRIP BLANK	1009346-2	na	TB
FB-120110	1012099-1	12/1/2010	FB
MW-67	1012113-1	12/1/2010	N
TRIP BLANK	1012113-2	12/1/2010	TB

Notes:

VOCs = Volatile Organic Compounds
N = Normal field sample
FD = Field duplicate
na = not applicable

TB = Trip Blank
EB = Equipment Blank
MB = Methanol Blank

TABLE A-2
Qualified Data

Table A-2
Qualified Data
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Date Collected	Analyte	Result	Units	Matrix	Qualifier	Comments
SWMU 7-1 (0-0.5')	8/17/2010	Acetone	3.42	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-1 (10-12')	8/17/2010	Acetone	11.5	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (5.75-7.0')	8/17/2010	Acetone	41.8	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (7-8.0')	8/17/2010	Acetone	13.7	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (10-12')	8/17/2010	Acetone	6.81	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (14-16')	8/17/2010	Acetone	18.4	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (0-0.5')	8/17/2010	Acetone	5.13	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (0-0.5') DUP	8/17/2010	Acetone	11.6	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 16-5 (GW)	8/26/2010	Nitrogen, Nitrate (As N)	49	mg/L	Aqueous	J-	Qualified due to analyzed past holding time
SWMU 16-5 (GW)	8/26/2010	Nitrogen, Nitrite (As N)	< 2.0	mg/L	Aqueous	UJ	Qualified due to analyzed past holding time
SWMU 7-3 (6-8')	8/17/2010	Acetone	21.5	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (8-10')	8/17/2010	Acetone	14.7	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (11-12')	8/17/2010	Acetone	10.0	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (12-14')	8/17/2010	Acetone	9.05	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-1 (1.5-2.0')	8/17/2010	Acetone	5.67	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 16-2 (GW)	8/25/2010	Fluoride	0.11	mg/L	Aqueous	J+	Qualified due to high MS/MSD recovery
SWMU 10-8 (1.5-2.0')	8/18/2010	Acetone	10.8	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-8 (1.5-2.0') dup	8/18/2010	Acetone	8.28	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-8 (6-7')	8/18/2010	Acetone	40.8	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (12-14')	8/17/2010	Antimony	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 7-2 (14-16')	8/17/2010	Antimony	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 7-3 (0-0.5')	8/17/2010	Antimony	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 7-3 (0-0.5') DUP	8/17/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 7-3 (6-8')	8/17/2010	Antimony	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 7-3 (8-10')	8/17/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-1 (0-0.5')	8/17/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-1 (1.5-2.0')	8/17/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-2 (0-0.5')	8/17/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-2 (1.5-2.0')	8/17/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-3 (0-0.5')	8/18/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-5 (0-0.5')	8/18/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-5 (1.5-2.0)	8/18/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-6 (0-0.5')	8/18/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-6 (1.5-2.0')	8/18/2010	Antimony	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-7 (0-0.5')	8/18/2010	Antimony	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-7 (1.5-2.0')	8/18/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-8 (0-0.5')	8/18/2010	Antimony	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-8 (1.5-2.0')	8/18/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-8 (1.5-2.0') dup	8/18/2010	Antimony	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-8 (6-7')	8/18/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-8 (10-12')	8/18/2010	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-1 (0-0.5')	8/17/2010	Barium	75	mg/Kg	Soil	J+	Qualified due to high MS/MSD recovery
SWMU 10-1 (1.5-2.0')	8/17/2010	Barium	59	mg/Kg	Soil	J+	Qualified due to high MS/MSD recovery
SWMU 10-2 (0-0.5')	8/17/2010	Barium	61	mg/Kg	Soil	J+	Qualified due to high MS/MSD recovery
SWMU 10-2 (1.5-2.0')	8/17/2010	Barium	60	mg/Kg	Soil	J+	Qualified due to high MS/MSD recovery
SWMU 10-3 (0-0.5')	8/18/2010	Barium	56	mg/Kg	Soil	J+	Qualified due to high MS/MSD recovery
SWMU 10-7 (0-0.5')	8/18/2010	Chloromethane	0.086	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-8 (0-0.5')	8/18/2010	Chloromethane	0.077	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination
SWMU 16-1 (0-0.5')	8/18/2010	Chloromethane	0.067	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.

Table A-2
Qualified Data
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Date Collected	Analyte	Result	Units	Matrix	Qualifier	Comments
SWMU 16-1 (1.5-2.0')	8/18/2010	Chloromethane	0.078	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 16-1 (2-4')	8/18/2010	Chloromethane	0.055	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 16-2 (18-20')	8/25/2010	Chloromethane	0.069	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 16-4 (0-0.5')	8/25/2010	Chloromethane	0.099	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 16-4 (20-22')	8/25/2010	Chloromethane	0.12	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 16-3 (0-0.5')	8/25/2010	Chloromethane	0.088	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 16-3 (1.5-2.0')	8/25/2010	Chloromethane	0.11	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 16-3 (4-6')	8/25/2010	Chloromethane	0.083	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 16-3 (18-20')	8/25/2010	Chloromethane	0.091	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 10-9 (0-0.5')	8/26/2010	Chloromethane	0.087	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 10-9 (0-0.5') DUP	8/26/2010	Chloromethane	0.073	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 10-9 (1.5-2.0')	8/26/2010	Chloromethane	0.086	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 10-9 (16-18')	8/26/2010	Chloromethane	0.075	mg/Kg	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 16-2 (0-0.5')	8/25/2010	Cyanide	< 0.50	mg/Kg	Soil	J-	Qualified due to analyzed past holding time
SWMU 16-2 (1.5-2.0')	8/25/2010	Cyanide	< 0.50	mg/Kg	Soil	J-	Qualified due to analyzed past holding time
SWMU 16-2 (8-10')	8/25/2010	Cyanide	< 0.50	mg/Kg	Soil	J-	Qualified due to analyzed past holding time
SWMU 16-2 (18-20')	8/25/2010	Cyanide	< 0.50	mg/Kg	Soil	J-	Qualified due to analyzed past holding time
SWMU 10-9 (0-0.5')	8/26/2010	Cyanide	< 0.50	mg/Kg	Soil	UJ	Qualified due to analyzed past holding time
SWMU 10-9 (0-0.5') DUP	8/26/2010	Cyanide	< 0.50	mg/Kg	Soil	UJ	Qualified due to analyzed past holding time
SWMU 10-9 (1.5-2.0')	8/26/2010	Cyanide	< 0.50	mg/Kg	Soil	UJ	Qualified due to analyzed past holding time
SWMU 10-9 (16-18')	8/26/2010	Cyanide	< 0.50	mg/Kg	Soil	UJ	Qualified due to analyzed past holding time
SWMU 16-2 (0-0.5')	8/25/2010	Mercury	< 0.033	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 16-2 (1.5-2.0')	8/25/2010	Mercury	< 0.033	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 16-2 (8-10')	8/25/2010	Mercury	< 0.033	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 16-2 (18-20')	8/25/2010	Mercury	< 0.16	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 7-1 (0-0.5')	8/17/2010	Methylene chloride	26.6	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-1 (5-7')	8/17/2010	Methylene chloride	29.4	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-1 (10-12')	8/17/2010	Methylene chloride	30.3	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (0-0.5')	8/17/2010	Methylene chloride	28.2	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (5.75-7.0')	8/17/2010	Methylene chloride	27.5	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (7-8.0')	8/17/2010	Methylene chloride	27.3	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (10-12')	8/17/2010	Methylene chloride	27.6	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (12-14')	8/17/2010	Methylene chloride	2.46	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-2 (14-16')	8/17/2010	Methylene chloride	23.3	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (0-0.5')	8/17/2010	Methylene chloride	23.7	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (0-0.5') DUP	8/17/2010	Methylene chloride	31.5	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (6-8')	8/17/2010	Methylene chloride	27.3	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (8-10')	8/17/2010	Methylene chloride	27.7	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (11-12')	8/17/2010	Methylene chloride	25.5	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 7-3 (12-14')	8/17/2010	Methylene chloride	24.5	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-1 (0-0.5')	8/17/2010	Methylene chloride	3.70	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-1 (1.5-2.0')	8/17/2010	Methylene chloride	6.87	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-2 (0-0.5')	8/17/2010	Methylene chloride	3.38	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-2 (1.5-2.0')	8/17/2010	Methylene chloride	4.94	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-3 (0-0.5')	8/18/2010	Methylene chloride	5.84	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-3 (1.5-2.0')	8/18/2010	Methylene chloride	6.28	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-4 (0-0.5')	8/18/2010	Methylene chloride	4.58	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-4 (1.5-2.0')	8/18/2010	Methylene chloride	6.93	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-8 (1.5-2.0')	8/18/2010	Methylene chloride	2.08	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination

Table A-2
Qualified Data
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Date Collected	Analyte	Result	Units	Matrix	Qualifier	Comments
SWMU 10-8 (1.5-2.0') dup	8/18/2010	Methylene chloride	2.11	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-8 (6-7')	8/18/2010	Methylene chloride	3.25	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-8 (10-12')	8/18/2010	Methylene chloride	3.78	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination
SWMU 10-9 (1.5-2.0')	8/26/2010	Methylene chloride	2.21	µg/Kg-dry	Soil	J+	Qualified due to potential laboratory contamination.
SWMU 10-1 (0-0.5')	8/17/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-1 (1.5-2.0')	8/17/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-2 (0-0.5')	8/17/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-2 (1.5-2.0')	8/17/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-3 (0-0.5')	8/18/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-5 (0-0.5')	8/18/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-5 (1.5-2.0)	8/18/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-6 (0-0.5')	8/18/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-6 (1.5-2.0')	8/18/2010	Thallium	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-7 (0-0.5')	8/18/2010	Thallium	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-7 (1.5-2.0')	8/18/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-8 (0-0.5')	8/18/2010	Thallium	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-8 (1.5-2.0')	8/18/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-8 (1.5-2.0') dup	8/18/2010	Thallium	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-8 (6-7')	8/18/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 10-8 (10-12')	8/18/2010	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/MSD recovery
SWMU 16-5 (GW)	8/26/2010	Chloromethane	10	µg/L	Aqueous	J+	Qualified due to potential laboratory contamination

Notes:
mg/L - milligrams per liter
ug/L - microgram per liter
UJ - Estimated reporting limit
J - potential bias

RPD - Relative Percent Difference
MS/MSD - Matrix spike/matrix spike duplicate

TABLE A-3
Field Duplicate Summary

Table A-3
Field Duplicate Summary
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 7-3 (0-0.5') Sample Result	SWMU 7-3 (0-0.5') DUP Sample Result	RPD (%)
TPH (mg/kg):	Diesel Range Organics (DRO)	50	< 10	NC
	Motor Oil Range Organics (MRO)	< 50	< 50	NC
	Gasoline Range Organics (GRO)	< 5.0	< 5.0	NC
VOCs (ug/kg-dry):	1,1,1,2-Tetrachloroethane	< 0.897	< 1.07	NC
	1,1,1-Trichloroethane	< 0.897	< 1.07	NC
	1,1,2,2-Tetrachloroethane	< 0.897	< 1.07	NC
	1,1,2-Trichloroethane	< 0.897	< 1.07	NC
	1,1-Dichloroethane	< 0.897	< 1.07	NC
	1,1-Dichloroethene	< 0.897	< 1.07	NC
	1,1-Dichloropropene	< 0.897	< 1.07	NC
	1,2,3-Trichlorobenzene	< 0.897	< 1.07	NC
	1,2,3-Trichloropropane	< 0.897	< 1.07	NC
	1,2,4-Trichlorobenzene	< 0.897	< 1.07	NC
	1,2,4-Trimethylbenzene	< 0.897	< 1.07	NC
	1,2-Dibromo-3-chloropropane	< 0.897	< 1.07	NC
	1,2-Dibromoethane (EDB)	< 0.897	< 1.07	NC
	1,2-Dichlorobenzene	< 0.897	< 1.07	NC
	1,2-Dichloroethane (EDC)	< 0.897	< 1.07	NC
	1,2-Dichloropropane	< 0.897	< 1.07	NC
	1,3,5-Trimethylbenzene	< 0.897	< 1.07	NC
	1,3-Dichlorobenzene	< 0.897	< 1.07	NC
	1,3-Dichloropropane	< 0.897	< 1.07	NC
	1,4-Dichlorobenzene	< 0.897	< 1.07	NC
	1-Methylnaphthalene	< 0.897	< 1.07	NC
	2,2-Dichloropropane	< 0.897	< 1.07	NC
	2-Butanone	< 0.897	< 1.07	NC
	2-Chlorotoluene	< 0.897	< 1.07	NC
	2-Hexanone	< 0.897	< 1.07	NC
	2-Methylnaphthalene	< 0.897	< 1.07	NC
	4-Chlorotoluene	< 0.897	< 1.07	NC
	4-Isopropyltoluene	< 0.897	< 1.07	NC
	4-Methyl-2-pentanone	< 0.897	< 1.07	NC
	Acetone	5.13 J+	11.6 J+	77.3 *
	Benzene	< 0.897	< 1.07	NC
	Bromobenzene	< 0.897	< 1.07	NC
	Bromodichloromethane	< 0.897	< 1.07	NC
	Bromoform	< 0.897	< 1.07	NC
	Bromomethane	< 0.897	< 1.07	NC
	Carbon disulfide	< 0.897	< 1.07	NC
	Carbon Tetrachloride	< 0.897	< 1.07	NC
	Chlorobenzene	< 0.897	< 1.07	NC
	Chloroethane	< 0.897	< 1.07	NC
	Chloroform	< 0.897	< 1.07	NC
	Chloromethane	< 0.897	< 1.07	NC
	cis-1,2-DCE	< 0.897	< 1.07	NC
	cis-1,3-Dichloropropene	< 0.897	< 1.07	NC
	Dibromochloromethane	< 0.897	< 1.07	NC
	Dibromomethane	< 0.897	< 1.07	NC
	Dichlorodifluoromethane	< 0.897	< 1.07	NC
	Ethylbenzene	< 0.897	< 1.07	NC
	Hexachlorobutadiene	< 0.897	< 1.07	NC
	Isopropylbenzene	< 0.897	< 1.07	NC
	Methyl tert-butyl ether (MTBE)	< 0.897	< 1.07	NC
	Methylene Chloride	23.7 J+	31.5 J+	28.3
	Naphthalene	< 0.897	< 1.07	NC
	n-Butylbenzene	< 0.897	< 1.07	NC
	n-Propylbenzene	< 0.897	< 1.07	NC
	sec-Butylbenzene	< 0.897	< 1.07	NC
	Styrene	< 0.897	< 1.07	NC
	tert-Butylbenzene	< 0.897	< 1.07	NC
	Tetrachloroethene (PCE)	< 0.897	< 1.07	NC
	Toluene	< 0.897	< 1.07	NC
	trans-1,2-DCE	< 0.897	< 1.07	NC
	trans-1,3-Dichloropropene	< 0.897	< 1.07	NC
	Trichloroethene (TCE)	< 0.897	< 1.07	NC
	Trichlorofluoromethane	< 0.897	< 1.07	NC
	Vinyl chloride	< 0.897	< 1.07	NC
	Xylenes, Total	< 0.897	< 1.07	NC

Table A-3
Field Duplicate Summary
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 7-3 (0-0.5') Sample Result	SWMU 7-3 (0-0.5') DUP Sample Result	RPD (%)
SVOCs (mg/kg):	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
	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	< 0.25	< 0.25	NC
	4-Nitrophenol	< 0.20	< 0.20	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 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 7-3 (0-0.5') Sample Result	SWMU 7-3 (0-0.5') DUP Sample Result	RPD (%)
Metals (mg/kg):	Antimony	< 5.0	< 2.5	NC
	Arsenic	< 5.0	2.6	NC
	Barium	140	160	13.3
	Beryllium	0.41	0.35	15.7
	Cadmium	< 0.20	< 0.10	NC
	Chromium	6.0	5.1	16.2
	Cobalt	3.4	2.8	19.4
	Cyanide	< 0.50	< 0.50	NC
	Lead	9.1	6.1	39.5 *
	Mercury	< 0.033	< 0.033	NC
	Nickel	4.7	4.3	8.9
	Selenium	< 5.0	< 2.5	NC
	Silver	< 0.50	< 0.25	NC
	Thallium	< 5.0	< 2.5	NC
	Vanadium	17	15	12.5
	Zinc	24	20	18.2

Notes:

RPD = Relative percent difference; [(difference)/(average)]* 10(
NC = Not calculated; RPD values were not calculated for non-detects
ug/L = micrograms per liter
mg/L = milligrams per liter
* = Field Duplicate RPD Outlier

Table A-3
Field Duplicate Summary
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 10-8 (1.5-2.0') Sample Result	SWMU 10-8 (1.5-2.0') DUP Sample Result	RPD (%)
TPH (mg/kg-dry):	Diesel Range Organics (DRO)	3200	3200	0.0
	Motor Oil Range Organics (MRO)	< 500	< 500	NC
	Gasoline Range Organics (GRO)	< 5.0	< 5.0	NC
VOCs (ug/kg-dry)	1,1,1,2-Tetrachloroethane	< 1.01	< 0.966	NC
	1,1,1-Trichloroethane	< 1.01	< 0.966	NC
	1,1,2,2-Tetrachloroethane	< 1.01	< 0.966	NC
	1,1,2-Trichloroethane	< 1.01	< 0.966	NC
	1,1-Dichloroethane	< 1.01	< 0.966	NC
	1,1-Dichloroethene	< 1.01	< 0.966	NC
	1,1-Dichloropropene	< 1.01	< 0.966	NC
	1,2,3-Trichlorobenzene	< 1.01	< 0.966	NC
	1,2,3-Trichloropropane	< 1.01	< 0.966	NC
	1,2,4-Trichlorobenzene	< 1.01	< 0.966	NC
	1,2,4-Trimethylbenzene	< 1.01	< 0.966	NC
	1,2-Dibromo-3-chloropropane	< 1.01	< 0.966	NC
	1,2-Dibromoethane (EDB)	< 1.01	< 0.966	NC
	1,2-Dichlorobenzene	< 1.01	< 0.966	NC
	1,2-Dichloroethane (EDC)	< 1.01	< 0.966	NC
	1,2-Dichloropropane	< 1.01	< 0.966	NC
	1,3,5-Trimethylbenzene	< 1.01	< 0.966	NC
	1,3-Dichlorobenzene	< 1.01	< 0.966	NC
	1,3-Dichloropropane	< 1.01	< 0.966	NC
	1,4-Dichlorobenzene	< 1.01	< 0.966	NC
	2,2-Dichloropropane	< 1.01	< 0.966	NC
	2-Butanone	5.12	3.61	34.6
	2-Chlorotoluene	< 1.01	< 0.966	NC
	2-Hexanone	< 1.01	< 0.966	NC
	4-Chlorotoluene	< 1.01	< 0.966	NC
	4-Isopropyltoluene	< 1.01	< 0.966	NC
	4-Methyl-2-pentanone	< 1.01	< 0.966	NC
	Acetone	10.8 J+	8.28 J+	26.4
	Benzene	1.41	< 0.966	NC
	Bromobenzene	< 1.01	< 0.966	NC
	Bromodichloromethane	< 1.01	< 0.966	NC
	Bromoform	< 1.01	< 0.966	NC
	Bromomethane	< 1.01	< 0.966	NC
	Carbon disulfide	< 1.01	< 0.966	NC
	Carbon tetrachloride	< 1.01	< 0.966	NC
	Chlorobenzene	< 1.01	< 0.966	NC
	Chloroethane	< 1.01	< 0.966	NC
	Chloroform	< 1.01	< 0.966	NC
	Chloromethane	< 1.01	< 0.966	NC
	cis-1,2-DCE	< 1.01	< 0.966	NC
	cis-1,3-Dichloropropene	< 1.01	< 0.966	NC
	Dibromochloromethane	< 1.01	< 0.966	NC
	Dibromomethane	< 1.01	< 0.966	NC
	Dichlorodifluoromethane	< 1.01	< 0.966	NC
	Ethylbenzene	< 1.01	< 0.966	NC
	Hexachlorobutadiene	< 1.01	< 0.966	NC
	Isopropylbenzene	< 1.01	< 0.966	NC
	Methyl tert-butyl ether (MTBE)	< 1.01	< 0.966	NC
	Methylene chloride	2.08 J+	2.11 J+	28.3
	Naphthalene	< 1.01	< 0.966	NC
	n-Butylbenzene	< 1.01	< 0.966	NC
	n-Propylbenzene	< 1.01	< 0.966	NC
	sec-Butylbenzene	< 1.01	< 0.966	NC
	Styrene	< 1.01	< 0.966	NC
	tert-Butylbenzene	< 1.01	< 0.966	NC
	Tetrachloroethene (PCE)	< 1.01	< 0.966	NC
	Toluene	< 1.01	< 0.966	NC
	trans-1,2-DCE	< 1.01	< 0.966	NC
	trans-1,3-Dichloropropene	< 1.01	< 0.966	NC
	Trichloroethene (TCE)	< 1.01	< 0.966	NC
	Trichlorofluoromethane	< 1.01	< 0.966	NC
	Vinyl chloride	< 1.01	< 0.966	NC
	Xylenes, Total	< 1.01	< 0.966	NC

Table A-3
Field Duplicate Summary
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 10-8 (1.5-2.0') Sample Result	SWMU 10-8 (1.5-2.0') DUP Sample Result	RPD (%)
SVOCs (mg/kg-dry):	1,2,4-Trichlorobenzene	< 0.40	< 0.40	NC
	1,2-Dichlorobenzene	< 0.40	< 0.40	NC
	1,3-Dichlorobenzene	< 0.40	< 0.40	NC
	1,4-Dichlorobenzene	< 0.40	< 0.40	NC
	2,4,5-Trichlorophenol	< 0.40	< 0.40	NC
	2,4,6-Trichlorophenol	< 0.40	< 0.40	NC
	2,4-Dichlorophenol	< 0.80	< 0.80	NC
	2,4-Dimethylphenol	< 0.60	< 0.60	NC
	2,4-Dinitrophenol	< 0.80	< 0.80	NC
	2,4-Dinitrotoluene	< 1.0	< 1.0	NC
	2,6-Dinitrotoluene	< 1.0	< 1.0	NC
	2-Chloronaphthalene	< 0.50	< 0.50	NC
	2-Chlorophenol	< 0.40	< 0.40	NC
	2-Methylnaphthalene	< 0.40	< 0.40	NC
	2-Methylphenol	< 1.0	< 1.0	NC
	2-Nitroaniline	< 0.40	< 0.40	NC
	2-Nitrophenol	< 0.40	< 0.40	NC
	3,3´-Dichlorobenzidine	< 0.50	< 0.50	NC
	3+4-Methylphenol	< 0.40	< 0.40	NC
	3-Nitroaniline	< 0.40	< 0.40	NC
	4,6-Dinitro-2-methylphenol	< 1.0	< 1.0	NC
	4-Bromophenyl phenyl ether	< 0.40	< 0.40	NC
	4-Chloro-3-methylphenol	< 1.0	< 1.0	NC
	4-Chloroaniline	< 1.0	< 1.0	NC
	4-Chlorophenyl phenyl ether	< 0.40	< 0.40	NC
	4-Nitroaniline	< 0.50	< 0.50	NC
	4-Nitrophenol	< 0.40	< 0.40	NC
	Acenaphthene	< 0.40	< 0.40	NC
	Acenaphthylene	< 0.40	< 0.40	NC
	Aniline	< 0.40	< 0.40	NC
	Anthracene	< 0.40	< 0.40	NC
	Azobenzene	< 0.40	< 0.40	NC
	Benz(a)anthracene	< 0.40	< 0.40	NC
	Benzo(a)pyrene	< 0.40	< 0.40	NC
	Benzo(b)fluoranthene	< 0.40	< 0.40	NC
	Benzo(g,h,i)perylene	< 0.40	< 0.40	NC
	Benzo(k)fluoranthene	< 0.40	< 0.40	NC
	Benzoic acid	< 1.0	< 1.0	NC
	Benzyl alcohol	< 0.40	< 0.40	NC
	Bis(2-chloroethoxy)methane	< 0.40	< 0.40	NC
	Bis(2-chloroethyl)ether	< 0.40	< 0.40	NC
	Bis(2-chloroisopropyl)ether	< 0.40	< 0.40	NC
	Bis(2-ethylhexyl)phthalate	< 1.0	< 1.0	NC
	Butyl benzyl phthalate	< 0.40	< 0.40	NC
	Carbazole	< 0.40	< 0.40	NC
	Chrysene	< 0.40	< 0.40	NC
	Dibenz(a,h)anthracene	< 0.40	< 0.40	NC
	Dibenzofuran	< 0.40	< 0.40	NC
	Diethyl phthalate	< 0.40	< 0.40	NC
	Dimethyl phthalate	< 0.40	< 0.40	NC
	Di-n-butyl phthalate	< 1.0	< 1.0	NC
	Di-n-octyl phthalate	< 0.50	< 0.50	NC
	Fluoranthene	< 0.40	< 0.40	NC
	Fluorene	< 0.40	< 0.40	NC
	Hexachlorobenzene	< 0.40	< 0.40	NC
	Hexachlorobutadiene	< 0.40	< 0.40	NC
	Hexachlorocyclopentadiene	< 0.40	< 0.40	NC
	Hexachloroethane	< 0.40	< 0.40	NC
	Indeno(1,2,3-cd)pyrene	< 0.40	< 0.40	NC
	Isophorone	< 1.0	< 1.0	NC
	Naphthalene	< 0.40	< 0.40	NC
	Nitrobenzene	< 1.0	< 1.0	NC
	N-Nitrosodi-n-propylamine	< 0.40	< 0.40	NC
	N-Nitrosodiphenylamine	< 0.40	< 0.40	NC
	Pentachlorophenol	< 0.80	< 0.80	NC
	Phenanthrene	< 0.40	< 0.40	NC
	Phenol	< 0.40	< 0.40	NC
	Pyrene	< 0.40	< 0.40	NC
	Pyridine	< 1.0	< 1.0	NC

Table A-3
Field Duplicate Summary
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 10-8 (1.5-2.0') Sample Result	SWMU 10-8 (1.5-2.0') DUP Sample Result	RPD (%)
Metals (mg/kg-dry):	Antimony	< 2.5	< 5.0	NC
	Arsenic	3.6	5.6	32.0
	Barium	150	180	18.2
	Beryllium	0.33	0.40	19.2
	Cadmium	< 0.10	< 0.20	NC
	Chromium	10	13	26.1
	Cobalt	2.6	3.5	29.5
	Cyanide	< 0.50	< 0.50	NC
	Lead	4.0	5.7	35.0
	Mercury	0.036	0.089	84.8
	Nickel	7.1	9.5	28.9
	Selenium	< 2.5	< 5.0	NC
	Silver	< 0.25	< 0.50	NC
	Thallium	< 2.5	< 5.0	NC
	Vanadium	23	27	16.0
	Zinc	43	130	100.6 *

Notes:

RPD = Relative percent difference; [(difference)/(average)]* 10(
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 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 16-5 (1.5-2.0') Sample Result	SWMU 16-5 (1.5-2.0') DUP Sample Result	RPD (%)
TPH (mg/kg-dry):	Diesel Range Organics (DRO)	35	27	25.8
	Motor Oil Range Organics (MRO)	58	< 50	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	< 1.00	< 0.20	NC
	2,2-Dichloropropane	< 1.00	< 0.10	NC
	2-Butanone	< 1.00	< 0.50	NC
	2-Chlorotoluene	< 1.00	< 0.050	NC
	2-Hexanone	< 1.00	< 0.50	NC
	2-Methylnaphthalene	< 1.00	< 0.20	NC
	4-Chlorotoluene	< 1.00	< 0.050	NC
	4-Isopropyltoluene	< 1.00	< 0.050	NC
	4-Methyl-2-pentanone	1.17	< 0.50	NC
	Acetone	3.70	< 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	< 0.10	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	< 0.050	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	< 1.00	< 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	2.47	< 0.050	NC
	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	1.16	< 0.10	NC

Table A-3
Field Duplicate Summary
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 16-5 (1.5-2.0') Sample Result	SWMU 16-5 (1.5-2.0') DUP Sample Result	RPD (%)
Metals (mg/kg-dry):	Aluminum	8900	7500	17.1
	Antimony	< 2.5	< 2.5	NC
	Arsenic	2.7	< 2.5	NC
	Barium	100	99	1.0
	Beryllium	0.29	0.24	18.9
	Boron	2.1	2.4	13.3
	Cadmium	< 0.10	< 0.10	NC
	Chromium	5.4	4.9	9.7
	Cobalt	2.5	2.2	12.8
	Copper	5.3	4.7	12.0
	Cyanide	< 0.50	< 0.50	NC
	Iron	8900	7600	16.8
	Lead	2.7	2.3	16.0
	Manganese	200	210	4.9
	Mercury	< 0.033	< 0.033	NC
	Molybdenum	0.50	0.56	11.3
	Nickel	5.5	4.6	17.8
	Selenium	< 2.5	< 2.5	NC
	Silver	< 0.25	< 0.25	NC
	Thallium	< 2.5	< 2.5	NC
	Uranium	< 2500	< 2500	NC
	Vanadium	19	16	17.1
	Zinc	29	21	32.0
General Chemistry (mg/k	Chloride	10	6.7	39.5 *
	Fluoride	2.7	2.6	3.8
	Sulfate	6300	4300	37.7 *

Notes:

RPD = Relative percent difference; [(difference)/(average)]* 10(
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
(1) = Not an RPD outlier since the difference between the field sample and duplicate sample is less than the method reporting limit.
(2) = Not an RPD outlier since analyte is previously noted as a laboratory contaminant.

Table A-3
Field Duplicate Summary
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 10-8 (1.5-2.0') *Sample Result*	SWMU 10-8 (1.5-2.0') DUP *Sample Result*	RPD (%)
TPH (mg/kg-dry):	Diesel Range Organics (DRO)	3200	3200	0.0
	Motor Oil Range Organics (MRO)	< 500	< 500	NC
	Gasoline Range Organics (GRO)	< 5.0	< 5.0	NC
VOCs (ug/kg-dry)	1,1,1,2-Tetrachloroethane	< 1.01	< 0.966	NC
	1,1,1-Trichloroethane	< 1.01	< 0.966	NC
	1,1,2,2-Tetrachloroethane	< 1.01	< 0.966	NC
	1,1,2-Trichloroethane	< 1.01	< 0.966	NC
	1,1-Dichloroethane	< 1.01	< 0.966	NC
	1,1-Dichloroethene	< 1.01	< 0.966	NC
	1,1-Dichloropropene	< 1.01	< 0.966	NC
	1,2,3-Trichlorobenzene	< 1.01	< 0.966	NC
	1,2,3-Trichloropropane	< 1.01	< 0.966	NC
	1,2,4-Trichlorobenzene	< 1.01	< 0.966	NC
	1,2,4-Trimethylbenzene	< 1.01	< 0.966	NC
	1,2-Dibromo-3-chloropropane	< 1.01	< 0.966	NC
	1,2-Dibromoethane (EDB)	< 1.01	< 0.966	NC
	1,2-Dichlorobenzene	< 1.01	< 0.966	NC
	1,2-Dichloroethane (EDC)	< 1.01	< 0.966	NC
	1,2-Dichloropropane	< 1.01	< 0.966	NC
	1,3,5-Trimethylbenzene	< 1.01	< 0.966	NC
	1,3-Dichlorobenzene	< 1.01	< 0.966	NC
	1,3-Dichloropropane	< 1.01	< 0.966	NC
	1,4-Dichlorobenzene	< 1.01	< 0.966	NC
	2,2-Dichloropropane	< 1.01	< 0.966	NC
	2-Butanone	5.12	3.61	34.6
	2-Chlorotoluene	< 1.01	< 0.966	NC
	2-Hexanone	< 1.01	< 0.966	NC
	4-Chlorotoluene	< 1.01	< 0.966	NC
	4-Isopropyltoluene	< 1.01	< 0.966	NC
	4-Methyl-2-pentanone	< 1.01	< 0.966	NC
	Acetone	10.8 J+	8.28 J+	26.4
	Benzene	1.41	< 0.966	NC
	Bromobenzene	< 1.01	< 0.966	NC
	Bromodichloromethane	< 1.01	< 0.966	NC
	Bromoform	< 1.01	< 0.966	NC
	Bromomethane	< 1.01	< 0.966	NC
	Carbon disulfide	< 1.01	< 0.966	NC
	Carbon tetrachloride	< 1.01	< 0.966	NC
	Chlorobenzene	< 1.01	< 0.966	NC
	Chloroethane	< 1.01	< 0.966	NC
	Chloroform	< 1.01	< 0.966	NC
	Chloromethane	< 1.01	< 0.966	NC
	cis-1,2-DCE	< 1.01	< 0.966	NC
	cis-1,3-Dichloropropene	< 1.01	< 0.966	NC
	Dibromochloromethane	< 1.01	< 0.966	NC
	Dibromomethane	< 1.01	< 0.966	NC
	Dichlorodifluoromethane	< 1.01	< 0.966	NC
	Ethylbenzene	< 1.01	< 0.966	NC
	Hexachlorobutadiene	< 1.01	< 0.966	NC
	Isopropylbenzene	< 1.01	< 0.966	NC
	Methyl tert-butyl ether (MTBE)	< 1.01	< 0.966	NC
	Methylene chloride	2.08 J+	2.11 J+	28.3
	Naphthalene	< 1.01	< 0.966	NC
	n-Butylbenzene	< 1.01	< 0.966	NC
	n-Propylbenzene	< 1.01	< 0.966	NC
	sec-Butylbenzene	< 1.01	< 0.966	NC
	Styrene	< 1.01	< 0.966	NC
	tert-Butylbenzene	< 1.01	< 0.966	NC
	Tetrachloroethene (PCE)	< 1.01	< 0.966	NC
	Toluene	< 1.01	< 0.966	NC
	trans-1,2-DCE	< 1.01	< 0.966	NC
	trans-1,3-Dichloropropene	< 1.01	< 0.966	NC
	Trichloroethene (TCE)	< 1.01	< 0.966	NC
	Trichlorofluoromethane	< 1.01	< 0.966	NC
	Vinyl chloride	< 1.01	< 0.966	NC
	Xylenes, Total	< 1.01	< 0.966	NC

Table A-3
Field Duplicate Summary
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 10-8 (1.5-2.0') Sample Result	SWMU 10-8 (1.5-2.0') DUP Sample Result	RPD (%)
SVOCs (mg/kg-dry):	1,2,4-Trichlorobenzene	< 0.40	< 0.40	NC
	1,2-Dichlorobenzene	< 0.40	< 0.40	NC
	1,3-Dichlorobenzene	< 0.40	< 0.40	NC
	1,4-Dichlorobenzene	< 0.40	< 0.40	NC
	2,4,5-Trichlorophenol	< 0.40	< 0.40	NC
	2,4,6-Trichlorophenol	< 0.40	< 0.40	NC
	2,4-Dichlorophenol	< 0.80	< 0.80	NC
	2,4-Dimethylphenol	< 0.60	< 0.60	NC
	2,4-Dinitrophenol	< 0.80	< 0.80	NC
	2,4-Dinitrotoluene	< 1.0	< 1.0	NC
	2,6-Dinitrotoluene	< 1.0	< 1.0	NC
	2-Chloronaphthalene	< 0.50	< 0.50	NC
	2-Chlorophenol	< 0.40	< 0.40	NC
	2-Methylnaphthalene	< 0.40	< 0.40	NC
	2-Methylphenol	< 1.0	< 1.0	NC
	2-Nitroaniline	< 0.40	< 0.40	NC
	2-Nitrophenol	< 0.40	< 0.40	NC
	3,3´-Dichlorobenzidine	< 0.50	< 0.50	NC
	3+4-Methylphenol	< 0.40	< 0.40	NC
	3-Nitroaniline	< 0.40	< 0.40	NC
	4,6-Dinitro-2-methylphenol	< 1.0	< 1.0	NC
	4-Bromophenyl phenyl ether	< 0.40	< 0.40	NC
	4-Chloro-3-methylphenol	< 1.0	< 1.0	NC
	4-Chloroaniline	< 1.0	< 1.0	NC
	4-Chlorophenyl phenyl ether	< 0.40	< 0.40	NC
	4-Nitroaniline	< 0.50	< 0.50	NC
	4-Nitrophenol	< 0.40	< 0.40	NC
	Acenaphthene	< 0.40	< 0.40	NC
	Acenaphthylene	< 0.40	< 0.40	NC
	Aniline	< 0.40	< 0.40	NC
	Anthracene	< 0.40	< 0.40	NC
	Azobenzene	< 0.40	< 0.40	NC
	Benz(a)anthracene	< 0.40	< 0.40	NC
	Benzo(a)pyrene	< 0.40	< 0.40	NC
	Benzo(b)fluoranthene	< 0.40	< 0.40	NC
	Benzo(g,h,i)perylene	< 0.40	< 0.40	NC
	Benzo(k)fluoranthene	< 0.40	< 0.40	NC
	Benzoic acid	< 1.0	< 1.0	NC
	Benzyl alcohol	< 0.40	< 0.40	NC
	Bis(2-chloroethoxy)methane	< 0.40	< 0.40	NC
	Bis(2-chloroethyl)ether	< 0.40	< 0.40	NC
	Bis(2-chloroisopropyl)ether	< 0.40	< 0.40	NC
	Bis(2-ethylhexyl)phthalate	< 1.0	< 1.0	NC
	Butyl benzyl phthalate	< 0.40	< 0.40	NC
	Carbazole	< 0.40	< 0.40	NC
	Chrysene	< 0.40	< 0.40	NC
	Dibenz(a,h)anthracene	< 0.40	< 0.40	NC
	Dibenzofuran	< 0.40	< 0.40	NC
	Diethyl phthalate	< 0.40	< 0.40	NC
	Dimethyl phthalate	< 0.40	< 0.40	NC
	Di-n-butyl phthalate	< 1.0	< 1.0	NC
	Di-n-octyl phthalate	< 0.50	< 0.50	NC
	Fluoranthene	< 0.40	< 0.40	NC
	Fluorene	< 0.40	< 0.40	NC
	Hexachlorobenzene	< 0.40	< 0.40	NC
	Hexachlorobutadiene	< 0.40	< 0.40	NC
	Hexachlorocyclopentadiene	< 0.40	< 0.40	NC
	Hexachloroethane	< 0.40	< 0.40	NC
	Indeno(1,2,3-cd)pyrene	< 0.40	< 0.40	NC
	Isophorone	< 1.0	< 1.0	NC
	Naphthalene	< 0.40	< 0.40	NC
	Nitrobenzene	< 1.0	< 1.0	NC
	N-Nitrosodi-n-propylamine	< 0.40	< 0.40	NC
	N-Nitrosodiphenylamine	< 0.40	< 0.40	NC
	Pentachlorophenol	< 0.80	< 0.80	NC
	Phenanthrene	< 0.40	< 0.40	NC
	Phenol	< 0.40	< 0.40	NC
	Pyrene	< 0.40	< 0.40	NC
	Pyridine	< 1.0	< 1.0	NC

Table A-3
Field Duplicate Summary
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 10-8 (1.5-2.0') Sample Result	SWMU 10-8 (1.5-2.0') DUP Sample Result	RPD (%)
Metals (mg/kg-dry):	Antimony	< 2.5	< 5.0	NC
	Arsenic	3.6	5.6	32.0
	Barium	150	180	18.2
	Beryllium	0.33	0.40	19.2
	Cadmium	< 0.10	< 0.20	NC
	Chromium	10	13	26.1
	Cobalt	2.6	3.5	29.5
	Cyanide	< 0.50	< 0.50	NC
	Lead	4.0	5.7	35.0
	Mercury	0.036	0.089	84.8 *
	Nickel	7.1	9.5	28.9
	Selenium	< 2.5	< 5.0	NC
	Silver	< 0.25	< 0.50	NC
	Thallium	< 2.5	< 5.0	NC
	Vanadium	23	27	16.0
	Zinc	43	130	100.6 *

Notes:
1. When comparing a detection with an non-detection, the RPD value was calculated using the non-detection limit.
RPD = Relative percent difference; [(difference)/(average)]* 10(
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
(1) = Not an RPD outlier since the difference between the field sample and duplicate sample is less than the method reporting limit.
(2) = Not an RPD outlier since analyte is previously noted as a laboratory contaminant.

TABLE A-4
Completeness Summaries

Table A-4
Completeness Summary - Soil
Group 4 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	100.0	64	100
	Gasoline Range Organics (GRO)	64	64	100.0	64	100
VOCs (ug/kg-dry)	2-Methylnapthalene	4	4	100.0	4	100
	All remaining VOC analytes	56	42 a	75.0	56	100
SVOCs (mg/kg-dry	All SVOC Analytes	43	43	100.0	43	100
Metals (mg/kg-dry	Aluminum	20	20	100.0	20	100
	Antimony	35	15 b	42.9	35	100
	Arsenic	35	35	100.0	35	100
	Barium	35	30 c	85.7	35	100
	Beryllium	35	35	100.0	35	100
	Boron	20	20	100.0	20	100
	Cadmium	35	35	100.0	35	100
	Chromium	35	35	100.0	35	100
	Cobalt	35	35	100.0	35	100
	Copper	20	20	100.0	20	100
	Cyanide	35	28 d	80.0	35	100
	Iron	20	20	100.0	20	100
	Lead	35	35	100.0	35	100
	Manganese	20	20	100.0	20	100
	Mercury	35	31 b	88.6	35	100
	Molybdenum	20	20	100.0	20	100
	Nickel	35	35	100.0	35	100
	Selenium	35	35	100.0	35	100
	Silver	35	35	100.0	35	100
	Thallium	35	20 b	57.1	35	100
	Uranium	20	20	100.0	20	100
	Vanadium	35	35	100.0	35	100
	Zinc	35	35	100.0	35	100
Other (mg/kg):	Fluoride	20	20	100.0	20	100
	Chloride	20	20	100.0	20	100
	Sulfate	20	20	100.0	20	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)*10(
Percent Technial Compliance = (Number of usable results / Number of reported results) * 10C
a = Qualified due to potential laboratory contamination.
b = Qualified due to low MS/MSD recovery
c = Qualified due to high MS/MSD recovery
d = Qualified due to exceedance of holding time

Table A-4
Completeness Summary - Groundwater Samples
Group 4 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	Total Number of Samples	Number of Contractual Compliance	Percent Contractural Compliance	Number of Usable Results	Percent Technical Complianc
TPH (mg/L):	Diesel Range Organics (DRO)	4	4	100	4	100
	Motor Oil Range Organics (MRO)	4	4	100	4	100
	Gasoline Range Organics (GRO)	5	5	100.0	5	100
VOCs (ug/L):	All analytes	5	4 [a]	80.0	5	100
SVOCs (ug/L):	All analytes	5	5	100	5	100
Inorganics (mg/L):	Chloride	5	5	100.0	5	100
	Fluoride	5	4 [b]	80.0	5	100
	Nitrate (as N) + Nitrite (as N)	3	2	66.7	3	100
	Nitrogen, Nitrate	2	1 [c]	50.0	2	100
	Nitrogen, Nitrite	2	1 [c]	50.0	2	100
	Sulfate	5	5	100.0	5	100
	Alkalinity, Total (As CaCO3)	5	5	100.0	5	100
	Bicarbonate	5	5	100.0	5	100
	Carbonate	5	5	100.0	5	100
	Total Dissolved Solids	5	5	100.0	5	100
Total Metals (mg/L):	Aluminum	4	4	100.0	4	100
	Antimony	3	3	100.0	3	100
	Arsenic	3	3	100.0	3	100
	Barium	4	4	100.0	4	100
	Beryllium	4	4	100.0	4	100
	Boron	4	4	100.0	4	100
	Cadmium	4	4	100.0	4	100
	Calcium	4	4	100.0	4	100
	Chromium	4	4	100.0	4	100
	Cobalt	4	4	100.0	4	100
	Cyanide	4	4	100.0	4	100
	Copper	4	4	100.0	4	100
	Iron	4	4	100.0	4	100
	Lead	4	4	100.0	4	100
	Magnesium	4	4	100.0	4	100
	Manganese	4	4	100.0	4	100
	Mercury	4	4	100.0	4	100
	Molybdenum	4	4	100.0	4	100
	Nickel	4	4	100.0	4	100
	Selenium	3	3	100.0	3	100
	Silver	4	4	100.0	4	100
	Thallium	3	3	100.0	3	100
	Uranium	4	4	100.0	4	100
	Vanadium	4	4	100.0	4	100
	Zinc	4	4	100.0	4	100
Dissolved Metals (mg/L):	Aluminum	4	4	100.0	4	100
	Boron	4	4	100.0	4	100
	Cyanide	4	4	100.0	4	100
	Copper	4	4	100.0	4	100
	Iron	4	4	100.0	4	100
	Manganese	4	4	100.0	4	100
	Molybdenum	4	4	100.0	4	100
	Potassium	4	4	100.0	4	100
	Sodium	4	4	100.0	4	100
	Uranium	4	4	100.0	4	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 potential laboratory contamination.
b = Qualified due to high MS/MSD recovery
c = Qualified due to exceedance of holding time

Chavez, Carl J, EMNRD

From: Monzeglio, Hope, NMENV
Sent: Monday, June 07, 2010 9:00 AM
To: Schmaltz, Randy
Cc: Kieling, John, NMENV; Cobrain, Dave, NMENV; Chavez, Carl J, EMNRD; Martinez, Cynthia, NMENV; Hains, Allen
Subject: Group 4
Attachments: GRCB-09-001 App w Mod Group 4 invest.pdf

Randy

This will go out in the mail today.

Hope

Hope Monzeglio
Environmental Specialist
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, BLDG 1
Santa Fe NM 87505
Phone: (505) 476-6045; Main No.: (505)-476-6000
Fax: (505)-476-6060
hope.monzeglio@state.nm.us

Websites:
New Mexico Environment Department
Hazardous Waste Bureau

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

BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

RON CURRY
Secretary

SARAH COTTRELL
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

June 7, 2010

Mr. Randy Schmaltz
Environmental Manager
Western Refining, Bloomfield Refinery
P.O. Box 159
Bloomfield, New Mexico 87413

**RE: APPROVAL WITH MODIFICATIONS
INVESTIGATION WORK PLAN GROUP 4
WESTERN REFINING SOUTHWEST, INC., BLOOMFIELD REFINERY
EPA ID# NMD089416416
HWB-GRCB-09-001**

Dear Mr. Schmaltz:

The New Mexico Environment Department (NMED) has received Western Refining Southwest, Inc., Bloomfield Refinery's (Western) Revised *Investigation Work Plan Group 4 SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area, and SWMU No. 16 Active Landfill)* (Work Plan), dated January 2010. NMED has reviewed the Work Plan and hereby issues this Approval with the following modifications.

Comment 1

The Work Plan divides the Solid Waste Management Units (SWMUs) into Sections (Section 2, 3, and 4). Each SWMU Section provides a Figures tab that includes the following figures: Figure 2 (SWMU Group No. 4 SWMU Locations), Figure 4 (Cross Section A-A' West to East), Figure 5 (Cross Section B-B' North to South), Figure 6 (April 2007 Potentiometric Surface), Figure 7 (Spring 2007 Separate Phase Hydrocarbon Thickness Map), and Figure 8 (Spring 2007 Dissolved-Phase Groundwater Data). In future Work Plans, Western may include Figures 2, 4, 5, 6, 7, and 8 with the general figures in Section 1 (Introduction) and each specific SWMU Section only needs to include figures that identify the sample locations specific to that SWMU.

Comment 2

In Section 2.3.1 (Anticipated Activities), page 2-6, Western states "[b]ecause the Raw Water Ponds (former North Evaporation Pond) are currently used to store fresh water and penetration of the underlying liner could threaten the physical integrity of the ponds, Western has requested that investigation of the liner material and underlying soils be deferred at this time."

NMED approves the deferral to investigate the Raw Water Ponds at this time. An investigation date will be established by NMED when Western nears completion of investigating the rest of the facility.

Comment 3

Section 3 addresses the investigation at SWMU No. 10 (Fire Training Area). Western must conduct the following during this investigation and revise the Work Plan accordingly:

a. Figure 9 (SWMU No. 10 Sample Locations Map) of this Section has a square feature identified as a Liquid Fueled Training Station which proposes the locations of two borings located on the west and east side of the feature. The boring located on the east side if the feature must be moved to the north side of the feature (downgradient side).

b. The proposed borings shown in Figure 9 in the vicinity of the Liquid Fueled Training Stations must be advanced within five feet of the structures.

c. Western states on pages 3-3 and 3-4 that "[t]here are no subsurface features at the Fire Training Area with the exception of the fuel supply lines from the two aboveground storage tanks. There is no reason to believe the fuel supply lines have had any impact on contaminant distribution within the area. The underground lines are buried in permeable soils with native material backfilled around the lines." Western provided no basis for this statement. In the Investigation Report, Western must explain the basis of the assertion that the fuel supply lines have not impacted this area and include a figure that provides the locations of all fuel lines associated with this SWMU.

d. Western's Response to NMED's September 3, 2009 Notice of Disapproval Investigation Group 4 letter, Comment 19 (items a and b) indicates that borings were not located in a few areas where natural gas is used. In the Investigation Report, Western must provide a figure that shows any above or below ground piping associated with the areas containing natural gas as well as include a description that discusses the use and storage of natural gas at this SWMU.

Comment 4
In Section 4.1 (Background), page 4-1, Western states "[t]he lateral extent of the [active] landfill is visibly obvious; however, the thickness of the material placed in the landfill is uncertain but is estimated to be 10 to 15 feet."

The above statement does not provide the dimensions for the lateral extent of the Active Landfill. The Investigation Report must include the dimensions and a description of the lateral extent of the Active Landfill.

Comment 5
In Section 4.3.1 (Anticipated Activities), pages 4-3 and 4-4, Western states "...soil samples will be collected at SWMU No. 16 Active Landfill from the five soil borings shown on Figure 10. Soil borings will be installed to a minimum depth of ten feet and samples collected as discussed in Section 5.2 with samples collected from the following intervals: 0-6 (all borings); 18-24" (all boring); from the 6" interval at the top of saturation, if encountered; the sample from each boring with the greatest apparent degree of contamination, based on field observations and field screening; and any additional intervals as determined based on field screening results."

For all boring locations drilled at the Active Landfill, Western must also collect a sample for analyses (as described in Section 5.8) from the native soil directly beneath the Active Landfill. The Investigation Report must also clarify that this SWMU is no longer in use and include when operations ceased.

Comment 6
In Section 5.2 (Soil Sampling), page 5-2, Western states "[the soil borings at the former South Evaporation Pond, Fire Training Area, and Active Landfill will be drilled to a minimum depth of ten feet, or five feet below the deepest detected contamination or waste material, whichever is deeper." In Section 5.2.1 (SWMU No. 7) page 5-2, Western states "[t]hree soil borings will be drilled within the location of the former South Evaporation Pond, with one of these at the former location of the inlet to the pond, as shown on Figure 3. The borings will be continuously logged with samples collected for analysis from each discernable layer, including the underlying native soil. If there is only one soil type encountered in a soil boring (i.e., there are not separate discernable layers), then one soil sample will be collected for analysis from 0 to 6".

The information provided in Section 5.2 for the South Evaporation Pond differs from that presented in Section 5.2.1. Western must apply both sampling approaches to the South Evaporation Pond with the following modification to Section 5.2.1; for all borings, a sample must also be collected directly from the total depth of the boring from native soil, regardless of the lack of discernable layers, in addition to the sample collected from the 0-to-6 inch interval.

Comment 7
In Section 5.8 (Chemical Analyses), page 5-11, Western states "[s]oil samples collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range organics exceed 200 parts per million."

Western must analyze soil samples for SW-846 Method 8270 if the individual or additive results for motor oil range organics and diesel range organics exceed 200 parts per million.

Comment 8
Western sent an email to NMED on May 26, 2010 that contained an attachment proposing changes to the QA/QC for Group 5. Western requested that if the QA/QC language was accepted by NMED, the changes also be applied to the Group 4 investigation Work Plan. NMED accepts the following QA/QC changes:

a. For soils, Western must collect four field duplicates samples.

b. For water, Western must collect field duplicate water samples obtained at a frequency of one sample per sampling event at permanent monitoring wells. Trip blanks must accompany laboratory sample bottles and shipping and storage containers intended for volatile organic compounds (VOC) analyses. The trip blanks must consist of a sample of analyte-free deionized water prepared by the laboratory and placed in an appropriate sample container. The trip blank must be prepared by the analytical laboratory prior to the sampling event and will be kept with the shipping containers and placed with other water samples obtained from the site each day. The trip blanks must be analyzed at a frequency of one per each shipping container of samples to be analyzed for VOCs.

c. Pending field conditions, Western may choose to collect additional QA/QC samples.

Western must adhere to all requirements in this Approval with Modifications. The Investigation Report must be submitted to NMED on or before **March 1, 2011**. OCD must be copied on all correspondence and be notified within one week prior to investigating the Active Landfill. NMED must be notified of the investigation activities in accordance with Section III.I of the July 27, 2007 Order.

If you have any questions regarding this letter, please contact Hope Monzeglio of my staff at (505) 476-6045.

Sincerely,

John E. Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
H. Monzeglio, NMED HWB
C. Chavez, OCD
A. Hains, Western El Paso
File: GRCB 2009 and Reading
HWB-GRCB-09-001

Western Refining

WNR
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NYSE

BLOOMFIELD REFINERY

RECEIVED OCD

2010 JAN 21 P 2: 03

Fed Ex #: 8709 9688 0616

James Bearzi, Bureau Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Bldg 1
Santa Fe, NM 87505

Re: Response to September 3, 2009 NOTICE OF DISAPPROVAL
Investigation Work Plan Group 4
Western Refining Southwest, Inc., Bloomfield Refinery
EPA ID# NMD089416416
HWB-GRCB-09-001

Dear Mr. Bearzi:

Western Refining Southwest, Inc., Bloomfield Refinery has prepared the following responses to your comments on the referenced investigation work plan. The revised work plan is enclosed, along with a CD containing a red-line strikeout copy noting changes from the original version (December 2008).

Comment 1

The current format of the Work Plan is difficult to follow and missing information making it hard to complete a thorough technical review. Western must revise the Work Plan as follows:

a. *Western must address each Solid Waste Management Unit (SWMU) in separate sections. Each section must include text, tables, figures, photographs, and engineering drawings (if applicable) associated with each SWMU. The text must include a Background (previous investigations), Site Conditions (surface and subsurface), Scope of Services, Investigative Methods, and Monitoring and Sampling Program subsections. Western must refer to Section X.B (Investigation Work Plan) of the July 27, 2007 Order (Order) for the required information. The associated tables, figures, photographs, and engineering drawings (if applicable) must be separated within the individual SWMU sections with labeled tabs. For example, tab separators should be inserted and titled Section 1 and the Section must include information for a SWMU (e.g., SWMU 7), followed by tab separators within the section titled "tables," figures," etc.*

Response 1a: The Work Plan has been reformatted as directed and the information is now presented in separate subsections for each SWMU. Based on this comment it would appear that separate subsections are required for each SWMU for Background (previous investigations), Site Conditions (surface and subsurface), Scope of Services, Investigative Methods, and the Monitoring and Sampling Program. However, Comment 1c. below indicates that only the Background (previous investigations), Site Conditions (surface and subsurface), and Scope of Services discussions are to be included in separate subsections for each SWMU. Accordingly, separate subsections are included for Background (previous investigations), Site Conditions (surface and subsurface), and Scope of Services.

b. The Executive Summary and Section 1 (Introduction) of the current Work Plan must be included in the revised Work Plan.

Response 1b: The Executive Summary and Section 1 of the original Work Plan (December 2008) submittal are included in the revised Work Plan.

c. Section 5 (Investigation Methods), Section 6 (Monitoring and Sampling Program), Section 7 (Schedule), Section 8 (References) of the current Work Plan must also be included in the revised Work Plan but does not need to be included in each SWMU-specific section. Sections 5-8 must be placed after the SWMU specific sections and must be separated by a tab.

The individual sections for each SWMU should follow an identical format. This applies to all future Work Plan submittals as well. In addition, Western must incorporate the requirements in this NOD to all applicable sections. Such formatting requirements will help Western organize and clarify its presentation, and facilitate NMED's review.

Response 1c: Sections 5, 6, 7 and 8 are included in the revised Work Plan using the same format as the original Work Plan. Pursuant to Comment No. 1a above, SWMU-specific subsections are included for the Background (previous investigations), Site Conditions (surface and subsurface), and Scope of Services discussions.

Comment 2

In the Section 2 (Background) discussions for each subsection (2.1 (SWMU No. 7 Raw Water Ponds), 2.2 (SWMU No. 10 Fire Training Area), and 2.3 (SWMU No. 16 Active Landfill)), Western must provide the dates of operations of the units.

Response 2: The dates of operation are included in the revised Work Plan (see Background Sections for each of the SWMUs; Sections 2.1, 3.1, and 4.1).

Comment 3

In Section 2.1 (SWMU No. 7 Raw Water Ponds), Western does not provide the depths of the Raw Water Ponds in the Background Section. The depth of the Raw Water Ponds is important for calculating the volume of water present within each pond and for determining how the sample collection will be conducted. Western must revise the Work Plan to include the depths of the Raw Water Ponds. If this information is unknown, Western must revise the Work Plan to identify how the depths will be determined during the investigation.

Response 3: A discussion on the depths of water in the Raw Water Ponds is included in the revised Work Plan (Section 2.1).

Comment 4

In Section 2.1 (SWMU No. 7 Raw Water Ponds), page 3, paragraph 1, Western states "[t]he first recorded site operations in this area were the evaporation ponds. There were two ponds of approximately 2.5 acres each. The northern pond is now the Raw Water Ponds and the southern pond was located immediately south (Figure 2)." Western must revise the Work Plan to state the current acreage of Raw Water Ponds.

Response 4: The current acreage of the Raw Water Ponds is presented in the Background subsection for SWMU No. 7 (Section 2.1).

Comment 5
In section 2.1 (SWMU No. 7 Raw Water Ponds), page 4, paragraph 3, Western states "[t]wo permanent monitoring wells and seven temporary monitoring wells were installed in October 2008, located immediately down-gradient of the Raw Water Ponds.... The samples are shown on Figure 8 and the analytical results are provided in Table 1."

The names of the samples shown on Figure 8 ("2008 RFI Sample Locations" (SB2-1, SB2-2, SB2-3, SB2-4, SB2-5/MW-50, SB2-6, SB2-7 and SB2-8) do not correlate with the names provided in Table 1 (SWMU2-1, SWMU2-2, SWMU2-3, SWMU2-4, SWMU2-5/MW-50, SWMU2-6, SWMU2-7, SWMU2-8, SWMU2-9/MW-51); it is not clear if the analytical data for the permanent monitoring wells and temporary wells, are provided in Table 1. Western must revise the Work Plan to clarify this discrepancy and include the correct names of the monitoring wells and temporary wells so that the information presented in the text, figures, and tables are consistent.

Response 5: The information presented in Table 1 is the correct analytical results for the ground water samples collected from the wells recently installed down-gradient of the Raw Water Ponds. The soil borings presented in Figure 8 were correctly numbered; however the well name was incorrectly shown using "SB" to indicate a soil boring versus using the SWMU designation. The sample location names on the figure (now Figure 3) have been revised to match those shown in the table.

Comment 6
In section 2.1 (SWMU No. 7 Raw Water Ponds), page 4, paragraph 3, Western states "[t]wo permanent monitoring wells and seven temporary monitoring wells were installed in October 2008, located immediately down-gradient of the Raw Water Ponds."

In the revised Work Plan, Western must list the names of the two monitoring wells and the seven temporary wells installed in October 2008.

Response 6: The names of the two monitoring wells and seven temporary wells are now listed in the text (Section 2.1).

Comment 7
In Section 2.1 (SWMU No. 7 Raw Water Ponds) Western references a Closure Plan for the Unlined Evaporation Lagoons and the Spray Evaporation Area which was approved by the New Mexico Oil Conservation Division (OCD).

NMED did not review or approve the closure plan referenced above. Therefore, NMED will not rely on the cited data to make regulatory decisions. No revision is necessary.

Response 7: None required.

Comment 8

In Section 2.2 (SWMU No. 10 Fire Training Area), page 6, paragraph 2, Western states "[t]his area was previously investigated during the 1993 RCRA Facility Investigation with four soil borings located in this area...All of the organic analyses were non-detect and the metals concentrations are reported to be less than the background concentrations developed during the 1993 RCRA Facility Investigation (Groundwater Technology Inc., 1994 and Groundwater Technology Inc., 1995). The analytical results for the soil samples are presented in Table 2."

A background study has not been completed in accordance with Section VIII.H of the Order; therefore, Western cannot compare inorganic constituents to background levels. The Groundwater Technology Inc., 1995 document is the Human Health and Ecological Risk Assessment; this document may no longer be valid, as NMED has since developed risk assessment guidance. Western must remove or qualify the reference to "background concentrations."

Response 8: Western believes the reference to background concentrations is adequately qualified. Western's intent with the use of the term "background concentrations" was only to reiterate the conclusions stated in the referenced Groundwater Technology documents pertaining to the 1993 RCRA Facility Investigation results.

This revised Work Plan states, "the metals concentrations are reported to be less than the background concentrations developed during the 1993 RCRA Facility Investigation . . . ." Western acknowledges that an appropriate background study in accordance to Section VIII.H. of the Order has yet to be completed. For that reason, the source Groundwater Technology documents are referenced and the metals concentrations that are presented in Table 2 are compared to the NMED screening levels, not background concentrations. Further clarification has been added to Section 3.1 (revised location of SWMU No. 10 discussion) to note that the analytical results in Table 2 are compared to the NMED screening levels and not the background concentrations developed during the 1993 RCRA Facility Investigation, as the NMED has not approved any background studies at this time.

Comment 9

In Section 3.1 (Surface Conditions), page 7, Western states "[n]orth of the refinery, surface water flows in a southeasterly direction toward the San Juan River."

It is NMED's understanding that surface water at the refinery generally flows in a northerly direction towards the San Juan River. Western must clarify the surface water flow direction in the revised Work Plan and provide an explanation in the response letter.

Response 9: NMED's understanding that surface water flows across the refinery property generally in the northerly direction is correct. In the Work Plan, the term "North of the refinery" was meant to refer to the area north of the river. The first paragraph of Section 3.1 begins as follows, "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 property, surface water flows in a southeasterly direction toward the San Juan River."

The text explains in the first sentence, that the refinery complex extends north to the San Juan River, thus "north of the refinery property" refers to the area on the north side of the San Juan River where surface water flows in a southeasterly direction toward the river. In the active portion of the refinery, where the process units and storage tanks are located, the surface gradient is to the northwest. The text is revised in subsections 2.2.1, 3.2.1, and 4.2.1 to clarify that on the north side of the San Juan River, adjacent to the refinery complex, surface water flows toward the river in a southeasterly direction.

Comment 10

In Section 3.1 (Surface Conditions), page 7, paragraph 3, Western states that "[t]he refinery complex is bisected by County Rd #4990 (Sullivan Road), which runs east-west. The process units, storage tanks (crude oil and liquid products), and wastewater treatment systems are located north of the county road. The crude oil and product loading racks, LPG storage tanks and loading racks...are located south of [the] county road."

Western must revise this Section of the Work Plan to include the location of SWMUs 7, 10, and 11 in reference to County Road #4990.

Response 10: The Work Plan has been revised to include a description of the location of the SWMUs relative to County Road #4990 in subsections 2.2.1, 3.2.1, and 4.2.1.

Comment 11

The Scope of Services, Section 4.0 does not provide enough detail to complete a thorough review. Western must revise the Scope of Services Section in accordance with X.B.7 (Scope of Services) of the Order, specifically to address the statement "[a] section on the scope of activities shall briefly describe a list of all anticipated activities to be performed during the investigation..." See Comments 12 and 13 below.

Response 11: In order to reduce the redundancy of the Work Plan content, the reader was referred to Sections 5.2 and 5.3 for detailed discussions on the collection of soil and ground water samples, respectively. Pursuant to NMED's direction, a separate Scope of Services subsection is presented for each SWMU that briefly describes a list of all anticipated activities to be performed at that SWMU. The new subsections included are 2.3.1, 3.3.1, and 4.3.1 for SWMU No. 7, SWMU No. 10 and SWMU No. 16, respectively.

Comment 12

In Section 4.0 (Scope of Services), Subsection 4.1 (Anticipated Activities), page 9, Western states "[p]ursuant to Section IV of the Order, a scope of services was developed to determine and evaluate the presence, nature, extent, and transport of contaminants. To accomplish this objective, soil, sediment, and groundwater samples will be collected at the SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area, and SWMU No. 16 Active Landfill. Soil borings will be installed and samples collected as discussed in Section 5.2. The installation of a monitoring well and collection of groundwater samples is discussed in Section 5.3."

Although Western states that soil, sediment, and groundwater samples will be collected, the Work Plan does not address the specific activities that will be conducted at each SWMU. Section 4.1 of the revised Work Plan must include a list of the anticipated activities to be conducted at each SWMU (e.g., collect six surface samples to a depth of one foot, install 5 borings to a depth of approximately ten feet below ground surface and collect a water sample at the water table if encountered, etc.). Western must refer to Section X.B (Investigation Work Plan), X.B.7 (Scope of Services) of the Order for details to be included in this revision. See also Comment 1.

Response 12: See response to Comment No. 11 above.

Comment 13
In section 4.0 (Scope of Services), Subsection 4.1 (Anticipated Activities), page 9, Western states "[so]il borings will be installed and samples collected as discussed in Section 5.2. The installation of a monitoring well and collection of groundwater samples is discussed in Section 5.3."

Subsection 4.1 refers to Section 5.2 (Soil Sampling) and 5.3 (Groundwater Monitoring) as stated above. It is not clear where within these sections (5.2 and 5.3) the investigation activities (number of borings and monitoring wells) for each SWMU are presented. These sections include information for sampling activities; however, the information is not presented in a clear manner. It is therefore difficult to understand what will be conducted at each SWMU (e.g., number of soil borings, monitoring wells to be installed). Western must revise the Work Plan to briefly describe the soil sampling and groundwater monitoring activities listed in the Scope of Services. See Comment 12.

Response 13: Additional subdivisions within Section 5.2 were created to separate the discussions for each of the SWMUs

Comment 14
In Section 5.2 (Soil Sampling), Western states that sediment samples will be collected from the Raw Water Ponds (SWMU No. 7). The Work Plan does not contain details of how the sediment samples be collected.

The sampling requirements for the Raw Water Ponds (SWMU No. 7) require modifications as sediment sampling is no longer needed. However, Western must consider the following if sediment sampling will be conducted in future investigations. Sediment sampling is different from soil sampling. Sediment sampling must therefore be addressed in a separate section in which the proposed sampling methods and procedures for collection of sediment samples must be described. Western must revise the Work Plan to remove all references to sediment sampling and incorporate the requirements established in Comments 15 and 16 below.

Response 14: The reference to sediment samples has been removed.

Comment 15

Western proposes to collect six sediment samples from the 0 to 6 inch interval at SWMU No. 7 (Raw Water Ponds).

The proposed 0-6 inch interval is not representative of the stratigraphic section beneath the Raw Water Ponds. Based on historical documents and conversation with Western, the stratigraphic section beneath the Evaporation Ponds/Raw Water Ponds (native sediments to the surface) is as follows: the Jackson Lake Terrace Deposit, four to six inches of bentonite, sediment/sludge accumulation from the interval when the Evaporation Ponds were in service, four to six more inches of bentonite and overlying sediment/silt accumulated from the San Juan River (from current service as the Raw Water Ponds). Western must revise the Work Plan to include characterization of the sediments, liners, and soils beneath the Raw Water Ponds (SWMU No. 7) from the water/sediment interface to the native soils. The Investigation Report must include a figure that depicts the thickness of each unit/layer, as well as provide the depths below the tops of the pond embankments and surrounding land surface. See Comment 16 below.

Response 15: Pursuant to discussions held on November 9, 2009 between Hope Monzeligo (NMED), David Cobrain (NMED), Randy Schmaltz (Western), Kelly Robinson (Western), and Scott Crouch (RPS), Western is requesting that investigation of the materials at the bottom of the Raw Water Ponds and the underlying soils be deferred at this time. Western is very concerned that drilling borings through the bottom of an active surface impoundment (i.e., the Raw Water Ponds) will result in a breach of the liner that cannot be reliably repaired.

Comment 16

Sampling activities at SWMU No. 7 (Raw Water Ponds) are being modified because sampling has not occurred in 10 years and the previous VOC data may be invalid due to improper sampling methods (samples were composited). Additionally, the Closure Plan submitted to OCD did not describe the sampling methods and procedures, nor did it indicate if soil was removed or if any remedial activities were completed. Finally, the current Work Plan does not include proposed sampling of potentially distinct layers (e.g., liners, sludge) beneath the Raw Water Ponds, nor was any sampling proposed for the South Evaporation Pond. Western must revise the Work Plan to incorporate the following sampling activities.

Response 16: No sampling was proposed for the South Evaporation Pond, as it is not listed as a SWMU or AOC in the Order. The Work Plan is revised as discussed below to incorporate sampling for this area.

a. *Instead of collecting six sediment samples, Western must advance three soil borings from within the Raw Water Ponds; two soil borings must be advanced within the western Raw Water Pond and one soil boring from within the eastern Raw Water Pond (see attached Figure 8 for the approximate locations). The borings must be continuously logged from the water/sediment interface into the underlying native soil. Samples must be collected from every discernable layer, including the native soil (e.g., sediment, bentonite, sludge, native soil). The samples must be analyzed in accordance with Section 5.8 (Chemical Analysis). Western must revise the text and figures in the Work Plan accordingly.*

Response 16a: As noted above, Western is requesting that investigation of the materials at the bottom of the Raw Water Ponds and the underlying soils be deferred at this time.

b. *Western must advance a boring within 25 feet of the historic discharge point where wastewater entered into the Evaporation Ponds. The boring must be continuously logged from the water/sediment interface into the native soil. Soil samples must be collected from every discernable layer, including native soil. The samples must be analyzed in accordance with Section 5.8 (Chemical Analysis). Western must revise the text and figures in the Work Plan accordingly.*

Response 16b: A soil boring will be completed within approximately 25 feet of the historic discharge point where wastewater entered the South Evaporation Pond. The boring will be continuously logged. Soil samples will be collected from every discernable layer, including native soil. The revisions to the Work Plan are presented in Sections 2.3.1 and 5.2.1.

c. Western must advance a soil boring at the location where the overflow from the north Evaporation Pond to the South Evaporation Pond occurred. The boring must be continuously logged from water/sediment interface into the native soil. Soil samples must be collected from every discernable layer, including the native soil. The samples must be analyzed in accordance with Section 5.8 (Chemical Analysis). Western must revise the text and figures in the Work Plan accordingly.

Response 16c: An interview of long-term refinery personnel was conducted to determine details on the historical operation of the evaporation ponds. The process water was piped directly to each of the evaporation ponds and there was not an overflow between the two ponds. As noted in responses to other comments, samples will be collected near the location where flows entered the South Evaporation Pond from the aeration lagoons.

d. *Western must advance two soil borings within the Former South Evaporation Pond. The approximate locations are identified in the attached Figure 2. The borings must be continuously logged from the surface into the underlying native soil. Soil samples must be collected from every discernable layer, including native soil. The soil samples must be analyzed for the constituents identified in Section 5.8 (Chemical Analysis). Western must revise the text and figures in the Work Plan accordingly.*

Response 16d: Two soil borings will be completed at the locations within the former South Evaporation Pond as specified by NMED. The borings will be drilled to a minimum depth of 10 feet and continuously logged. Samples will be collected for chemical analysis from every discernable layer (e.g., apparently unimpacted surface interval (fill), stained layer, and apparently unimpacted native soils). The revisions to the Work Plan are presented in Section 2.3.1 and 5.2.1.

e. *If groundwater is encountered beneath the former South Pond, a water sample must be collected at the water table and analyzed for the constituents identified in Section 5.8 (Chemical Analysis). Western must revise the text and figures in the Work Plan accordingly.*

Response 16e: If ground water is encountered when installing the soil borings within the location of the former South Evaporation Pond, then ground water samples will be collected and analyzed as directed. The revisions to the Work Plan are presented in Section 2.3.1 and 5.3.2.

Comment 17

In reference to SWMU No. 7 (Raw Water Ponds), Western must revise the Work Plan to include the following figures:

a. *A figure that identifies the location of the historic inlet pipe that discharged wastewater to the former Evaporation Ponds, the location of the overflow pipe connecting the north evaporation pond to the south evaporation pond, and the location of the existing inlet pipe where water enters from the San Juan River.*

b. *A figure that depicts the Raw Water Ponds and the Former South Evaporation Pond, and the areas in the vicinity of the soil boring B-6.*

Response 17: Figure 8 (now Figure 3) has been revised to include the requested information, with the exception of the overflow pipe that did not exist.

Comment 18

The historical analytical results at the former Evaporation Ponds (existing Raw Water Ponds), provided in Table 2, identified detections of thallium above the New Mexico Soil Screening Levels (soil-to-groundwater screening levels). Therefore, Western must revise the Work Plan to include the analysis of thallium to Section 5.8 (Chemical Analysis).

Response 18: The list of analyses has been revised in Section 5.8 to include thallium.

Comment 19

In Section 5.2 (Soil Sampling), page 12 and 13, Western states "[a]s there are individual props located within the area where liquid fuel (e.g., diesel and gasoline) is used and there is the potential for constituents to be released to soils at known locations, a judgmental sampling design is appropriate. Four soil borings are proposed near these locations as shown on Figure 9. In addition, two soil borings will be located within the drainage ditch, which runs along the western side of the area and collects surface water runoff from the area. One of the borings will be located in the small pit on the north end of the ditch."

Western must revise the Work Plan to incorporate the following additional sampling locations at SWMU No. 10 (The Fire Training Area):

a. *Soil borings must be installed at all locations where fire is ignited and burning occurs during the fire trainings. All changes must be reflected in the text and figures in the revised Work Plan.*

Response 19a: Additional soil borings have been included to cover all locations where fire training occurs with the exception of a few stations where only natural gas is used.

As no liquid hydrocarbons are used at these stations, there is no potential for residual hydrocarbons to be present. The changes have been reflected in the SWMU-specific Scope of Services subsection 3.3 for SWMU No. 10 and on Figure 9.

b. *A soil boring must be installed from all shaded areas within SWMU No. 10 and as shown in Figure 9, unless an explanation can be provided as to why sampling is unnecessary.*

Response 19b: A soil boring has been located at each of the shaded areas on Figure 9, with the exception of a few small lightly shaded areas that are locations where only natural gas was utilized.

c. *Revise Figure 9 (SWMU No. 10 Sample Locations Map) to depict all drainage features and outfalls. In addition, the figure must identify all features in the figure (e.g., all dark spots must be labeled); it is not clear if the shadows are surface staining, actual shadows, or tangible features. This figure must also include the proposed sample locations.*

Response 19c: Figure 9 has been revised to identify the features within SWMU No. 10. For clarification, there is no outfall. A storm water drainage ditch runs along the western edge of the area and terminates into a closed depression at the northwest corner of the area. The dark spots within SWMU No. 10 are aboveground structures (e.g., containment structures, tanks, piping, etc.) and their shadows. The fire training stations that used liquid hydrocarbons are labeled, as well as the stations where only natural gas was used.

d. *The soil samples collected from the soil borings must follow the sampling methods and procedures as presented in the Work Plan.*

Response 19d: None required.

Comment 20

In Section 5.2 (Soil Sampling), page 13, paragraph 2, Western states "[t]he landfill area of interest was divided into quadrants, with one soil boring located near the center of each quadrant (Figure 10)."

Western addresses how the Active Landfill was divided into quadrants for soil sampling, but the quadrants are not shown in the figure. If Western continues to describe the Active Landfill area as being divided into quadrants, the quadrants must be presented in the figure or the text must be revised to remove reference to the quadrants. In addition, Western must revise the Work Plan to include the following modifications to the Active Landfill investigation:

Response 20: The quadrants have been added to Figure 10.

a. *Western must install an additional soil boring in the center of the Active Landfill (see attached Figure 10 for the approximate location). Western must revise the text and figure in the Work Plan accordingly.*

Response 20a: A soil boring was added to the center of the landfill (Figure 10) and is discussed in the Scope of Services subsection (4.3) for SWMU No. 16 and in subsection 5.2.3.

b. *Western must modify the chemical analysis for all soil samples collected at the Active Landfill; these changes incorporate the OCD sampling requirements. All soil samples collected from the five borings must be analyzed for the metals identified in Section 5.8 (Chemical Analysis) with the addition of aluminum, boron, copper, manganese, molybdenum, iron, and uranium. Soil samples must also be analyzed for chlorides, sulfate, fluoride, and gasoline range organics (GRO). If GRO is detected at concentrations greater than 80 parts per million (ppm), the soil samples also must be analyzed for VOCs. In addition, soil samples must be analyzed for DRO extended (motor oil range organics (MRO)), if DRO is detected at concentrations greater than 200 ppm, the soil samples must be analyzed for semi-volatile organic compounds (SVOCs). Western must revise the text in the Work Plan accordingly.*

Response 20b: The list of inorganic analytes for soils in Section 5.8 has been revised as directed. Section 5.8 already specifies analyses for GRO, MRO, VOCs, and SVOCs. It is not practicable to wait on analytical results for GRO before determining whether to analyze for VOCs and still meet the method 5035 holding times. All samples will be analyzed for VOCs. As directed, if DRO extended (MRO) concentrations exceed 200 ppm, then the samples will be analyzed for SVOCs.

c. *If any water samples are collected, the water samples must be analyzed for the constituents identified in Section 5.8 (Chemical Analysis) in addition to the constituents identified in item b above.*

Response 20c: The additional analytes specified in item b above were added to the specified ground water analyses in Section 5.8 for any ground water samples collected at SWMU No. 16.

d. *Western must determine the total depth of the Active Landfill.*

Response 20d: The original Work Plan specified that the soil borings located in the Active landfill will be drilled to a minimum depth of ten feet, or five feet below the deepest detected contamination or waste material, whichever is deeper. This activity will determine the total depth of the landfill and no change to the Work Plan is required.

Western must revise the text in the Work Plan to incorporate the above changes.

Comment 21

Western must revise the Work Plan to include a figure(s) that depicts the locations of all sampling locations referenced in Table 1.

Response 21: The scale of Figure 3 (previously Figure 8) has been changed so that all sample locations referenced in Table 1 are visible on this figure.

Comment 22

In Figure 9, Western has a blue dot that states "Proposed Well" at the North end of SWMU No. 10. The legend also contains a blue dot that states "SB9-1 2008 RFI Sample Location."

As indicated in the figure, it is not clear if the "proposed well" was a sample location in the 2008 RFI. Western must revise Figure 9 in the revised Work Plan to clarify the difference between the blue dots or use different symbols to show the difference between the "proposed well" and the "2008 RFI sample locations."

Response 22: Figure 9 has been revised to include a different symbol for the proposed well location.

Comment 23

Western does not mention the installation of a new permanent monitoring well (proposed well) until Section 5.3.2 (Groundwater Sampling), after drilling and installation of a monitoring well has already been discussed. In the revised Work Plan, Western must address the installation of the monitoring well and its location in the Scope of Services Section, so it is clear that a well is going to be installed. In addition, Section 5.3 (groundwater Monitoring) discusses monitoring wells, as if more than one monitoring well is being installed. Western must revise Section 5.3 to also make it clear that only one monitoring well will be installed and sampled as part of this investigation.

Response 23: The proposed monitoring well is discussed in the Scope of Services subsection (3.3.1) for SWMU No. 10 and the reference to "wells" has been changed to "well" in Section 5.3. A similar clarification was made to subsections 5.1 and 5.3.2.

If you have questions or would like to discuss the revised 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
John Kieling – NMED HWB
Laurie King – EPA Region 6 (w/attachment)
Allen Hains – Western Refining El Paso
Scott Crouch – RPS Austin

RPS

404 Camp Craft Rd., Austin, Texas 78746, USA
T +1 512 347 7588 **F** +1 512 347 8243 **W** www.rpsgroup.com

INVESTIGATION WORK PLAN

Group 4
(SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area and SWMU No. 16 Active Landfill)

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

December 2008
(Revised January 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

Table of Contents

List of Sections

Executive Summary iii

Section 1 Introduction 1-1

Section 2 SWMU No. 7 Raw Water Ponds 2-1
2.1 Background 2-1
2.2 Site Conditions 2-3
2.2.1 Surface Conditions 2-4
2.2.2 Subsurface Conditions 2-5
2.3 Scope of Services 2-5
2.3.1 Anticipated Activities 2-6
2.3.2 Background Information Research 2-6
2.3.3 Collection and Management of Investigation Derived Waste 2-7
2.3.4 Surveys 2-7

Section 3 SWMU No. 10 Fire Training Area 3-1
3.1 Background 3-1
3.2 Site Conditions 3-2
3.2.1 Surface Conditions 3-2
3.2.2 Subsurface Conditions 3-3
3.3 Scope of Services 3-4
3.3.1 Anticipated Activities 3-4
3.3.2 Background Information Research 3-5
3.3.3 Collection and Management of Investigation Derived Waste 3-5
3.3.4 Surveys 3-5

Section 4 SWMU No. 16 Active Landfill 4-1
4.1 Background 4-1
4.2 Site Conditions 4-1
4.2.1 Surface Conditions 4-2
4.2.2 Subsurface Conditions 4-2
4.3 Scope of Services 4-3
4.3.1 Anticipated Activities 4-3
4.3.2 Background Information Research 4-4
4.3.3 Collection and Management of Investigation Derived Waste 4-4
4.3.4 Surveys 4-4

Section 5 Investigation Methods 5-1
5.1 Drilling Activities 5-1
5.2 Soil Sampling 5-2
5.2.1 SWMU No. 7 5-2
5.2.2 SWMU No. 10 5-2
5.2.3 SWMU No. 16 5-3
5.2.4 Soil Sample Field Screening and Logging 5-4
5.3 Groundwater Water Monitoring 5-5
5.3.1 Groundwater Levels 5-5
5.3.2 Groundwater Sampling 5-6

Table of Contents *(continued)*

List of Sections

5.3.3 Well Purging 5-6
5.3.4 Groundwater Sample Collection 5-7
5.4 Sample Handling 5-8
5.5 Decontamination Procedures 5-9
5.6 Field Equipment Calibration Procedures 5-10
5.7 Documentation of Field Activities 5-10
5.8 Chemical Analyses 5-11
5.9 Data Quality Objectives 5-13

Section 6 Monitoring and Sampling Program 6-1
6.1 Groundwater Monitoring 6-1

Section 7 Schedule 7-1

Section 8 References 8-1

List of Tables

Table 1 Groundwater Analytical Results (Section 2)
Table 2 Soil Analytical Results Summary (Section 2 and 3)
Table 3 Field Measurement Summary (Section 5)

List of Figures

Figure 1 Site Location Map (Section 1)
Figure 2 Group No. 4 SWMU Locations (Sections 1, 2, 3, and 4)
Figure 3 SWMU No. 7 Sample Locations Map (Section 2)
Figure 4 Cross Section A-A' West to East (Sections 2, 3, and 4)
Figure 5 Cross Section B-B' North to South (Sections 2, 3, and 4)
Figure 6 April 2007 Potentiometric Surface (Sections 2, 3, and 4)
Figure 7 Spring 2007 Separate Phase Hydrocarbon Thickness Map (Sections 2, 3, and 4)
Figure 8 Spring 2007 Dissolved-Phase Groundwater Data (Sections 2, 3, and 4)
Figure 9 SWMU No. 10 Sample Locations Map (Section 3)
Figure 10 SWMU No. 16 Sample Locations Map (Section 4)

List of Appendices

Appendix A Soil Boring Logs
Appendix B Closure Plan for Unlined Evaporation Lagoons and the Spray Evaporation Area
Appendix C Investigation Derived Waste (IDW) Management Plan

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 Investigation Work Plan has been prepared for the SWMUs designated as Group 4. A Class I permit modification was approved on June 10, 2008 to reflect the change in ownership of the refinery to Western Refining Southwest, Inc. The operator is now Western Refining Southwest, Inc. – Bloomfield Refinery.

The planned investigation activities include collection of soil, sediment, and groundwater samples, which will be analyzed for potential site-related constituents. The specific sampling locations, sample collection procedures, and analytical methods are included. These activities are based, in part, on the results of previous site investigation activities.

SWMU Group 4 includes SWMU No. 7 Raw Water Ponds, SWMU No. 10 Fire Training Area, and SWMU No. 16 Active Landfill. 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.

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 Western Refining Southwest, Inc., which is a wholly owned subsidiary of Western Refining Company, and it is operated by Western Refining Southwest, Inc. – Bloomfield Refinery. The Bloomfield Refinery has an approximate refining capacity of 18,000 barrels per day. Various process units are operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, sulfur recovery, merox treater, catalytic polymerization, and diesel hydrotreating. Current and past operations have produced 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 4 in the Order. This includes:

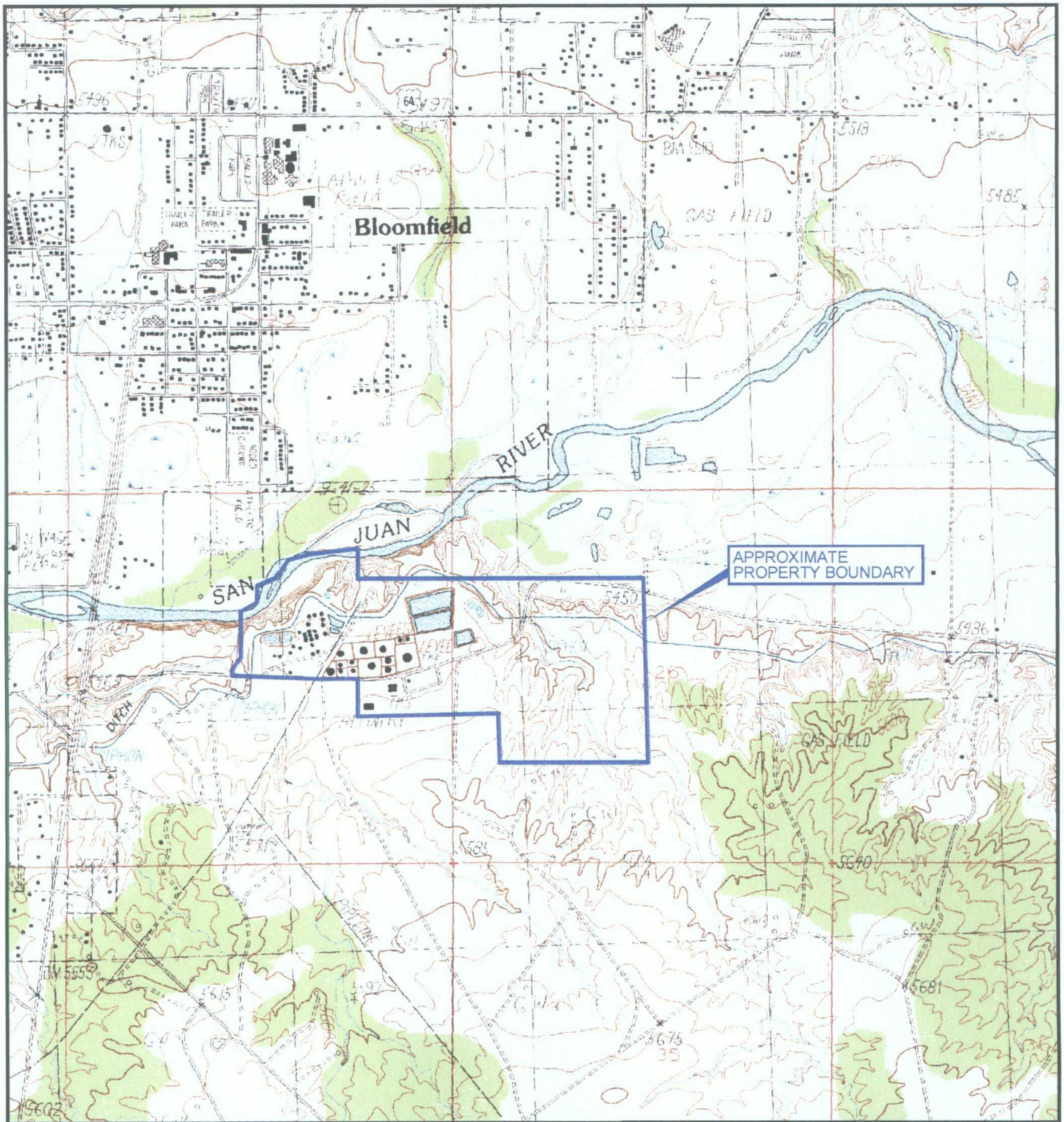
- SWMU No. 7 Raw Water Ponds;
- SWMU No. 10 Fire Training Area; and
- SWMU No. 16 Active Landfill.

The location of the individual SWMUs is shown on Figure 2 and all of these SWMUs are located on the northeastern portion of the refinery property. Photographs of the three SWMUs are included at the end of each individual section that discusses a specific SWMU.

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.

Figures

- Figure 1   Site Location Map
- Figure 2   Group No. 4 SWMU Locations



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

0 2000
SCALE IN FEET

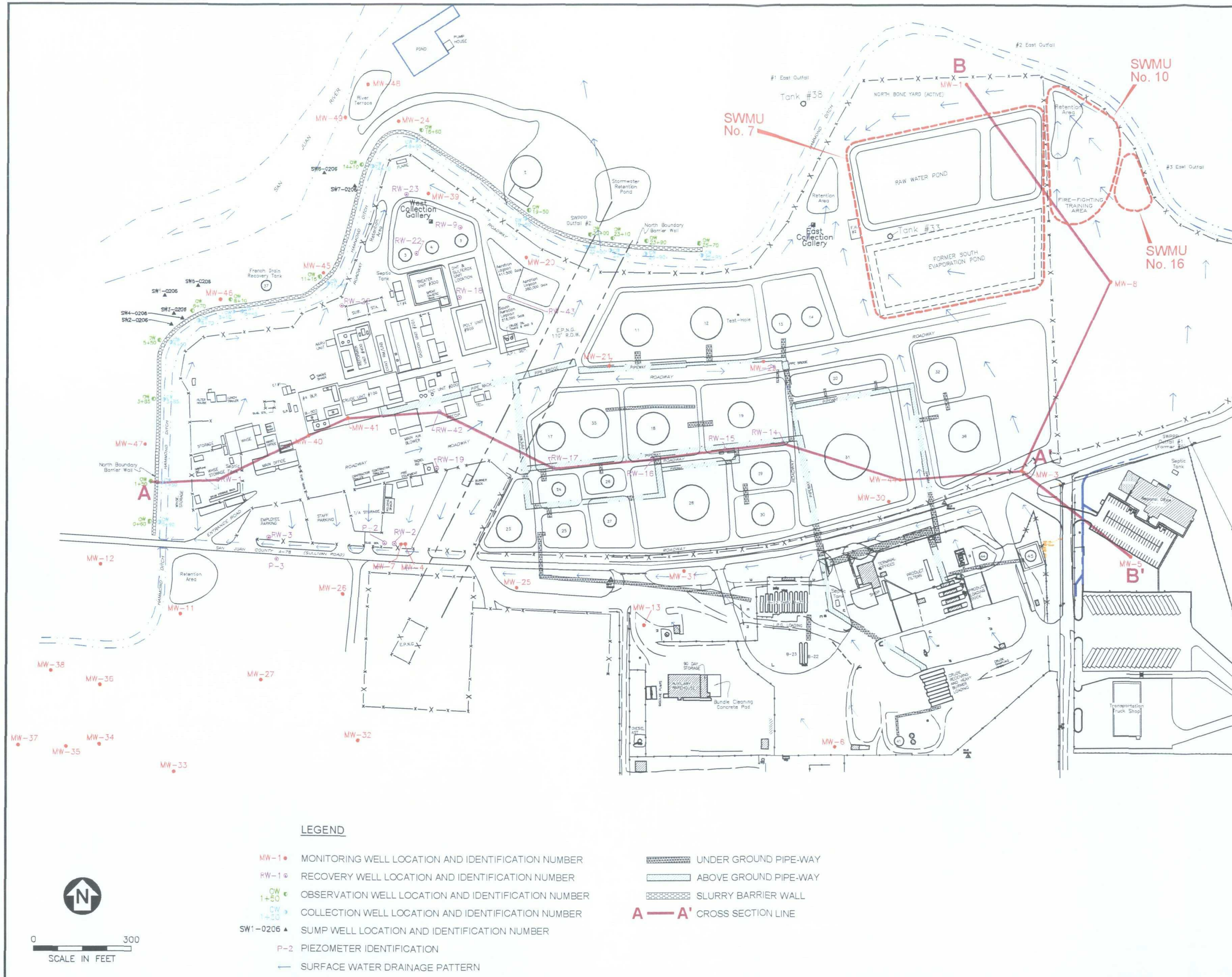
NEW MEXICO
QUADRANGLE LOCATION

Western Refining
WESTERN REFINING SOUTHWEST

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

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 01/05/10 | FILE: WestRef-B12

FIGURE 2
SWMU GROUP No. 4
SWMU LOCATIONS
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

Section 2
SWMU No. 7 Raw Water Ponds

This section presents background information, a discussion on site conditions, and a scope of services for SWMU No. 7.

2.1 Background

This section presents background information, including a review of historical waste management activities to identity the following:

- Type and characteristics of all waste and all contaminants handled in the SWMU;
- Known and possible sources of contamination;
- History of releases; and
- Known extent of contamination.

The first recorded site operations in this area were fresh water ponds, which were constructed in 1976. In 1982, the fresh water ponds were converted to evaporation ponds. There were two ponds of approximately 2.5 acres each. The northern pond is now the Raw Water Ponds and the southern pond was located immediately to the south (Figure 2). The ponds were lined with four to six inches of bentonite with earthen dikes. Process wastewater flowed from the current north aeration lagoon directly into the northern evaporation pond and directly into the southern evaporation pond as shown on Figure 3. The water evaporated or some was pumped to the Spray Irrigation Area. After a Class I injection well was permitted, the evaporation ponds were decommissioned in 1994.

Following Closure Plan activities for the evaporation ponds as approved by the New Mexico Oil Conservation Division (OCD) in May 1996, two Raw Water Ponds were constructed in 1996 within the former northern evaporation pond. The Raw Water Ponds, which cover approximately 2.5 acres and impound water to an average depth of six feet, are currently used as temporary storage for the refinery's fresh water supply. Surface water is pumped from the San Juan River to the ponds, where any entrained sediment is allowed to settle before the water is pumped to the refinery's on-site water treatment plant and subsequently stored in Tank #2, which is a 2,814,000 gallon steel above ground storage tank. These operations are not associated with any waste management activities.

In addition to storage of water pumped from the San Juan River, water that collects in the #1 East Outfall is pumped to the Raw Water Ponds. On July 31, 2003 Western (Giant Industries at the time of the discovery) noted hydrocarbon at the #1 East Outfall. Initially, Western initiated an Emergency Action Plan that included construction of two earthen containment dikes configured in series. Water that collected in this area was transported via vacuum trucks to the refinery's wastewater treatment system. On October 15, 2003, Western notified the OCD of their plans to install an oil-water separator (Tank #33) to which the fluids would flow through before being diverted to the Raw Water Ponds. Routine sampling of the discharge from Tank #33 to the Raw Water Ponds was initiated and the sample results starting in February of 2005 are included in Table 1. While there have been some periodic increases in concentrations of constituents discharged from Outfall #1, the concentrations have been very low during most of the time period in which water has been discharged to the Raw Water Ponds.

An additional source of water that is diverted to the Raw Water Ponds comes from remediation activities at the river terrace area. Effluent from the dewatering operations at the river terrace area is first treated via carbon adsorption units and then discharged to the Raw Water Ponds. The effluent is routinely sampled before it is discharged and the analytical results indicate that no environmental impacts have occurred to the Raw Water Ponds from the river terrace operations. The analytical results from the effluent testing, which are all non-detect, are included in Table 1.

There have been numerous past sampling events in the area of the Raw Water Ponds. Groundwater has been routinely monitored immediately down-gradient of the ponds at MW-1 since the well was installed in 1984 pursuant to the facility Discharge Permit (GW-1). The historical groundwater results at MW-1 have not indicated any concentrations of chemicals above applicable standards (Table 1). As part of the on-going investigation of the refinery being conducted under the 2007 NMED Order, additional groundwater samples were recently collected immediately down-gradient of the ponds in the area of SWMU No. 2 Drum Storage Area North Bone Yard. Two permanent monitoring wells (SWMU2-5/MW-50 and SWMU2-9/MW-51) and seven temporary monitoring wells (SWMU2-1, SWMU2-2, SWMU2-3, SWMU2-4, SWMU2-6, SWMU2-7, and SWMU2-8) were installed in October 2008, located immediately down-gradient of the Raw Water Ponds. Groundwater samples were collected from these new locations in October 2008 and analyzed for potential site-related constituents. These recent samples confirm the earlier results of MW-1, that there are no impacts to groundwater from the Raw Water Ponds that exceed applicable standards, with the exception of a few metals. It is common to detect low concentrations of total metals in samples collected from temporary or new wells, where turbidity readings are high and sediment has been entrained in the water samples. The sample locations are shown on Figure 3 and the analytical results are provided in Table 1.

Soil samples were first collected in the area of the ponds during the 1993 RCRA Facility Investigation. Two soil borings (B-5 and B-6) were located immediately west of the evaporation ponds and two soil borings (B-7 and B-9) were located immediately east of the evaporation ponds, which also places them in SWMU No. 10 Fire Training Area. Soil samples were collected from each of these soil borings and analyzed for volatile and semi-volatile organics, total petroleum hydrocarbons, and metals. All of the organic analyses were non-detect and the metals concentrations were generally low. The locations of the soil borings are shown on Figure 3 and the analytical results are provided in Table 2. Copies of the soil boring logs are presented in Appendix A.

After the evaporation ponds were decommissioned 1994, a closure plan entitled, Closure Plan for the Unlined Evaporation Lagoons and the Spray Evaporation Area, was completed on August 13, 1996. A copy of the closure plan is included in Appendix B. The results of analytical testing on soil samples collected from beneath the evaporation ponds are discussed on pages 2 and 3 of the closure plan and are summarized in a table in Attachment C to the closure plan. All organic analyses were non-detect and the metal results do not indicate any impact to soils beneath the ponds. Chloride and sulfate concentrations were elevated in the 0-1' sample but reduced significantly in the sample collected at 3-5 feet below ground surface. A map showing sample locations is included in Attachment B of the closure plan. On page 3 of the closure plan, Giant proposed to use the closed evaporation ponds as raw water ponds. As discussed above, a monitoring well (MW-1) is located down-gradient of ponds and analyses of groundwater samples collected at this well have not detected any environmental impacts from the ponds.

The New Mexico Oil Conservation Division (OCD) approved the Closure Plan for the Unlined Evaporation Lagoons and the Spray Evaporation Area on August 28, 1996 with the requirement to continue monitoring groundwater at MW-1 and MW-5. A copy of the August 28, 1996 OCD letter is included in Appendix B.

2.2 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.

2.2.1 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 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. 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 land surface at SWMU No. 7 and the former South Evaporation Pond slopes gently to the northwest.

The refinery complex is bisected by County Rd #4990 (Sulivan Road), which runs east-west. The process units, storage tanks (crude oil and liquid products), wastewater treatment systems, and SWMU No. 7 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. There is very little vegetation throughout these areas with most surfaces composed of concrete, asphalt, or gravel. The portion of SWMU No. 7 that is not covered by the Raw Water Pond is mostly void of vegetation with the exception of a band of weeds growing around the margin of the Raw Water Ponds. The area between the refinery and the San Juan River does have limited vegetation on slopes that are not too steep to support vegetation.

SWMU No. 7 is listed in the Order as the Raw Water Ponds, which occupies the location of the former North Evaporation Pond. Essentially all of the area defined as SWMU No. 7 is currently in use for the Raw Water Ponds. The former South Evaporation Pond, which was located immediately adjacent to the North Evaporation Pond is not in any active use and has not been used since the South Evaporation Pond was closed.

2.2.2 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 4 and 5 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 and prevents site related contaminants from migrating to deeper aquifers. The potentiometric surface as measured in April 2007 is presented as Figure 6 and shows the groundwater flowing to the northwest, toward the San Juan River.

Previous site investigations have identified and delineated impacts to groundwater from historical site operations. Figure 7 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 8. Neither SPH nor dissolved groundwater impacts were noted at SWMU No. 7.

There are no subsurface features at the Raw Water ponds with the exception of the water supply line from the river terrace area and the water line going to the water storage tank. Neither of these is believed to have had any impacted on contaminant distribution within the area.

2.3 Scope of Services

This subsection presents a brief description of the anticipated sample collection activities to be performed during the investigation, background information research conducted to develop the

Scope of Services, a description of the collection and management of investigation derived waste, and surveying to be conducted to record sample location and elevation data.

2.3.1 Anticipated Activities

Pursuant to Section IV of the Order, a scope of services was developed to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil samples and possibly groundwater samples will be collected at SWMU No. 7 in the area of the former South Evaporation Pond. Because the Raw Water Ponds (former North Evaporation Pond) are currently used to store fresh water and penetration of the underlying liner could threaten the physical integrity of the ponds, Western has requested that investigation of the liner material and underlying soils be deferred at this time. Three soil borings will be installed to a minimum depth of ten feet within the location of the former South Evaporation Pond (Figure 3). Two of the borings will be completed at locations specified by NMED in their NOD letter dated September 3, 2009 and the third boring is located within approximately 25 feet of the inlet to the former South Evaporation Pond. The soil borings will be continuously logged and samples collected for analysis from each discernable layer, including underlying native soil. Soil borings will be installed and samples collected as discussed in Section 5.2.

If groundwater is encountered during the soil sampling efforts, then groundwater samples will be collected from the soil borings as discussed in Section 5.3.

2.3.2 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 this work plan. The previously collected data provides very good 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 groundwater information and provide SWMU-specific information regarding contaminant occurrence and distribution within soils and potentially groundwater, if it is encountered in the soil borings.

2.3.3 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 will be contained and characterized using methods based on the boring location, boring depth, drilling method, and type of contaminants suspected or encountered. All purged groundwater and decontamination water will be characterized prior to disposal unless it is disposed in the refinery wastewater treatment system upstream of the API Separator. An IDW management plan is included as Appendix C.

2.3.4 Surveys

The horizontal coordinates and elevation of each soil boring that is located on dry land (e.g., within the former South Evaporation Pond) 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)). Alternate survey methods may be proposed by the Respondents in site-specific work plans. Any proposed survey method must be approved by the Department prior to implementation. 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.

Tables

- Table 1 Groundwater Analytical Results
- Table 2 Soil Analytical Results Summary

Table 1
Groundwater Analytical Results
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Analyte	WQCC 20NMAC 6.2.3103	SWMU2-1 GW	SWMU 2-2 GW	SWMU 2-3 GW	SWMU 2-4 GW	SWMU2-5 / MW-50	SWMU 2-6 GW	SWMU 2-7 GW	SWMU 2-8 GW	SWMU 2-9 / MW-51	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
Date		9/29/2008	9/29/2008	9/29/2008	9/30/2008	10/28/2008	9/30/2008	9/30/2008	10/1/2008	10/28/2008	3/3/2003	8/21/2003	3/3/2004	8/23/2004	4/11/2005	8/5/2005	4/5/2006	8/15/2006	4/1/2007	8/28/2007	4/8/2008	8/13/2008
Total metals (mg/l)																						
Antimony	0.006 [2]	0.0012	< 0.0010	< 0.0010	< 0.0010	<0.001	< 0.0010	< 0.0010	< 0.0010	<0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	0.01 [2]	**0.012**	< 0.0010	0.0028	0.005	**0.012**	0.0039	0.0091	0.0034	**0.012**	NA	<0.02 [1]	NA	<0.02	NA	NA	NA	<0.02	NA	<0.2	NA	<0.02
Barium	1.0	**1.5**	0.22	0.24	0.2	0.8	0.53	0.5	0.29	0.2	NA	0.46 [1]	NA	0.052	NA	NA	NA	0.023	NA	0.023	NA	0.15
Beryllium	0.004 [2]	0.0024	< 0.0020	< 0.0020	< 0.0020	0.001	0.0021	**0.0076**	0.0021	<0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	0.005 [2]	<0.0050	< 0.0050	< 0.0050	< 0.0050	<0.001	< 0.0050	< 0.0050	< 0.0050	<0.001	NA	<0.002 [1]	NA	<0.002	NA	NA	NA	<0.002	NA	<0.002	NA	<0.002
Chromium	0.05	0.46	< 0.010	< 0.010	< 0.010	0.02	0.033	0.023	0.028	<0.01	NA	<0.006 [1]	NA	<0.006	NA	<0.006	NA	<0.006	NA	<0.006	NA	<0.006
Cobalt	0.05	0.032	< 0.010	< 0.010	< 0.010	0.01	0.017	**0.058**	0.019	<0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.006 [1]	NA	NA	NA	NA	NA	NA	NA	<0.006	NA	<0.006
Cyanide	0.2	< 0.0050	< 0.0050	< 0.0050	< 0.0050	<0.005	< 0.0050	< 0.0050	< 0.0050	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.05	0.034	< 0.0050	< 0.0050	< 0.0050	0.02	0.022	0.033	0.017	<0.01	NA	<0.005 [1]	NA	<0.005	NA	<0.005	NA	<0.005	NA	<0.005	NA	<0.005
Mercury	0.002	<0.00020	< 0.00020	< 0.00020	< 0.0020	<0.001	0.00021	0.00052	< 0.00020	<0.001	NA	NA	NA	<0.0002	NA		NA	<0.0002	NA	<0.0002	NA	<0.0002
Nickel	0.200	0.097	< 0.020	< 0.020	< 0.020	0.03	< 0.020	0.046	0.025	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.05	<0.0010	< 0.0010	< 0.0010	< 0.0010	0.001	< 0.0010	0.0019	0.001	<0.001	NA	0.043 [1]	NA	<0.05	NA	NA	NA	<0.05	NA	<0.05	NA	<0.05
Silver	0.05	<0.010	<0.010	<0.010	< 0.010	<0.005	< 0.010	<0.010	<0.010	<0.005	NA	<0.005 [1]	NA	<0.005	NA	NA	NA	<0.005	NA	<0.005	NA	<0.005
Uranium	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1 [1]	NA	NA	NA	NA	NA	NA	NA	<0.1	NA	NA
Vanadium	0.26 [3]	0.044	< 0.010	< 0.010	< 0.010	<0.1	0.04	0.035	0.017	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	10.0	1.6	1.2	1.4	0.55	0.12	0.14	0.18	0.15	0.05	NA	0.12 [1]	NA	NA	NA	NA	NA	NA	NA	<0.05	NA	<0.05
Volatiles (ug/l)																						
1,1,1,2-Tetrachloroethane	0.52 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,1,1-Trichloroethane	60	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,1,2,2-Tetrachloroethane	10	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0
1,1,2-Trichloroethane	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,1-Dichloroethane	25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,1-Dichloropropene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,2,3-Trichlorobenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,2,3-Trichloropropane	0.0096 [3]	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0
1,2,4-Trichlorobenzene	70.0 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,2,4-Trimethylbenzene	15.0 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,2-Dibromo-3-chloropropane	0.2 [2]	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0
1,2-Dibromoethane (EDB)	0.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,2-Dichlorobenzene	600.0 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,2-Dichloroethane (EDC)	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,2-Dichloropropane	5.0 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,3,5-Trimethylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,3-Dichlorobenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,3-Dichloropropane	730 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1,4-Dichlorobenzene	75.0 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
1-Methylnaphthalene	Ne	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 4.0	NA	< 4.0
2,2-Dichloropropane	Ne	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0
2-Butanone	7,100.0 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2-Chlorotoluene	730.0 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
2-Hexanone	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2-Methylnaphthalene	Ne	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 4.0	NA	< 4.0
4-Chlorotoluene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
4-Isopropyltoluene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
4-Methyl-2-pentanone	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Acetone	22,000 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Benzene	5 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	1.1	1.3	<0.5	<0.5	<1.0	<0.5	< 1.0	<1.0	< 1.0
Bromobenzene	20.0 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Bromodichloromethane	0.12 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0

Table 1
Groundwater Analytical Results
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Analyte	WQCC 20NMAC 6.2.3103	SWMU2-1 GW	SWMU 2-2 GW	SWMU 2-3 GW	SWMU 2-4 GW	SWMU2-5 / MW-50	SWMU 2-6 GW	SWMU 2-7 GW	SWMU 2-8 GW	SWMU 2-9 / MW-51	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
Date		9/29/2008	9/29/2008	9/29/2008	9/30/2008	10/28/2008	9/30/2008	9/30/2008	10/1/2008	10/28/2008	3/3/2003	8/21/2003	3/3/2004	8/23/2004	4/11/2005	8/5/2005	4/5/2006	8/15/2006	4/1/2007	8/28/2007	4/8/2008	8/13/2008
Bromoform	8.5 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Bromomethane	8.7 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Carbon disulfide	1,000 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Carbon Tetrachloride	5.0 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Chlorobenzene	100.0 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Chloroethane	Ne	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0
Chloroform	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Chloromethane	190 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
cis-1,2-DCE	70 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
cis-1,3-Dichloropropene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Dibromochloromethane	0.15 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Dibromomethane	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Dichlorodifluoromethane	390 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Ethylbenzene	700 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<0.5	<1.0	0.65	< 1.0	2.3	< 1.0
Hexachlorobutadiene	0.86 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Isopropylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Methyl tert-butyl ether (MTBE)	12 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.5	<1.5	<2.5	<1.0	<2.5	<2.5	<2.5	<1.0	<2.5	< 1.0	<1.5	< 1.0
Methylene Chloride	5.0 [3]	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 3.0	NA	< 3.0
Naphthalene	0.14	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	NA	< 2.0
n-Butylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
n-Propylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
sec-Butylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Styrene	100 2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
tert-Butylbenzene	Ne	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Tetrachloroethene (PCE)	5 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Toluene	750	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<0.5	<1.0	0.63	< 1.0	<1.0	< 1.0
trans-1,2-DCE	100 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
trans-1,3-Dichloropropene	0.4 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Trichloroethene (TCE)	5 [2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Trichlorofluoromethane	1,300 [3]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Vinyl chloride	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0
Xylenes, Total	620	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	<2.0	<3.0	<3.0	<1.0	1.1	<0.5	<0.5	<1.0	4.3	< 1.5	16	< 1.5
Semivolatiles (ug/l)																						
1,2,4-Trichlorobenzene	70 [2]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
1,2-Dichlorobenzene	600 3	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
1,3-Dichlorobenzene	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
1,4-Dichlorobenzene	75 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2,4,5-Trichlorophenol	3,700 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2,4,6-Trichlorophenol	6.1 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2,4-Dichlorophenol	110 [3]	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	NA	< 20
2,4-Dimethylphenol	730 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2,4-Dinitrophenol	73 [3]	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	NA	< 20
2,4-Dinitrotoluene	0.22 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2,6-Dinitrotoluene	37 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2-Chloronaphthalene	2,900 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2-Chlorophenol	180 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2-Methylnaphthalene	150 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2-Methylphenol	1,800 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2-Nitroaniline	110 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
2-Nitrophenol	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
3,3´-Dichlorobenzidine	0.15 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10

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Analyte	WQCC 20NMAC 6.2.3103	SWMU2-1 GW	SWMU 2-2 GW	SWMU 2-3 GW	SWMU 2-4 GW	SWMU2-5 / MW-50	SWMU 2-6 GW	SWMU 2-7 GW	SWMU 2-8 GW	SWMU 2-9 / MW-51	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
Date		9/29/2008	9/29/2008	9/29/2008	9/30/2008	10/28/2008	9/30/2008	9/30/2008	10/1/2008	10/28/2008	3/3/2003	8/21/2003	3/3/2004	8/23/2004	4/11/2005	8/5/2005	4/5/2006	8/15/2006	4/1/2007	8/28/2007	4/8/2008	8/13/2008
3+4-Methylphenol	180[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
3-Nitroaniline	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
4,6-Dinitro-2-methylphenol	Ne	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	NA	< 20
4-Bromophenyl phenyl ether	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
4-Chloro-3-methylphenol	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
4-Chloroaniline	0.34[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
4-Chlorophenyl phenyl ether	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
4-Nitroaniline	3.4[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
4-Nitrophenol	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Acenaphthene	2,200[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Acenaphthylene	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Aniline	12[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Anthracene	11,000[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Azobenzene	0.12[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Benz(a)anthracene	0.029[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Benzo(a)pyrene	0.2[2]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Benzo(b)fluoranthene	0.029[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Benzo(g,h,i)perylene	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Benzo(k)fluoranthene	0.29[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Benzoic acid	150,000[3]	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	NA	< 20
Benzyl alcohol	18,000[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Bis(2-chloroethoxy)methane	110[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Bis(2-chloroethyl)ether	0.012[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Bis(2-chloroisopropyl)ether	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Bis(2-ethylhexyl)phthalate	6[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Butyl benzyl phthalate	35[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Carbazole	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Chrysene	2.9[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Dibenz(a,h)anthracene	0.0029[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Dibenzofuran	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Diethyl phthalate	29,000[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Dimethyl phthalate	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Di-n-butyl phthalate	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Di-n-octyl phthalate	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Fluoranthene	1,500[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Fluorene	1,500[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Hexachlorobenzene	1.0[2]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Hexachlorobutadiene	0.86[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Hexachlorocyclopentadiene	50[2]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Hexachloroethane	4.8[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Indeno(1,2,3-cd)pyrene	0.029[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Isophorone	71[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Naphthalene	30	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Nitrobenzene	0.12[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
N-Nitrosodimethylamine	0.00042[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
N-Nitrosodi-n-propylamine	0.0096[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
N-Nitrosodiphenylamine	14[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Pentachlorophenol	1[2]	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	NA	< 20
Phenanthrene	Ne	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Phenol	5[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Pyrene	1,100[3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10

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Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Analyte	WQCC 20NMAC 6.2.3103	SWMU2-1 GW	SWMU 2-2 GW	SWMU 2-3 GW	SWMU 2-4 GW	SWMU2-5 / MW-50	SWMU 2-6 GW	SWMU 2-7 GW	SWMU 2-8 GW	SWMU 2-9 / MW-51	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
Date		9/29/2008	9/29/2008	9/29/2008	9/30/2008	10/28/2008	9/30/2008	9/30/2008	10/1/2008	10/28/2008	3/3/2003	8/21/2003	3/3/2004	8/23/2004	4/11/2005	8/5/2005	4/5/2006	8/15/2006	4/1/2007	8/28/2007	4/8/2008	8/13/2008
Pyridine	37 [3]	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
total petroleum hydrocarbons (mg/l)																						
Gasoline Range Organics (GRO)	0.2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.21	<0.05
Diesel Range Organics (DRO)	0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.0
Motor Oil Range Organics (MRO)	0.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	<5.0
general chemistry (mg/l)																						
Alkalinity, Total (As CaCO3)	Ne	370	330	240	230	240	240	240	250	280	NA	NA	NA	NA	NA	NA	NA	NA	NA	290	NA	280
Bicarbonate	Ne	370	330	240	230	240	240	240	250	280	NA	NA	NA	NA	NA	NA	NA	NA	NA	290	NA	280
Calcium	Ne	86	85	48	59	55	65	55	63	102	NA	74	NA	67	NA	68	NA	61	NA	63	NA	NA
Carbonate	Ne	< 2.0	< 2.0	< 2.0	NA	< 2.0	NA	< 2.0	< 2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2	NA	<2
Chloride	250	10	10	12	16	9.9	13	11	25	12	NA	33	NA	29	NA	31	NA	17	NA	16	NA	19
Iron	1	< 0.020	< 0.020	< 0.020	< 0.020	<0.03	< 0.020	0.036	0.20	<0.03	NA	<0.02	NA	0.27	NA	0.14	NA	<0.005	NA	<0.02	NA	<0.02
Magnesium	Ne	17	17	12	16	14	15	14	14	20	NA	18	NA	18	NA	18	NA	16	NA	16	NA	NA
Manganese	0.2	**2.4**	0.18	**1.4**	**1.6**	**1.72**	**1.1**	**0.51**	**0.33**	**1.89**	NA	0.09	NA	0.13	NA	0.14	NA	0.08	NA	0.027	NA	0.022
Nitrogen, Nitrate (As N)	10	1.5	NA	NA	NA	NA	NA	NA	NA	0.68	NA	1.6	NA	1.9	NA	2.1	NA	NA	NA	1.9	NA	1.2
Nitrogen, Nitrite (As N)	Ne	< 0.10	NA	NA	NA	< 0.10	NA	NA	NA	< 0.10	NA	<0.1	NA	<0.1	NA	<0.1	NA	1.2	NA	<0.1	NA	<0.1
Nitrate (As N)+Nitrite (As N)	10	NA	1.3	< 1.0	3.8	< 1.0	6.3	< 1.0	3.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	Ne	2.5	2.5	2.7	4.6	2	3.1	2.5	3.7	3	NA	2.4	NA	2.1	NA	2.7	NA	2.6	NA	2	NA	NA
Sodium	Ne	50	55	40	64	41	72	63	150	53	NA	120	NA	110	NA	140	NA	150	NA	78	NA	NA
Sulfate	600	31	86	25	130	29	130	97	300	150	NA	200	NA	220	NA	190	NA	190	NA	160	NA	130

1 - dissolved metals analyses
2 - Federal Maximum Contaminant Level
3 - USEPA Regional Screening Levels (April 2009)
Ne - not established
NA - not analyzed
units - micrograms/liter (ug/l), milligrams/liter (mg/l)

Table 1
Groundwater Analytical Results
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Analyte	WQCC 20NMAC 6.2.3103	Tank #33														
Sample Date		2/23/2005	3/7/2005	4/27/2005	5/4/2005	6/8/2005	7/6/2005	8/24/2005	9/21/2005	10/19/2005	11/9/2005	12/5/2005	1/30/2006	6/15/2006	9/13/2006	10/17/2006
Benzene	5^1	**50**	**38**	4.5	1.8	1.2	<0.5	<0.5	0.84	0.93	0.61	<0.5	<1	<1	<1	<1
Ethylbenzene	700^1	<5	4.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Toluene	750	20	7.9	2.4	1.1	0.63	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Xylenes, Total	620	22	20	2.4	1.4	1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<3	<3	<3	<3

Analyte	WQCC 20NMAC 6.2.3103	Tank #33														
Sample Date		1/3/2007	4/25/2007	7/5/2007	10/9/2007	3/24/2008	4/10/2008	4/15/2008	4/21/2008	4/28/2008	5/5/2008	5/12/2008	5/19/2008	5/27/2008	6/2/2008	6/9/2008
Benzene	5^1	<1.0	<1.0	3.0	<1.0	**760**	**130**	**130**	**140**	**190**	**160**	**100**	**93**	**49**	**130**	**91**
Ethylbenzene	700^1	<1.0	<1.0	<1.0	<1.0	**1600**	360	200	220	170	150	42	25	21	84	110
Toluene	750	<1.0	<1.0	<1.0	<1.0	170	56	<1.0	30	6.7	7.9	<1.0	<1.0	<1.0	6.8	25
Xylenes, Total	620	<3.0	<2.0	<2.0	<3.0	**4700**	**1200**	**1100**	**1200**	**1600**	**1600**	**1100**	**970**	**790**	**1100**	**2100**
Methyl tertbutyl ether (MTBE)	12.0^2	NA	NA	NA	NA	<1.0	NA	<1.0	<1.0	3.6	3.6	<1.0	8.5	<1.0	<1.0	<1.0

Analyte	WQCC 20NMAC 6.2.3103	Tank #33														
Sample Date		6/16/2008	6/26/2008	7/2/2008	7/7/2008	7/16/2008	7/22/2008	7/31/2008	8/5/2008	8/14/2008	8/19/2008	8/25/2008	9/9/2008	9/18/2008	9/25/2008	10/1/2008
Benzene	5^1	**11**	**31**	4.9	**41**	**56**	**75**	**71**	**25**	**110**	3.6	**25**	**10**	**8.2**	4.6	3.2
Ethylbenzene	700^1	6.1	17	5.1	42	43	54	39	19	120	2.2	10	2.3	14	<1.0	<1.0
Toluene	750	<1.0	<1.0	4.9	2.8	<1.0	<1.0	<1.0	<1.0	6.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	620	140	180	55	410	380	450	430	210	540	24	**790**	16	6.7	<2.0	<2.0
Methyl tertbutyl ether (MTBE)	12.0^2	1.0	<1.0	1.9	2.3	<1.0	<1.0	<1.0	1.6	1.9	2.0	1.7	1.8	1.7	1.7	1.5

Analyte	WQCC 20NMAC 6.2.3103	Tank #33					
Sample Date		10/8/2008	10/15/2008	10/22/2008	10/27/2008	11/3/2008	12/2/2008
Benzene	5^1	2.5	2.2	2.2	2.3	1.5	1.7
Ethylbenzene	700^1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	750	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	620	<2.0	<2.0	<2.0	<2.0	<2.0	2.6
Methyl tertbutyl ether (MTBE)	12.0^2	1.5	1.6	2.2	2.4	2.4	<1.0

130 - bolded value exceeds applicable standard
units - micrograms/liter (ug/l)
1 - Federal Maximum Contaminant Level
2 - *EPA Regional Screening Level* (April 2009)

Table 1
Groundwater Analytical Results
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Analyte	WQCC 20NMAC 6.2.3103	River Terrace Groundwater Remediation System Effluent																		
Sample Date		01/18/06	03/01/06	06/08/06	09/13/06	12/13/06	02/20/07	02/27/07	03/13/07	04/02/07	04/16/07	04/25/07	6/20/087	07/12/07	08/14/07	09/10/07	10/09/07	3/6/2008	4/15/2008	7/2/2008
volatiles (ug/l)																				
Benzene	5 [1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	700 [1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	750	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	620	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<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
total petroleum hydrocarbons (mg/l)																				
Diesel Range Organics (DRO)	0.2 [2]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0
Gasoline Range Organics (GRO)	0.2 [2]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050

units - micrograms/liter (ug/l), milligrams/liter (mg/l)
NA - not analyzed
1 - Federal Maximum Contaminant Level
2 - NMED TPH Screening Guidelines October 2006 - Unknown oil

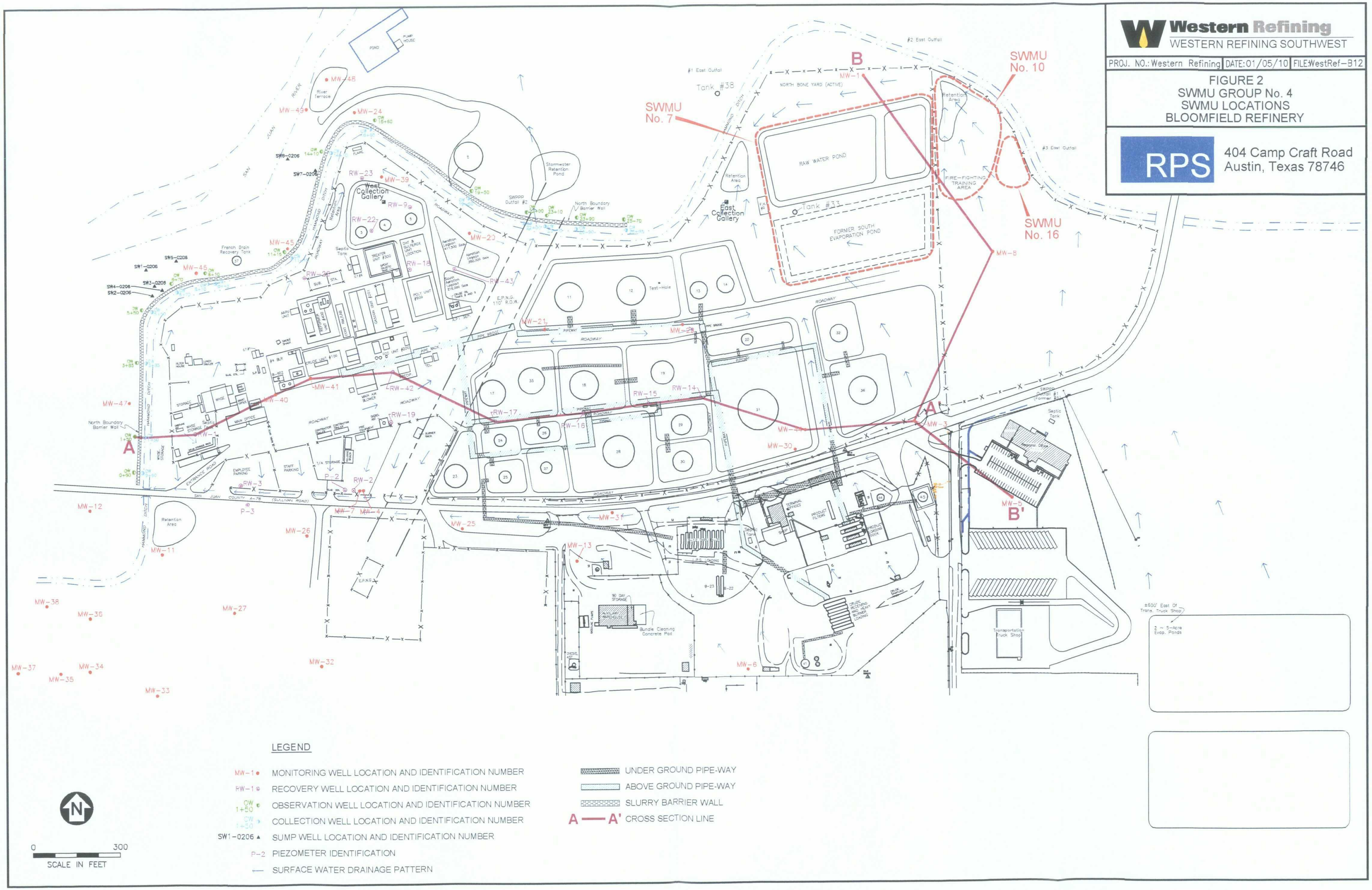
Table 2
Soil Analytical Results Summary
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

			Parameters															
			Acetone	Benzene	Toluene	Ethylbenzene	m.p-Xylene	o-Xylene	Methylene chloride	Semi-Volatile Organics	Total Petroleum Hydrocarbons	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Thallium	Zinc
	Soil Screening Levels (mg/kg):		76.9 (3)	0.037 (3)	21.7 (3)	0.291 (3)	24.5 (3)	24.7 (3)	0.215 (3)	Ne	Ne	144 (2)	27.5 (3)	42.2 (4)	1030 (3)	800 (1)	953 (3)	3.43 (3)	13,600 (3)
Sample No.	Sample Location	Date Sampled																	
B-5 (2-4')	at SWMU No. 7	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.3	7.2	6.5	ND	5.9	16	26
B-6 (2-4')	at SWMU No. 7	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54	3.2	8.1	9.1	ND	6.8	20	33
B-7 (6-8')	at SWMU No. 7 & 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	5.7	5.3	ND	4.8	14	21
B-8 (6-8')	at SWMU No. 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.57	3.2	9.3	7.1	ND	7	21	33
B-9 (2-4')	at SWMU No. 7 & 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.77	ND	ND	ND	1.6	ND	8
B-10 (10-12')	at SWMU No. 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	2.3	6	ND	ND	4.7	13	22

Notes:
units milligrams per kilogram (mg/kg)
ND - not detected, quantitation limit not provided in 1994 RFI Investigation Report
Ne - not established
The listed soil screening level is the lowest of the available NMED industrial/occupational, construction, and soil-to-ground water DAF 20 screening levels (Rev. 5 12/2009)
1 - Industrial/Occupational Soil Screening Level
2 - Construction Work Soil Screening Level
3 - Soil-to-Ground Water Screening Level
4 - Based on chromium VI

Figures

- Figure 2 Group No. 4 SWMU Locations
- Figure 3 SWMU No. 7 Sample Locations Map
- Figure 4 Cross Section A-A' West to East
- Figure 5 Cross Section B-B' North to South
- Figure 6 April 2007 Potentiometric Surface
- Figure 7 Spring 2007 Separate Phase Hydrocarbon Thickness Map
- Figure 8 Spring 2007 Dissolved-Phase Groundwater Data



Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining
DATE: 01/05/10
FILE: WestRef-B12
FIGURE 2
SWMU GROUP No. 4
SWMU LOCATIONS
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746
SWMU No. 7
SWMU No. 10
SWMU No. 16
RAW WATER POND
FORMER SOUTH EVAPORATION POND
FIRE-FIGHTING TRAINING AREA
NORTH BONE YARD (ACTIVE)
West Collection Gallery
East Collection Gallery
Stormwater Retention Pond
North Boundary Barrier Wall
River Terrace
French Drain Recovery Tank
Retention Area
Bundle Cleaning Concrete Pad
Transportation Truck Shop
±600' East Of Trans. Truck Shop
2 – 5-Acre Evap. Ponds
SAN JUAN RIVER
HAMMOND DITCH
SAN JUAN COUNTY A-78 (SULLIVAN ROAD)
A
A'
B
B'
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
SURFACE WATER DRAINAGE PATTERN
UNDER GROUND PIPE-WAY
ABOVE GROUND PIPE-WAY
SLURRY BARRIER WALL
A — A' CROSS SECTION LINE
0
300
SCALE IN FEET
N

Aerial Map Source: Google Maps, 2008 DigitalGlobe.

N

0 80
SCALE IN FEET

LEGEND

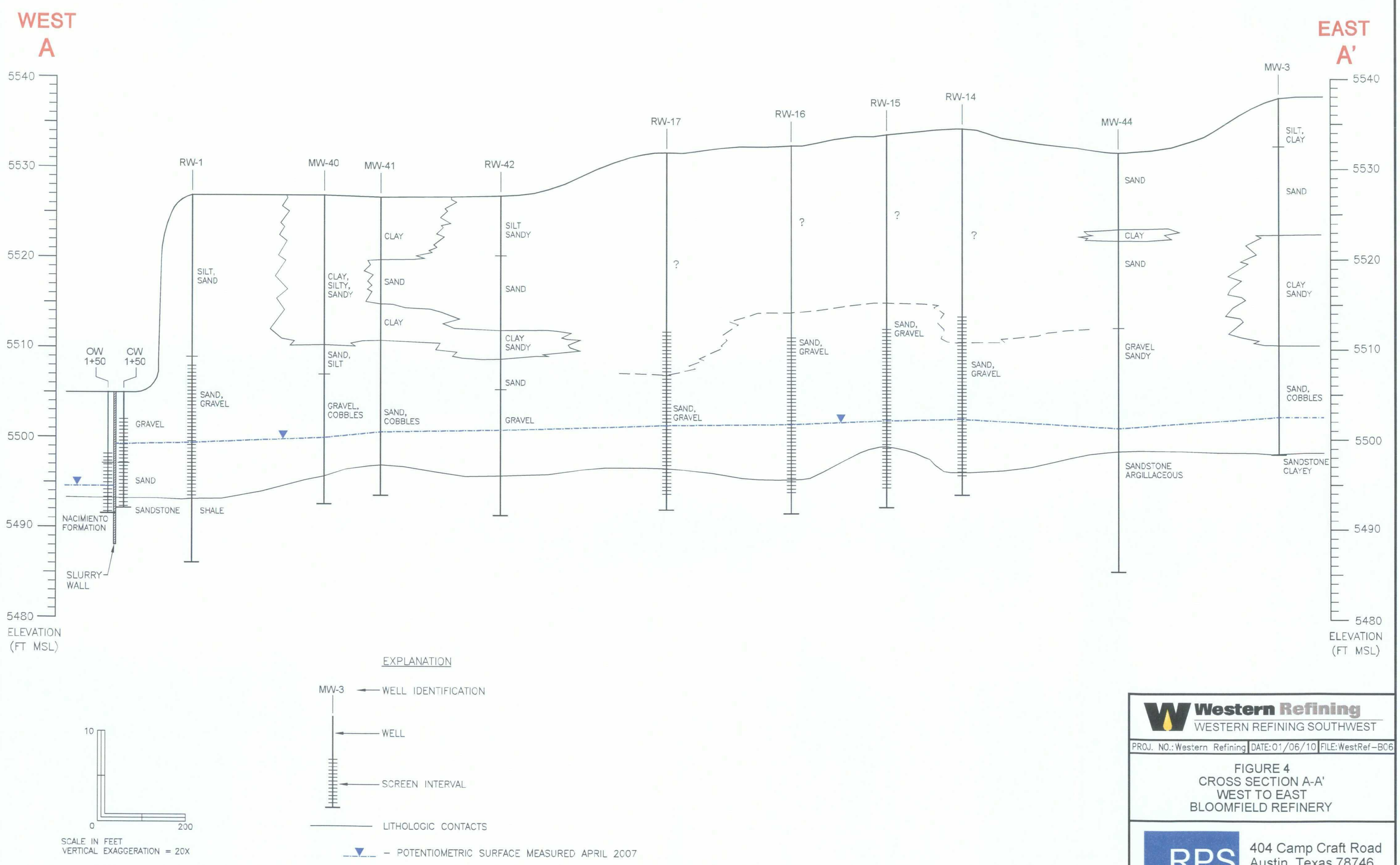
- MW-1 ✱ PRE-RFI MONITORING WELL LOCATION
- SWMU2-1 ● 2008 RFI SAMPLE LOCATION
- 1996 SURFACE SOIL SAMPLE LOCATION
- B-5 1994 RFI SOIL BORING LOCATION
- PROPOSED SOIL BORING LOCATION
- EXTENT OF FORMER SOUTH EVAPORATION POND

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/05/10	FILE: WestRef-B13

FIGURE 3
SWMU No. 7
SAMPLE LOCATIONS MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

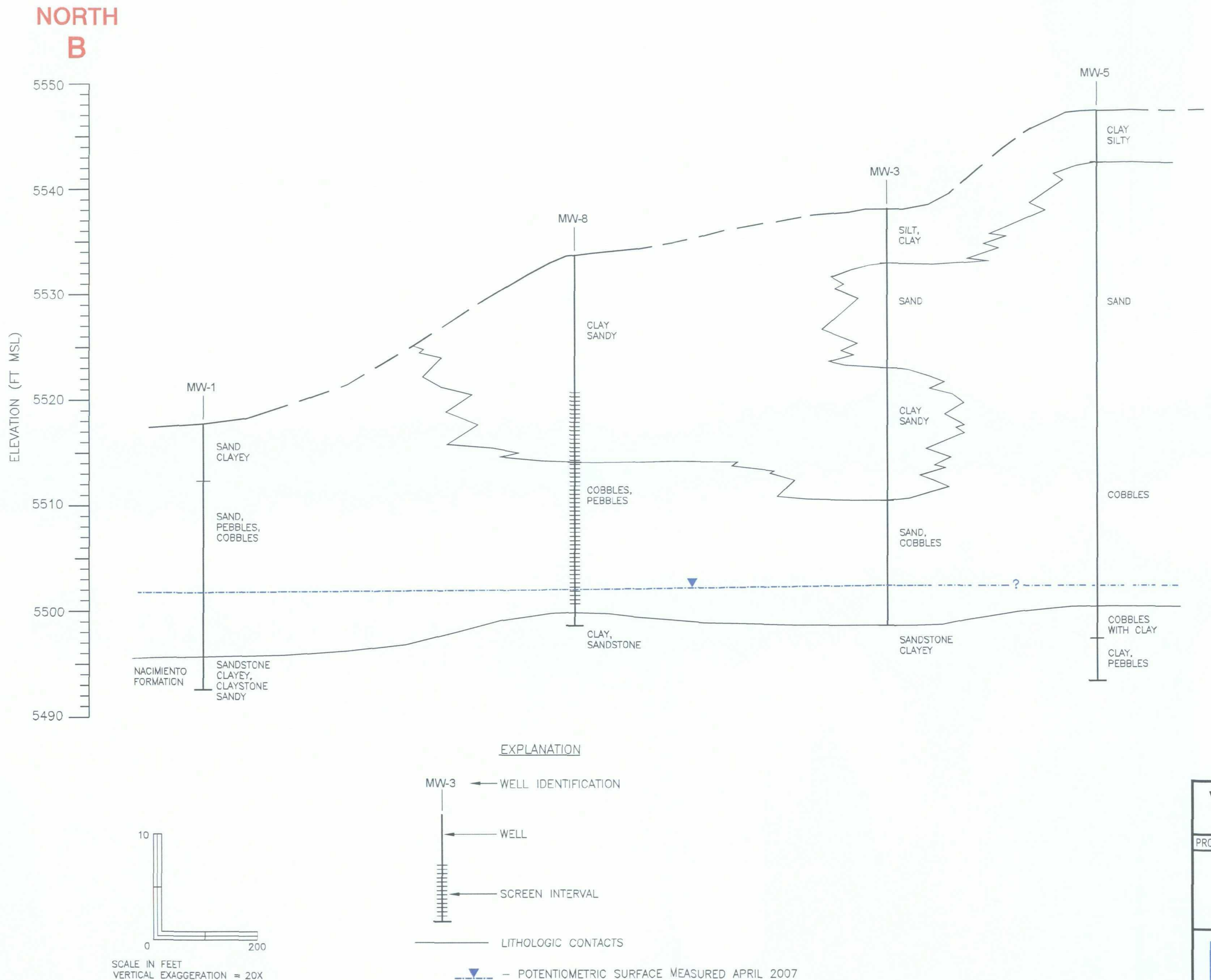


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef-B06

FIGURE 4
CROSS SECTION A-A'
WEST TO EAST
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

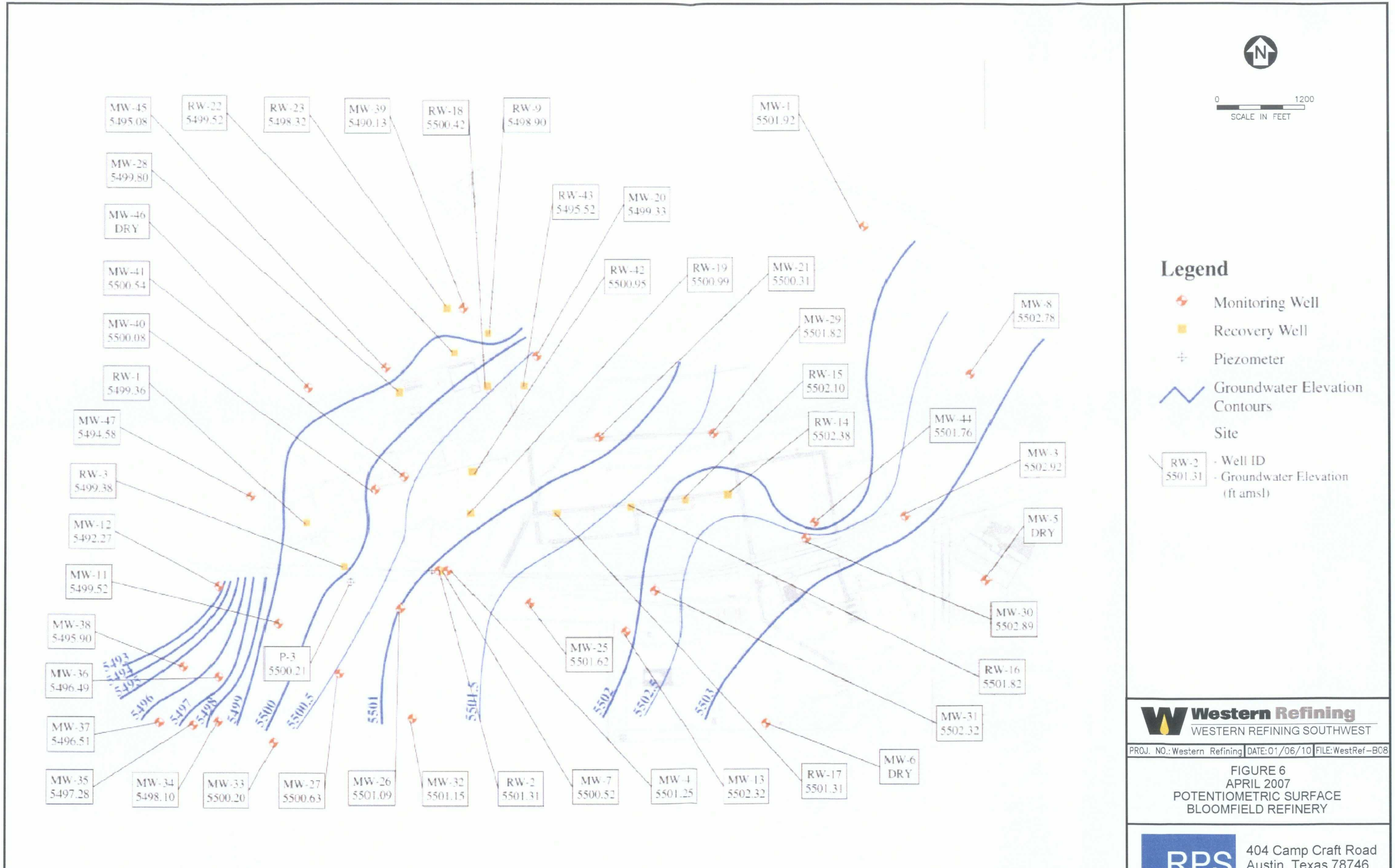


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef~B07

FIGURE 5
CROSS SECTION B-B'
NORTH TO SOUTH
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



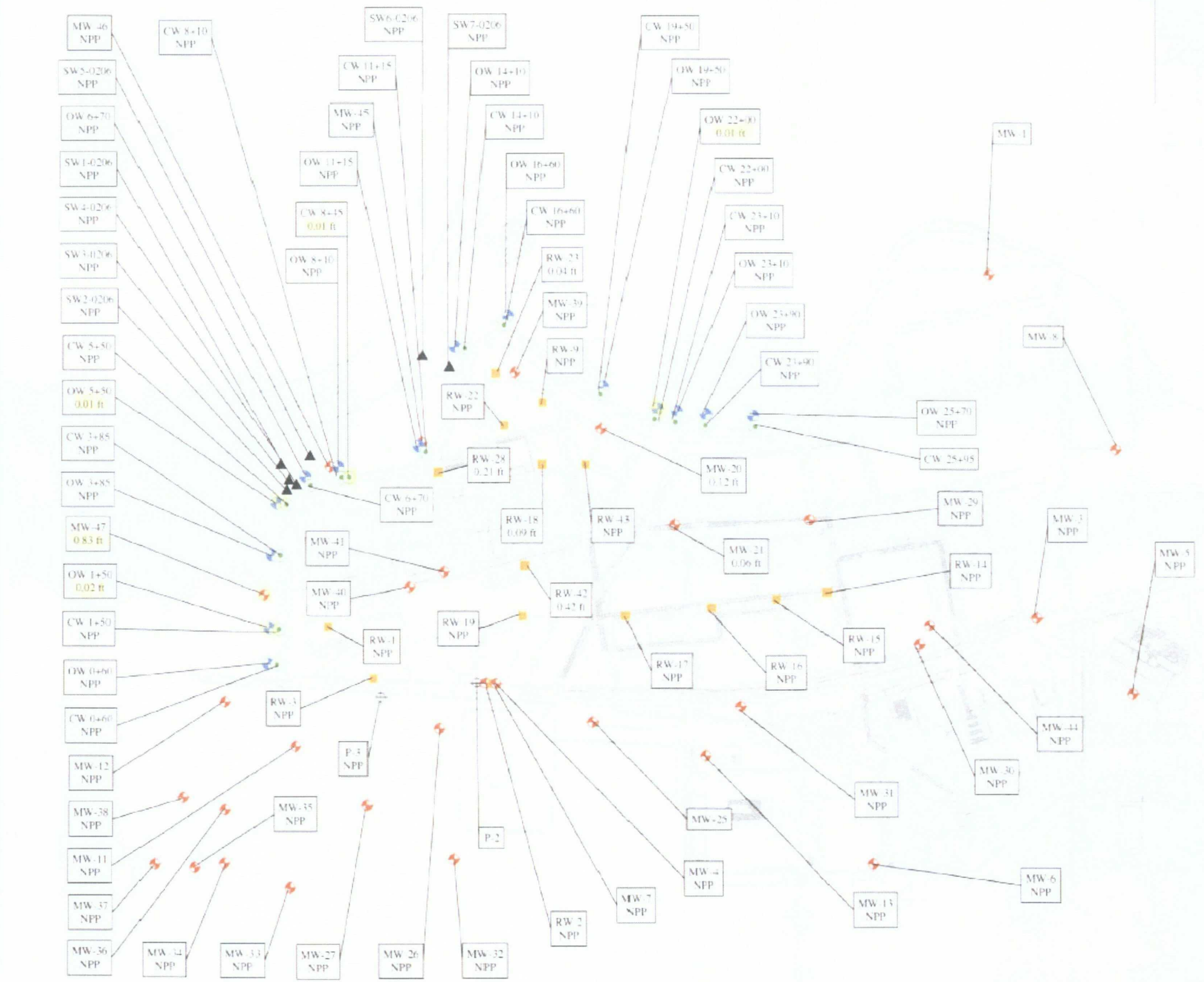
Map Source: Malcolm–Pirnie Facility–Wide Groundwater Monitoring Plan, Western Refining Bloomfield Refinery, Figure 7 Groundwater.mxd, July 2007.

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef–B08

FIGURE 6
APRIL 2007
POTENTIOMETRIC SURFACE
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Map Source: Malcolm-Pirnie Facility-Wide Groundwater Monitoring Plan, Western Refining Bloomfield Refinery, Figure 8 Separate Phase Hydrocarbon Map.mxd, July 2007.

0 1200
SCALE IN FEET

Legend

- Monitoring Well
- Observation Well
- Recovery Well
- Piezometer
- Collection Well
- Sump Well
- Site

MW-35
NPP
- Well ID

ft = Feet

NPP = No Product Present
NA = Not Available

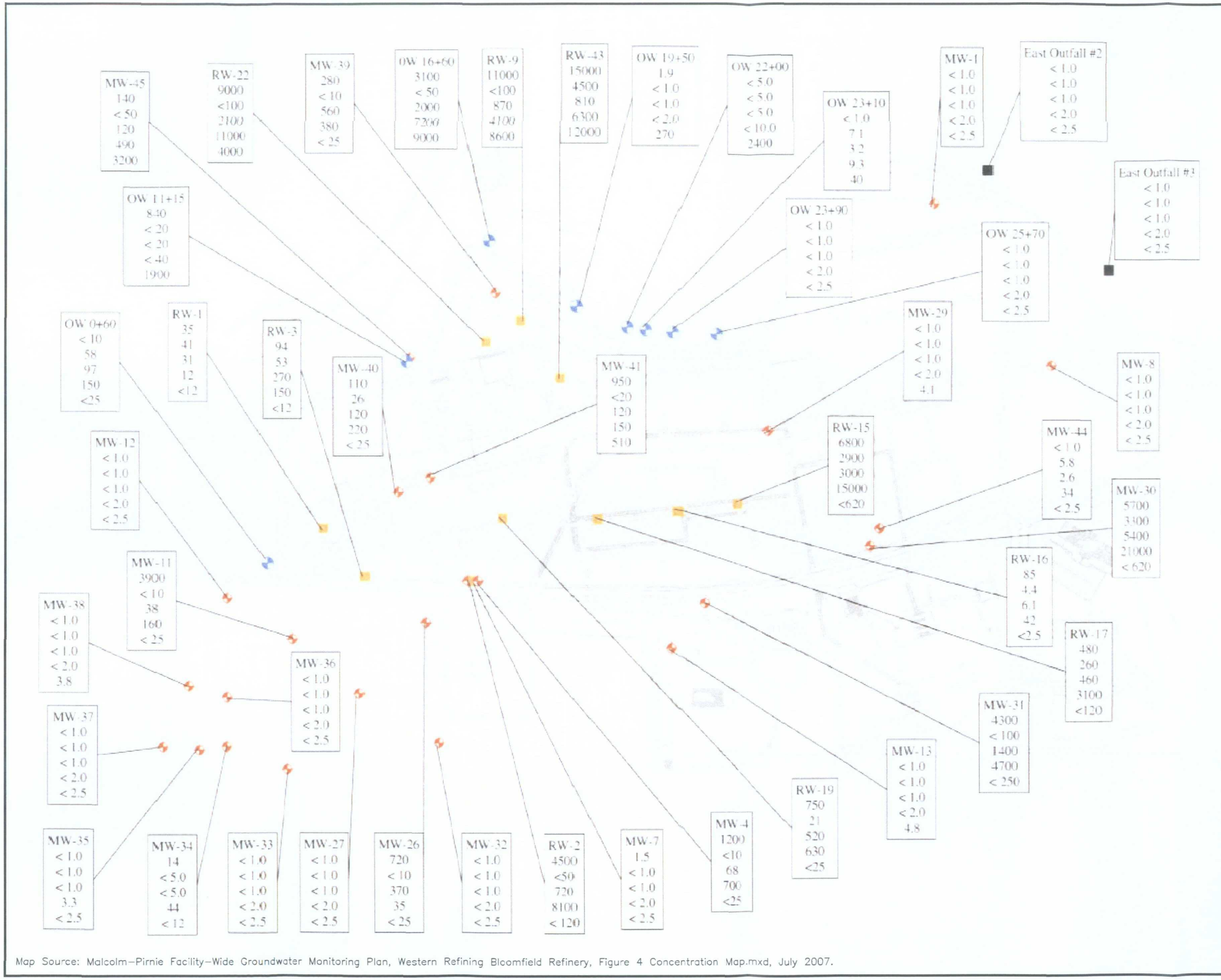
Note:
OWs and CWs were collected on 1/15/07
SWs were collected on 1/2/07

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef-BC9

FIGURE 7
SPRING 2007
SEPARATE PHASE
HYDROCARBON THICKNESS MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Legend

- Monitoring Well
- Observation Well
- Outfall
- Recovery Well
- Site

MW-35	
< 1.0	- Benzene
< 1.0	- Toluene
< 1.0	- Ethylbenzene
3.3	- Xylenes, Total
< 2.5	- MTBE

All concentrations in micrograms per liter (ug/L)

Western Refining
WESTERN REFINING SOUTHWEST

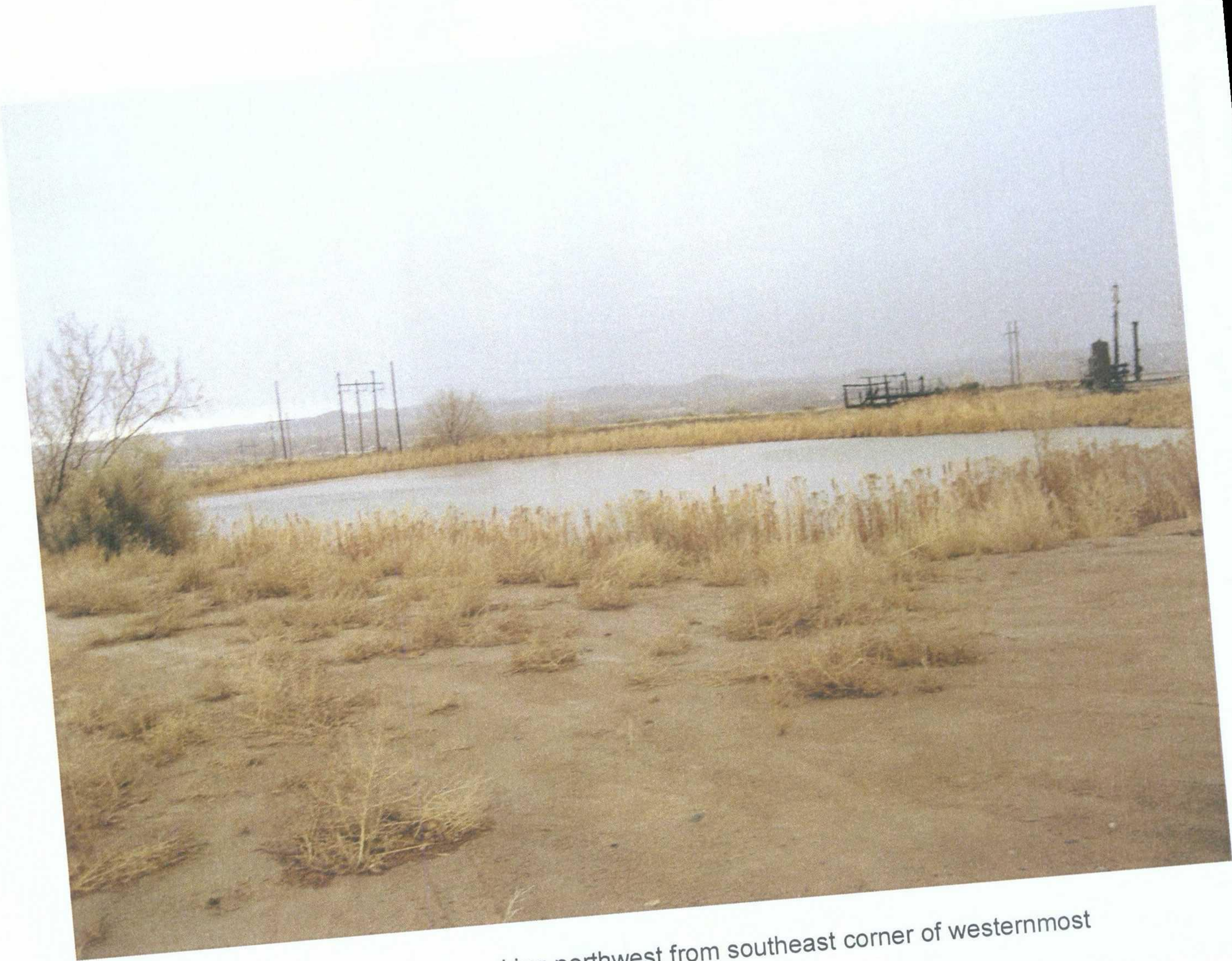
PROJ. NO.: Western Refining | DATE: 01/06/10 | FILE: WestRef-B10

FIGURE 8
SPRING 2007
DISSOLVED-PHASE
GROUNDWATER DATA
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

Photographs

Raw Water Ponds (SWMU No. 7) Looking northwest from southeast corner of ponds.



Raw Water Ponds (SWMU No. 7) Looking northwest from southeast corner of westernmost pond.

Section 3
SWMU No. 10 Fire Training Area

This section presents background information, a discussion on site conditions, and a scope of services for SWMU No. 10.

3.1 Background

This section presents background information, including a review of historical waste management activities to identity the following:

- Type and characteristics of all waste and all contaminants handled in the SWMU;
- Known and possible sources of contamination;
- History of releases; and
- Known extent of contamination.

The Fire Training Area, which has been identified as SWMU No. 10, is located immediately east of the Raw Water Ponds (Figure 2). It covers a small area approximately 160 wide by 250 long, with a surface drainage ditch along the west side that appears to catch any runoff from the area. The ditch flows into a small depression at the northern end of the Fire Training Area.

This area has been used since 1981 and continues to be used by the on-site fire fighting team for practice and training. There are two small approx. 250-500 gallon above ground storage tanks on the south end of the area that are used to fuel the training fires. One tank contains diesel and gasoline and the other contains propane. There are a number of props arranged in two rows running north-south on both sides of the area where the actual training exercises take place. Dry powder composed of sodium bicarbonate and potassium bicarbonate and aqueous film forming foam are used as the fire suppressant agents.

This area was previously investigated during the 1993 RCRA Facility Investigation with four soil borings located in this area. Two borings (B-7 and B-9) were placed along the west side in the drainage ditch and the other two borings (B-8 and B-10) were located along the center of the area (Figure 9). One soil sample was collected from each of the borings and analyzed for volatile and semi-volatile organic constituents, total petroleum hydrocarbons, and metals. All of the organic analyses were non-detect and the metals concentrations are reported to be less than the background concentrations developed during the 1993 RCRA Facility Investigation (Groundwater Technology Inc., 1994 and Groundwater Technology Inc., 1995). The analytical results for the soil samples are presented in Table 2. The analytical results in Table 2 are compared to the NMED screening levels and not the background concentrations developed during the 1993 RCRA Facility Investigation, as the NMED has not approved any background studies at this time.

3.2 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.

3.2.1 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 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. 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 land surface at SWMU No. 10 slopes gently to the northwest, with a stormwater drainage ditch running along the western side of the SWMU and terminating in a closed depression in the northwester corner of the area.

The refinery complex is bisected by County Rd #4990 (Sulivan Road), which runs east-west. The process units, storage tanks (crude oil and liquid products), wastewater treatment systems, and SWMU No. 10 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. There is very little vegetation throughout these areas with most surfaces composed of concrete, asphalt, or gravel. SWMU No. 10 is mostly void of vegetation with bare soil and/or gravel at the land surface. The area between the refinery and the San Juan River does have limited vegetation on slopes that are not too steep to support vegetation.

SWMU No. 10 is used for fire training exercises and there is no other current use for this area. Each training station has a prop (e.g., horizontal tank or vertical separator tank) used as the source of fire that is extinguished during the training exercise.

3.2.2 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 4 and 5 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 and prevents site related contaminants from migrating to deeper aquifers. The potentiometric surface as measured in April 2007 is presented as Figure 6 and shows the groundwater flowing to the northwest, toward the San Juan River.

Previous site investigations have identified and delineated impacts to groundwater from historical site operations. Figure 7 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 8. Neither SPH nor dissolved groundwater impacts were noted at SWMU No. 10.

There are no subsurface features at the Fire Training Area with the exception of the fuel supply lines from the two aboveground storage tanks. There is no reason to believe the fuel supply lines have had any impacted on contaminant distribution within the area. The underground lines are buried in permeable soils with native material backfilled around the lines.

3.3 Scope of Services

This subsection presents a brief description of the anticipated sample collection activities to be performed during the investigation, background information research conducted to develop the Scope of Services, a description of the collection and management of investigation derived waste, and surveying to be conducted to record sample location and elevation data.

3.3.1 Anticipated Activities

Pursuant to Section IV of the Order, a scope of services was developed to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil and groundwater samples will be collected at the SWMU No. 10 Fire Training Area. Soil borings will be installed at each of the fire training stations that utilized liquid hydrocarbons with two additional borings located in the surface water drainage ditch that runs along the western side of the SWMU (Figure 9). In addition, one soil boring, which will be completed as a permanent monitoring well, will be installed in the far northwest corner of the Fire Training Area (Figure 9). This results in nine soil borings that will extend to a minimum depth of ten feet with samples collected as discussed in Section 5.2. Discrete soil samples will be collected for laboratory analyses at the following intervals:

- 0-6" (all borings);
- 18-24" (all borings);
- From the 6" interval at the top of saturation, if encountered;
- The sample from each boring with the greatest apparent degree of contamination, based on field observations and field screening; and
- Any additional intervals as determined based on field screening results.

One permanent monitoring well will be installed at the northwest corner of the SWMU. The well will be installed and groundwater samples collected as discussed in Section 5.3.

3.3.2 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 this work plan. The previously collected data provides very good 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 groundwater information and provide SWMU-specific information regarding contaminant occurrence and distribution within soils and groundwater.

3.3.3 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 will be contained and characterized using methods based on the boring location, boring depth, drilling method, and type of contaminants suspected or encountered. All purged groundwater and decontamination water will be characterized prior to disposal unless it is disposed in the refinery wastewater treatment system upstream of the API Separator. An IDW management plan is included as Appendix C.

3.3.4 Surveys

The horizontal coordinates and elevation of each soil boring, the top of the monitoring well casing, the ground surface at the 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)). Alternate survey methods may be proposed by the Respondents in site-specific work plans. Any proposed survey method must be approved by the Department prior to implementation. 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.

Tables

- Table 2 Soil Analytical Results Summary

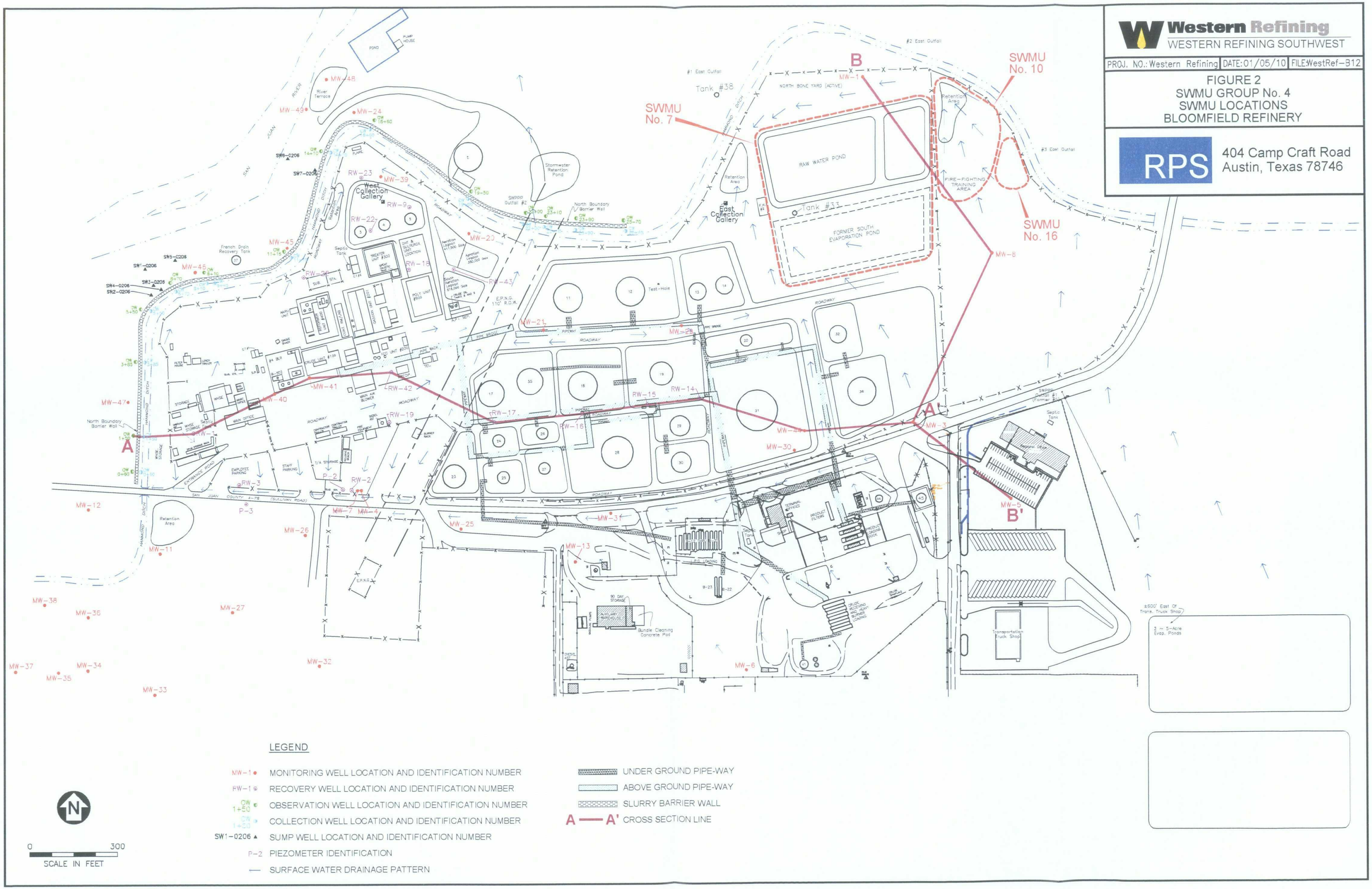
Table 2
Soil Analytical Results Summary
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

			Parameters																
			Acetone	Benzene	Toluene	Ethylbenzene	m.p-Xylene	o-Xylene	Methylene chloride	Semi-Volatile Organics	Total Petroleum Hydrocarbons	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Thallium	Zinc
	Soil Screening Levels (mg/kg):		76.9 (3)	0.037 (3)	21.7 (3)	0.291 (3)	24.5 (3)	24.7 (3)	0.215 (3)	Ne	Ne	144 (2)	27.5 (3)	42.2 (4)	1030 (3)	800 (1)	953 (3)	3.43 (3)	13,600 (3)
Sample No.	Sample Location	Date Sampled																	
B-5 (2-4')	at SWMU No. 7	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.3	7.2	6.5	ND	5.9	16	26
B-6 (2-4')	at SWMU No. 7	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54	3.2	8.1	9.1	ND	6.8	20	33
B-7 (6-8')	at SWMU No. 7 &	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	5.7	5.3	ND	4.8	14	21
B-8 (6-8')	at SWMU No. 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.57	3.2	9.3	7.1	ND	7	21	33
B-9 (2-4')	at SWMU No. 7 &	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.77	ND	ND	ND	1.6	ND	8
B-10 (10-12')	at SWMU No. 10	2/22/1994	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	2.3	6	ND	ND	4.7	13	22

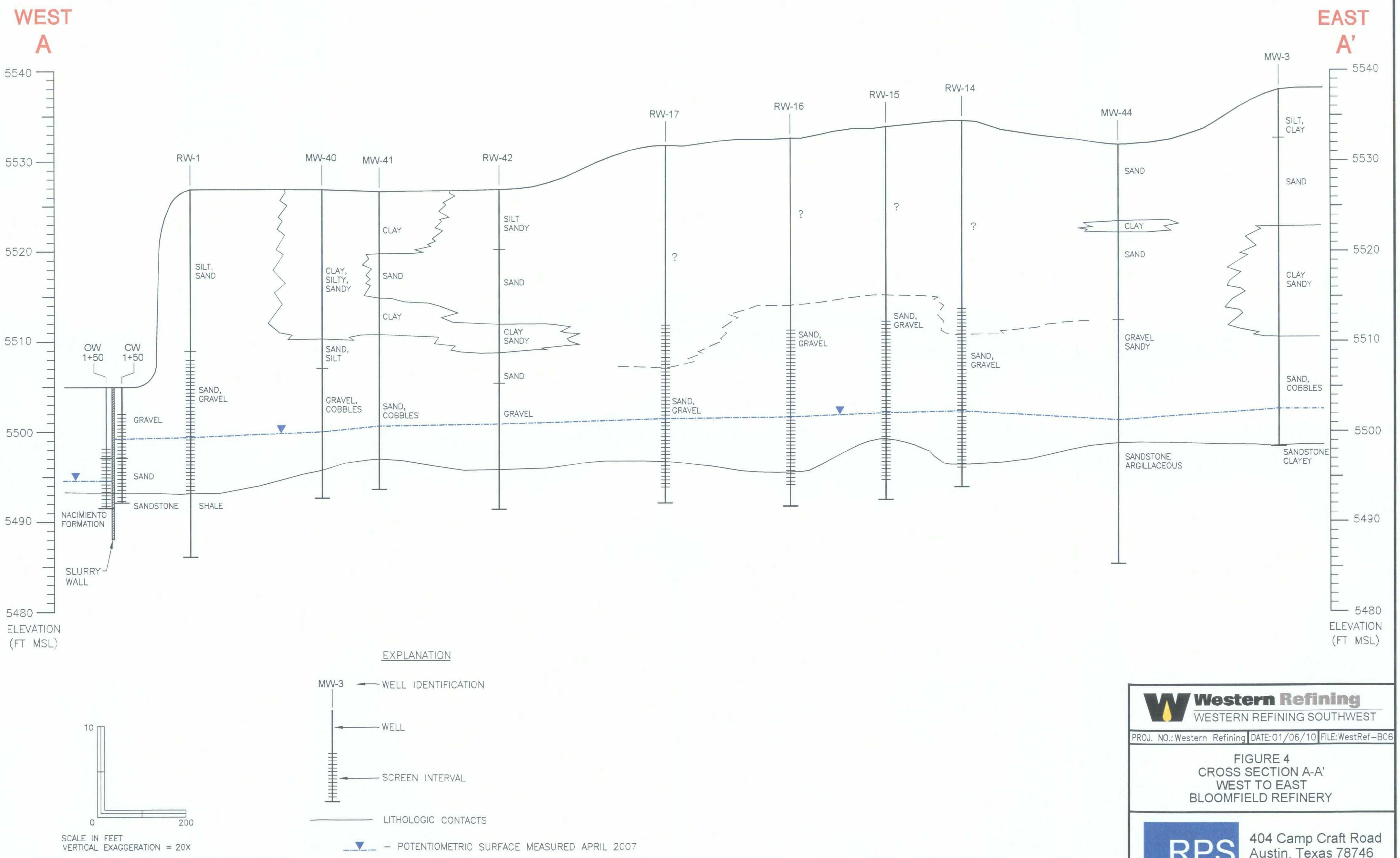
Notes:
units milligrams per kilogram (mg/kg)
ND - not detected, quantitation limit not provided in 1994 RFI Investigation Report
Ne - not established
The listed soil screening level is the lowest of the available NMED industrial/occupational, construction, and soil-to-ground water DAF 20 screening levels (Rev. 5 12/2009)
1 - Industrial/Occupational Soil Screening Level
2 - Construction Work Soil Screening Level
3 - Soil-to-Ground Water Screening Level
4 - Based on chromium VI

Figures

- Figure 2 Group No. 4 SWMU Locations
- Figure 4 Cross Section A-A' West to East
- Figure 5 Cross Section B-B' North to South
- Figure 6 April 2007 Potentiometric Surface
- Figure 7 Spring 2007 Separate Phase Hydrocarbon Thickness Map
- Figure 8 Spring 2007 Dissolved-Phase Groundwater Data
- Figure 9 SWMU No. 10 Sample Locations Map



Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining
DATE: 01/05/10
FILE: WestRef-B12
FIGURE 2
SWMU GROUP No. 4
SWMU LOCATIONS
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746
SWMU No. 7
SWMU No. 10
SWMU No. 16
RAW WATER POND
FORMER SOUTH EVAPORATION POND
FIRE-FIGHTING TRAINING AREA
NORTH BONE YARD (ACTIVE)
East Collection Gallery
West Collection Gallery
Stormwater Retention Pond
North Boundary Barrier Wall
French Drain Recovery Tank
River Terrace
Retention Area
Bundle Cleaning Concrete Pad
Transportation Truck Shop
±600' East Of Trans. Truck Shop
3 ~ 5-Acre Evap. Ponds
Tank #38
Tank #33
#1 East Outfall
#2 East Outfall
#3 East Outfall
MW-1
MW-3
MW-5
MW-6
MW-8
MW-11
MW-12
MW-13
MW-20
MW-21
MW-24
MW-25
MW-26
MW-27
MW-30
MW-31
MW-32
MW-33
MW-34
MW-35
MW-36
MW-37
MW-38
MW-39
MW-40
MW-41
MW-45
MW-46
MW-47
MW-48
MW-49
RW-2
RW-3
RW-9
RW-14
RW-15
RW-16
RW-17
RW-18
RW-19
RW-22
RW-23
RW-42
P-2
P-3
SW1-0206
SW2-0206
SW3-0206
SW4-0206
SW5-0206
SW7-0206
SW8-0206
A
A'
B
B'
ROADWAY
SAN JUAN COUNTY 4-78 (SULLIVAN ROAD)
HAMMOND DITCH
SAN JUAN RIVER
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
SURFACE WATER DRAINAGE PATTERN
UNDER GROUND PIPE-WAY
ABOVE GROUND PIPE-WAY
SLURRY BARRIER WALL
A — A' CROSS SECTION LINE
N
0 300
SCALE IN FEET

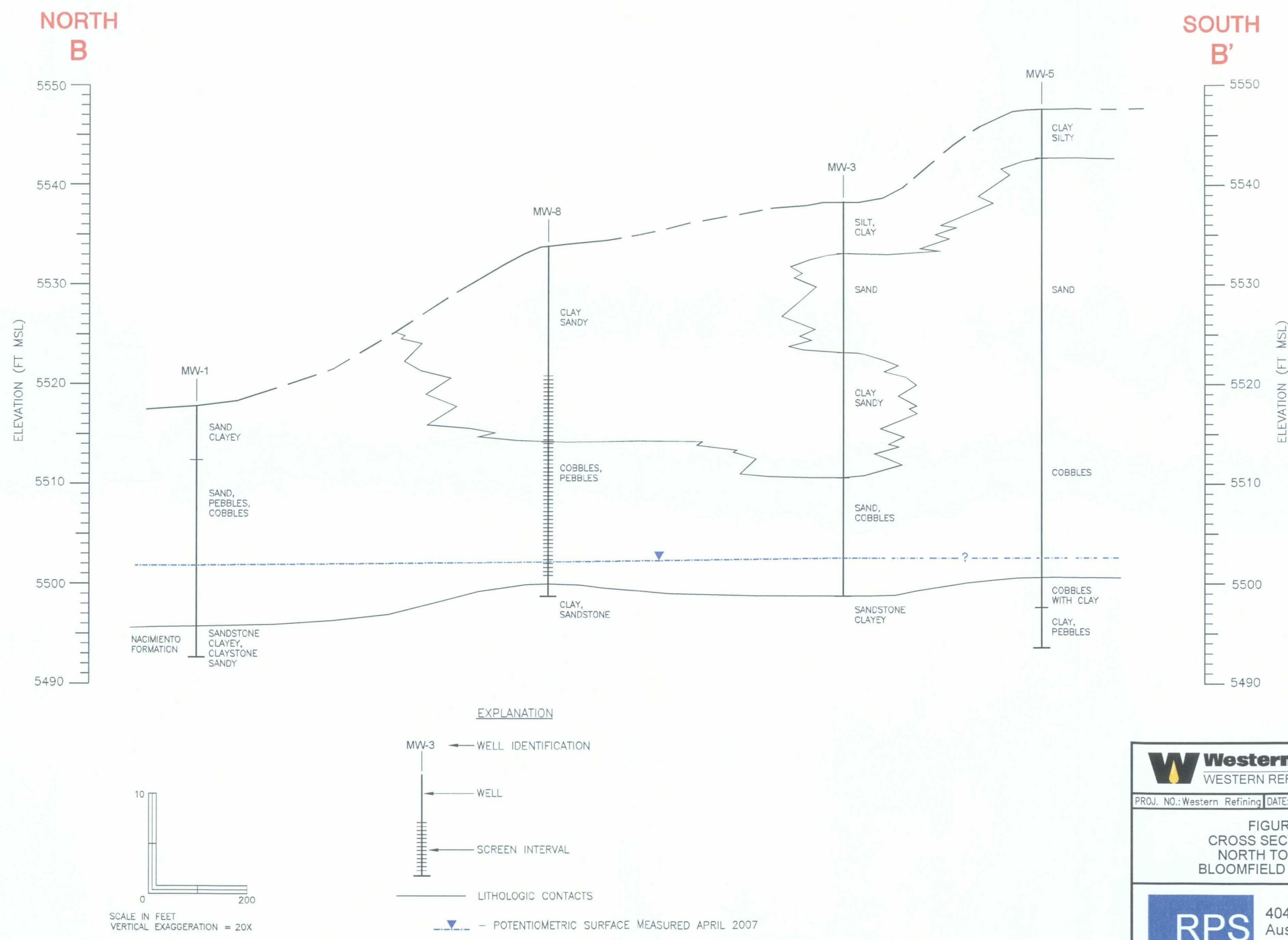


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 01/06/10 | FILE: WestRef–BC6

FIGURE 4
CROSS SECTION A-A'
WEST TO EAST
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

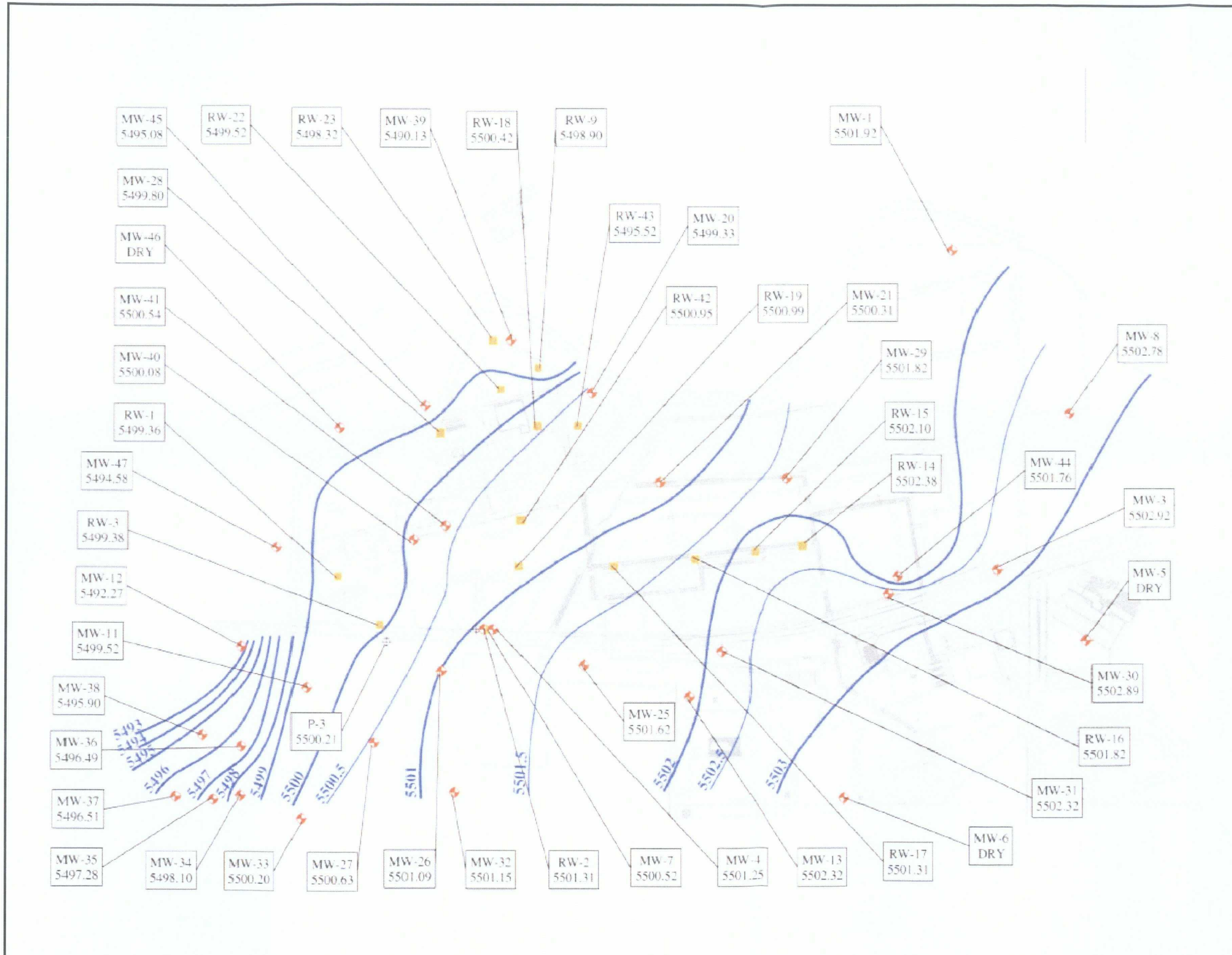


Western Refining
WESTERN REFINING SOUTHWEST

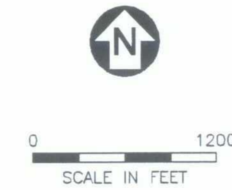
PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef-B07

FIGURE 5
CROSS SECTION B-B'
NORTH TO SOUTH
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Map Source: Malcolm-Pirnie Facility-Wide Groundwater Monitoring Plan, Western Refining Bloomfield Refinery, Figure 7 Groundwater.mxd, July 2007.



Legend

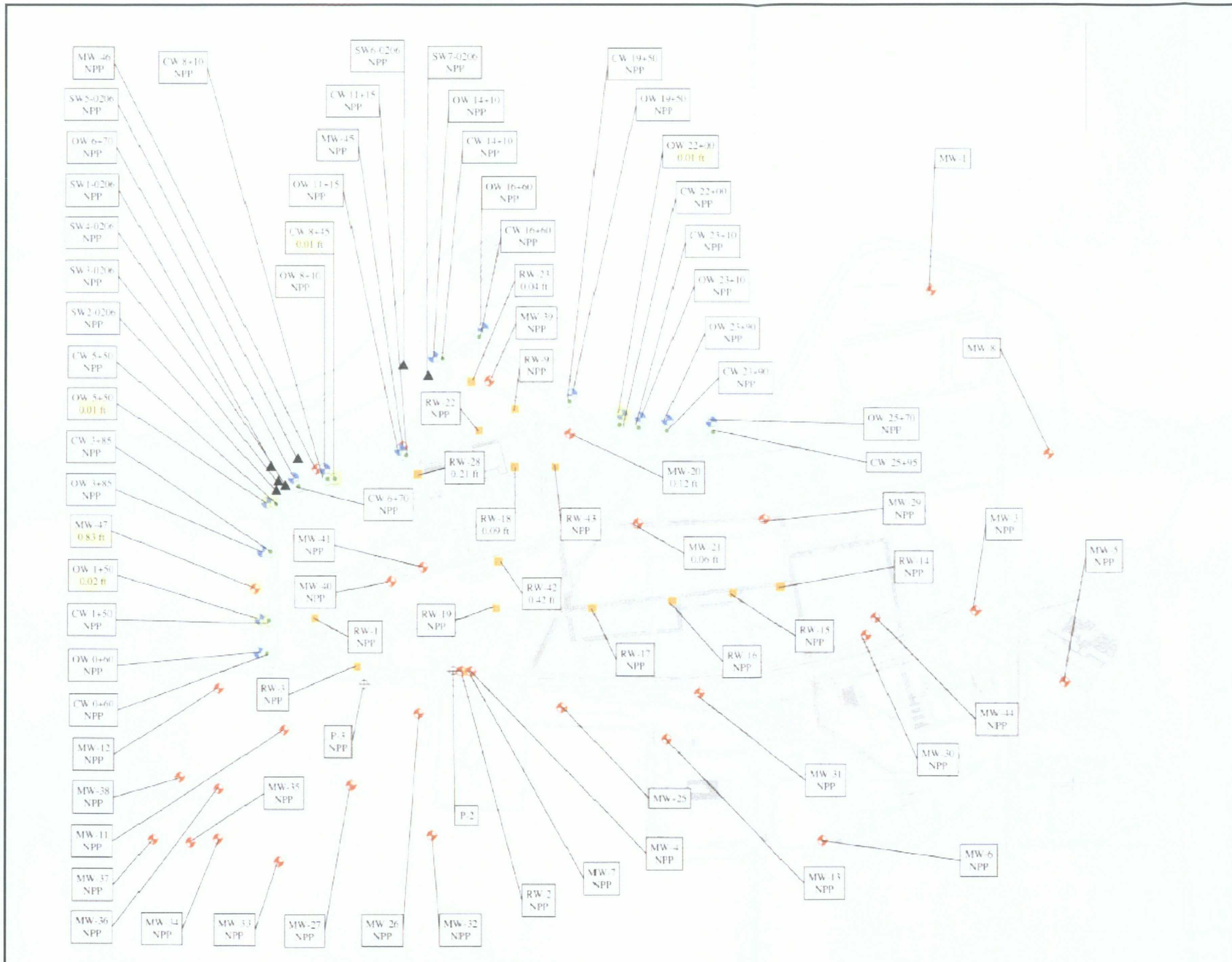
- Monitoring Well
- Recovery Well
- Piezometer
- Groundwater Elevation Contours
- Site
- RW-2 5501.31 - Well ID - Groundwater Elevation (ft amsl)

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef-B08

FIGURE 6
APRIL 2007
POTENTIOMETRIC SURFACE
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Map Source: Malcolm-Pirnie Facility-Wide Groundwater Monitoring Plan, Western Refining Bloomfield Refinery, Figure 8 Separate Phase Hydrocarbon Map.mxd, July 2007.

N

0 1200
SCALE IN FEET

Legend

- Monitoring Well
- Observation Well
- Recovery Well
- Piezometer
- Collection Well
- Sump Well
- Site

MW-35 NPP - Well ID

ft = Feet

NPP = No Product Present
NA = Not Available

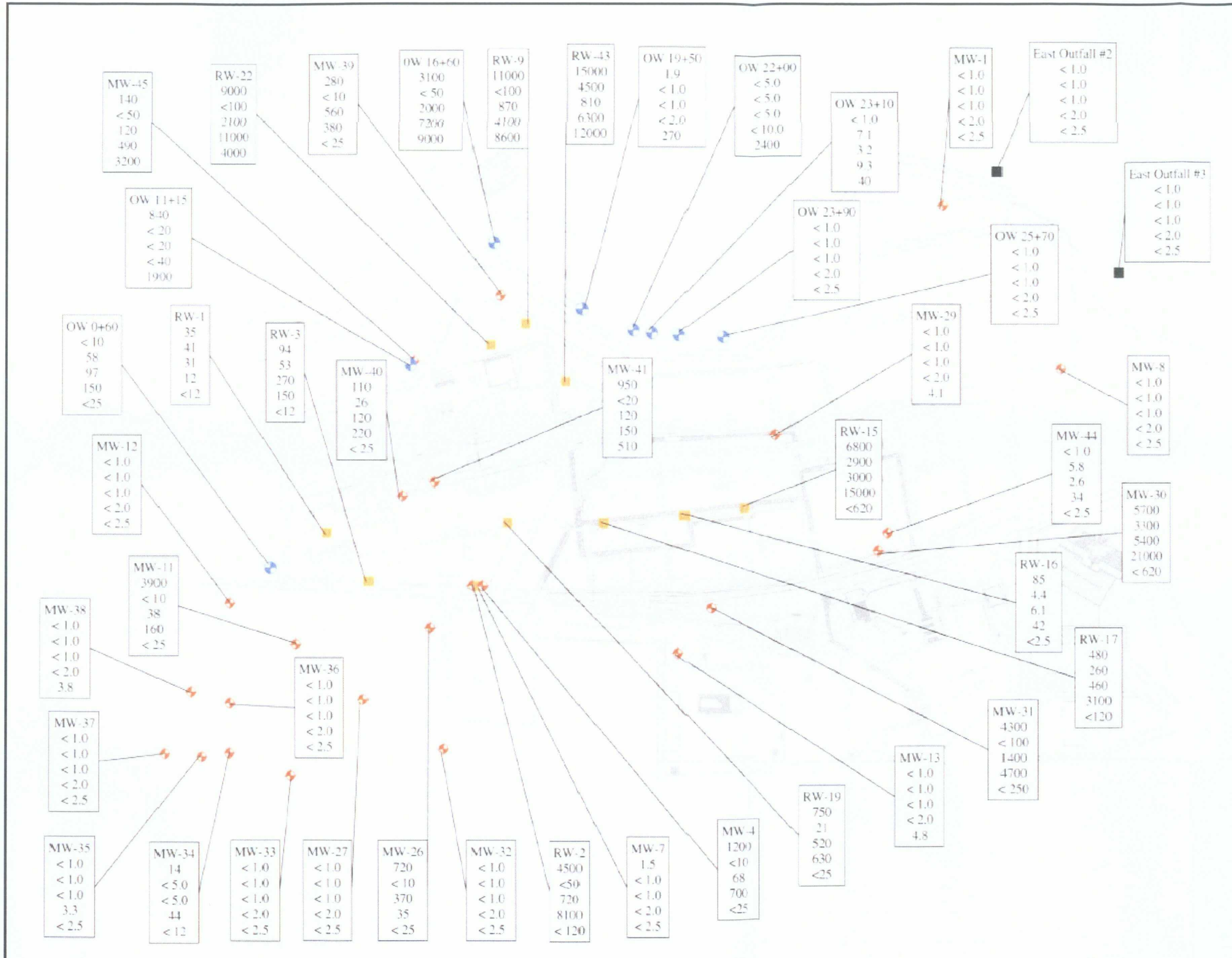
Note:
OWs and CWs were collected on 1/15/07
SWs were collected on 1/2/07

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef-B09

FIGURE 7
SPRING 2007
SEPARATE PHASE
HYDROCARBON THICKNESS MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Map Source: Malcolm-Pirnie Facility-Wide Groundwater Monitoring Plan, Western Refining Bloomfield Refinery, Figure 4 Concentration Map.mxd, July 2007.

Legend

- Monitoring Well
- Observation Well
- Outfall
- Recovery Well
- Site

MW-35	
< 1.0	- Benzene
< 1.0	- Toluene
< 1.0	- Ethylbenzene
3.3	- Xylenes, Total
< 2.5	MTBE

All concentrations in micrograms per liter (ug/L)

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 01/06/10 | FILE: WestRef-B10

FIGURE 8
SPRING 2007
DISSOLVED-PHASE
GROUNDWATER DATA
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 01/06/10 | FILE: WestRef-B14

FIGURE 9
SWMU No. 10
SAMPLE LOCATIONS MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

Photographs

Fire Training Area (SWMU No. 10) Looking north from location just south of training area.

Fire Training Area (SWMU No. 10) Looking south from location near northeast portion of training area.

Section 4
SWMU No. 16 Active Landfill

This section presents background information, a discussion on site conditions, and a scope of services for SWMU No. 16.

4.1 Background

This section presents background information, including a review of historical waste management activities to identity the following:

- Type and characteristics of all waste and all contaminants handled in the SWMU;
- Known and possible sources of contamination;
- History of releases; and
- Known extent of contamination.

The active landfill, which began operation in approximately 1983, is located immediately adjacent to the fire training area, on the east side (Figure 2). It occupies an area approximately 120 feet by 150 feet. The landfill is included as an active disposal facility in the refinery's Discharge Plan, which is reviewed and approved by the OCD. The materials disposed of in the landfill include elemental sulfur, which is produced at the sulfur recovery unit, and fines and spent catalyst from the Fluidized Catalytic Cracking (FCC) unit. The FCCU catalyst is a non-hazardous metallic (alumina) solid, which is periodically replaced.

The spent catalyst, fines and elemental sulfur is placed in lifts and covered with clean soil. The lateral extent of the landfill is visibly obvious; however, the thickness of the material placed in the landfill is uncertain but is estimated to be 10 to 15 feet. No historical assessments have been conducted in this area as it is a permitted disposal area. There are no indications of releases from the unit and based on the physical nature of the material placed in the landfill there is little potential for a release.

4.2 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.

4.2.1 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 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. A minor drainage feature is located on the eastern portion of the refinery, near where SWMU No. 16 is 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 land surface at SWMU No. 16 slopes generally to the north.

The refinery complex is bisected by County Rd #4990 (Sulivan Road), which runs east-west. The process units, storage tanks (crude oil and liquid products), wastewater treatment systems, and SWMU No. 16 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. 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 slopes that are not too steep to support vegetation.

The current use of the land surface at SWMU No. 16 is disposal of materials permitted by the OCD. This is no other current use for this area.

4.2.2 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 4 and 5 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 and prevents site related contaminants from migrating to deeper aquifers. The potentiometric surface as measured in April 2007 is presented as Figure 6 and shows the groundwater flowing to the northwest, toward the San Juan River.

Previous site investigations have identified and delineated impacts to groundwater from historical site operations. Figure 7 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 8. Neither SPH nor dissolved groundwater impacts were noted at SWMU No. 16. There are no subsurface features at the Active Landfill such as buried pipelines or sumps.

4.3 Scope of Services

This subsection presents a brief description of the anticipated sample collection activities to be performed during the investigation, background information research conducted to develop the Scope of Services, a description of the collection and management of investigation derived waste, and surveying to be conducted to record sample location and elevation data.

4.3.1 Anticipated Activities

Pursuant to Section IV of the Order, a scope of services was developed to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil samples will be collected at SWMU No. 16 Active Landfill from the five soil borings shown on Figure 10. Soil borings will be installed to a minimum depth of ten feet and samples collected as discussed in Section 5.2 with samples collected from the following intervals:

- 0-6" (all borings);
- 18-24" (all borings);
- From the 6" interval at the top of saturation, if encountered;
- The sample from each boring with the greatest apparent degree of contamination, based on field observations and field screening; and
- Any additional intervals as determined based on field screening results.

If groundwater is encountered in the soil borings, then a groundwater sample will be collected for analysis as discussed in Section 5.3.

4.3.2 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 this work plan. The previously collected data provides very good 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 groundwater information and provide SWMU-specific information regarding contaminant occurrence and distribution within soils and groundwater.

4.3.3 Collection and Management of Investigation Derived Waste

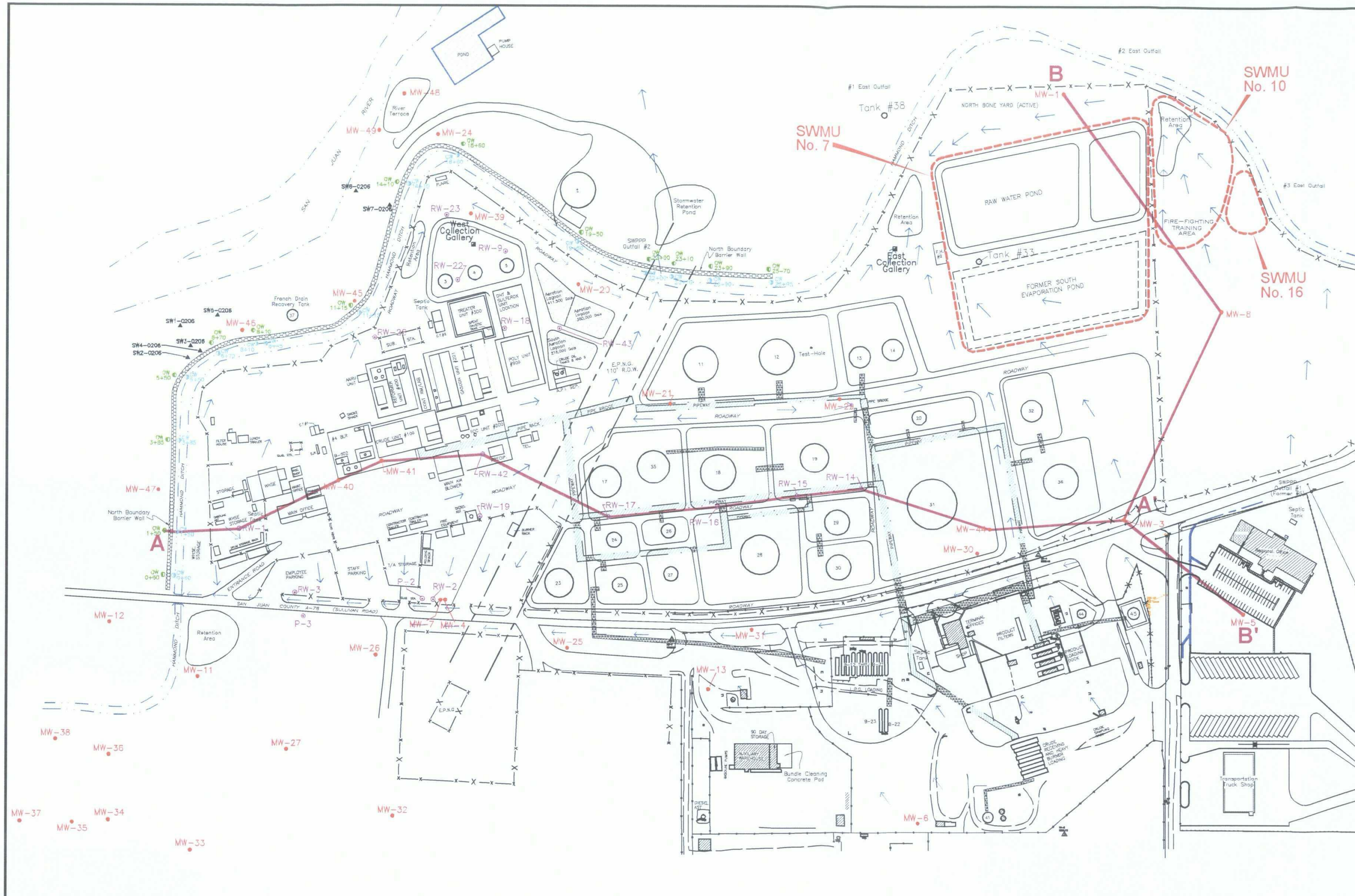
Drill cuttings, excess sample material and decontamination fluids, and all other investigation derived waste (IDW) associated with soil borings will be contained and characterized using methods based on the boring location, boring depth, drilling method, and type of contaminants suspected or encountered. All purged groundwater and decontamination water will be characterized prior to disposal unless it is disposed in the refinery wastewater treatment system upstream of the API Separator. An IDW management plan is included as Appendix C.

4.3.4 Surveys

The horizontal coordinates and elevation of each soil boring 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)). Alternate survey methods may be proposed by the Respondents in site-specific work plans. Any proposed survey method must be approved by the Department prior to implementation. 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.

Figures

- Figure 2 Group No. 4 SWMU Locations
- Figure 4 Cross Section A-A' West to East
- Figure 5 Cross Section B-B' North to South
- Figure 6 April 2007 Potentiometric Surface
- Figure 7 Spring 2007 Separate Phase Hydrocarbon Thickness Map
- Figure 8 Spring 2007 Dissolved-Phase Groundwater Data
- Figure 10 SWMU No. 16 Sample Locations Map



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
SURFACE WATER DRAINAGE PATTERN
UNDER GROUND PIPE-WAY
ABOVE GROUND PIPE-WAY
SLURRY BARRIER WALL
A — A' CROSS SECTION LINE

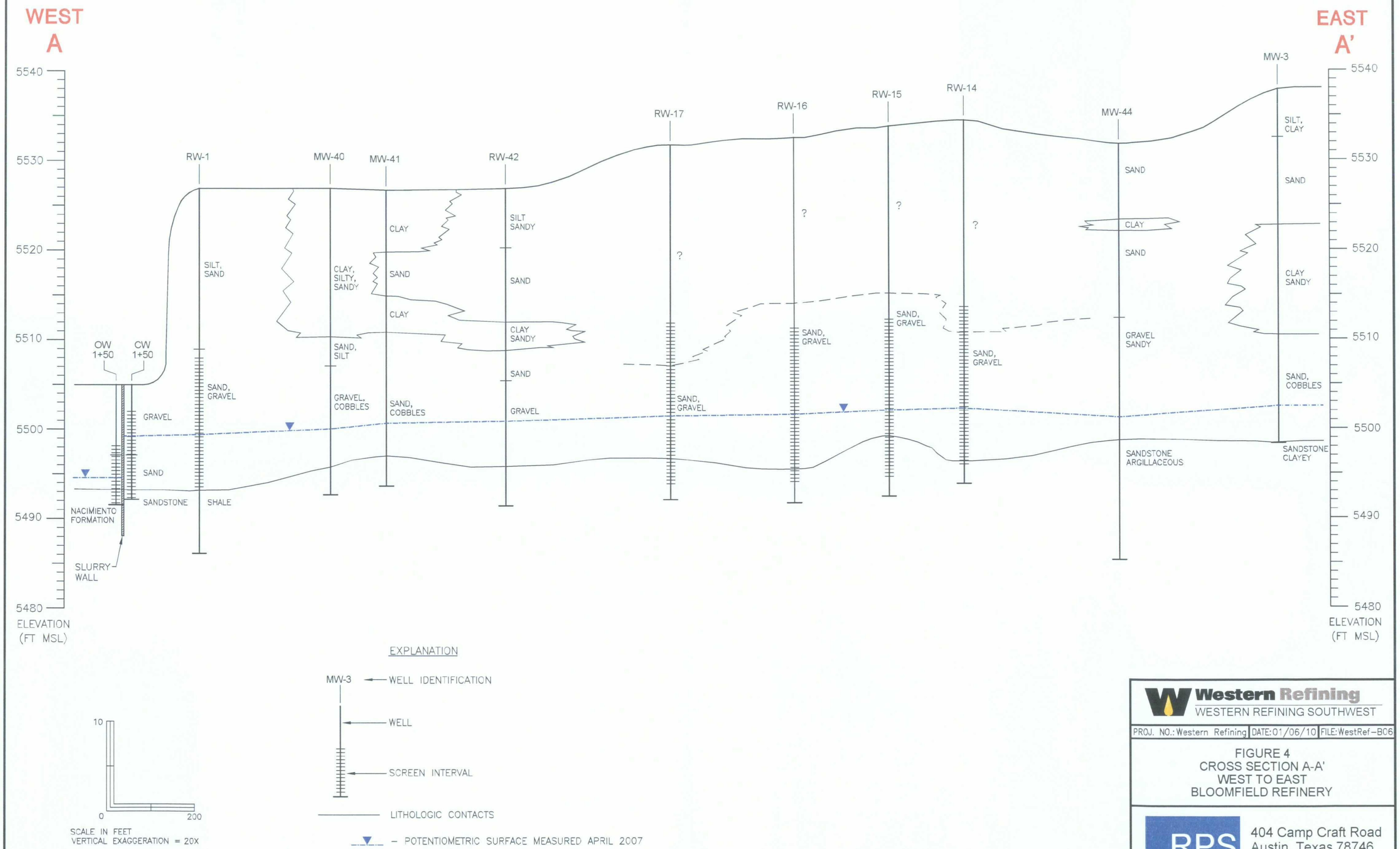
0 300
SCALE IN FEET

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/05/10	FILE: WestRef-B12

FIGURE 2
SWMU GROUP No. 4
SWMU LOCATIONS
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

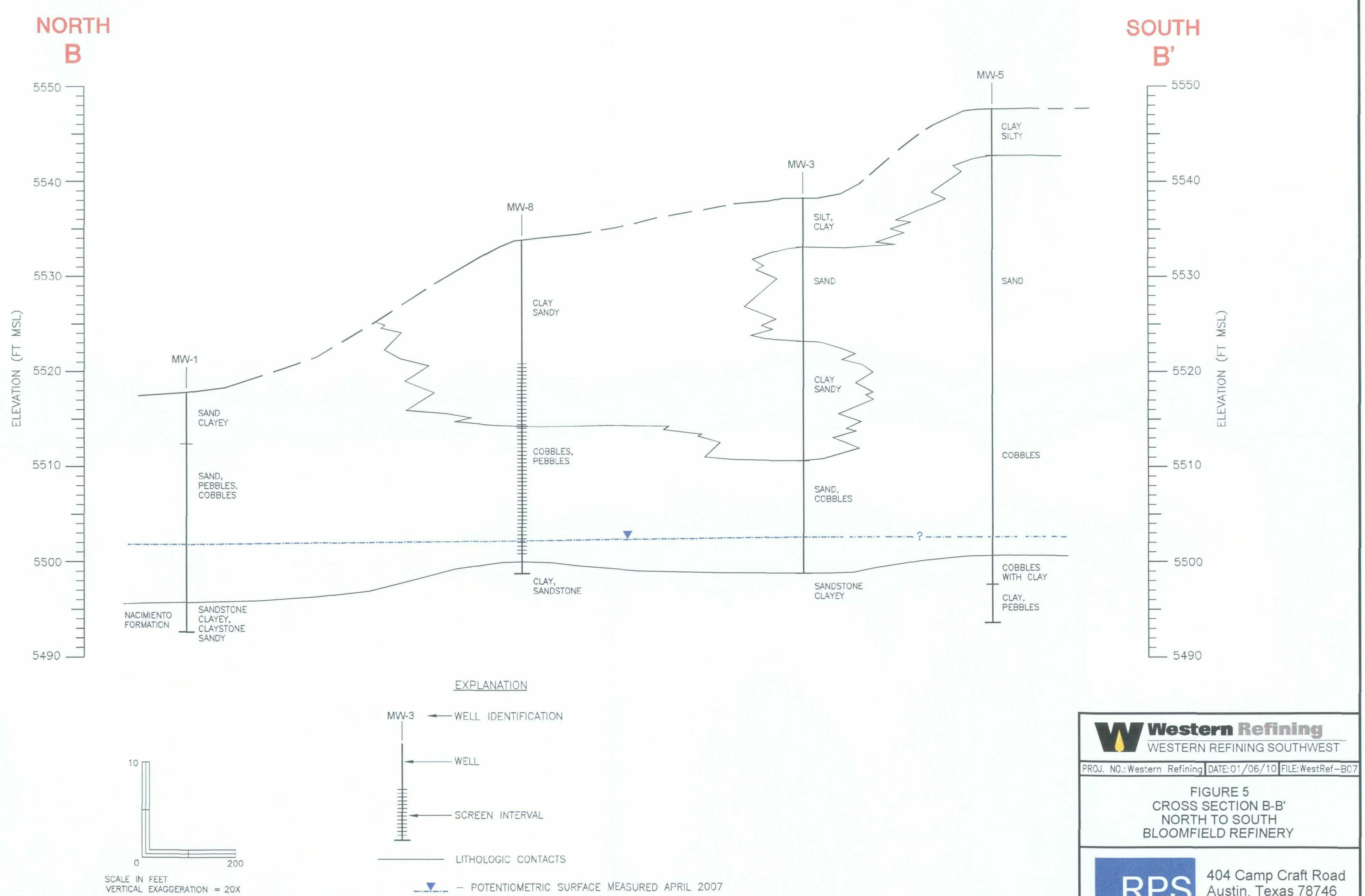


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef–B06

FIGURE 4
CROSS SECTION A-A'
WEST TO EAST
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

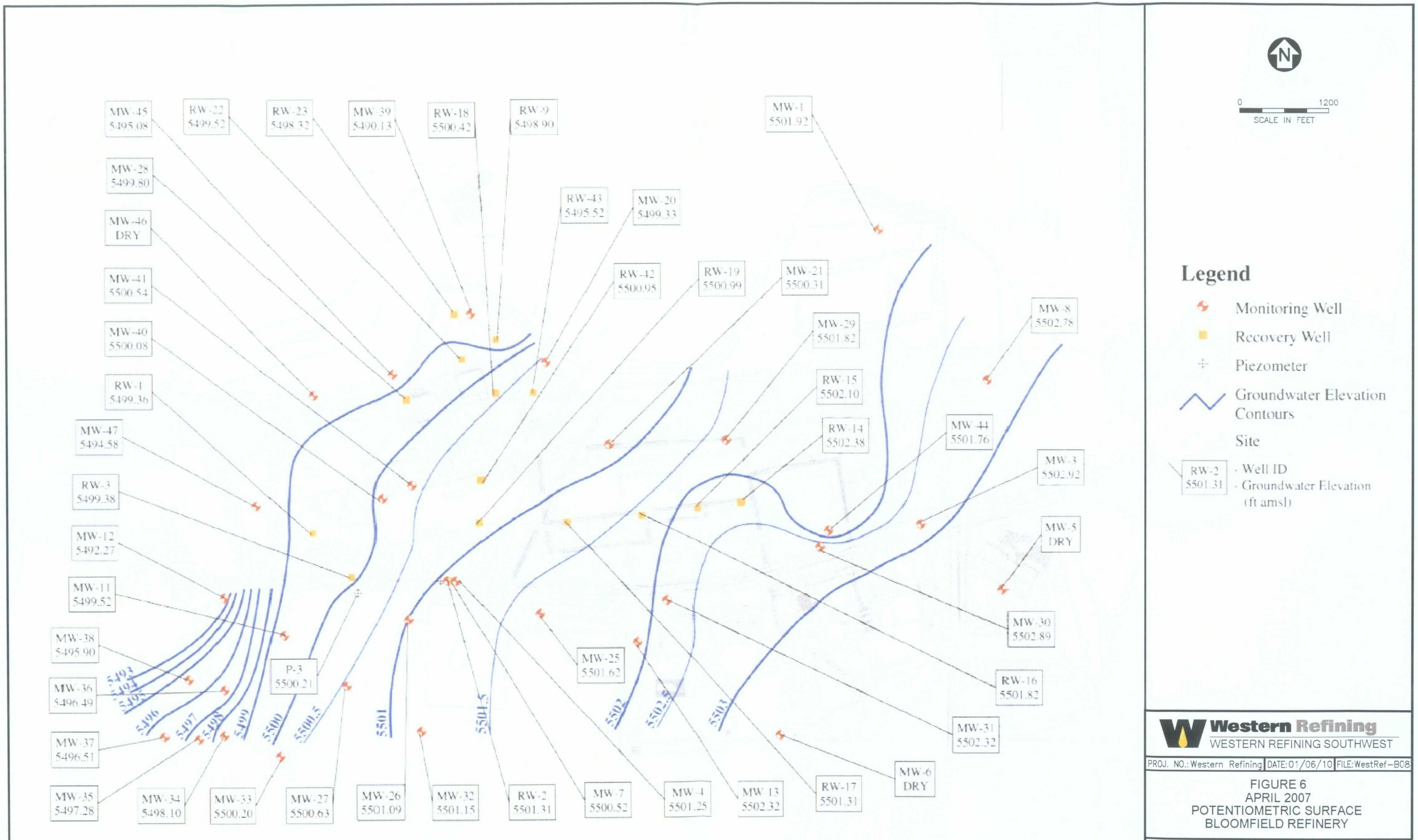


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef-B07

FIGURE 5
CROSS SECTION B-B'
NORTH TO SOUTH
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



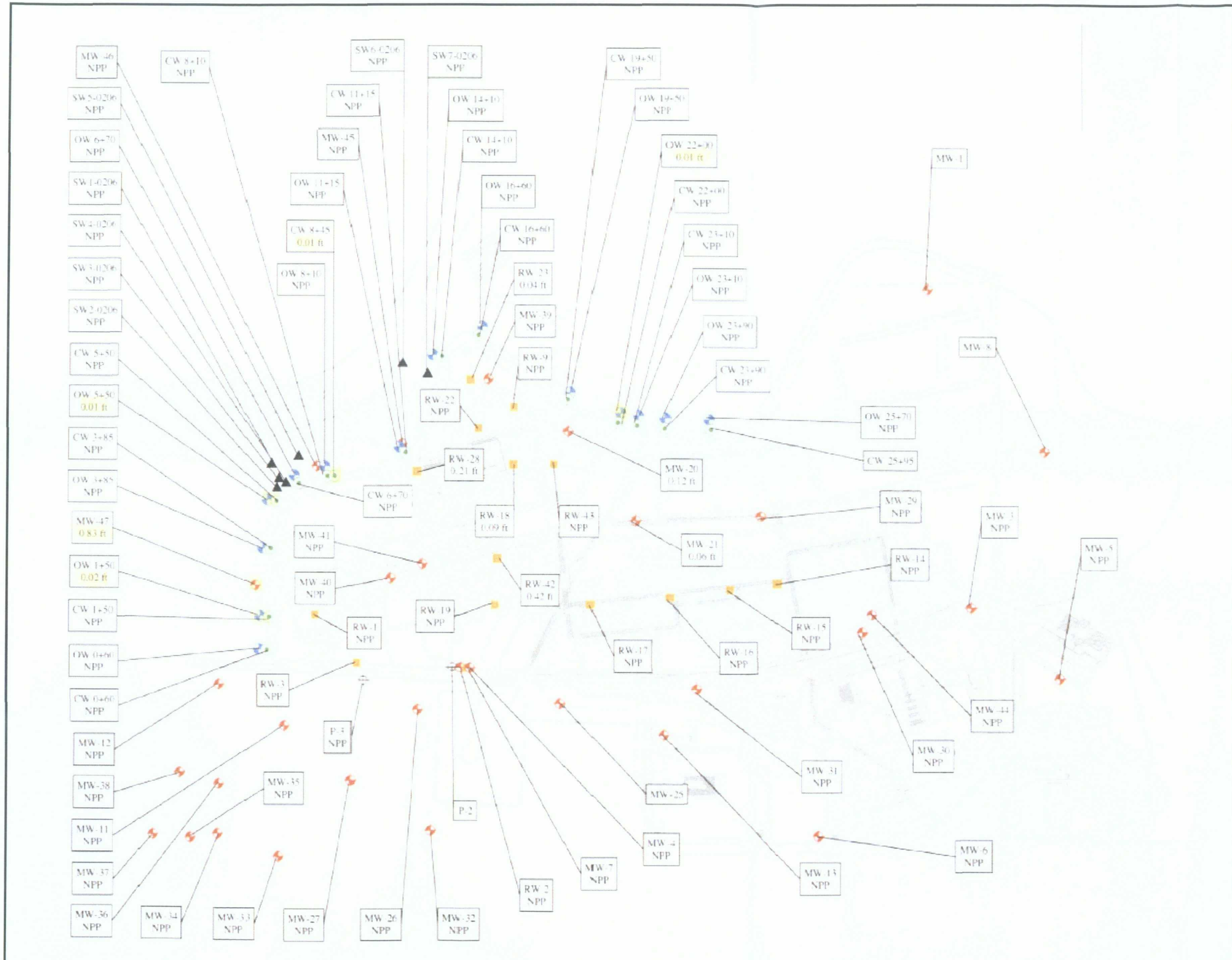
Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef–B08

FIGURE 6
APRIL 2007
POTENTIOMETRIC SURFACE
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

Map Source: Malcolm–Pirnie Facility–Wide Groundwater Monitoring Plan, Western Refining Bloomfield Refinery, Figure 7 Groundwater.mxd, July 2007.



Map Source: Malcolm-Pirnie Facility-Wide Groundwater Monitoring Plan, Western Refining Bloomfield Refinery, Figure 8 Separate Phase Hydrocarbon Map.mxd, July 2007.

0 1200
SCALE IN FEET

Legend

- Monitoring Well
- Observation Well
- Recovery Well
- Piezometer
- Collection Well
- Sump Well
- Site

MW-35 NPP — Well ID

ft = Feet

NPP = No Product Present
NA = Not Available

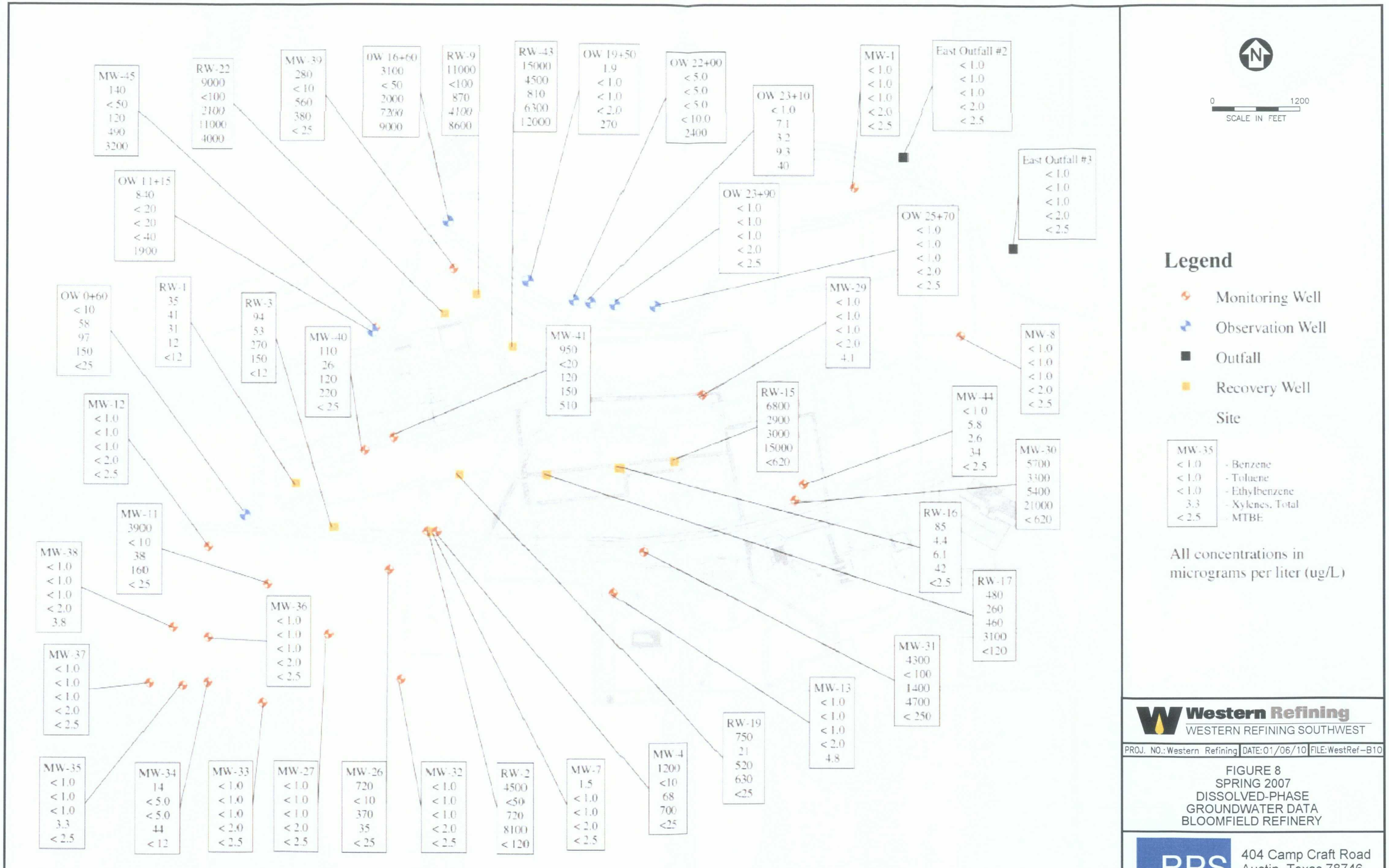
Note:
OWs and CWs were collected on 1/15/07
SWs were collected on 1/2/07

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef-B09

FIGURE 7
SPRING 2007
SEPARATE PHASE
HYDROCARBON THICKNESS MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Map Source: Malcolm-Pirnie Facility-Wide Groundwater Monitoring Plan, Western Refining Bloomfield Refinery, Figure 4 Concentration Map.mxd, July 2007.

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef-B10

FIGURE 8
SPRING 2007
DISSOLVED-PHASE
GROUNDWATER DATA
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

Aerial Map Source: Google Maps, 2008 DigitalGlobe.

N

0 60
SCALE IN FEET

LEGEND

SWMU9-1 ● 2008 RFI SAMPLE LOCATION

PROPOSED SOIL BORING LOCATION

— — — — QUADRANT DIVIDING LINE

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef–B15

FIGURE 10
SWMU No. 16
SAMPLE LOCATIONS MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

Photographs

Active Landfill (SWMU No. 16) Looking east from western side of landfill.

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 for each of the SWMUs.

5.1 Drilling Activities

Soil borings and one monitoring well will be drilled using either hollow-stem auger or if necessary, air rotary methods including ODEX. The monitoring well construction/completion will be conducted in accordance with the requirements of Section IX of the Order. 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. If contamination is detected at the water table, then the soil borings will be drilled five feet below the water table or to refusal. The soil boring to be completed as a permanent monitoring well will be drilled to the top of bedrock (Nacimiento Formation) and the anticipated completion depth ranges from 20 to 30 feet. Soil samples will be collected continuously and logged by a qualified geologist or engineer. Slotted (0.01 inch) PVC well screen will be placed at the bottom of the well and will extend for 10 to 15 feet to ensure that the well is screened across the water table and to the extent possible the entire saturated zone is open to the well, with approximately five feet of screen above the water table. A 10/20 sand filter pack will be installed to two feet over the top of the well screen.

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. 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

The soil borings at the former South Evaporation Pond, Fire Training Area and Active Landfill will be drilled to a minimum depth of ten feet, or five feet below the deepest detected contamination or waste material, whichever is deeper. A decontaminated split-barrel sampler or continuous five-foot core barrel will be used to obtain samples during the drilling of each boring. Surface samples may be collected using decontaminated, hand-held stainless steel sampling device, shelby tube, or thin-wall sampler, or a pre-cleaned disposable sampling device. A portion of the sample 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 5.2.4. Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below in Section 5.4.

Quality Assurance/Quality Control (QA/QC) samples will be collected to monitor the validity of the soil sample collection procedures as follows:

- Field duplicates will be collected at a rate of 10 percent;
- Equipment blanks will be collected from all sampling apparatus at a frequency of 10 percent or one per day if disposable sampling equipment is used; and
- Field blanks will be collected at a frequency of one per day.

5.2.1 SWMU No. 7

Three soil borings will be drilled within the location of the former South Evaporation Pond, with one of these at the former location of the inlet to the pond, as shown on Figure 3. The borings will be continuously logged with samples collected for analysis from each discernable layer, including the underlying native soil. If there is only one soil type encountered in a soil boring (i.e., there are not separate discernable layers), then one soil sample will be collected for analysis from 0 to 6".

5.2.2 SWMU No. 10

The Fire Training Area (SWMU No. 10) is located immediately east of the Raw Water Ponds (Figure 2). This area has been historically used and continues to be used by the on-site fire fighting team for practice and training. This area was previously investigated during the 1993 RCRA Facility Investigation with four soil borings located in this area (see Section 3.1). All of the organic analyses were non-detect and the metals concentrations were reported to be less than the background concentrations developed during the 1993 RCRA Facility Investigation (Groundwater Technology Inc., 1995). Because these samples were collected approximately 14 years ago, new samples are recommended to establish current conditions.

As there are individual props located within the area where liquid fuel (e.g., diesel and gasoline) is used and there is the potential for constituents to be released to soils at known locations, a judgmental sampling design is appropriate. Six soil borings are proposed near these locations as shown on Figure 9. In addition, two soil borings will be located within the drainage ditch, which runs along the western side of the area and collects surface water runoff from the area. One of the borings will be located in the small pit on the north end of the ditch. In addition, a permanent monitoring well is proposed in the northwest corner of the Fire Training Area and soil samples will also be collected from this location. Discrete soil samples will be collected for laboratory analyses at the following intervals:

- 0-6" (all borings);
- 18-24" (all borings);
- From the 6" interval at the top of saturation, if encountered;
- The sample from each boring with the greatest apparent degree of contamination, based on field observations and field screening; and
- Any additional intervals as determined based on field screening results.

5.2.3 SWMU No. 16

The Active Landfill (SWMU No. 16) is located immediately adjacent to the Fire Training Area, on the east side. It occupies an area approximately 120 feet by 150 feet. The materials disposed of in the landfill include fines and spent catalyst from the FCC unit and elemental sulfur. The waste materials are spread relatively evenly across the landfill area by heavy machinery and thus there are no readily identifiable "hot spots" or obvious concentrations of waste. An evaluation of the possible use of a simple random or stratified sampling design indicates an unreasonably large sample size for such a small area in order to meet common statistical performance criteria (e.g., significance level = 5% & power = 95%). A more appropriate sampling design to locate any areas of contamination within the area of the landfill is a systematic or grid sampling design. The landfill area of interest was divided into quadrants, with one soil boring located near the center of each quadrant (Figure 10). Each boring will represent an area of approximately 4,500 square feet or one tenth of an acre. This is very conservative for a commercial/industrial facility and is less than the half-acre exposure area commonly used for residential properties (EPA, 1991 and EPA, 1996). An additional boring was located in the center of the four quadrants at the direction of NMED.

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

- 0-6" (all borings);
- 18-24" (all borings);
- From the 6" interval at the top of saturation, if encountered;
- The sample from each boring with the greatest apparent degree of contamination, based on field observations and field screening; and
- Any additional intervals as determined based on field screening results.

5.2.4 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 and excavation logs. Field screening results 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 or test pit 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, therefore, all 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

5.3.1 Groundwater Levels

Groundwater level and SPH thickness measurements will be obtained at each new monitoring well prior to purging in preparation for a sampling event. Measurement data and the date and time of each measurement will be recorded on a site monitoring data sheet. The depth to groundwater and SPH thickness levels will be measured to the nearest 0.01 ft. The depth to groundwater and SPH thickness will be recorded relative to the surveyed well casing rim or other surveyed datum. A corrected water table elevation will be provided in wells containing SPH by adding 0.8 times the measured SPH thickness to the measured water table elevation. During regularly scheduled groundwater monitoring events, groundwater and SPH levels will be measured in all wells within 48 hours of the start of obtaining water level measurements. All automated and manual extraction of SPH and water from recovery wells, observation wells, and collection wells, which is close enough to affect measurements at the new wells, will be discontinued for 48 hours prior to the measurement of water and product levels.

Groundwater level and SPH thickness measurements will also be obtained at each new monitoring well during the next regularly scheduled facility-wide groundwater sampling event to facilitate preparation of a facility-wide potentiometric surface map.

5.3.2 Groundwater Sampling

Near the Raw Water Ponds (SWMU No. 7), groundwater has been routinely monitored immediately down-gradient of the ponds at MW-1 since the well was installed in 1984 to determine if there are impacts from the ponds. Additionally, groundwater sampling was completed in October 2008 at nine new locations (SWMU2-1, SWMU2-2, SWMU2-3, SWMU2-4, SWMU2-5/MW-50, SWMU2-6, SWMU2-7, SWMU2-8, and SWMU2-9/MW-51) down-gradient of the ponds and the results do not indicate any impacts from the ponds. No additional sampling of groundwater is proposed under this Work Plan for the investigation of the SWMU No. 7, unless groundwater is encountered in the soil borings. If groundwater is encountered, then a ground water sample will be collected for analysis prior to plugging the boring.

One new permanent monitoring well will be completed at the location shown on Figure 9 at the Fire Training Area. The location was chosen to evaluate groundwater quality immediately down-gradient of potential source areas in the Fire Training Area (SWMU No. 10) and it should also provide information on water quality down-gradient of the Active Landfill (SWMU No. 16). In addition, if any soil borings located within the Fire Training Area or Active Landfill encounter groundwater, then a groundwater sample will be collected for analysis prior to plugging the boring.

The new permanent monitoring well will be developed within two weeks of well completion. Groundwater samples will initially be obtained from the newly constructed monitoring well no later than five days after the completion of well development. A second round of groundwater monitoring and sampling will be conducted no sooner than 30 days and not later than 75 days of the initial sampling event. Subsequent sampling events will be dependent upon the analytical results of the first two sampling events and as specified by the NMED. All monitoring wells scheduled for sampling during a groundwater sampling event will be sampled within 15 days of the start of the monitoring and sampling event.

5.3.3 Well Purging

All zones in each monitoring well will be purged by removing groundwater with a dedicated bailer or disposable bailer prior to sampling in order to ensure that formation water is being sampled.

Purge volumes (a minimum of three well volumes including filter pack) will be determined by monitoring, at a minimum, groundwater pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, and temperature after every two gallons or each well volume, whichever is less, has been purged from the well. Purging will continue, as needed, until the specific conductance, pH, and temperature readings are within 10 percent between readings for three consecutive measurements. Field water quality parameters will also be compared to historical data provided in Table 3 to ensure that the measurements are indicative of formation water. The volume of groundwater purged, the instruments used, and the readings obtained at each interval will be recorded on the field-monitoring log. Well purging may also be conducted in accordance with the NMED's Position Paper *Use of Low-Flow and other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring* (October 30, 2001, as updated).

5.3.4 Groundwater Sample Collection

Groundwater samples will be collected within 24 hours of the completion of well purging using dedicated bailers or disposal bailers. Alternatively, well sampling may also be conducted in accordance with the NMED's Position Paper *Use of Low-Flow and other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring* (October 30, 2001, as updated). Sample collection methods will be documented in the field monitoring reports. The samples will be transferred to the appropriate, clean, laboratory-prepared containers provided by the analytical laboratory. Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below in Section 5.4.

Groundwater samples intended for metals analysis will be submitted to the laboratory as total metals samples. QA/QC samples will be collected to monitor the validity of the groundwater sample collection procedures as follows:

- Field duplicate water samples will be obtained at a frequency of ten percent, with a minimum, of one duplicate sample per sampling event;
- Field blanks will be obtained at a minimum frequency of one per day. Field blanks will be generated by filling sample containers in the field with deionized water and submitting the samples, along with the groundwater samples, to the analytical laboratory for the appropriate analyses.
- Equipment rinsate blanks will be obtained for chemical analysis at the rate of ten percent or a minimum of one rinsate blank per sampling day. Equipment rinsate blanks will be collected at a rate of one per sampling day if disposable sampling

equipment is used. Rinsate samples will be generated by rinsing deionized water through unused or decontaminated sampling equipment. The rinsate sample will be placed in the appropriate sample container and submitted with the groundwater samples to the analytical laboratory for the appropriate analyses.

- Trip blanks will accompany laboratory sample bottles and shipping and storage containers intended for VOC analyses. Trip blanks will consist of a sample of analyte-free deionized water prepared by the laboratory and placed in an appropriate sample container. The trip blank will be prepared by the analytical laboratory prior to the sampling event and will be kept with the shipping containers and placed with other water samples obtained from the site each day. Trip blanks will be analyzed at a frequency of one for each shipping container of samples to be analyzed for VOCs.

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. Temperature blanks will be included with each shipping container.

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, reusable sampling equipment and well materials. 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, split-barrel or core samplers, non-dedicated well developing or purging equipment, groundwater quality measurement instruments, and water level measurement instruments, 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.

Groundwater and 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 collected at SWMU No. 16 (Active Landfill), will be analyzed by SW-846 Method 8270 only if the results for motor oil range organics exceed 200 parts per million. This screening process for SW-846 Method 8270 will only be used for soil samples collected at SWMU No. 16

Groundwater and soil samples will also be 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 335.4/335.2 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

Analyte	Analytical Method
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Groundwater samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Chloride	EPA method 300.0
Sulfate	EPA method 300.0
Calcium	EPA method 6010/6020
Magnesium	EPA method 6010/6020
Sodium	EPA method 6010/6020
Potassium	EPA method 6010/6020
Manganese	SW-846 method 6010/6020
Nitrate/nitrite	EPA method 300.0
Ferric/ferrous Iron	SW-846 method 6010/6020 & SM 3500Fe2+

Soil samples collected at SWMU No 16 (Active Landfill) and groundwater samples, if any, collected at SWMU No. 16, will be analyzed for the following constituents in addition to those listed above.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

As discussed in section 5.3.3, field measurements will be obtained for pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, and temperature.

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, sediment and groundwater to determine if there has been a release of contaminants at the individual SWMUs.

The quantity of data is SWMU specific and is based on the historical operations at individual locations. The quality of data that is 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 and 5.3.2

for groundwater. In addition, sample collection techniques (e.g., purging of monitoring wells to collect formation water) will be utilized to help ensure representative results. An evaluation of on-going groundwater monitoring results will be performed to assess representativeness.

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.

Tables

- **Table 3 Field Measurement Summary**

Table 3
Field Measurement Summary
Group 4 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

		Field Measurements				
Well ID:	Date Sampled:	E.C. (umhos/cm)	pH (s.u.)	Temperature (deg F)	DO (mg/L)	ORP (--)
MW #1	3/3/2003	1285	8.01	54	NM	NM
	8/21/2003	1001	7.41	63	6.5	105.0
	3/2/2004	887	7.51	53	NM	NM
	8/23/2004	927	6.90	63	5.4	-532.0
	4/1/2005	1115	6.90	54	NM	NM
	8/1/2005	986	7.02	63	9.2	106
	4/6/2006	815	6.84	56	NM	NM
	8/15/2006	952	7.03	64	0.9	223.3
	4/2/2007	811	6.92	56.6	NM	NM
	8/22/2007	854	6.97	64.3	4.0	228

Notes:
deg F = degrees Fahrenheit
E.C. = electrical conductivity
mg/L = milligrams per liter
MW = monitoring well
NM = not measured
ORP = Oxidation Reduction Potential
DO - dissolved oxygen
s.u. = standard units (recorded by portable umhos/cm = micro-mhos per centimeter

Section 6
Monitoring and Sampling Program

6.1 Groundwater Monitoring

After the initial investigation activities are completed, a second round of groundwater samples will be collected to confirm the initial groundwater analyses for samples collected at new monitoring wells. The groundwater samples will be collected no sooner than 30 days after the initial sampling event and no later than 75 days after the initial sampling event. If possible, the second sampling event will be timed to coincide with the regularly scheduled semiannual groundwater sampling events. The samples will be analyzed for the same constituents for which the first samples were analyzed.

Any subsequent sampling events will be based on the results of the first two analyses and will be approved by the NMED prior to implementation.

Section 7
Schedule

This investigation Work Plan will be implemented within 90 days of NMED approval. The estimated timeframes for each of the planned activities is as shown below:

- Field work (inclusive of all soil and initial groundwater sampling) -- four weeks;
- Laboratory analyses for initial sampling event – four weeks;
- Data reduction and validation (soils and initial groundwater event) – three weeks;
- Second groundwater sampling event – one week;
- Laboratory analyses for second groundwater sampling event – three weeks;
- Data reduction and validation (second groundwater event) – two weeks; and
- Data gap analysis – three weeks.

Completion of the data gap analysis will complete all activities conducted under this investigation Work Plan. Western will then prepare an Investigation Report pursuant to Section X.C of the Order. The Investigation Report will be submitted to the NMED within 120 calendar days of completion of the data gap analysis.

Section 8
References

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, 1991, Human Health Evaluation Manual, Part B: "Development of Risk-Based Preliminary Remediation Goals; United States Environmental Protection Agency, Office of Solid Waste and Emergency Response; Memorandum December 13, 1991, OSWER Directive 9285.7-01B, 54p.

EPA, 1996, Soil Screening Guidance: User's Guide; United States Environmental Protection Agency, Office of Solid Waste and Emergency Response; Publication 9355.4-23, p. 123.

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.

Groundwater Technology Inc., 1995, Human Health and Ecological Risk Assessment; Giant Refining Company #50 County Road 4990 Bloomfield, New Mexico, p.39.

Appendix A

Soil Boring Logs

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring B-05

See Site Map
For Boring Location

COMMENTS:

Posthole to 2'. Hit cobble layer @ 5'. Poor recovery @ 6': No sample collected at 6'. Terminated boring. No groundwater encountered. Boring backfilled with cement-bentonite.

Project Bloomfield Refining Company Owner Bloomfield Refining Company
Location West of Evaporation Pond #2 Proj. No. 023353014
Surface Elev. ______ Total Hole Depth 8 ft. Diameter ______
Top of Casing ______ Water Level Initial ______ Static ______
Screen: Dia ______ Length ______ Type/Size ______
Casing: Dia ______ Length ______ Type ______
Fill Material ______ Rig/Core B55
Drill Co. Western Technology Method Split Spoon/Hollow Stem Auger (7")
Driller Rob Log By Tim Busby Date 02/23/94 Permit # ______
Checked By ______ License No. ______

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						0-5': Light brown to brown Silty Sand, some clay, moist, no odor
2	0		2/2/5		ML	
4	0		26/34/31			
5						Light brown to gray Sand and gravel and cobbles, moist, no odor
6	0		40/37/39		GW	
8						Total Depth @ 8 feet.
10						
12						
14						
16						
18						
20						
22						
24						

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring B-06

Project *Bloomfield Refining Company* Owner *Bloomfield Refining Company*
Location *West of Evaporation Pond #1* Proj. No. *023353014*
Surface Elev. ____ Total Hole Depth *10 ft.* Diameter ____
Top of Casing ____ Water Level Initial ____ Static ____
Screen: Dia ____ Length ____ Type/Size ____
Casing: Dia ____ Length ____ Type ____
Fill Material ____ Rig/Core *B55*
Drill Co. *Western Technology* Method *Split Spoon/Hollow Stem Auger (7")*
Driller *Rob* Log By *Tim Busby* Date *02/23/94* Permit # ____
Checked By ____ License No. ____

See Site Map For Boring Location

COMMENTS:

Shelby sample collected @ 4-5'; Cobble layer @ ~ 5.5'. Cuttings collected @ 6'. Try to sample @ 8 because driller thinks we're thru layer. 9" into sample blow count=27, bouncing on cobble. No groundwater encountered. Boring filled with cement/bentonite.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0					ML	0-5.5': Light brown to brown Silty Sand, trace clay, moist, no odor
2	0		12/8/8			
4	4		10/11			
6	2				GW	5.5-10': Light brown to tan, Sand and gravel and cobbles, very coarse, poorly graded, moist, no odor
8	0					
10	0					Total Depth @ 10 feet.
12						
14						
16						
18						
20						
22						
24						

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring B-07

See Site Map
For Boring Location

COMMENTS:

Post hole to 2'. No groundwater encountered. Boring backfilled with cement/bentonite.

Project Bloomfield Refining Company Owner Bloomfield Refining Company
Location Southwestern section of Fire Training Area Proj. No. 023353014
Surface Elev. ____ Total Hole Depth 12 ft. Diameter ____
Top of Casing ____ Water Level Initial ____ Static ____
Screen: Dia ____ Length ____ Type/Size ____
Casing: Dia ____ Length ____ Type ____
Fill Material ____ Rig/Core B55
Drill Co. Western Technology Method Split Spoon/Hollow Stem Auger (7")
Driller Rob Log By Tim Busby Date 02/23/94 Permit # ____
Checked By ____ License No. ____

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						0-7': Light brown to brown Sandy Silt, moist, no odor
2	0		2/2/1			
4	0		6/5/4		ML	
6	0		12/13/12			
7						7-12': Light brown to brown Silty Sand, trace silt, moist, no odor
8	0					
10	0		5/6/7		SM	
12						Total Depth @ 12 feet.
14						
16						
18						
20						
22						
24						

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring B-08

See Site Map
For Boring Location

Project Bloomfield Refining Company Owner Bloomfield Refining Company
Location Southeastern section of Fire Training Area Proj. No. 023353014
Surface Elev. ______ Total Hole Depth 12 ft. Diameter ______
Top of Casing ______ Water Level Initial ______ Static ______
Screen: Dia ______ Length ______ Type/Size ______
Casing: Dia ______ Length ______ Type ______
Fill Material ______ Rig/Core B55
Drill Co. Western Technology Method Split Spoon/Hollow Stem Auger (7")
Driller Rob Log By Tim Busby Date 02/23/94 Permit # ______
Checked By ______ License No. ______

COMMENTS:

Post hole to 2'. No groundwater encountered. Boring backfilled with cement/bentonite.

Depth (ft.)	PID (ppm)	Sample ID / Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2					
0				ML	0-7.5': Light brown to brown Sandy Silt, moist, no odor
2	0	3/3/4			
4	0	6/5/7			
6	1	8/13/16			
8	0	6/8/9		CL	7.5-8': Clay, trace sand, brown, moist, no odor
				SM	8-12': Silty Sand, light brown to brown, moist, no odor
10	0	6/10/13			
12					Total Depth @ 12 feet.
14					
16					
18					
20					
22					
24					

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring B-09

See Site Map For Boring Location

Project *Bloomfield Refining Company* Owner *Bloomfield Refining Company*
Location *Northeastern section of Fire Training Area* Proj. No. *023353014*
Surface Elev. ______ Total Hole Depth *10 ft.* Diameter ______
Top of Casing ______ Water Level Initial ______ Static ______
Screen: Dia ______ Length ______ Type/Size ______
Casing: Dia ______ Length ______ Type ______
Fill Material ______ Rig/Core *B55*
Drill Co. *Western Technology* Method *Split Spoon/Hollow Stem Auger (7")*
Driller *Rob* Log By *Tim Busby* Date *02/23/94* Permit # ______
Checked By ______ License No. ______

COMMENTS:

Post hole to 2'. No groundwater encountered. Bag samples only @ 8 & 10'. No odor. Boring backfilled with cement/bentonite.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						0-7.5': Silty Sand, light brown to brown, moist, no odor
2	0		4/3/3			
4	0		4/6/5		ML	
6	0		5/4/12			
8	0				CL	7.5-8': Clay, brown, moist, no odor, cobbles from 8-10'
					GW	8-10': Cobbles
10	0					Total Depth @ 10 feet.
12						
14						
16						
18						
20						
22						
24						

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring **B-10**

See Site Map
For Boring Location

Project *Bloomfield Refining Company* Owner *Bloomfield Refining Company*
Location *Northwestern section of Fire Training Area* Proj. No. *023353014*
Surface Elev. ______ Total Hole Depth *12 ft.* Diameter ______
Top of Casing ______ Water Level Initial ______ Static ______
Screen: Dia ______ Length ______ Type/Size ______
Casing: Dia ______ Length ______ Type ______
Fill Material ______ Rig/Core *B55*
Drill Co. *Western Technology* Method *Split Spoon/Hollow Stem Auger (7")*
Driller *Rob* Log By *Tim Busby* Date *02/23/94* Permit # ______
Checked By ______ License No. ______

COMMENTS:

Post hole to 2'. No groundwater encountered. Boring backfilled with cement/bentonite.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						0-11': Silty Sand, light brown to brown, moist, no odor
2	0					
4	0		6/7/7			
6	0		4/5/7		ML	
8	0		5/7/4			
10	0		6/6/23			
					CL	11-12': Clay and cobbles, brown, moist, no odor
12						Total Depth @ 12 feet.
14						
16						
18						
20						
22						
24						

Appendix B

Closure Plan for Unlined Evaporation Lagoons and the Spray Evaporation Area

CLOSURE PLAN
FOR THE
UNLINED EVAPORATION LAGOONS
AND THE
SPRAY EVAPORATION AREA

GIANT REFINING COMPANY - BLOOMFIELD
#50 COUNTY ROAD 4990
BLOOMFIELD, NEW MEXICO

PREPARED FOR:

NEW MEXICO OIL CONSERVATION DIVISION

PREPARED BY:

LYNN SHELTON
ENVIRONMENTAL MANAGER
GIANT REFINING COMPANY - BLOOMFIELD

AUGUST 13, 1996

TABLE OF CONTENTS

I.	Introduction	1
II.	General Information	1
III.	Background Information	1-2
IV.	Geology / Hydrology	2
V.	Sampling and Analysis	2
VI.	Discussion of Analytical Results	2-3
VII.	Closure	3
VIII.	Future Use of the Units	3
IX.	Conclusion	3

CLOSURE PLAN FOR THE UNLINED EVAPORATION LAGOONS AND THE SPRAY EVAPORATION AREA

GIANT REFINING COMPANY - BLOOMFIELD DISCHARGE PLAN GW-001

I. INTRODUCTION:

The Unlined Evaporation Lagoons and the Spray Evaporation Area (see Site Plan, Attachment A) have been identified in the Discharge Plan as units to be closed. Giant Refining Company - Bloomfield (GRC) has assumed the responsibility for entering into closure of those units. This closure plan will outline the closure activities and the subsequent uses of those units.

II. GENERAL INFORMATION:

1. **Name of Discharger, Operator, and Owner**

   San Juan Refining Company
   P.O. Box 159
   Bloomfield, New Mexico 87413
   (505) 632 8013

2. **Facility Contacts**

   Lynn Shelton, Environmental Manager

3. **Location of Facility**

   286.93 acres, more or less, being that portion of the NW1/4 NE1/4 and the S1/2 NE1/4 and the N1/2 NE1/4 SE1/4 of Section 27, and the S1/2 NW1/4 and the N1/2 NW1/4 SW1/4 and the SE1/4 NW1/4 SW1/4 and the NE1/4 SW1.4 of Section 26, Township 29 North, Range 11 West, NMPM, San Juan County, New Mexico.

4. **Type of Operation**

   Giant Refining Company - Bloomfield (GRC) is a petroleum refinery with a nominal crude capacity in barrels per calendar day (bpcd) of 18,000. Processing units include crude desalting, crude distillation, catalytic hydrotreating, catalytic reforming, fluidized catalytic cracking, catalytic polymerization, diesel hydrodesulfurization, gas concentration and treating, and sulfur recovery.

   Crude supplies are delivered by pipeline and tank trucks. Products are sold, via tank trucks, from a product terminal operated by GRC.

III. BACKGROUND INFORMATION:

The Unlined Evaporation Lagoons consist of two earthen dike lagoons (lined with 4-6 inches of bentonite) of approximately 2.5 acres each. The process wastewater effluent flowed from the

North Oily Water Pond into the north Unlined Lagoon and then into the south Unlined Lagoon. The water evaporated in place or was transferred to the Spray Evaporation Area to enhance evaporation. Studies showed the lagoons to seep water at a rate of 10 to 20 gallons per minute. Monitor Well MW-1, which is immediately down-gradient of the lagoons, has traditionally been sampled semi-annually to detect any contamination of the uppermost perched water table that might be associated with the seepage from these lagoons.

After completion of the Class I injection well, the ponds were decommissioned in 1994 and scheduled for closure. The water remaining in the ponds was allowed to evaporate. Soil samples around the lagoons were collected and analyzed in 1993 during the RCRA Facility Investigation and found to be non-hazardous.

The Spray Evaporation Area was used to spray process water from the Unlined Evaporation Lagoons to enhance evaporation. Although diked to prevent runoff, the area did not typically store water. Because of the dikes, the RFI study concluded that the Spray Evaporation Area as well as the Unlined Evaporation Lagoons were unlikely to allow runoff to contaminate surface waters. Monitor Well MW-5 is immediately down-gradient of the evaporation area and has been traditionally sampled semi-annually to detect any contamination to the uppermost perch water table as a result from seepage from the spray evaporation activities.

The Spray Evaporation Area was decommissioned in 1994.

GRC is preparing this Closure Plan as required by the facility's Discharge Plan GW-001, Section 6.1.4 and the Attachment To The Discharge Plan GW-001 Approval Letter, dated January 29, 1996.

IV. GEOLOGY / HYDROLOGY:

Geology and hydrology at the refinery are amply documented in the Discharge Permit GD-001, Section 9.0, Site Characteristics, and is included here by reference.

V. SAMPLING AND ANALYSIS:

GRC arranged for a technician from Philip Environmental to sample the Unlined Evaporation Lagoons, the Spray Evaporation Area, and a background sample on July 10, 1996. The samples were collected according to standard SW-846 protocol at sampling points selected by GRC and approved by the Oil Conservation Division. The sampling event of July 10, 1996 was witnessed by Mr. Denny Foust of the OCD Aztec office.

A copy of the sampling site drawings, the Soil Sample Identification Numbering System, the WQCC constituent list (including both the WQCC standard and the lab reporting limits), the approval letter from OCD dated June 20, 1996, and the soil sampling report from Philip Environmental are included as Attachment B.

The soil samples were analyzed by Inter-Mountain Laboratories, Inc. in Farmington, New Mexico. The results of those analyses were tabulated to expedite reference. The original and tabulated analytical data is presented in Attachment C.

VI. DISCUSSION OF ANALYTICAL RESULTS:

Analytical data indicates that no organic hydrocarbons were detected in either the Unlined Evaporation Lagoons or the Spray Evaporation Area. Elevated levels of some metals over the background sample were observed, particularly Iron and Aluminum. Chromium and Lead were detected at very near background levels, with Selenium not being detected in any sample. Inorganic Chloride and Sulfate were observed at slightly above background levels. pH was observed at relatively neutral levels.

GRC concludes that the analytical data does not present any justification for additional cleanup activities prior to closure and reuse of the affected areas.

VII. CLOSURE:

GRC proposes to enter into clean closure of both the Unlined Evaporation Lagoons and the Spray Evaporation Area. Sampling and analysis performed in 1993 and 1996 has demonstrated that there is no evidence of potential releases at the facility from any future use of either unit. Future uses of the units, which is described below, either make beneficial use of the unit (Unlined Evaporation Lagoons) or require site work at the unit (Spray Evaporation Area) that is similar to what would be performed in normal closure.

Based on the above conclusions, GRC proposes that no additional closure activity other than those described below will be required. Furthermore, GRC proposes that the semi-annual sampling and analysis of monitoring wells MW-1 and MW-5 be discontinued.

VIII. FUTURE USE OF THE UNITS:

GRC proposes to use the decommissioned Unlined Evaporation Lagoons as fresh water make-up ponds. These two lagoons would replace the two smaller make-up ponds that are presently in service. The additional capacity of the new lagoons would provide GRC with additional flexibility in the use of the river water make-up via additional settling time for suspended solids, particularly when the river is turbid, and additional capacity in case of river pump failure. The use of the unlined evaporation lagoons will not create an increased possibility of contamination to the uppermost perched water table. Furthermore, the seepage rates of the two sets of lagoons are nearly identical.

GRC proposes to use the Spray Evaporation Area as the site for Giant's Pipeline and Transportation truck shop and parking area as well as an office complex. Civil work performed at the site will be essentially the same as would be performed by installing and grading a soil cap under normal closure activities. The entire site would be graded and profiled to provide for construction of the new facilities which would eliminate the dikes in the spray evaporation area.

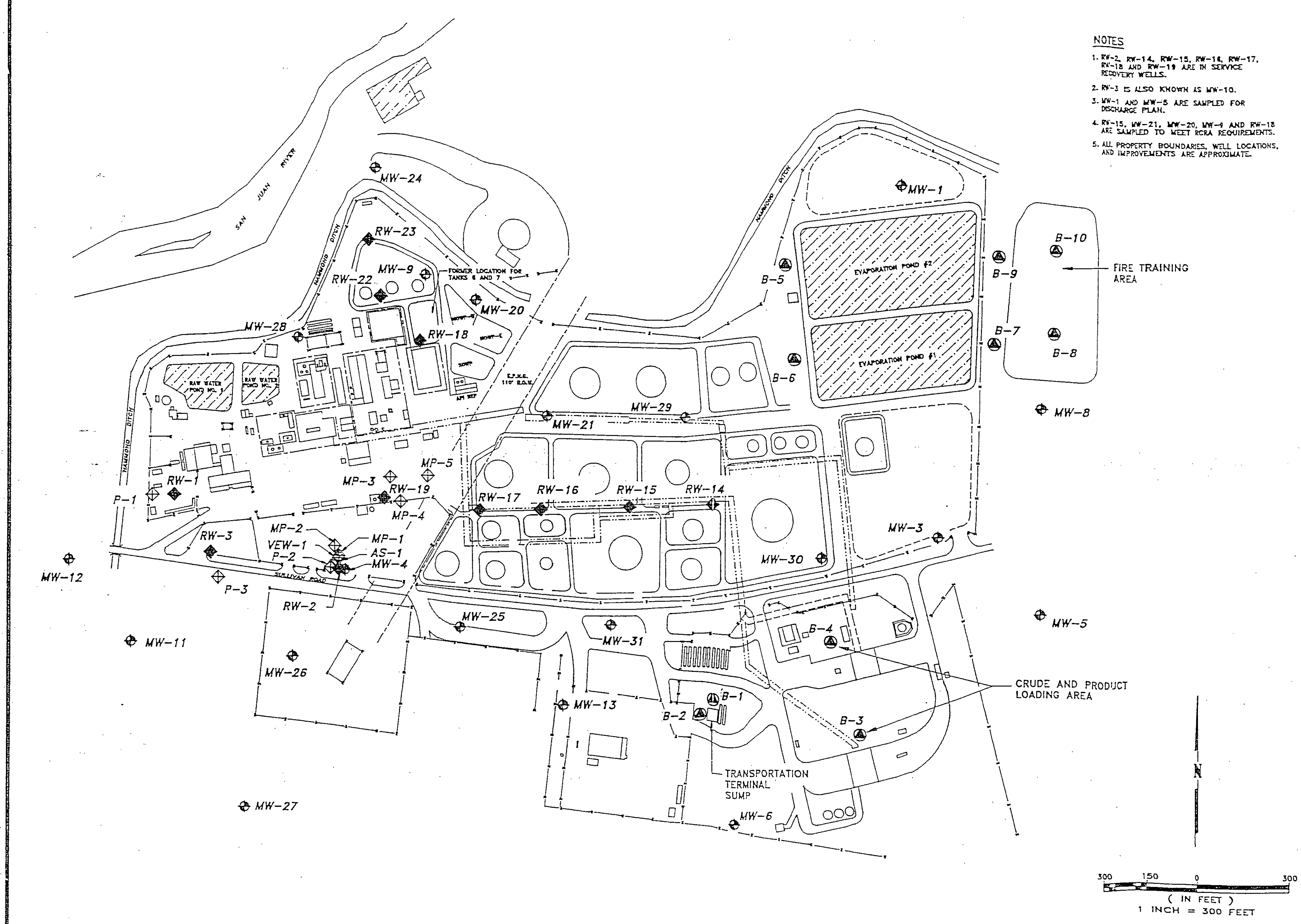
IX. CONCLUSION:

GRC has provided analytical data that corroborates the 1993 RFI data that indicates that no concentrations of hazardous constituents exist in either the Unlined Evaporation Lagoons or the Spray Evaporation Area that would require extraordinary closure activities. The future uses of the affected units will make beneficial use of the land that are occupied by the two units.

CLOSURE PLAN

ATTACHMENT A

Missing?



NOTES

1. RW-2, RW-14, RW-15, RW-16, RW-17, RW-18 AND RW-19 ARE IN SERVICE RECOVERY WELLS.
2. RW-3 IS ALSO KNOWN AS MW-10.
3. MW-1 AND MW-5 ARE SAMPLED FOR DISCHARGE PLAN.
4. RW-15, MW-21, MW-20, MW-9 AND RW-18 ARE SAMPLED TO MEET RCRA REQUIREMENTS.
5. ALL PROPERTY BOUNDARIES, WELL LOCATIONS, AND IMPROVEMENTS ARE APPROXIMATE.

NO.	DATE	BY	REVISION

LEGEND

- ——·—·— PIPEWAY
- – – – – – UNDERGROUND PIPEWAY
- —— x —— FENCE
- MW-1 MONITORING WELL
- RW-1 RECOVERY WELL
- B-1 SOIL BORING
- P-1 PIEZOMETER

ATTENTION

THIS DRAWING AND ANY ATTACHMENTS ("DRAWINGS") HAVE BEEN PRODUCED FOR THE SOLE USE OF THE RECIPIENT AND MUST NOT BE USED, REUSED, REPRODUCED, MODIFIED OR COPIED ("USED") IN ANY MANNER WITHOUT PRIOR WRITTEN APPROVAL OF GROUNDWATER TECHNOLOGY, INC. THIS DRAWING MAY CONTAIN CONFIDENTIAL AND PROPRIETARY INFORMATION OF GROUNDWATER TECHNOLOGY, INC. ANY UNAUTHORIZED USE OF THIS DRAWING IS STRICTLY PROHIBITED.

SIGNATURE	DATE
PROJECT GEO:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary
#50 COUNTY ROAD 4990
BLOOMFIELD, NEW MEXICO

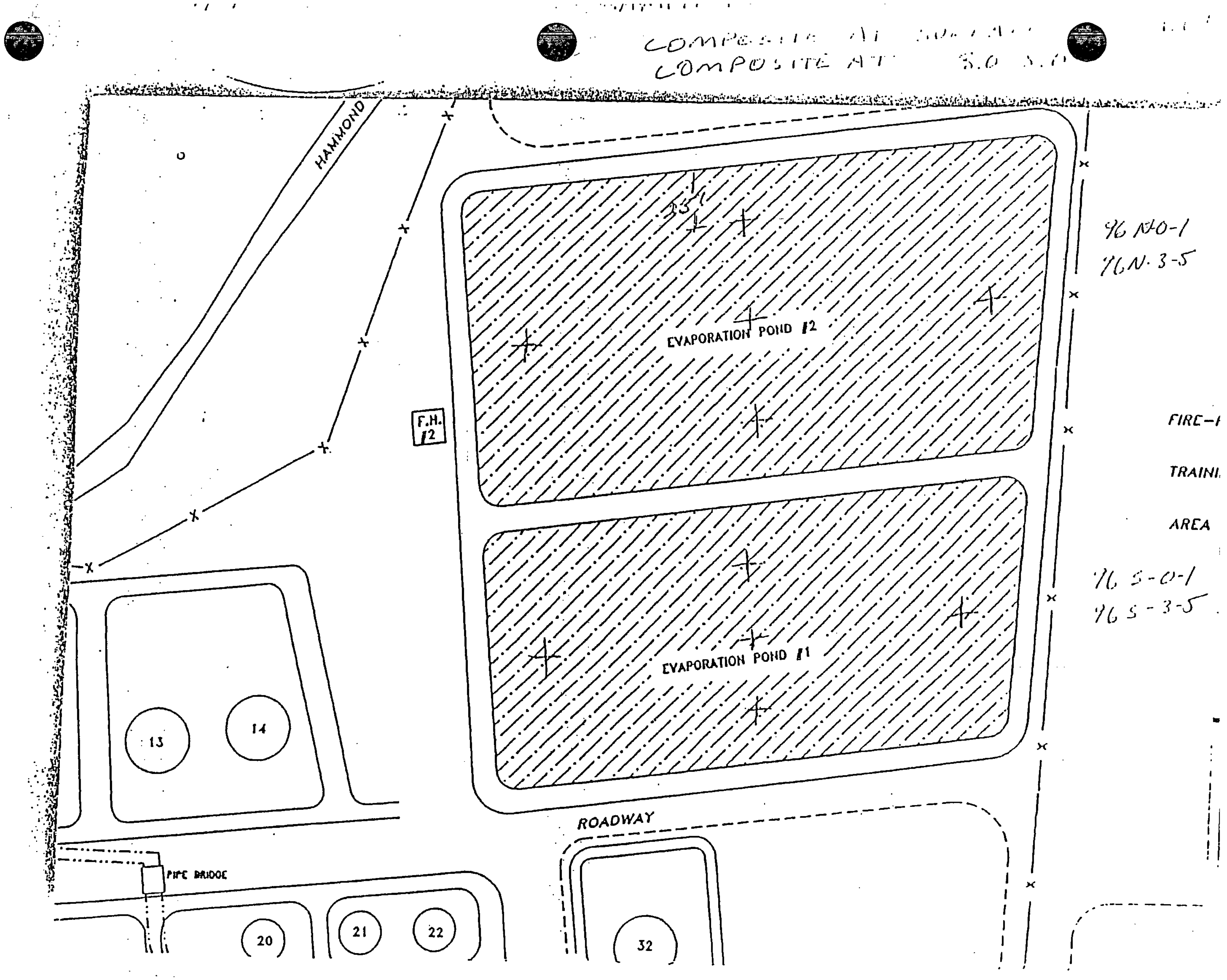
GROUNDWATER TECHNOLOGY
2501 YALE BLVD. SE. SUITE 204
ALBUQUERQUE, NEW MEXICO 87106
(505) 242-3113

SOIL BORING/ MONITORING WELL LOCATIONS

DESIGNED BY:	DRAFTED BY: J. ML	CHECKED BY:
DATE: SEPT. 28, 1994		FILE: MW-LOCA
PROJECT NO.: 023353014		CONTRACT:
DRAWING: FIGURE 5		REVISION:

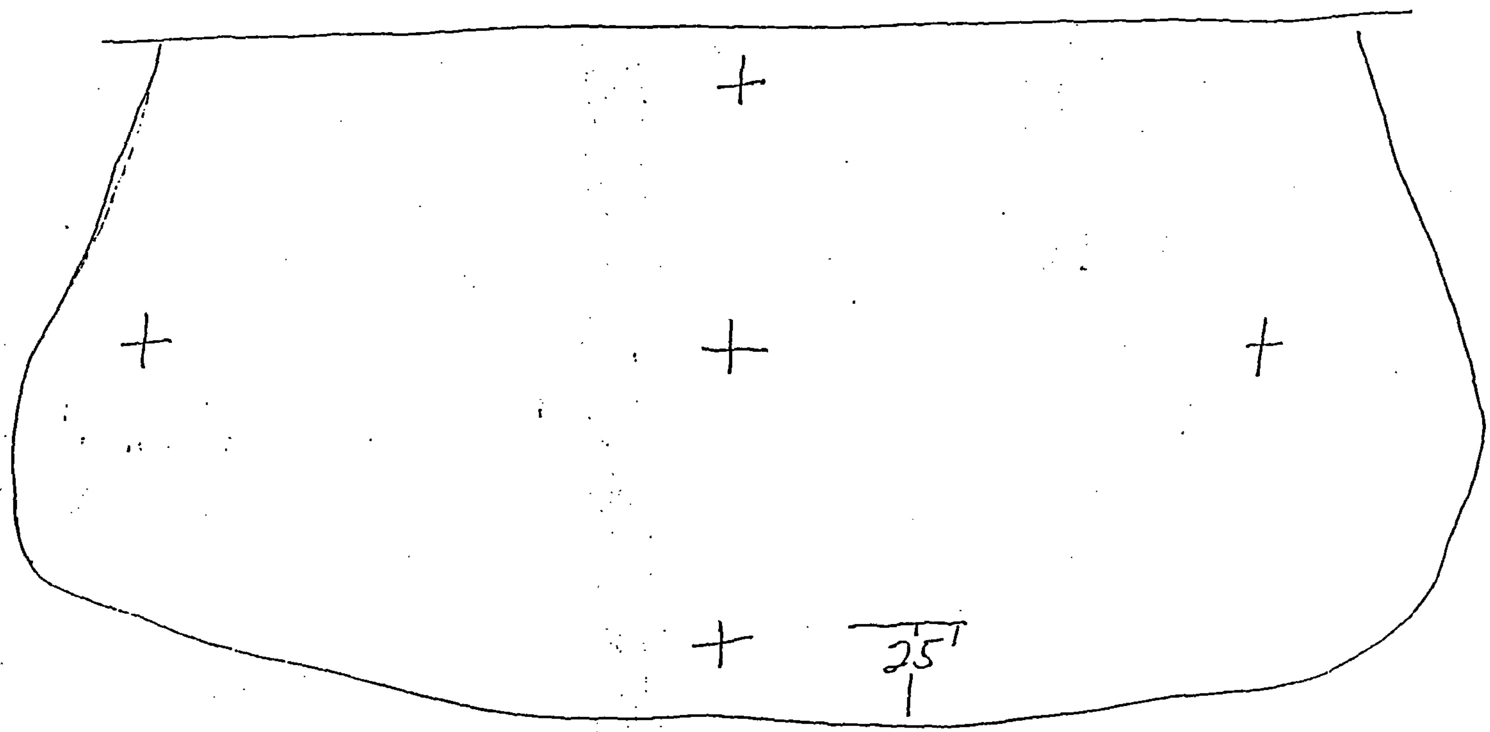
CLOSURE PLAN

ATTACHMENT B


COMPOSITE AT SURFACE
COMPOSITE AT 3.0 5.0
HAMMOND
F.H. #2
EVAPORATION POND #2
EVAPORATION POND #1
13
14
20
21
22
32
PIPE BRIDGE
ROADWAY
96 N-0-1
96 N-3-5
FIRE-
TRAINI
AREA
96 S-0-1
96 S-3-5

EVAPORATION SPRAY AREA

96E-0-1
96E-3-5



NOT TO SCALE TLS 7/1/96

SOIL SAMPLE IDENTIFICATION NUMBERING SYSTEM

OCD SOIL SAMPLING EVENT
JULY 10, 1996
GIANT REFINING COMPANY - BLOOMFIELD

EXAMPLE:

96 N - 0-1

96	=	1996 Sampling Event
N	=	North Evaporation Lagoon
S	=	South Evaporation Lagoon
E	=	Spray Evaporation Area
B	=	Background Sample
0-1	=	Surface to 1 foot depth interval
3-5	=	Three to five feet depth interval

Total of eight samples, each location composited.

WQCC CONSTITUENT LIST

1996 OCD SAMPLING EVENT

JULY 10, 1996

Parameter	WQCC Standard (mg/l)	Lab Reporting Limit (mg/kg)
Arsenic	0.1	0.25
Barium	1.0	1.0
Cadmium	0.01	0.05
Chromium	0.05	0.5
Cyanide	0.2	0.2
Flouride	1.6	1.6
Lead	0.05	0.25
Total Mercury	0.002	0.2
Nitrate (NO3 as N)	10.0	10.0
Selenium	0.05	0.25
Silver	0.05	0.5
Uranium	5.0	10.0
Benzene	0.01	0.2
Toluene	0.75	0.2
Carbon Tetrachloride	0.01	0.2
1,2-Dichloroethane	0.01	0.2
1,1-Dichloroethylene	0.005	0.2
1,1,2,2-Tetrachloroethylene	0.02	0.2
1,1,2-Trichloroethylene	0.1	0.2
Ethylbenzene	0.75	0.2
Total Xylenes	0.62	0.2
Methylene Chloride	0.1	0.2
Chloroform	0.1	0.2
1,1-Dichloroethane	0.025	0.2
Ethylene Dibromide	0.0001	0.2
1,1,1-Trichloroethane	0.06	0.2
1,1,2-Trichlorethane	0.01	0.2
1,1,2,2-Tetrachloroethane	0.01	0.2
Vinyl Chloride	0.001	0.2
PAHs: total Naphthalene plus monomethylnaphthalenes	0.03	0.6
Benzo(a)pyrene	0.0007	0.5
Chloride	250	250
Copper	1.0	1.0
Iron	1.0	1.25
Manganese	0.2	0.5
Phenols	0.005	1.0
Sulfate (SO4)	600	600
Zinc	10	10.0
pH	6 to 9	6 to 9
Aluminum	5.0	5.0
Boron	0.75	2.5
Cobalt	0.05	0.5
Molybdenum	1.0	1.0
Nickel	0.2	0.5

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

June 20, 1996

CERTIFIED MAIL
RETURN RECEIPT NO.P-594-835-145

Mr. Lynn Shelton
Environmental Manager
Giant Industries
P.O. Box 159
Bloomfield, NM 87413

RE: **Soil Sampling Parameters**
Faxed to OCD on May 6, 1996

Dear Mr. Shelton:

The New Mexico Oil Conservation Division (OCD) has reviewed the Fax submitted from Giant regarding the sampling of the soil underlying the evaporation lagoons. The OCD approves of the list with the requirement that only WQCC 3103 A, B, and C constituents be analyzed for in the soils utilizing approved sample collection and analysis methods as outlined in SW-846 and approved by the EPA. The OCD will require Giant to contact the Santa Fe Office at (505)-827-7156 and Mr. Denny Foust with the District at 334- 6178 one week before the soil samples are taken so that the OCD may have a representative at the site during the sample collection.

Please submit the results with a cover letter discussing the course of action Giant wishes to pursue with the area that are being sampled for these parameters outlined above to the Santa Fe OCD office for approval with a copy sent to Mr. Denny Foust with the Aztec District OCD office.

If Giant has any questions regarding this matter please feel free to call me at (505)-827-7156.

Sincerely,

Patricio W. Sanchez
Petroleum Engineering Specialist

XC: Mr. Denny Foust

PHILIP
ENVIRONMENTAL

Environmental Services Group
Southern Region

July 22, 1996 Project 16633

Mr. Lynn Shelton
Environmental Manager
Giant Refining Company
P.O. Box 159
Bloomfield, New Mexico 87413

RE: Report for Soil Sampling at Giant Refining Company's Evaporation Spray Areas at the Bloomfield Refinery, Bloomfield, New Mexico

Dear Mr. Shelton:

On July 10, 1996, Philip Environmental Services Corporation (Philip) initiated field work for soil sampling at Giant Refining Company's (Giant) Bloomfield Refinery, Bloomfield, New Mexico. Composite soil samples were collected within two separate Evaporation Lagoons and one Evaporation Spray Area, located at the Bloomfield Refinery, in addition to the collection of two composite background samples.

Sampling activities were conducted in the presence of representatives from Giant and the New Mexico Oil Conservation Division. Samples were preserved on ice and hand delivered by Giant, under chain of custody, to Inter-Mountain Laboratories Inc., in Farmington, New Mexico and were analyzed for New Mexico Water Quality Control Commission (WQCC) parameters, which are presented in Attachment A.

METHODOLOGY

Five-point composite soil samples were collected from two distinct layers within each evaporation Lagoon. One sample point was located in the middle of the Lagoon, with the other four sample points at locations 25 feet from each side of the containment dike in each Lagoon. Sample locations are presented in Attachment B. The first five-point composite sample was collected from the surface to approximately 1 foot below ground surface (bgs). The second five-point composite sample was collected from approximately 3 -5 feet bgs.

In addition to the samples collected within the three Evaporation Lagoons, two background samples were collected from an area upgradient of the Evaporation Lagoons. The background samples were collected from two separate borings, which were composited at intervals of 0 -1 foot bgs and 3 -5 foot bgs.

Samples were collected from each boring by advancing a stainless steel hand auger to the desired depth, and placing the soil in a stainless steel bowl. After soil was collected from the specified interval from each of the five separate borings within the Lagoon, it was then composited and containerized. Sample containers were labeled with a unique identification number, depth of collection, and sample time and date. Samples were then preserved on ice prior to delivery to the laboratory..

Prior to sample collection, all sampling equipment was decontaminated with an Alconox™ detergent and potable water wash, followed by a propanol rinse. When not in use, sampling equipment was kept covered to avoid potential contamination.

SUMMARY

A total of six five-point composite samples were collected from the Evaporation Lagoons, with two five-point composite samples collected from the background area. Sample identification numbers, locations, and soil descriptions are presented in Soil Sampling Data Sheets in Attachment C. Soil collected from the North Evaporation Lagoon from the 0 -1 foot and 3 -5 foot bgs intervals exhibited a black discolored sandy clay interval. Soil collected form the South Evaporation Lagoon exhibited a dark gray discolored sandy clay interval within the 0 -1 foot bgs sample interval. Samples collected from the spray evaporation area and the background area did not exhibit any visible discoloration.

If you have any questions or require further information, please feel free to contact Cory M. Chance at Philip's Farmington, New Mexico office at (505) 326-2262.

Sincerely,

PHILIP ENVIRONMENTAL SERVICES CORPORATION

Cory M. Chance

Cory M. Chance
Geologist

Attachments:

A. WQCC Analytical Parameters
B. Sample Locations
C. Soil Sampling Data forms

PHILIP ENVIRONMENTAL

ATTACHMENT A

WQCC CONSTITUENT LIST

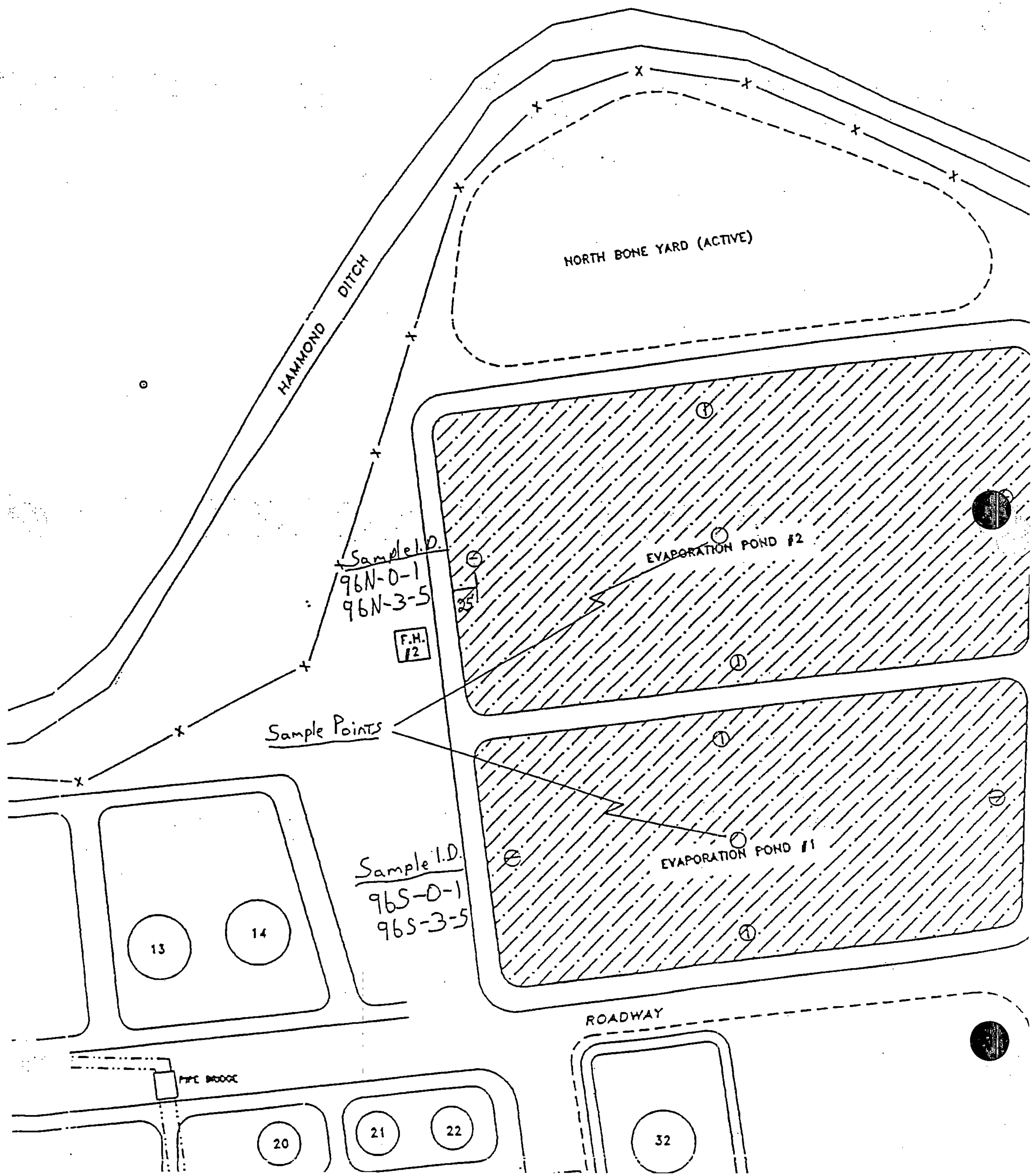
1996 OCD SAMPLING EVENT

JULY 10, 1996

Parameter	WQCC Standard (mg/l)	Lab Reporting Limit (mg/kg)
Arsenic	0.1	0.25
Barium	1.0	1.0
Cadmium	0.01	0.05
Chromium	0.05	0.5
Cyanide	0.2	0.2
Flouride	1.6	1.6
Lead	0.05	0.25
Total Mercury	0.002	0.2
Nitrate (NO3 as N)	10.0	10.0
Selenium	0.05	0.25
Silver	0.05	0.5
Uranium	5.0	10.0
Benzene	0.01	0.2
Toluene	0.75	0.2
Carbon Tetrachloride	0.01	0.2
1,2-Dichloroethane	0.01	0.2
1,1-Dichloroethylene	0.005	0.2
1,1,2,2-Tetrachloroethylene	0.02	0.2
1,1,2-Trichloroethylene	0.1	0.2
Ethylbenzene	0.75	0.2
Total Xylenes	0.62	0.2
Methylene Chloride	0.1	0.2
Chloroform	0.1	0.2
1,1-Dichloroethane	0.025	0.2
Ethylene Dibromide	0.0001	0.2
1,1,1-Trichloroethane	0.06	0.2
1,1,2-Trichlorethane	0.01	0.2
1,1,2,2-Tetrachloroethane	0.01	0.2
Vinyl Chloride	0.001	0.2
PAHs: total Naphthalene plus monomethylnaphthalenes	0.03	0.6
Benzo(a)pyrene	0.0007	0.5
Chloride	250	250
Copper	1.0	1.0
Iron	1.0	1.25
Manganese	0.2	0.5
Phenols	0.005	1.0
Sulfate (SO4)	600	600
Zinc	10	10.0
pH	6 to 9	6 to 9
Aluminum	5.0	5.0
Boron	0.75	2.5
Cobalt	0.05	0.5
Molybdenum	1.0	1.0
Nickel	0.2	0.5

PHILIP ENVIRONMENTAL

ATTACHMENT B



HAMMOND DITCH
NORTH BONE YARD (ACTIVE)
EVAPORATION POND #2
EVAPORATION POND #1
Sample I.D.
96N-0-1
96N-3-5
F.H. #2
25'
Sample Points
Sample I.D.
96S-0-1
96S-3-5
ROADWAY
PIPE BRIDGE
13
14
20
21
22
32

PHILIP ENVIRONMENTAL

SITE SKETCH

Serial No. SS-

Title Evaporation Spray Area + Background

Project Name Giant Soil Sampling

Project No. 16633

Project Manager CM Chance

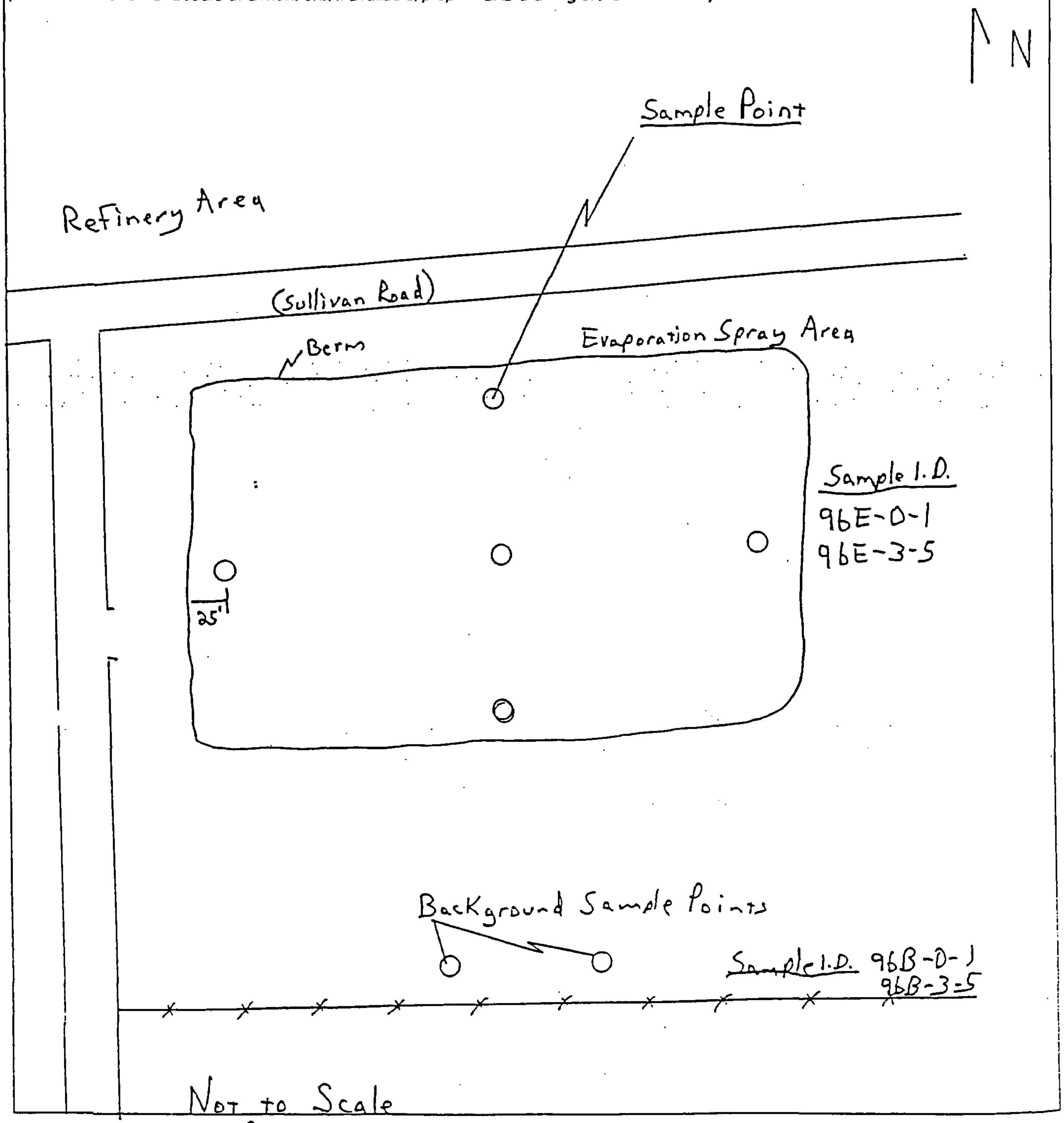
Phase.Task No. 1000.77

Client Company Giant Refining Co

Site Name Bloomfield Refinery

Site Address Bloomfield, NM

(Include north arrow and scale or dimensions. If available, preprint CAD drawing of site on this form.)



Sketched by: C. Chance

Date 7/11/96

PHILIP ENVIRONMETAL

ATTACHMENT C

PHILIP ENVIRONMENTAL

SOIL/SEDIMENT/SLUDGE SAMPLING DATA

Serial No. SSSSD

Date 7/10/96

Project Name Giant Soil Sampling

Project No. 16632

Project Manager CM Chance

Phase.Task No. 1000 .77

Client Company Giant

Site Name Giant Refinery

Site Address Bloomfield, New Mexico

Sampling Method
- ☑ Hand Auger
- ☐ Spoon
- ☐ Backhoe
- ☐ Drill Rig
- ☐ Other

Type of Sample
- ☐ Grab
- ☑ Composite

QA
- ☐ Primary
- ☐ Duplicate

Reason For Collection
- ☑ Lab Analysis
- ☐ On-Site Headspace
- ☐ Physical Testing
- ☐ Other

Portable Screening Instrument Used ☐ None

Type	Manufacturer	Model
☐ PID (Lamp ____ eV)		
☐ FID		
☐ CGI		
☐ Other		
☐ Other		

Sample No.	Location	Time Collected	Sample Type: Soil	Sed.	Slg.	Volume Collected	Field Instrument Reading
96N-0-1	North Evaporation Lagoon	1015	✓			3-500ml 1-1000ml	
	Lt br-br silty SAND abnt clay, F-med, tr gravel, Blk clayey sand						
96N-3-5	A/A	1130	✓			A/A	
96S-0-1	South Evaporation Lagoon	1345	✓			A/A	
	DK Gry, sandy clay, wet, odor						
96S-3-5	lt br sand, vf-f sand, mod clay, sl moist, tr gravel	1430	✓			A/A	

Chain-of-Custody Form Number

Comments

Signature Cory M Chance Date 7/10/96 Reviewer Date

PHILIP ENVIRONMENTAL

SOIL/SEDIMENT/SLUDGE SAMPLING DATA

Serial No. SSSSD

Date 7/11/96

Project Name Giant Soil Sampling

Project No. 16633

Project Manager CM Chance

Phase.Task No. 1000.77

Client Company Giant

Site Name Giant Refinery (Bloomfield Refinery)

Site Address Bloomfield, New Mexico

Sampling Method
- ☑ Hand Auger
- ☐ Spoon
- ☐ Backhoe
- ☐ Drill Rig
- ☐ Other

QA
- ☐ Primary
- ☐ Duplicate

Reason For Collection
- ☑ Lab Analysis
- ☐ On-Site Headspace
- ☐ Physical Testing
- ☐ Other

Portable Screening Instrument Used ☐ None

Type	Manufacturer	Model
☐ PID (Lamp ____ eV)		
☐ FID		
☐ CGI		
☐ Other		
☐ Other		

Type of Sample
- ☐ Grab
- ☑ Composite

Sample No.	Location	Time Collected	Sample Type: Soil	Sample Type: Sed.	Sample Type: Slg.	Volume Collected	Field Instrument Reading
96E-0-1	Spray Evaporation Area	0945	✓			3-500 ml 1-1000 ml	
	Lt Br SILT, tr f-med sand, tr-med clay, dry						
96E-3-5	Lt Br silty CLAY, tr f-med sand, dry	1045	✓			A/A	
96B-04	Background (S. of Evap. Area along S. fence line)	1145	✓			A/A	
	lt br silty, tr vf-f sand, clay, loose, dry						
96B-3-5	Lt br silty sand, vf-f sand, tr clay, loose, dry	1200	✓			A/A	

Chain-of-Custody Form Number

Comments

Signature [illegible] Date 7/11/96 Reviewer Date

CLOSURE PLAN

ATTACHMENT C

TABULATED ANALYTICAL DATA FOR CLOSURE ACTIVITIES					
GIANT REFINING COMPANY - BLOOMFIELD					
JULY, 1996					
NORTH UNLINED LAGOON					
		0-1 Foot	3-5 Feet	WQCC	Laboratory
Parameter	Units	Result	Result	Standard	Limit
Aluminum	mg/kg	6,144.00	6,020.00	5.00	5.00
Arsenic	mg/kg	<0.50	<0.50	0.10	0.25
Barium	mg/kg	99.40	93.20	1.00	1.00
Boron	mg/kg	49.50	47.30	0.75	2.50
Cadmium	mg/kg	<0.10	<0.10	0.01	0.05
Chromium	mg/kg	8.00	5.80	0.05	0.50
Cobalt	mg/kg	3.38	3.01	0.05	0.50
Copper	mg/kg	6.09	4.68	1.00	1.00
Iron	mg/kg	7,722.00	8,416.00	1.00	1.25
Lead	mg/kg	7.22	6.80	0.05	0.25
Manganese	mg/kg	140.00	173.00	0.20	0.50
Mercury	mg/kg	<0.10	<0.10	0.002	0.20
Molybdenum	mg/kg	<1.00	<1.00	1.00	1.00
Nickel	mg/kg	5.64	5.46	0.20	0.50
Selenium	mg/kg	<0.50	<0.50	0.05	0.25
Silver	mg/kg	<1.00	<1.00	0.05	0.50
Uranium	mg/kg	54.90	60.40	5.00	10.00
Zinc	mg/kg	30.30	23.30	10.00	10.00
Lab pH	s.u.	6.90	8.00	6 to 9	6 to 9
Fluoride	ppm	0.53	1.25	1.60	1.60
Chloride	ppm	3783.00	998.00	250.00	250.00
Sulfate	ppm	3638.00	370.00	600.00	600.00
Cyanide	mg/Kg	<0.10	<0.10	0.20	0.20
Nitrate as Nitrogen	ppm	0.46	0.05	10.00	10.00
Benzene	mg/kg	ND	ND	0.01	0.20
Toluene	mg/kg	ND	ND	0.75	0.20
Carbon Tetrachloride	mg/kg	ND	ND	0.01	0.20
1,2-Dichloroethane	mg/kg	ND	ND	0.01	0.20
1,1-Dichloroethylene	mg/kg	ND	ND	0.0005	0.20
1,1,2,2-Tetrachloroethylene	mg/kg	ND	ND	0.02	0.20
1,1,2-Trichloroethylene	mg/kg	ND	ND	0.1	0.20
Ethylbenzene	mg/kg	ND	ND	0.75	0.20
Total Xylenes	mg/kg	ND	ND	0.62	0.20
Methylene Chloride	mg/kg	ND	ND	0.1	0.20
Chloroform	mg/kg	ND	ND	0.1	0.20
1,1-Dichloroethane	mg/kg	ND	ND	0.025	0.20
Ethylene Dibromide	mg/kg	ND	ND	0.0001	0.20
1,1,1-Trichloroethane	mg/kg	ND	ND	0.06	0.20
1,1,2-Trichloroethane	mg/kg	ND	ND	0.01	0.20
1,1,2,2-Tetrachloroethane	mg/kg	ND	ND	0.01	0.20
Vinyl Chloride	mg/kg	ND	ND	0.01	0.20
PAHs: total Naphthalene plus	mg/kg				
monomethylnaphthalenes	mg/kg	ND	ND	0.03	0.60

TABULATED ANALYTICAL DATA FOR CLOSURE ACTIVITIES					
GIANT REFINING COMPANY - BLOOMFIELD					
JULY, 1996					
SOUTH UNLINED LAGOON					
		0-1 Foot	3-5 Feet	WQCC	Laboratory
Parameter	Units	Result	Result	Standard	Limit
Aluminum	mg/kg	7,646.00	3,820.00	5.00	5.00
Arsenic	mg/kg	<0.50	<0.50	0.10	0.25
Barium	mg/kg	154.00	48.10	1.00	1.00
Boron	mg/kg	47.60	40.80	0.75	2.50
Cadmium	mg/kg	<0.10	<0.10	0.01	0.05
Chromium	mg/kg	30.90	4.20	0.05	0.50
Cobalt	mg/kg	3.99	1.78	0.05	0.50
Copper	mg/kg	10.70	3.46	1.00	1.00
Iron	mg/kg	10,486.00	5,068.00	1.00	1.25
Lead	mg/kg	7.72	4.93	0.05	0.25
Manganese	mg/kg	230.00	107.00	0.20	0.50
Mercury	mg/kg	<0.10	<0.10	0.002	0.20
Molybdenum	mg/kg	<1.00	<1.00	1.00	1.00
Nickel	mg/kg	8.34	3.04	0.20	0.50
Selenium	mg/kg	<0.50	<0.50	0.05	0.25
Silver	mg/kg	3.11	<1.00	0.05	0.50
Uranium	mg/kg	69.50	29.50	5.00	10.00
Zinc	mg/kg	52.30	15.70	10.00	10.00
Lab pH	s.u.	7.10	7.90	6 to 9	6 to 9
Fluoride	ppm	0.35	2.71	1.60	1.60
Chloride	ppm	2711.00	445.00	250.00	250.00
Sulfate	ppm	3193.00	469.00	600.00	600.00
Cyanide	mg/Kg	0.25	<0.10	0.20	0.20
Nitrate as Nitrogen	ppm	0.69	0.08	10.00	10.00
Benzene	mg/kg	ND	ND	0.01	0.20
Toluene	mg/kg	ND	ND	0.75	0.20
Carbon Tetrachloride	mg/kg	ND	ND	0.01	0.20
1,2-Dichloroethane	mg/kg	ND	ND	0.01	0.20
1,1-Dichloroethylene	mg/kg	ND	ND	0.0005	0.20
1,1,2,2-Tetrachloroethylene	mg/kg	ND	ND	0.02	0.20
1,1,2-Trichloroethylene	mg/kg	ND	ND	0.1	0.20
Ethylbenzene	mg/kg	ND	ND	0.75	0.20
Total Xylenes	mg/kg	ND	ND	0.62	0.20
Methylene Chloride	mg/kg	ND	ND	0.1	0.20
Chloroform	mg/kg	ND	ND	0.1	0.20
1,1-Dichloroethane	mg/kg	ND	ND	0.025	0.20
Ethylene Dibromide	mg/kg	ND	ND	0.0001	0.20
1,1,1-Trichloroethane	mg/kg	ND	ND	0.06	0.20
1,1,2-Trichloroethane	mg/kg	ND	ND	0.01	0.20
1,1,2,2-Tetrachloroethane	mg/kg	ND	ND	0.01	0.20
Vinyl Chloride	mg/kg	ND	ND	0.01	0.20
PAHs: total Naphthalene plus	mg/kg				
monomethylnaphthalenes	mg/kg	ND	ND	0.03	0.50
Benzo(a)pyrene	mg/kg	ND	ND	0.0007	0.50

TABULATED ANALYTICAL DATA FOR CLOSURE ACTIVITIES

GIANT REFINING COMPANY - BLOOMFIELD

JULY, 1996

SPRAY EVAPORATION AREA

Parameter	Units	0-1 Foot Result	3-5 Feet Result	WQCC Standard	Laboratory Limit
Aluminum	mg/kg	10,122.00	7,102.00	5.00	5.00
Arsenic	mg/kg	1.16	0.53	0.10	0.25
Barium	mg/kg	195.00	189.00	1.00	1.00
Boron	mg/kg	55.80	56.90	0.75	2.50
Cadmium	mg/kg	0.16	<0.10	0.01	0.05
Chromium	mg/kg	9.48	7.48	0.05	0.50
Cobalt	mg/kg	5.06	4.11	0.05	0.50
Copper	mg/kg	3.58	2.32	1.00	1.00
Iron	mg/kg	13,097.00	10,569.00	1.00	1.25
Lead	mg/kg	11.60	7.69	0.05	0.25
Manganese	mg/kg	223.00	240.00	0.20	0.50
Mercury	mg/kg	<0.10	<0.10	0.002	0.20
Molybdenum	mg/kg	<1.00	1.05	1.00	1.00
Nickel	mg/kg	1.16	7.38	0.20	0.50
Selenium	mg/kg	<0.50	<0.50	0.05	0.25
Silver	mg/kg	<1.00	<1.00	0.05	0.50
Uranium	mg/kg	86.40	66.40	5.00	10.00
Zinc	mg/kg	45.30	30.60	10.00	10.00
Lab pH	s.u.	7.60	7.80	6 to 9	6 to 9
Fluoride	ppm	1.15	1.76	1.60	1.60
Chloride	ppm	2582.00	1235.00	250.00	250.00
Sulfate	ppm	2156.00	724.00	600.00	600.00
Cyanide	mg/Kg	<0.10	<0.10	0.20	0.20
Nitrate as Nitrogen	ppm	6.42	0.51	10.00	10.00
Benzene	mg/kg	ND	ND	0.01	0.20
Toluene	mg/kg	ND	ND	0.75	0.20
Carbon Tetrachloride	mg/kg	ND	ND	0.01	0.20
1,2-Dichloroethane	mg/kg	ND	ND	0.01	0.20
1,1-Dichloroethylene	mg/kg	ND	ND	0.0005	0.20
1,1,2,2-Tetrachloroethylene	mg/kg	ND	ND	0.02	0.20
1,1,2-Trichloroethylene	mg/kg	ND	ND	0.1	0.20
Ethylbenzene	mg/kg	ND	ND	0.75	0.20
Total Xylenes	mg/kg	ND	ND	0.62	0.20
Methylene Chloride	mg/kg	ND	ND	0.1	0.20
Chloroform	mg/kg	ND	ND	0.1	0.20
1,1-Dichloroethane	mg/kg	ND	ND	0.025	0.20
Ethylene Dibromide	mg/kg	ND	ND	0.0001	0.20
1,1,1-Trichloroethane	mg/kg	ND	ND	0.06	0.20
1,1,2-Trichloroethane	mg/kg	ND	ND	0.01	0.20
1,1,2,2-Tetrachloroethane	mg/kg	ND	ND	0.01	0.20
Vinyl Chloride	mg/kg	ND	ND	0.01	0.20
PAHs: total Naphthalene plus	mg/kg				
monomethylnaphthalenes	mg/kg	ND	ND	0.03	0.60

TABULATED ANALYTICAL DATA FOR CLOSURE ACTIVITIES

GIANT REFINING COMPANY - BLOOMFIELD

JULY, 1996

BACKGROUND SAMPLE

Parameter	Units	0-1 Foot Result	3-5 Feet Result	WQCC Standard	Laboratory Limit
Aluminum	mg/kg	6,199.00	3,266.00	5.00	5.00
Arsenic	mg/kg	<0.50	<0.50	0.10	0.25
Barium	mg/kg	166.00	56.00	1.00	1.00
Boron	mg/kg	55.00	51.90	0.75	2.50
Cadmium	mg/kg	0.10	<0.10	0.01	0.05
Chromium	mg/kg	6.85	3.16	0.05	0.50
Cobalt	mg/kg	3.84	1.83	0.05	0.50
Copper	mg/kg	2.18	3.87	1.00	1.00
Iron	mg/kg	9,401.00	4,751.00	1.00	1.25
Lead	mg/kg	8.00	4.99	0.05	0.25
Manganese	mg/kg	205.00	113.00	0.20	0.50
Mercury	mg/kg	<0.10	<0.10	0.002	0.20
Molybdenum	mg/kg	<1.00	<1.00	1.00	1.00
Nickel	mg/kg	7.27	3.46	0.20	0.50
Selenium	mg/kg	<0.50	<0.50	0.05	0.25
Silver	mg/kg	<1.00	<1.00	0.05	0.50
Uranium	mg/kg	84.10	31.10	5.00	10.00
Zinc	mg/kg	33.20	•	10.00	10.00
Lab pH	s.u.	7.50	8.20	6 to 9	6 to 9
Fluoride	ppm	0.77	0.38	1.60	1.60
Chloride	ppm	1054.00	324.00	250.00	250.00
Sulfate	ppm	2790.00	395.00	600.00	600.00
Cyanide	mg/Kg	<0.10	<0.10	0.20	0.20
Nitrate as Nitrogen	ppm	14.20	<0.05	10.00	10.00
Benzene	mg/kg	ND	ND	0.01	0.20
Toluene	mg/kg	ND	ND	0.75	0.20
Carbon Tetrachloride	mg/kg	ND	ND	0.01	0.20
1,2-Dichloroethane	mg/kg	ND	ND	0.01	0.20
1,1-Dichloroethylene	mg/kg	ND	ND	0.0005	0.20
1,1,2,2-Tetrachloroethylene	mg/kg	ND	ND	0.02	0.20
1,1,2-Trichloroethylene	mg/kg	ND	ND	0.1	0.20
Ethylbenzene	mg/kg	ND	ND	0.75	0.20
Total Xylenes	mg/kg	ND	ND	0.62	0.20
Methylene Chloride	mg/kg	ND	ND	0.1	0.20
Chloroform	mg/kg	ND	ND	0.1	0.20
1,1-Dichloroethane	mg/kg	ND	ND	0.025	0.20
Ethylene Dibromide	mg/kg	ND	ND	0.0001	0.20
1,1,1-Trichloroethane	mg/kg	ND	ND	0.06	0.20
1,1,2-Trichloroethane	mg/kg	ND	ND	0.01	0.20
1,1,2,2-Tetrachloroethane	mg/kg	ND	ND	0.01	0.20
Vinyl Chloride	mg/kg	ND	ND	0.01	0.20
PAHs: total Naphthalene plus	mg/kg				
monomethylnaphthalenes	mg/kg	ND	ND	0.03	0.60
Benzo(a)pyrene	mg/kg	ND	ND	0.0007	0.50

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

5 August 1996

Lynn Shelton
Giant Refining Co.
P. O. Box 159
Bloomfield, NM 87413

Mr. Shelton:

Enclosed please find the report for the samples received by our laboratory for analysis on July 10, 1996.

If you have any questions about the results of these analyses, please don't hesitate to call me at your convenience.

Sincerely,

Anna Schaerer

Anna Schaerer
Organic Analyst/IML-Farmington

Enclosure

xc: File

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Client:	Giant Refining Co.		
Project:	Bloomfield		
Sample ID:	96S-0-1	Date Reported:	08/05/96
Laboratory ID:	0396G01318	Date Sampled:	07/10/96
Sample Matrix:	Soil	Time Sampled:	1:30 PM
Condition:	Cool/Intact	Date Received:	07/10/96

Parameter	Analytical Result	Units
Lab pH	7.1	s.u.
Fluoride	0.35	ppm
Chloride	2,711	ppm
Sulfate	3,193	ppm
Cyanide	0.25	mg/Kg
Nitrate as Nitrogen	0.69	ppm
Trace Metals (Total)		
Aluminum	7,646	mg/Kg
Arsenic	<0.5	mg/Kg
Barium	154	mg/Kg
Boron	47.6	mg/Kg
Cadmium	<0.10	mg/Kg
Chromium	30.9	mg/Kg
Cobalt	3.99	mg/Kg
Copper	10.7	mg/Kg
Iron	10,486	mg/Kg
Lead	7.72	mg/Kg
Manganese	230	mg/Kg
Mercury	<0.10	mg/Kg
Molybdenum	<1.00	mg/Kg
Nickel	8.34	mg/Kg
Selenium	<0.50	mg/Kg
Silver	3.11	mg/Kg
Uranium	69.5	mg/Kg
Zinc	52.3	mg/Kg

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported by AJ

Reviewed by SB

Inter·Mountain Laboratories, Inc.

2506 W. Main Stre[illegible]
Farmington, New M[illegible] 874[illegible]

Client:	Giant Refining Co.		
Project:	Bloomfield		
Sample ID:	96S-3-5	Date Reported:	08/05/96
Laboratory ID:	0396G01319	Date Sampled:	07/10/96
Sample Matrix:	Soil	Time Sampled:	2:30 PM
Condition:	Cool/Intact	Date Received:	07/10/96

Parameter	Analytical Result	Units
Lab pH	7.9	s.u.
Fluoride	2.71	ppm
Chloride	445	ppm
Sulfate	469	ppm
Cyanide	<0.10	mg/Kg
Nitrate as Nitrogen	0.08	ppm
Trace Metals (Total)		
Aluminum	3,820	mg/Kg
Arsenic	<0.50	mg/Kg
Barium	48.1	mg/Kg
Boron	40.8	mg/Kg
Cadmium	<0.10	mg/Kg
Chromium	4.20	mg/Kg
Cobalt	1.78	mg/Kg
Copper	3.46	mg/Kg
Iron	5,068	mg/Kg
Lead	4.93	mg/Kg
Manganese	107	mg/Kg
Mercury	<0.10	mg/Kg
Molybdenum	<1.0	mg/Kg
Nickel	3.04	mg/Kg
Selenium	<0.50	mg/Kg
Silver	<1.0	mg/Kg
Uranium	29.5	mg/Kg
Zinc	15.7	mg/Kg

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported: dk

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Client:	Giant Refining Co.		
Project:	Bloomfield		
Sample ID:	96N-0-1	Date Reported:	08/05/96
Laboratory ID:	0396G01320	Date Sampled:	07/10/96
Sample Matrix:	Soil	Time Sampled:	10:11 AM
Condition:	Cool/Intact	Date Received:	07/10/96

Parameter	Analytical Result	Units
Lab pH	6.9	s.u.
Fluoride	0.53	ppm
Chloride	3,783	ppm
Sulfate	3,638	ppm
Cyanide	<0.10	mg/Kg
Nitrate as Nitrogen	0.46	ppm
Trace Metals (Total)		
Aluminum	6,144	mg/Kg
Arsenic	<0.50	mg/Kg
Barium	99.4	mg/Kg
Boron	49.5	mg/Kg
Cadmium	<0.10	mg/Kg
Chromium	8.00	mg/Kg
Cobalt	3.38	mg/Kg
Copper	6.09	mg/Kg
Iron	7,722	mg/Kg
Lead	7.22	mg/Kg
Manganese	140	mg/Kg
Mercury	<0.10	mg/Kg
Molybdenum	<1.00	mg/Kg
Nickel	5.64	mg/Kg
Selenium	<0.50	mg/Kg
Silver	<1.0	mg/Kg
Uranium	54.9	mg/Kg
Zinc	30.3	mg/Kg

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported by AS

Reviewed by SB

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New M... 01

Client:	**Giant Refining Co.**		
Project:	Bloomfield		
Sample ID:	96N-3-5	Date Reported:	08/05/96
Laboratory ID:	0396G01321	Date Sampled:	07/10/96
Sample Matrix:	Soil	Time Sampled:	11:30 AM
Condition:	Cool/Intact	Date Received:	07/10/96

Parameter	Analytical Result	Units
Lab pH	8.0	s.u.
Fluoride	1.25	ppm
Chloride	998	ppm
Sulfate	370	ppm
Cyanide	<0.10	mg/Kg
Nitrate as Nitrogen	0.05	ppm
Trace Metals (Total)		
Aluminum	6,020	mg/Kg
Arsenic	<0.50	mg/Kg
Barium	93.2	mg/Kg
Boron	47.3	mg/Kg
Cadmium	<0.10	mg/Kg
Chromium	5.80	mg/Kg
Cobalt	3.01	mg/Kg
Copper	4.68	mg/Kg
Iron	8,416	mg/Kg
Lead	6.80	mg/Kg
Manganese	173	mg/Kg
Mercury	<0.10	mg/Kg
Molybdenum	<1.0	mg/Kg
Nickel	5.46	mg/Kg
Selenium	<0.50	mg/Kg
Silver	<1.0	mg/Kg
Uranium	60.4	mg/Kg
Zinc	23.3	mg/Kg

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported by: dk

Reviewed by: CR

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Quality Control / Quality Assurance

Known Analysis

Total Metals

Client:	**Giant Refining**	Date Reported:	08/05/96
Project:	Bloomfield	Date Sampled:	07/10/96
Lab ID:	0396G01318-22	Date Received:	07/10/96
Matrix:	Soil		
Condition:	Cool / Intact		

Known Analysis

Parameter	Found Result	Known Result	Units	Percent Recovery
Aluminum	0.94	1.00	mg/L	**94%**
Arsenic	0.009	0.010	mg/L	**90%**
Barium	0.91	1.00	mg/L	**91%**
Boron	0.95	1.00	mg/L	**95%**
Cadmium	0.004	0.004	mg/L	**100%**
Chromium	1.02	1.00	mg/L	**102%**
Cobalt	0.91	1.00	mg/L	**91%**
Copper	0.005	0.005	mg/L	**100%**
Iron	0.96	1.00	mg/L	**96%**
Lead	0.040	0.040	mg/L	**100%**
Manganese	1.01	1.00	mg/L	**101%**
Mercury	0.440	0.400	mg/L	**110%**
Molybdenum	1.01	1.00	mg/L	**101%**
Nickel	1.01	1.00	mg/L	**101%**
Selenium	0.010	0.010	mg/L	**100%**
Silver	0.004	0.004	mg/L	**98%**
Uranium	1.19	1.00	mg/L	**119%**
Zinc	1.01	1.00	mg/L	**101%**

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported By:

Reviewed By:

2506 W. Main Street
Farmington, New Me[illegible]01

Quality Control / Quality Assurance

Spike Analysis

Total Metals

Client:	Giant Refining		Date Reported:	08/05/96
Project:	Bloomfield		Date Sampled:	07/10/96
Lab ID:	0396G01318-22		Date Received:	07/10/96
Matrix:	Soil			
Condition:	Cool / Intact			

Spike Analysis

Parameter	Spiked Sample Result (mg/L	Sample Result (mg/L	Spike Added (mg/L	Percent Recovery
Aluminum	9.14	<0.05	10.0	91%
Arsenic	0.029	0.001	0.030	93%
Barium	1.26	0.88	0.50	92%
Boron	0.89	0.44	0.50	99%
Cadmium	0.002	<0.001	0.002	108%
Chromium	0.58	0.07	0.50	103%
Cobalt	0.47	0.03	0.50	89%
Copper	0.007	0.002	0.005	106%
Iron	9.28	<0.025	10.00	93%
Lead	0.032	0.010	0.025	106%
Manganese	1.63	1.24	0.50	98%
Mercury	0.55	<0.10	0.50	98%
Molybdenum	0.53	<0.10	0.50	105%
Nickel	0.56	0.05	0.50	103%
Selenium	0.024	0.001	0.025	92%
Silver	0.003	<0.001	0.003	108%
Uranium	0.95	0.49	0.50	102%
Zinc	0.79	0.27	0.50	109%

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992

Comments:

JK

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Quality Control / Quality Assurance

Blank Analysis
Total Metals

Client:	Giant Refining		
Project:	Bloomfield	Date Reported:	08/05/96
Lab ID:	0396G01318-22	Date Sampled:	07/10/96
Matrix:	Soil	Date Received:	07/10/96
Condition:	Cool / Intact		

Blank Analysis

Parameter	Result	Detection Limit (mg/L)
Aluminum	ND	5.00
Arsenic	ND	0.50
Barium	ND	1.00
Boron	ND	5.00
Cadmium	ND	0.10
Chromium	ND	1.00
Cobalt	ND	1.00
Copper	ND	0.10
Iron	ND	2.50
Lead	ND	0.50
Manganese	ND	1.00
Mercury	ND	0.10
Molybdenum	ND	1.00
Nickel	ND	1.00
Selenium	ND	0.50
Silver	ND	1.00
Uranium	ND	20.0
Zinc	ND	5.00

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported by: ________

Reviewed by: ________

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana [illegible]15

EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client:	GIANT REFINING COMPANY			
Sample ID:	96 S-0-1		Date Reported:	07/30/96
Project ID:	Bloomfield, NM		Date Sampled:	07/10/96
Lab ID:	B965796	0396G01318	Date Received:	07/12/96
Matrix:	Soil		Date Extracted:	07/16/96
			Date Analyzed:	07/18/96

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/k
1,1,2,2-Tetrachloroethane	ND	1.0	mg/k
1,1,2-Trichloroethane	ND	1.0	mg/k
1,1-Dichloroethane	ND	1.0	mg/k
1,1-Dichloroethene	ND	1.0	mg/k
1,2-Dichloroethane	ND	1.0	mg/k
1,2-Dichloropropane	ND	1.0	mg/k
2-Butanone (MEK)	ND	5.0	mg/k
2-Hexanone	ND	1.0	mg/k
4-Methyl-2-pentanone (MIBK)	ND	1.0	[illegible]
Acetone	ND	5.0	[illegible]
Benzene	ND	1.0	mg/k
Bromodichloromethane	ND	1.0	mg/l
Bromoform	ND	1.0	mg/l
Bromomethane	ND	1.0	mg/l
Carbon Disulfide	ND	1.0	mg/l
Carbon Tetrachloride	ND	1.0	mg/
Chlorobenzene	ND	1.0	mg/
Chloroethane	ND	1.0	mg/
Chloroform	ND	1.0	mg/
Chloromethane	ND	1.0	mg/
cis-1,3-Dichloropropene	ND	1.0	mg/
Dibromochloromethane	ND	1.0	mg/
Ethylbenzene	ND	1.0	mg/
m,p-Xylene	ND	1.0	mg/
Methylene chloride	ND	5.0	mg/
o-Xylene	ND	1.0	mg/
Styrene	ND	1.0	mg/
Tetrachloroethene (PCE)	ND	1.0	mg/
Toluene	ND	1.0	mg

Continue

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client:	GIANT REFINING COMPANY	Date Reported:	07/30/96
Sample ID:	96 S-0-1	Date Sampled:	07/10/96
Project ID:	Bloomfield, NM	Date Received:	07/12/96
Lab ID:	B965796 0396G01318	Date Extracted:	07/16/96
Matrix:	Soil	Date Analyzed:	07/18/96

Continued

Parameter	Result	PQL	Units
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg
Vinyl Chloride	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
1,2-Dichloroethane-d4	94	70 - 121
Bromofluorobenzene	107	74 - 121
Toluene-d8	109	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, Rev. 1, November 1992.

Inter·Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client: GIANT REFINING COMPANY
Sample ID: 96 S-0-1
Project ID: Bloomfield, NM
Lab ID: B965796 0396G01318
Matrix: Soil

Date Reported: 07/25/96
Date Sampled: 07/10/96
Date Received: 07/12/96
Date Extracted: 07/17/96
Date Analyzed: 07/22/96

Parameter	Result	PQL	Units
1,2,4-Trichlorobenzene	ND	5.0	mg/kg
1,2-Dichlorobenzene	ND	5.0	mg/kg
1,3-Dichlorobenzene	ND	5.0	mg/kg
1,4-Dichlorobenzene	ND	5.0	mg/kg
2,4,5-Trichlorophenol	ND	10	mg/kg
2,4,6-Trichlorophenol	ND	10	mg/kg
2,4-Dichlorophenol	ND	5.0	mg/kg
2,4-Dimethylphenol	ND	5.0	mg/k
2,4-Dinitrophenol	ND	10	mg/k
2,4-Dinitrotoluene	ND	5.0	[illegible]
2,6-Dinitrotoluene	ND	5.0	mg/k
2-Chloronaphthalene	ND	5.0	mg/k
2-Chlorophenol	ND	5.0	mg/k
2-Methylnaphthalene	ND	5.0	mg/k
2-Methylphenol	ND	5.0	mg/k
2-Nitroaniline	ND	25	mg/k
2-Nitrophenol	ND	5.0	mg/k
3,3'-Dichlorobenzidine	ND	10	mg/k
3-Methylphenol/4-Methylphenol	ND	5.0	mg/k
3-Nitroaniline	ND	25	mg/k
4,6-Dinitro-2-methylphenol	ND	25	mg/k
4-Bromophenyl-phenylether	ND	5.0	mg/k
4-Chloro-3-methylphenol	ND	10	mg/k
4-Chloroaniline	ND	10	mg/k
4-Chlorophenyl-phenylether	ND	5.0	mg/k
4-Nitroaniline	ND	10	mg/k
4-Nitrophenol	ND	10	mg/k
Acenaphthene	ND	5.0	mg/k

Continued

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client: GIANT REFINING COMPANY
Sample ID: 96 S-0-1
Project ID: Bloomfield, NM
Lab ID: B965796 0396G01318
Matrix: Soil

Date Reported: 07/25/96
Date Sampled: 07/10/96
Date Received: 07/12/96
Date Extracted: 07/17/96
Date Analyzed: 07/22/96

Parameter	Result	PQL	Units
Continued			
Acenaphthylene	ND	5.0	mg/kg
Anthracene	ND	5.0	mg/kg
Benzo(a)anthracene	ND	5.0	mg/kg
Benzo(a)pyrene	ND	5.0	mg/kg
Benzo(b)fluoranthene	ND	5.0	mg/kg
Benzo(g,h,i)perylene	ND	5.0	mg/kg
Benzo(k)fluoranthene	ND	5.0	mg/kg
Benzoic Acid	ND	25	mg/kg
Benzyl Alcohol	ND	10	mg/kg
bis(2-Chloroethoxy)methane	ND	5.0	mg/kg
bis(2-Chloroethyl)ether	ND	5.0	mg/kg
bis(2-Chloroisopropyl)ether	ND	5.0	mg/kg
bis(2-Ethylhexyl)phthalate	ND	25	mg/kg
Butylbenzylphthalate	ND	5.0	mg/kg
Chrysene	ND	5.0	mg/kg
Di-n-Butylphthalate	ND	25	mg/kg
Di-n-Octylphthalate	ND	25	mg/kg
Dibenz(a,h)anthracene	ND	5.0	mg/kg
Dibenzofuran	ND	5.0	mg/kg
Diethylphthalate	ND	5.0	mg/kg
Dimethylphthalate	ND	5.0	mg/kg
Fluoranthene	ND	5.0	mg/kg
Fluorene	ND	5.0	mg/kg
Hexachlorobenzene	ND	10	mg/kg
Hexachlorobutadiene	ND	10	mg/kg
Hexachlorocyclopentadiene	ND	5.0	mg/kg
Hexachloroethane	ND	10	mg/kg
Indeno(1,2,3-cd)pyrene	ND	5.0	mg/kg

Continued

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana [illegible]15

EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client:	GIANT REFINING COMPANY		Date Reported:	07/25/96
Sample ID:	96 S-0-1		Date Sampled:	07/10/96
Project ID:	Bloomfield, NM		Date Received:	07/12/96
Lab ID:	B965796	0396G01318	Date Extracted:	07/17/96
Matrix:	Soil		Date Analyzed:	07/22/96

Parameter	Result	PQL	Units
Continued			
Isophorone	ND	5.0	mg/k
N-Nitrosodi-n-propylamine	ND	5.0	mg/k
N-Nitrosodiphenylamine	ND	5.0	mg/k
Naphthalene	ND	5.0	mg/k
Nitrobenzene	ND	5.0	mg/k
Pentachlorophenol	ND	25	mg/k
Phenanthrene	ND	5.0	mg/k
Phenol	ND	5.0	[illegible]/k
Pyrene	ND	5.0	

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
2,4,6-Tribromophenol	52	19 - 122
2-Fluorobiphenyl	65	30 - 115
2-Fluorophenol	46	25 - 121
Nitrobenzene-d5	53	23 - 120
Phenol-d6	51	24 - 113
Terphenyl-d14	47	18 - 137

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8270, Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, November 1990.

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client: GIANT REFINING COMPANY
Sample ID: 96 S-3-5
Project ID: Bloomfield, NM
Lab ID: B965797 0396G01319
Matrix: Soil

Date Reported: 07/30/96
Date Sampled: 07/10/96
Date Received: 07/12/96
Date Extracted: 07/16/96
Date Analyzed: 07/18/96

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/kg
1,1,2,2-Tetrachloroethane	ND	1.0	mg/kg
1,1,2-Trichloroethane	ND	1.0	mg/kg
1,1-Dichloroethane	ND	1.0	mg/kg
1,1-Dichloroethene	ND	1.0	mg/kg
1,2-Dichloroethane	ND	1.0	mg/kg
1,2-Dichloropropane	ND	1.0	mg/kg
2-Butanone (MEK)	ND	5.0	mg/kg
2-Hexanone	ND	1.0	mg/kg
4-Methyl-2-pentanone (MIBK)	ND	1.0	mg/kg
ιcetone	ND	5.0	mg/kg
Benzene	ND	1.0	mg/kg
Bromodichloromethane	ND	1.0	mg/kg
Bromoform	ND	1.0	mg/kg
Bromomethane	ND	1.0	mg/kg
Carbon Disulfide	ND	1.0	mg/kg
Carbon Tetrachloride	ND	1.0	mg/kg
Chlorobenzene	ND	1.0	mg/kg
Chloroethane	ND	1.0	mg/kg
Chloroform	ND	1.0	mg/kg
Chloromethane	ND	1.0	mg/kg
cis-1,3-Dichloropropene	ND	1.0	mg/kg
Dibromochloromethane	ND	1.0	mg/kg
Ethylbenzene	ND	1.0	mg/kg
m,p-Xylene	ND	1.0	mg/kg
Methylene chloride	ND	5.0	mg/kg
o-Xylene	ND	1.0	mg/kg
Styrene	ND	1.0	mg/kg
Tetrachloroethene (PCE)	ND	1.0	mg/kg
Toluene	ND	1.0	mg/kg

Continued

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana ...15

EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client: GIANT REFINING COMPANY
Sample ID: 96 S-3-5
Project ID: Bloomfield, NM
Lab ID: B965797 0396G01319
Matrix: Soil

Date Reported: 07/30/96
Date Sampled: 07/10/96
Date Received: 07/12/96
Date Extracted: 07/16/96
Date Analyzed: 07/18/96

Parameter	Result	PQL	Units
Continued			
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg
Vinyl Chloride	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
1,2-Dichloroethane-d4	90	70 - 121
Bromofluorobenzene	100	74 - 121
Toluene-d8	102	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, Rev. 1, November 1992.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client: GIANT REFINING COMPANY
Sample ID: 96 S-3-5
Project ID: Bloomfield, NM
Lab ID: B965797 0396G01319
Matrix: Soil

Date Reported: 07/25/96
Date Sampled: 07/10/96
Date Received: 07/12/96
Date Extracted: 07/17/96
Date Analyzed: 07/23/96

Parameter	Result	PQL	Units
1,2,4-Trichlorobenzene	ND	1.0	mg/kg
1,2-Dichlorobenzene	ND	1.0	mg/kg
1,3-Dichlorobenzene	ND	1.0	mg/kg
1,4-Dichlorobenzene	ND	1.0	mg/kg
2,4,5-Trichlorophenol	ND	2.0	mg/kg
2,4,6-Trichlorophenol	ND	2.0	mg/kg
2,4-Dichlorophenol	ND	1.0	mg/kg
2,4-Dimethylphenol	ND	1.0	mg/kg
2,4-Dinitrophenol	ND	2.0	mg/kg
`,4-Dinitrotoluene	ND	1.0	mg/kg
∠,6-Dinitrotoluene	ND	1.0	mg/kg
2-Chloronaphthalene	ND	1.0	mg/kg
2-Chlorophenol	ND	1.0	mg/kg
2-Methylnaphthalene	ND	1.0	mg/kg
2-Methylphenol	ND	1.0	mg/kg
2-Nitroaniline	ND	5.0	mg/kg
2-Nitrophenol	ND	1.0	mg/kg
3,3'-Dichlorobenzidine	ND	2.0	mg/kg
3-Methylphenol/4-Methylphenol	ND	1.0	mg/kg
3-Nitroaniline	ND	5.0	mg/kg
4,6-Dinitro-2-methylphenol	ND	5.0	mg/kg
4-Bromophenyl-phenylether	ND	1.0	mg/kg
4-Chloro-3-methylphenol	ND	2.0	mg/kg
4-Chloroaniline	ND	2.0	mg/kg
4-Chlorophenyl-phenylether	ND	1.0	mg/kg
4-Nitroaniline	ND	2.0	mg/kg
4-Nitrophenol	ND	2.0	mg/kg
Acenaphthene	ND	1.0	mg/kg

Continued

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client:	GIANT REFINING COMPANY			
Sample ID:	96 S-3-5		Date Reported:	07/25/96
Project ID:	Bloomfield, NM		Date Sampled:	07/10/96
Lab ID:	B965797	0396G01319	Date Received:	07/12/96
Matrix:	Soil		Date Extracted:	07/17/96
			Date Analyzed:	07/23/96

Parameter	Result	PQL	Units
Continued			
Acenaphthylene	ND	1.0	mg/k
Anthracene	ND	1.0	mg/k
Benzo(a)anthracene	ND	1.0	mg/k
Benzo(a)pyrene	ND	1.0	mg/k
Benzo(b)fluoranthene	ND	1.0	mg/k
Benzo(g,h,i)perylene	ND	1.0	mg/k
Benzo(k)fluoranthene	ND	1.0	mg/k
Benzoic Acid	ND	5.0	[illegible]/k
Benzyl Alcohol	ND	2.0	
bis(2-Chloroethoxy)methane	ND	1.0	mg/k
bis(2-Chloroethyl)ether	ND	1.0	mg/k
bis(2-Chloroisopropyl)ether	ND	1.0	mg/k
bis(2-Ethylhexyl)phthalate	ND	5.0	mg/k
Butylbenzylphthalate	ND	1.0	mg/k
Chrysene	ND	1.0	mg/k
Di-n-Butylphthalate	ND	5.0	mg/k
Di-n-Octylphthalate	ND	5.0	mg/k
Dibenz(a,h)anthracene	ND	1.0	mg/k
Dibenzofuran	ND	1.0	mg/k
Diethylphthalate	ND	1.0	mg/k
Dimethylphthalate	ND	1.0	mg/k
Fluoranthene	ND	1.0	mg/k
Fluorene	ND	1.0	mg/k
Hexachlorobenzene	ND	2.0	mg/k
Hexachlorobutadiene	ND	2.0	mg/k
Hexachlorocyclopentadiene	ND	1.0	mg/k
Hexachloroethane	ND	2.0	mg/k
Indeno(1,2,3-cd)pyrene	ND	1.0	mg/k

Continued

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EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client: GIANT REFINING COMPANY
Sample ID: 96 S-3-5
Project ID: Bloomfield, NM
Lab ID: B965797 0396G01319
Matrix: Soil

Date Reported: 07/25/96
Date Sampled: 07/10/96
Date Received: 07/12/96
Date Extracted: 07/17/96
Date Analyzed: 07/23/96

Parameter	Result	PQL	Units
Continued			
Isophorone	ND	1.0	mg/kg
N-Nitrosodi-n-propylamine	ND	1.0	mg/kg
N-Nitrosodiphenylamine	ND	1.0	mg/kg
Naphthalene	ND	1.0	mg/kg
Nitrobenzene	ND	1.0	mg/kg
Pentachlorophenol	ND	5.0	mg/kg
Phenanthrene	ND	1.0	mg/kg
Phenol	ND	1.0	mg/kg
...ne	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
2,4,6-Tribromophenol	55	19 - 122
2-Fluorobiphenyl	62	30 - 115
2-Fluorophenol	58	25 - 121
Nitrobenzene-d5	63	23 - 120
Phenol-d6	64	24 - 113
Terphenyl-d14	47	18 - 137

ND - Not Detected at Practical Quantitation Level (PQL)

...ference: Method 8270, Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, November 1990.

Analyst RRK

Reviewed

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1160 Research Drive
Bozeman, Montana [illegible]

EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client:	GIANT REFINING COMPANY			
Sample ID:	96 N-0-1		Date Reported:	07/30/96
Project ID:	Bloomfield, NM		Date Sampled:	07/10/96
Lab ID:	B965798	0396G01320	Date Received:	07/12/96
Matrix:	Soil		Date Extracted:	07/16/96
			Date Analyzed:	07/18/96

Parameter	Result	PQL	Units
Continued			
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg
Vinyl Chloride	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
1,2-Dichloroethane-d4	92	70 - 121
Bromofluorobenzene	107	74 - 121
Toluene-d8	105	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, Rev. 1, November 1992.

F.D. 7/31/96

Inter-Mountain Laboratories, Inc.

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EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client:	GIANT REFINING COMPANY			
Sample ID:	96 N-0-1		Date Reported:	07/25/96
Project ID:	Bloomfield, NM		Date Sampled:	07/10/96
Lab ID:	B965798	0396G01320	Date Received:	07/12/96
Matrix:	Soil		Date Extracted:	07/17/96
			Date Analyzed:	07/22/96

Parameter	Result	PQL	Units
1,2,4-Trichlorobenzene	ND	5.0	mg/kg
1,2-Dichlorobenzene	ND	5.0	mg/kg
1,3-Dichlorobenzene	ND	5.0	mg/kg
1,4-Dichlorobenzene	ND	5.0	mg/kg
2,4,5-Trichlorophenol	ND	10	mg/kg
2,4,6-Trichlorophenol	ND	10	mg/kg
2,4-Dichlorophenol	ND	5.0	mg/kg
2,4-Dimethylphenol	ND	5.0	mg/kg
2,4-Dinitrophenol	ND	10	mg/kg
2,4-Dinitrotoluene	ND	5.0	mg/kg
2,6-Dinitrotoluene	ND	5.0	mg/kg
2-Chloronaphthalene	ND	5.0	mg/kg
2-Chlorophenol	ND	5.0	mg/kg
2-Methylnaphthalene	ND	5.0	mg/kg
2-Methylphenol	ND	5.0	mg/kg
2-Nitroaniline	ND	25	mg/kg
2-Nitrophenol	ND	5.0	mg/kg
3,3'-Dichlorobenzidine	ND	10	mg/kg
3-Methylphenol/4-Methylphenol	ND	5.0	mg/kg
3-Nitroaniline	ND	25	mg/kg
4,6-Dinitro-2-methylphenol	ND	25	mg/kg
4-Bromophenyl-phenylether	ND	5.0	mg/kg
4-Chloro-3-methylphenol	ND	10	mg/kg
4-Chloroaniline	ND	10	mg/kg
4-Chlorophenyl-phenylether	ND	5.0	mg/kg
4-Nitroaniline	ND	10	mg/kg
4-Nitrophenol	ND	10	mg/kg
Acenaphthene	ND	5.0	mg/kg

Continued

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EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client:	GIANT REFINING COMPANY		Date Reported:	07/25/96
Sample ID:	96 N-0-1		Date Sampled:	07/10/96
Project ID:	Bloomfield, NM		Date Received:	07/12/96
Lab ID:	B965798	0396G01320	Date Extracted:	07/17/96
Matrix:	Soil		Date Analyzed:	07/22/96

Parameter	Result	PQL	Units
Continued			
Isophorone	ND	5.0	mg/kg
N-Nitrosodi-n-propylamine	ND	5.0	mg/kg
N-Nitrosodiphenylamine	ND	5.0	mg/kg
Naphthalene	ND	5.0	mg/kg
Nitrobenzene	ND	5.0	mg/kg
Pentachlorophenol	ND	25	mg/kg
Phenanthrene	ND	5.0	mg/kg
Phenol	ND	5.0	/kg
Pyrene	ND	5.0	

JALITY CONTROL - Surrogate Recovery	%	QC Limits
2,4,6-Tribromophenol	49	19 - 122
2-Fluorobiphenyl	58	30 - 115
2-Fluorophenol	44	25 - 121
Nitrobenzene-d5	49	23 - 120
Phenol-d6	49	24 - 113
Terphenyl-d14	42	18 - 137

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8270, Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, November 1990.

Analyst RRD

Reviewed UK

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EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client:	GIANT REFINING COMPANY		
Sample ID:	96 N-3-5	Date Reported:	07/30/96
Project ID:	Bloomfield, NM	Date Sampled:	07/10/96
Lab ID:	B965799 0396G01321	Date Received:	07/12/96
Matrix:	Soil	Date Extracted:	07/16/96
		Date Analyzed:	07/17/96

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/kg
1,1,2,2-Tetrachloroethane	ND	1.0	mg/kg
1,1,2-Trichloroethane	ND	1.0	mg/kg
1,1-Dichloroethane	ND	1.0	mg/kg
1,1-Dichloroethene	ND	1.0	mg/kg
1,2-Dichloroethane	ND	1.0	mg/kg
1,2-Dichloropropane	ND	1.0	mg/kg
2-Butanone (MEK)	ND	5.0	mg/kg
2-Hexanone	ND	1.0	mg/kg
4-Methyl-2-pentanone (MIBK)	ND	1.0	mg/kg
Acetone	ND	5.0	mg/kg
nzene	ND	1.0	mg/kg
Bromodichloromethane	ND	1.0	mg/kg
Bromoform	ND	1.0	mg/kg
Bromomethane	ND	1.0	mg/kg
Carbon Disulfide	ND	1.0	mg/kg
Carbon Tetrachloride	ND	1.0	mg/kg
Chlorobenzene	ND	1.0	mg/kg
Chloroethane	ND	1.0	mg/kg
Chloroform	ND	1.0	mg/kg
Chloromethane	ND	1.0	mg/kg
cis-1,3-Dichloropropene	ND	1.0	mg/kg
Dibromochloromethane	ND	1.0	mg/kg
Ethylbenzene	ND	1.0	mg/kg
m,p-Xylene	ND	1.0	mg/kg
Methylene chloride	ND	5.0	mg/kg
o-Xylene	ND	1.0	mg/kg
Styrene	ND	1.0	mg/kg
Tetrachloroethene (PCE)	ND	1.0	mg/kg
Toluene	ND	1.0	mg/kg

Continued

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EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client: GIANT REFINING COMPANY
Sample ID: 96 N-3-5
Project ID: Bloomfield, NM
Lab ID: B965799 0396G01321
Matrix: Soil

Date Reported: 07/30/96
Date Sampled: 07/10/96
Date Received: 07/12/96
Date Extracted: 07/16/96
Date Analyzed: 07/17/96

Parameter	Result	PQL	Units
Continued			
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg
Vinyl Chloride	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
1,2-Dichloroethane-d4	99	70 - 121
Bromofluorobenzene	110	74 - 121
luene-d8	111	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, Rev. 1, November 1992.

Analyst E.D. 7/31/96

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EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client:	GIANT REFINING COMPANY			
Sample ID:	96 N-3-5		Date Reported:	07/25/96
Project ID:	Bloomfield, NM		Date Sampled:	07/10/96
Lab ID:	B965799	0396G01321	Date Received:	07/12/96
Matrix:	Soil		Date Extracted:	07/17/96
			Date Analyzed:	07/23/96

Parameter	Result	PQL	Units
1,2,4-Trichlorobenzene	ND	1.0	mg/kg
1,2-Dichlorobenzene	ND	1.0	mg/kg
1,3-Dichlorobenzene	ND	1.0	mg/kg
1,4-Dichlorobenzene	ND	1.0	mg/kg
2,4,5-Trichlorophenol	ND	2.0	mg/kg
2,4,6-Trichlorophenol	ND	2.0	mg/kg
2,4-Dichlorophenol	ND	1.0	mg/kg
2,4-Dimethylphenol	ND	1.0	mg/kg
2,4-Dinitrophenol	ND	2.0	mg/kg
2,4-Dinitrotoluene	ND	1.0	mg/kg
[illegible]-Dinitrotoluene	ND	1.0	mg/kg
2-Chloronaphthalene	ND	1.0	mg/kg
2-Chlorophenol	ND	1.0	mg/kg
2-Methylnaphthalene	ND	1.0	mg/kg
2-Methylphenol	ND	1.0	mg/kg
2-Nitroaniline	ND	5.0	mg/kg
2-Nitrophenol	ND	1.0	mg/kg
3,3'-Dichlorobenzidine	ND	2.0	mg/kg
3-Methylphenol/4-Methylphenol	ND	1.0	mg/kg
3-Nitroaniline	ND	5.0	mg/kg
4,6-Dinitro-2-methylphenol	ND	5.0	mg/kg
4-Bromophenyl-phenylether	ND	1.0	mg/kg
4-Chloro-3-methylphenol	ND	2.0	mg/kg
4-Chloroaniline	ND	2.0	mg/kg
4-Chlorophenyl-phenylether	ND	1.0	mg/kg
4-Nitroaniline	ND	2.0	mg/kg
4-Nitrophenol	ND	2.0	mg/kg
Acenaphthene	ND	1.0	mg/kg

Continued

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EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client: GIANT REFINING COMPANY
Sample ID: 96 N-3-5
Project ID: Bloomfield, NM
Lab ID: B965799 0396G01321
Matrix: Soil

Date Reported: 07/25/96
Date Sampled: 07/10/96
Date Received: 07/12/96
Date Extracted: 07/17/96
Date Analyzed: 07/23/96

Parameter	Result	PQL	Units
Continued			
Acenaphthylene	ND	1.0	mg/kg
Anthracene	ND	1.0	mg/kg
Benzo(a)anthracene	ND	1.0	mg/kg
Benzo(a)pyrene	ND	1.0	mg/kg
Benzo(b)fluoranthene	ND	1.0	mg/kg
Benzo(g,h,i)perylene	ND	1.0	mg/kg
Benzo(k)fluoranthene	ND	1.0	mg/kg
Benzoic Acid	ND	5.0	mg/kg
Benzyl Alcohol	ND	2.0	mg/kg
bis(2-Chloroethoxy)methane	ND	1.0	mg/kg
bis(2-Chloroethyl)ether	ND	1.0	mg/kg
bis(2-Chloroisopropyl)ether	ND	1.0	mg/kg
bis(2-Ethylhexyl)phthalate	ND	5.0	mg/kg
Butylbenzylphthalate	ND	1.0	mg/kg
Chrysene	ND	1.0	mg/kg
Di-n-Butylphthalate	ND	5.0	mg/kg
Di-n-Octylphthalate	ND	5.0	mg/kg
Dibenz(a,h)anthracene	ND	1.0	mg/kg
Dibenzofuran	ND	1.0	mg/kg
Diethylphthalate	ND	1.0	mg/kg
Dimethylphthalate	ND	1.0	mg/kg
Fluoranthene	ND	1.0	mg/kg
Fluorene	ND	1.0	mg/kg
Hexachlorobenzene	ND	2.0	mg/kg
Hexachlorobutadiene	ND	2.0	mg/kg
Hexachlorocyclopentadiene	ND	1.0	mg/kg
Hexachloroethane	ND	2.0	mg/kg
Indeno(1,2,3-cd)pyrene	ND	1.0	mg/kg

Continued

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EPA METHOD 8270
HSL SEMI-VOLATILE COMPOUNDS
BASE/NEUTRAL/ACID EXTRACTABLES

Client:	GIANT REFINING COMPANY		Date Reported:	07/25/96
Sample ID:	96 N-3-5		Date Sampled:	07/10/96
Project ID:	Bloomfield, NM		Date Received:	07/12/96
Lab ID:	B965799	0396G01321	Date Extracted:	07/17/96
Matrix:	Soil		Date Analyzed:	07/23/96

Continued

Parameter	Result	PQL	Units
Isophorone	ND	1.0	mg/kg
N-Nitrosodi-n-propylamine	ND	1.0	mg/kg
N-Nitrosodiphenylamine	ND	1.0	mg/kg
Naphthalene	ND	1.0	mg/kg
Nitrobenzene	ND	1.0	mg/kg
Pentachlorophenol	ND	5.0	mg/kg
Phenanthrene	ND	1.0	mg/kg
Phenol	ND	1.0	mg/kg
Pyrene	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
2,4,6-Tribromophenol	51	19 - 122
2-Fluorobiphenyl	51	30 - 115
2-Fluorophenol	44	25 - 121
Nitrobenzene-d5	49	23 - 120
Phenol-d6	50	24 - 113
Terphenyl-d14	46	18 - 137

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8270, Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, November 1990.

Analyst RRD

Reviewed WS

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QUALITY ASSURANCE / QUALITY CONTROL

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LAB QA/QC
EPA METHOD 8240
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Date Analyzed: 07/18/96
Lab ID: IBS006200
Matrix:

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/kg
1,1,2,2-Tetrachloroethane	ND	1.0	mg/kg
1,1,2-Trichloroethane	ND	1.0	mg/kg
1,1-Dichloroethane	ND	1.0	mg/kg
1,1-Dichloroethene	ND	1.0	mg/kg
1,2-Dichloroethane	ND	1.0	mg/kg
1,2-Dichloropropane	ND	1.0	mg/kg
Benzene	ND	1.0	mg/kg
Bromodichloromethane	ND	1.0	mg/kg
Bromoform	ND	1.0	mg/kg
Bromomethane	ND	1.0	mg/kg
Carbon Tetrachloride	ND	1.0	mg/kg
Chlorobenzene	ND	1.0	mg/kg
Chloroethane	ND	1.0	mg/kg
Chloroform	ND	1.0	mg/kg
Chloromethane	ND	1.0	mg/kg
cis-1,3-Dichloropropene	ND	1.0	mg/kg
Dibromochloromethane	ND	1.0	mg/kg
Ethylbenzene	ND	1.0	mg/kg
m,p-Xylene	ND	1.0	mg/kg
Methylene chloride	ND	5.0	mg/kg
o-Xylene	ND	1.0	mg/kg
Styrene	ND	1.0	mg/kg
Tetrachloroethene (PCE)	ND	1.0	mg/kg
Toluene	ND	1.0	mg/kg
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg
Vinyl Chloride	ND	1.0	mg/kg
2-Butanone (MEK)	ND	5.0	mg/kg
Carbon Disulfide	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg
2-Hexanone	ND	1.0	mg/kg

Continued

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LAB QA/QC
EPA METHOD 8240
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Date Analyzed: 07/18/96
Lab ID: IBS006200
Matrix:

Parameter	Result	PQL	Units
Continued			
4-Methyl-2-pentanone (MIBK)	ND	1.0	mg/k
Acetone	ND	5.0	mg/k

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
Bromofluorobenzene	106	74 - 121
1,2-Dichloroethane-d4	89	70 - 121
Toluene-d8	107	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

Analyst E.D. 7/31/96 Reviewed LB

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LAB QA/QC
EPA METHOD 8240
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Date Analyzed: 07/17/96
Lab ID: IBS006199
Matrix:

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/kg
1,1,2,2-Tetrachloroethane	ND	1.0	mg/kg
1,1,2-Trichloroethane	ND	1.0	mg/kg
1,1-Dichloroethane	ND	1.0	mg/kg
1,1-Dichloroethene	ND	1.0	mg/kg
1,2-Dichloroethane	ND	1.0	mg/kg
1,2-Dichloropropane	ND	1.0	mg/kg
Benzene	ND	1.0	mg/kg
Bromodichloromethane	ND	1.0	mg/kg
Bromoform	ND	1.0	mg/kg
Bromomethane	ND	1.0	mg/kg
Carbon Tetrachloride	ND	1.0	mg/kg
Chlorobenzene	ND	1.0	mg/kg
Chloroethane	ND	1.0	mg/kg
Chloroform	ND	1.0	mg/kg
Chloromethane	ND	1.0	mg/kg
cis-1,3-Dichloropropene	ND	1.0	mg/kg
Dibromochloromethane	ND	1.0	mg/kg
Ethylbenzene	ND	1.0	mg/kg
m,p-Xylene	ND	1.0	mg/kg
Methylene chloride	ND	5.0	mg/kg
o-Xylene	ND	1.0	mg/kg
Styrene	ND	1.0	mg/kg
Tetrachloroethene (PCE)	ND	1.0	mg/kg
Toluene	ND	1.0	mg/kg
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg
Vinyl Chloride	ND	1.0	mg/kg
2-Butanone (MEK)	ND	5.0	mg/kg
Carbon Disulfide	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg
2-Hexanone	ND	1.0	mg/kg

Continued

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LAB QA/QC
EPA METHOD 8240
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Date Analyzed: 07/17/96
Lab ID: IBS006199
Matrix:

Parameter	Result	PQL	Units
Continued			
4-Methyl-2-pentanone (MIBK)	ND	1.0	mg/k
Acetone	ND	5.0	mg/k

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
Bromofluorobenzene	111	74 - 121
1,2-Dichloroethane-d4	92	70 - 121
Toluene-d8	110	81 - 117

Analyst E.O. 7/31/96

Reviewed [illegible]

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

LAB QA/QC
EPA METHOD 8240
METHOD BLANK

Date Analyzed: 07/17/96
Lab ID: MBS006198
Matrix: Sand
Date Extracted: 07/16/96

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/kg
1,1,2,2-Tetrachloroethane	ND	1.0	mg/kg
1,1,2-Trichloroethane	ND	1.0	mg/kg
1,1-Dichloroethane	ND	1.0	mg/kg
1,1-Dichloroethene	ND	1.0	mg/kg
1,2-Dichloroethane	ND	1.0	mg/kg
1,2-Dichloropropane	ND	1.0	mg/kg
2-Butanone (MEK)	ND	5.0	mg/kg
2-Hexanone	ND	1.0	mg/kg
4-Methyl-2-pentanone (MIBK)	ND	1.0	mg/kg
Acetone	ND	5.0	mg/kg
Benzene	ND	1.0	mg/kg
Bromodichloromethane	ND	1.0	mg/kg
Bromoform	ND	1.0	mg/kg
Bromomethane	ND	1.0	mg/kg
Carbon Disulfide	ND	1.0	mg/kg
Carbon Tetrachloride	ND	1.0	mg/kg
Chlorobenzene	ND	1.0	mg/kg
Chloroethane	ND	1.0	mg/kg
Chloroform	ND	1.0	mg/kg
Chloromethane	ND	1.0	mg/kg
cis-1,3-Dichloropropene	ND	1.0	mg/kg
Dibromochloromethane	ND	1.0	mg/kg
Ethylbenzene	ND	1.0	mg/kg
m,p-Xylene	ND	1.0	mg/kg
Methylene chloride	ND	5.0	mg/kg
o-Xylene	ND	1.0	mg/kg
Styrene	ND	1.0	mg/kg
Tetrachloroethene (PCE)	ND	1.0	mg/kg
Toluene	ND	1.0	mg/kg
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg

Continued

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Bozeman, Montana 59715

LAB QA/QC
EPA METHOD 8240
METHOD BLANK

Date Analyzed: 07/17/96
Lab ID: MBS006198
Matrix: Sand
Date Extracted: 07/16/96

Parameter	Result	PQL	Units
Continued			
Vinyl Chloride	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
1,2-Dichloroethane-d4	95	70 - 121
Bromofluorobenzene	105	74 - 121
Toluene-d8	110	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

Analyst F.D. 7/11/96 Reviewed [illegible]

1160 Research Drive
Bozeman, Montana 59715

LAB QA/QC
EPA METHOD 8270
METHOD BLANK

Date Analyzed: 07/20/96
Lab ID: MBS96199
Matrix: Soil
Date Extracted: 07/17/96

Parameter	Result	PQL	Units
1,2,4-Trichlorobenzene	ND	1.0	mg/kg
1,2-Dichlorobenzene	ND	1.0	mg/kg
1,3-Dichlorobenzene	ND	1.0	mg/kg
1,4-Dichlorobenzene	ND	1.0	mg/kg
2,4,5-Trichlorophenol	ND	2.0	mg/kg
2,4,6-Trichlorophenol	ND	2.0	mg/kg
2,4-Dichlorophenol	ND	1.0	mg/kg
2,4-Dimethylphenol	ND	1.0	mg/kg
2,4-Dinitrophenol	ND	2.0	mg/kg
2,4-Dinitrotoluene	ND	1.0	mg/kg
2,6-Dinitrotoluene	ND	1.0	mg/kg
2-Chloronaphthalene	ND	1.0	mg/kg
2-Chlorophenol	ND	1.0	mg/kg
2-Methylnaphthalene	ND	1.0	mg/kg
2-Methylphenol	ND	1.0	mg/kg
2-Nitroaniline	ND	5.0	mg/kg
2-Nitrophenol	ND	1.0	mg/kg
3,3'-Dichlorobenzidine	ND	2.0	mg/kg
3-Methylphenol/4-Methylphenol	ND	1.0	mg/kg
3-Nitroaniline	ND	5.0	mg/kg
4,6-Dinitro-2-methylphenol	ND	5.0	mg/kg
4-Bromophenyl-phenylether	ND	1.0	mg/kg
4-Chloro-3-methylphenol	ND	2.0	mg/kg
4-Chloroaniline	ND	2.0	mg/kg
4-Chlorophenyl-phenylether	ND	1.0	mg/kg
4-Nitroaniline	ND	2.0	mg/kg
4-Nitrophenol	ND	2.0	mg/kg
Acenaphthene	ND	1.0	mg/kg
Acenaphthylene	ND	1.0	mg/kg
Anthracene	ND	1.0	mg/kg
Benzo(a)anthracene	ND	1.0	mg/kg
Benzo(a)pyrene	ND	1.0	mg/kg
Benzo(b)fluoranthene	ND	1.0	mg/kg

Continued

1160 Research Drive
Bozeman, Montana 59715

LAB QA/QC
EPA METHOD 8270
METHOD BLANK

Date Analyzed: 07/20/96
Lab ID: MBS96199
Matrix: Soil
Date Extracted: 07/17/96

Parameter	Result	PQL	Units
Continued			
Benzo(g,h,i)perylene	ND	1.0	mg/kg
Benzo(k)fluoranthene	ND	1.0	mg/kg
Benzoic Acid	ND	5.0	mg/kg
Benzyl Alcohol	ND	2.0	mg/kg
bis(2-Chloroethoxy)methane	ND	1.0	mg/kg
bis(2-Chloroethyl)ether	ND	1.0	mg/kg
bis(2-Chloroisopropyl)ether	ND	1.0	mg/kg
bis(2-Ethylhexyl)phthalate	ND	5.0	mg/kg
Butylbenzylphthalate	ND	1.0	mg/kg
Chrysene	ND	1.0	mg/kg
Di-n-Butylphthalate	ND	5.0	mg/kg
Di-n-Octylphthalate	ND	5.0	mg/kg
Dibenz(a,h)anthracene	ND	1.0	mg/kg
Dibenzofuran	ND	1.0	mg/kg
Diethylphthalate	ND	1.0	mg/kg
Dimethylphthalate	ND	1.0	mg/kg
Fluoranthene	ND	1.0	mg/kg
Fluorene	ND	1.0	mg/kg
Hexachlorobenzene	ND	2.0	mg/kg
Hexachlorobutadiene	ND	2.0	mg/kg
Hexachlorocyclopentadiene	ND	1.0	mg/kg
Hexachloroethane	ND	2.0	mg/kg
Indeno(1,2,3-cd)pyrene	ND	1.0	mg/kg
Isophorone	ND	1.0	mg/kg
N-Nitrosodi-n-propylamine	ND	1.0	mg/kg
N-Nitrosodiphenylamine	ND	1.0	mg/kg
Naphthalene	ND	1.0	mg/kg
Nitrobenzene	ND	1.0	mg/kg
Pentachlorophenol	ND	5.0	mg/kg
Phenanthrene	ND	1.0	mg/kg
Phenol	ND	1.0	mg/kg
Pyrene	ND	1.0	mg/kg

Continued

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Bozeman, Montana 59715

LAB QA/QC
EPA METHOD 8270
METHOD BLANK

Date Analyzed: 07/20/96
Lab ID: MBS96199
Matrix: Soil
Date Extracted: 07/17/96

Parameter	Result	PQL	Units

Continued

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
2,4,6-Tribromophenol	56	19 - 122
2-Fluorobiphenyl	53	30 - 115
2-Fluorophenol	46	25 - 121
Nitrobenzene-d5	51	23 - 120
Phenol-d6	56	24 - 113
Terphenyl-d14	45	18 - 137

ND - Not Detected at Practical Quantitation Level (PQL)

Analyst RED

Reviewed wS

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

LAB QA/QC
EPA METHOD 8240
BLANK SPIKE / BLANK SPIKE DUPLICATE SUMMARY

Date Analyzed: 07/17/96
Lab ID: BSS60198
Matrix: Sand
Date Extracted: 07/16/96

Original Sample Parameters

Parameter	Spike Added (mg/kg)	Sample Result (mg/kg)	Spike Result (mg/kg)	BS Recovery %	QC Limits Rec.
1,1-Dichloroethene	10	0	8.44	84	59 -172
Benzene	10	0	9.77	98	62 -137
Chlorobenzene	10	0	10.7	107	66 -142
Toluene	10	0	10.8	108	59 -139
Trichloroethene (TCE)	10	0	10.3	103	60 -133

Duplicate Sample Parameters

Parameter	Spike Added (mg/kg)	BSD Result (mg/kg)	BSD Recovery %	RPD %	QC Limits RPD	QC Limits Rec.
1,1-Dichloroethene	10	10.2	102	19	22	59 [illegible]2
Benzene	10	10.1	101	3	24	62 [illegible]
Chlorobenzene	10	10.8	108	1	21	66 -1[illegible]
Toluene	10	10.8	108	0	21	59 -139
Trichloroethene (TCE)	10	10.5	105	2	21	60 -133

Note: Spike Recoveries are calculated using zero for Sample result
if Sample result was less than PQL (Practical Quantitation Level).

Spike Recovery: 0 out of 10 outside QC limits.
RPD: 0 out of 5 outside QC limits.

Analyst E.D. 7/31/96

Reviewed [signature]

1160 Research Drive
Bozeman, Montana 59715

LAB QA/QC
EPA METHOD 8270
BLANK SPIKE / BLANK SPIKE DUPLICATE SUMMARY

Date Analyzed: 07/20/96
Lab ID: BSS96199
Matrix: Soil
Date Extracted: 07/17/96

Original Sample Parameters

Parameter	Spike Added (mg/kg)	Sample Result (mg/kg)	Spike Result (mg/kg)	BS Recovery %	QC Limits Rec.
1,2,4-Trichlorobenzene	10	0	4.0	40	38 -107
1,4-Dichlorobenzene	10	0	4.2	42	28 -104
2,4-Dinitrotoluene	10	0	6.8	68	28 - 89
2-Chlorophenol	20	0	8.3	42	25 -102
4-Chloro-3-methylphenol	20	0	12	60	26 -103
4-Nitrophenol	20	0	11	55	11 -114
Acenaphthene	10	0	6.2	62	31 -137
N-Nitrosodi-n-propylamine	10	0	8.0	80	41 -126
Pentachlorophenol	20	0	13	65	17 -109
Phenol	20	0	8.3	42	26 - 90
Pyrene	10	0	5.1	51	35 -142

Duplicate Sample Parameters

Parameter	Spike Added (mg/kg)	BSD Result (mg/kg)	BSD Recovery %	RPD %		QC Limits RPD	QC Limits Rec.
1,2,4-Trichlorobenzene	10	5.8	58	37	*	23	38 -107
1,4-Dichlorobenzene	10	5.9	59	34	*	27	28 -104
2,4-Dinitrotoluene	10	7.0	70	3		47	28 - 89
2-Chlorophenol	20	12	60	36		50	25 -102
4-Chloro-3-methylphenol	20	13	65	8		33	26 -103
4-Nitrophenol	20	12	60	9		50	11 -114
Acenaphthene	10	6.8	68	9		19	31 -137
N-Nitrosodi-n-propylamine	10	8.5	85	6		38	41 -126
Pentachlorophenol	20	14	70	7		47	17 -109
Phenol	20	12	60	36	*	35	26 - 90
Pyrene	10	5.4	54	6		36	35 -142

Note: Spike Recoveries are calculated using zero for Sample result if Sample result was less than PQL (Practical Quantitation Level).

Spike Recovery: 0 out of 22 outside QC limits.
RPD: 3 out of 11 outside QC limits.

Analyst RRD

Reviewed ld

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

LAB QA/QC
EPA METHOD 8270
MATRIX SPIKE

Date Analyzed: **07/23/96**
Lab ID: 0596H05797 SK1 0396G01319
Matrix: Soil
Date Extracted: 07/17/96

Parameter	Spike Added (mg/kg)	Sample Result (mg/kg)	Spike Result (mg/kg)	MS Recovery %	QC Limits Rec.
1,2,4-Trichlorobenzene	10	0	5.4	54	38 -107
1,4-Dichlorobenzene	10	0	5.1	51	28 -104
2,4-Dinitrotoluene	10	0	6.4	64	28 - 89
2-Chlorophenol	20	0	12	60	25 -102
4-Chloro-3-methylphenol	20	0	13	65	26 -103
4-Nitrophenol	20	0	11	55	11 -114
Acenaphthene	10	0	6.5	65	31 -137
N-Nitrosodi-n-propylamine	10	0	8.5	85	41 -126
Pentachlorophenol	20	0	12	60	17 -109
Phenol	20	0	12	60	26 [illegible]
Pyrene	10	0	5.1	51	35 -[illegible]

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
2,4,6-Tribromophenol	59	19 -122
2-Fluorobiphenyl	66	30 -115
2-Fluorophenol	60	25 -121
Nitrobenzene-d5	68	23 -120
Phenol-d6	67	24 -113
Terphenyl-d14	44	18 -137

Note: Spike Recoveries are calculated using zero for Sample result if Sample result was less than PQL (Practical Quantitation Level).

Spike Recovery: 0 out of 11 outside QC limits.

Analyst RA

Reviewed LH

Inter-Mountain Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Client/Project Name: GIANT REFINING CO - BLMFLD

Project Location:

Sampler: (Signature) LYNN SHELTON

Chain of Custody Tape No.

ANALYSES / PARAMETERS

Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers	WQCC LIST					Remarks
96 S-0-1	7/10/96	1330		SOIL	4	X					
96 S-3-5	7/10/96	1430			4	X					
96 N-0-1	7/10/96	1011			4	X					
96 N-3-5	7/10/96	1130			4	X					
											cool + intact

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Lynn Shelton	7/10/96	5:34 PM	Chris Raymer	7-10-96	17
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by laboratory: (Signature)	Date	Time

Inter-Mountain Laboratories, Inc.

- ☐ 1633 Terra Avenue, Sheridan, Wyoming 82801, Telephone (307) 672-8945
- ☐ 1701 Phillips Circle, Gillette, Wyoming 82718, Telephone (307) 682-8945
- ☒ 2506 West Main Street, Farmington, NM 87401, Telephone (505) 326-4737
- ☐ 1160 Research Dr., Bozeman, Montana 59715, Telephone (406) 586-8450
- ☐ 11183 SH 30, College Station, TX 77845, Telephone (409) 776-8945
- ☐ 3304 Longmire Drive, College Station, TX 77845, Telephone (409) 774-4999

37672

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

5 August 1996

Lynn Shelton
Giant Refining Co.
P. O. Box 159
Bloomfield, NM 87413

Mr. Shelton:

Enclosed please find the report for the samples received by our laboratory for analysis on July 11, 1996.

If you have any questions about the results of these analyses, please don't hesitate to call me at your convenience.

Sincerely,

Anna Schaerer

Anna Schaerer
Organic Analyst/IML-Farmington

Enclosure

xc: File

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

CASE NARRATIVE

Client: GIANT REFINING COMPANY
Project: Bloomfield, NM Received on: 07/16/96
Set ID: 0596H05846 # samples: 4

Suites: 8240 Standard, 8270 PAHs

Samples were received for analysis at Inter-Mountain Laboratories (IML), Bozeman, Montana. Enclosed are the results of these analyses.

Limits of detection for each instrument/analysis are determined by sample matrix effects, instrument performance under standard conditions, and dilution requirements to maintain chromatography output within calibration ranges. Quantitations have been calculated on an as received basis.

Jack Felkey
IML-Bozeman

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Client:	**Giant Refining Co.**		
Project:	Bloomfield		
Sample ID:	96E-0-1	Date Reported:	08/05/96
Laboratory ID:	0396G01328	Date Sampled:	07/11/96
Sample Matrix:	Soil	Time Sampled:	9:45 AM
Condition:	Cool/Intact	Date Received:	07/11/96

Parameter	Analytical Result	Units
Lab pH	7.6	s.u.
Fluoride	1.15	ppm
Chloride	2,582	ppm
Sulfate	2,156	ppm
Cyanide	<0.10	mg/Kg
Nitrate as Nitrogen	6.42	ppm
Trace Metals (Total)		
Aluminum	10,122	mg/Kg
Arsenic	1.16	mg/Kg
Barium	195	mg/Kg
Boron	55.8	mg/Kg
Cadmium	0.158	mg/Kg
Chromium	9.48	mg/Kg
Cobalt	5.06	mg/Kg
Copper	3.58	mg/Kg
Iron	13,097	mg/Kg
Lead	11.6	mg/Kg
Manganese	223	mg/Kg
Mercury	<0.10	mg/Kg
Molybdenum	<1.00	mg/Kg
Nickel	1.16	mg/Kg
Selenium	<0.50	mg/Kg
Silver	<1.00	mg/Kg
Uranium	86.4	mg/Kg
Zinc	45.3	mg/Kg

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported by ___*[signature]*___ Reviewed by ___*[signature]*___

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Client: Giant Refining Co.
Project: Bloomfield
Sample ID: 96E-3-5
Laboratory ID: 0396G01329
Sample Matrix: Soil
Condition: Cool/Intact

Date Reported: 08/05/96
Date Sampled: 07/11/96
Time Sampled: 10:45 AM
Date Received: 07/11/96

Parameter	Analytical Result	Units
Lab pH	7.8	s.u.
Fluoride	1.76	ppm
Chloride	1,235	ppm
Sulfate	724	ppm
Cyanide	<0.10	mg/Kg
Nitrate as Nitrogen	0.51	ppm
Trace Metals (Total)		
Aluminum	7,102	mg/Kg
Arsenic	0.527	mg/Kg
Barium	189	mg/Kg
Boron	56.9	mg/Kg
Cadmium	<0.10	mg/Kg
Chromium	7.48	mg/Kg
Cobalt	4.11	mg/Kg
Copper	2.32	mg/Kg
Iron	10,569	mg/Kg
Lead	7.69	mg/Kg
Manganese	240	mg/Kg
Mercury	<0.10	mg/Kg
Molybdenum	1.05	mg/Kg
Nickel	7.38	mg/Kg
Selenium	<0.50	mg/Kg
Silver	<1.00	mg/Kg
Uranium	66.4	mg/Kg
Zinc	30.6	mg/Kg

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported by ___*dk*___

Reviewed by ___*JB*___

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

lient:	Giant Refining Co.		
Project:	Bloomfield		
Sample ID:	96B-0-1	Date Reported:	08/05/96
Laboratory ID:	0396G01330	Date Sampled:	07/11/96
Sample Matrix:	Soil	Time Sampled:	11:45 AM
Condition:	Cool/Intact	Date Received:	07/11/96

Parameter	Analytical Result	Units
Lab pH	7.5	s.u.
Fluoride	0.77	ppm
Chloride	1,054	ppm
Sulfate	2,790	ppm
Cyanide	<0.10	mg/Kg
Nitrate as Nitrogen	14.2	ppm
Trace Metals (Total)		
Aluminum	6,199	mg/Kg
Arsenic	<0.50	mg/Kg
Barium	166	mg/Kg
Boron	55.0	mg/Kg
Cadmium	0.104	mg/Kg
Chromium	6.85	mg/Kg
Cobalt	3.84	mg/Kg
Copper	2.18	mg/Kg
Iron	9,401	mg/Kg
Lead	8.00	mg/Kg
Manganese	205	mg/Kg
Mercury	<0.10	mg/Kg
Molybdenum	<1.00	mg/Kg
Nickel	7.27	mg/Kg
Selenium	<0.50	mg/Kg
Silver	<1.00	mg/Kg
Uranium	84.1	mg/Kg
Zinc	33.2	mg/Kg

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported by ~~dk~~ Reviewed by SB

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

lient:	**Giant Refining Co.**		
Project:	Bloomfield		
Sample ID:	96B-3-5	Date Reported:	08/05/96
Laboratory ID:	0396G01331	Date Sampled:	07/11/96
Sample Matrix:	Soil	Time Sampled:	12:30 PM
Condition:	Cool/Intact	Date Received:	07/11/96

Parameter	Analytical Result	Units
Lab pH	8.2	s.u.
Fluoride	0.38	ppm
Chloride	324	ppm
Sulfate	395	ppm
Cyanide	<0.10	mg/Kg
Nitrate as Nitrogen	<0.05	ppm
Trace Metals (Total)		
Aluminum	3,266	mg/Kg
Arsenic	<0.50	mg/Kg
Barium	56.0	mg/Kg
Boron	51.9	mg/Kg
Cadmium	<0.10	mg/Kg
Chromium	3.16	mg/Kg
Cobalt	1.83	mg/Kg
Copper	3.87	mg/Kg
Iron	4,751	mg/Kg
Lead	4.99	mg/Kg
Manganese	113	mg/Kg
Mercury	<0.10	mg/Kg
Molybdenum	<1.00	mg/Kg
Nickel	3.46	mg/Kg
Selenium	<0.50	mg/Kg
Silver	<1.00	mg/Kg
Uranium	31.1	mg/Kg
Zinc		mg/Kg

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported by ________

Reviewed by ________

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Quality Control / Quality Assurance
Spike Analysis
Total Metals

Client: Giant Refining
Project: Bloomfield
Lab ID: 0396G01328-31
Matrix: Soil
Condition: Cool / Intact

Date Reported: 08/05/96
Date Sampled: 07/11/96
Date Received: 07/11/96

Spike Analysis

Parameter	Spiked Sample Result (mg/L	Sample Result (mg/L	Spike Added (mg/L	Percent Recovery
Aluminum	9.14	<0.05	10.0	91%
Arsenic	0.029	0.001	0.030	93%
Barium	1.26	0.88	0.50	92%
Boron	0.89	0.44	0.50	99%
Cadmium	0.002	<0.001	0.002	108%
Chromium	0.58	0.07	0.50	103%
Cobalt	0.47	0.03	0.50	89%
Copper	0.007	0.002	0.005	106%
Iron	9.28	<0.025	10.00	93%
Lead	0.032	0.010	0.025	106%
Manganese	1.63	1.24	0.50	98%
Mercury	0.55	<0.10	0.50	98%
Molybdenum	0.53	<0.10	0.50	105%
Nickel	0.56	0.05	0.50	103%
Selenium	0.024	0.001	0.025	92%
Silver	0.003	<0.001	0.003	108%
Uranium	0.95	0.49	0.50	102%
Zinc	0.79	0.27	0.50	109%

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported By: dk

Reviewed By: SB

2506 W. Main Street
Farmington, New Mexico 87401

Quality Control / Quality Assurance

Known Analysis

Total Metals

Client: Giant Refining
Project: Bloomfield
Lab ID: 0396G01328-31
Matrix: Soil
Condition: Cool / Intact

Date Reported: 08/05/96
Date Sampled: 07/11/96
Date Received: 07/11/96

Known Analysis

Parameter	Found Result	Known Result	Units	Percent Recovery
Aluminum	0.94	1.00	mg/L	94%
Arsenic	0.009	0.010	mg/L	90%
Barium	0.91	1.00	mg/L	91%
Boron	0.95	1.00	mg/L	95%
Cadmium	0.004	0.004	mg/L	100%
Chromium	1.02	1.00	mg/L	102%
Cobalt	0.91	1.00	mg/L	91%
Copper	0.005	0.005	mg/L	100%
Iron	0.96	1.00	mg/L	96%
Lead	0.040	0.040	mg/L	100%
Manganese	1.01	1.00	mg/L	101%
Mercury	0.440	0.400	mg/L	110%
Molybdenum	1.01	1.00	mg/L	101%
Nickel	1.01	1.00	mg/L	101%
Selenium	0.010	0.010	mg/L	100%
Silver	0.004	0.004	mg/L	98%
Uranium	1.19	1.00	mg/L	119%
Zinc	1.01	1.00	mg/L	101%

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported By: ________

Reviewed By: ________

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Quality Control / Quality Assurance

Blank Analysis
Total Metals

Client:	**Giant Refining**			
Project:	Bloomfield		Date Reported:	08/05/96
Lab ID:	0396G01328-31		Date Sampled:	07/11/96
Matrix:	Soil		Date Received:	07/11/96
Condition:	Cool / Intact			

Blank Analysis

Parameter	Result	Detection Limit (mg/L)
Aluminum	ND	5.00
Arsenic	ND	0.50
Barium	ND	1.00
Boron	ND	5.00
Cadmium	ND	0.10
Chromium	ND	1.00
Cobalt	ND	1.00
Copper	ND	0.10
Iron	ND	2.50
Lead	ND	0.50
Manganese	ND	1.00
Mercury	ND	0.10
Molybdenum	ND	1.00
Nickel	ND	1.00
Selenium	ND	0.50
Silver	ND	1.00
Uranium	ND	20.0
Zinc	ND	5.00

Reference: "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, United States Environmental Protection Agency, November, 1986.
"Test Methods for Evaluating Solid Wastes", Method 3050, SW-846, 3rd ed., November 1992.

Comments:

Reported by: *AK* Reviewed by: *JB*

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client:	GIANT REFINING COMPANY			
Sample ID:	96B-0-1		Date Reported:	07/31/96
Project ID:	Bloomfield, NM		Date Sampled:	07/11/96
Lab ID:	B965848	0396G01328	Date Received:	07/16/96
Matrix:	Soil		Date Extracted:	07/23/96
			Date Analyzed:	07/25/96

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/kg
1,1,2,2-Tetrachloroethane	ND	1.0	mg/kg
1,1,2-Trichloroethane	ND	1.0	mg/kg
1,1-Dichloroethane	ND	1.0	mg/kg
1,1-Dichloroethene	ND	1.0	mg/kg
1,2-Dichloroethane	ND	1.0	mg/kg
1,2-Dichloropropane	ND	1.0	mg/kg
2-Butanone (MEK)	ND	5.0	mg/kg
2-Hexanone	ND	1.0	mg/kg
4-Methyl-2-pentanone (MIBK)	ND	1.0	mg/kg
Acetone	ND	5.0	mg/kg
Benzene	ND	1.0	mg/kg
Bromodichloromethane	ND	1.0	mg/kg
Bromoform	ND	1.0	mg/kg
Bromomethane	ND	1.0	mg/kg
Carbon Disulfide	ND	1.0	mg/kg
Carbon Tetrachloride	ND	1.0	mg/kg
Chlorobenzene	ND	1.0	mg/kg
Chloroethane	ND	1.0	mg/kg
Chloroform	ND	1.0	mg/kg
Chloromethane	ND	1.0	mg/kg
cis-1,3-Dichloropropene	ND	1.0	mg/kg
Dibromochloromethane	ND	1.0	mg/kg
Ethylbenzene	ND	1.0	mg/kg
m,p-Xylene	ND	1.0	mg/kg
Methylene chloride	ND	5.0	mg/kg
o-Xylene	ND	1.0	mg/kg
Styrene	ND	1.0	mg/kg
Tetrachloroethene (PCE)	ND	1.0	mg/kg
Toluene	ND	1.0	mg/kg

Continued

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EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client:	GIANT REFINING COMPANY		
Sample ID:	96B-0-1	Date Reported:	07/31/96
Project ID:	Bloomfield, NM	Date Sampled:	07/11/96
Lab ID:	B965848 0396G01328	Date Received:	07/16/96
Matrix:	Soil	Date Extracted:	07/23/96
		Date Analyzed:	07/25/96

Parameter	Result	PQL	Units
Continued			
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg
Vinyl Chloride	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
1,2-Dichloroethane-d4	90	70 - 121
omofluorobenzene	118	74 - 121
Toluene-d8	113	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, Rev. 1, November 1992.

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8270
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	GIANT REFINING COMPANY		Date Reported:	07/29/96
Sample ID:	96B-0-1		Date Sampled:	07/11/96
Project ID:	Bloomfield, NM		Date Received:	07/16/96
Lab ID:	B965848	0396G01328	Date Extracted:	07/23/96
Matrix:	Soil		Date Analyzed:	07/26/96

Parameter	Result	PQL	Units
3-Methylcholanthrene	ND	1.0	mg/kg
Acenaphthene	ND	1.0	mg/kg
Acenaphthylene	ND	1.0	mg/kg
Anthracene	ND	1.0	mg/kg
Benzo(a)anthracene	ND	1.0	mg/kg
Benzo(a)pyrene	ND	1.0	mg/kg
Benzo(b)fluoranthene	ND	1.0	mg/kg
Benzo(g,h,i)perylene	ND	1.0	mg/kg
Benzo(k)fluoranthene	ND	1.0	mg/kg
Chrysene	ND	1.0	mg/kg
Dibenz(a,h)anthracene	ND	1.0	mg/kg
Fluoranthene	ND	1.0	mg/kg
Fluorene	ND	1.0	mg/kg
Indeno(1,2,3-cd)pyrene	ND	1.0	mg/kg
Naphthalene	ND	1.0	mg/kg
Phenanthrene	ND	1.0	mg/kg
Pyrene	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
2,4,6-Tribromophenol	65	19 - 122
2-Fluorobiphenyl	57	30 - 115
2-Fluorophenol	49	25 - 121
Nitrobenzene-d5	50	23 - 120
Phenol-d6	69	24 - 113
Terphenyl-d14	47	18 - 137

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8270, Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, November 1990.

Analyst RR

Reviewed

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client:	GIANT REFINING COMPANY			
Sample ID:	96B-3-5		Date Reported:	07/31/96
Project ID:	Bloomfield, NM		Date Sampled:	07/11/96
Lab ID:	B965849	0396G01328	Date Received:	07/16/96
Matrix:	Soil		Date Extracted:	07/23/96
			Date Analyzed:	07/25/96

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/kg
1,1,2,2-Tetrachloroethane	ND	1.0	mg/kg
1,1,2-Trichloroethane	ND	1.0	mg/kg
1,1-Dichloroethane	ND	1.0	mg/kg
1,1-Dichloroethene	ND	1.0	mg/kg
1,2-Dichloroethane	ND	1.0	mg/kg
1,2-Dichloropropane	ND	1.0	mg/kg
2-Butanone (MEK)	ND	5.0	mg/kg
2-Hexanone	ND	1.0	mg/kg
4-Methyl-2-pentanone (MIBK)	ND	1.0	g/k
Acetone	ND	5.0	k
Benzene	ND	1.0	[illegible]
Bromodichloromethane	ND	1.0	mg/k
Bromoform	ND	1.0	mg/k
Bromomethane	ND	1.0	mg/k
Carbon Disulfide	ND	1.0	mg/k
Carbon Tetrachloride	ND	1.0	mg/k
Chlorobenzene	ND	1.0	mg/k
Chloroethane	ND	1.0	mg/k
Chloroform	ND	1.0	mg/k
Chloromethane	ND	1.0	mg/k
cis-1,3-Dichloropropene	ND	1.0	mg/k
Dibromochloromethane	ND	1.0	mg/k
Ethylbenzene	ND	1.0	mg/k
m,p-Xylene	ND	1.0	mg/k
Methylene chloride	ND	5.0	mg/k
o-Xylene	ND	1.0	mg/k
Styrene	ND	1.0	mg/k
Tetrachloroethene (PCE)	ND	1.0	mg/k
Toluene	ND	1.0	mg/k

Continued

Inter-Mountain Laboratories, Inc.

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EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client:	GIANT REFINING COMPANY		
Sample ID:	96B-3-5	Date Reported:	07/31/96
Project ID:	Bloomfield, NM	Date Sampled:	07/11/96
Lab ID:	B965849 0396G01328	Date Received:	07/16/96
Matrix:	Soil	Date Extracted:	07/23/96
		Date Analyzed:	07/25/96

Parameter	Result	PQL	Units
Continued			
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg
Vinyl Chloride	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
1,2-Dichloroethane-d4	94	70 - 121
ofluorobenzene	110	74 - 121
Toluene-d8	109	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

ference: Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, Rev. 1, November 1992.

Analyst E.D. 7/31/96

Reviewed

Inter-Mountain Laboratories, Inc.

1160 Research Drive
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EPA METHOD 8270
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	GIANT REFINING COMPANY			
Sample ID:	96B-3-5		Date Reported:	07/29/96
Project ID:	Bloomfield, NM		Date Sampled:	07/11/96
Lab ID:	B965849	0396G01328	Date Received:	07/16/96
Matrix:	Soil		Date Extracted:	07/23/96
			Date Analyzed:	07/26/96

Parameter	Result	PQL	Units
3-Methylcholanthrene	ND	1.0	mg/kg
Acenaphthene	ND	1.0	mg/kg
Acenaphthylene	ND	1.0	mg/kg
Anthracene	ND	1.0	mg/kg
Benzo(a)anthracene	ND	1.0	mg/kg
Benzo(a)pyrene	ND	1.0	mg/kg
Benzo(b)fluoranthene	ND	1.0	mg/kg
Benzo(g,h,i)perylene	ND	1.0	mg/kg
Benzo(k)fluoranthene	ND	1.0	mg/kg
Chrysene	ND	1.0	'kg
Dibenz(a,h)anthracene	ND	1.0	
Fluoranthene	ND	1.0	mg/kg
Fluorene	ND	1.0	mg/kg
Indeno(1,2,3-cd)pyrene	ND	1.0	mg/kg
Naphthalene	ND	1.0	mg/kg
Phenanthrene	ND	1.0	mg/kg
Pyrene	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
2,4,6-Tribromophenol	62	19 - 122
2-Fluorobiphenyl	51	30 - 115
2-Fluorophenol	44	25 - 121
Nitrobenzene-d5	45	23 - 120
Phenol-d6	64	24 - 113
Terphenyl-d14	49	18 - 137

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8270, Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, November 1990.

Analyst

Reviewed

Inter-Mountain Laboratories, Inc.

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EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client: GIANT REFINING COMPANY
Sample ID: 96E-0-1
Project ID: Bloomfield, NM
Lab ID: B965846 0396G01328
Matrix: Soil

Date Reported: 07/31/96
Date Sampled: 07/11/96
Date Received: 07/16/96
Date Extracted: 07/23/96
Date Analyzed: 07/25/96

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/kg
1,1,2,2-Tetrachloroethane	ND	1.0	mg/kg
1,1,2-Trichloroethane	ND	1.0	mg/kg
1,1-Dichloroethane	ND	1.0	mg/kg
1,1-Dichloroethene	ND	1.0	mg/kg
1,2-Dichloroethane	ND	1.0	mg/kg
1,2-Dichloropropane	ND	1.0	mg/kg
2-Butanone (MEK)	ND	5.0	mg/kg
2-Hexanone	ND	1.0	mg/kg
4-Methyl-2-pentanone (MIBK)	ND	1.0	mg/kg
Acetone	7.0	5.0	mg/kg
Benzene	ND	1.0	mg/kg
Bromodichloromethane	ND	1.0	mg/kg
Bromoform	ND	1.0	mg/kg
Bromomethane	ND	1.0	mg/kg
Carbon Disulfide	ND	1.0	mg/kg
Carbon Tetrachloride	ND	1.0	mg/kg
Chlorobenzene	ND	1.0	mg/kg
Chloroethane	ND	1.0	mg/kg
Chloroform	ND	1.0	mg/kg
Chloromethane	ND	1.0	mg/kg
cis-1,3-Dichloropropene	ND	1.0	mg/kg
Dibromochloromethane	ND	1.0	mg/kg
Ethylbenzene	ND	1.0	mg/kg
m,p-Xylene	ND	1.0	mg/kg
Methylene chloride	ND	5.0	mg/kg
o-Xylene	ND	1.0	mg/kg
Styrene	ND	1.0	mg/kg
Tetrachloroethene (PCE)	ND	1.0	mg/kg
Toluene	ND	1.0	mg/kg

Continued

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client:	GIANT REFINING COMPANY			
Sample ID:	96E-0-1		Date Reported:	07/31/96
Project ID:	Bloomfield, NM		Date Sampled:	07/11/96
Lab ID:	B965846	0396G01328	Date Received:	07/16/96
Matrix:	Soil		Date Extracted:	07/23/96
			Date Analyzed:	07/25/96

Parameter	Result	PQL	Units
Continued			
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg
Vinyl Chloride	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
1,2-Dichloroethane-d4	89	70 - 121
romofluorobenzene	119	74 - 121
Toluene-d8	110	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, Rev. 1, November 1992.

76.1

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8270
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	GIANT REFINING COMPANY		Date Reported:	07/29/96
Sample ID:	96E-0-1		Date Sampled:	07/11/96
Project ID:	Bloomfield, NM		Date Received:	07/16/96
Lab ID:	B965846	0396G01328	Date Extracted:	07/23/96
Matrix:	Soil		Date Analyzed:	07/26/96

Parameter	Result	PQL	Units
3-Methylcholanthrene	ND	1.0	mg/kg
Acenaphthene	ND	1.0	mg/kg
Acenaphthylene	ND	1.0	mg/kg
Anthracene	ND	1.0	mg/kg
Benzo(a)anthracene	ND	1.0	mg/kg
Benzo(a)pyrene	ND	1.0	mg/kg
Benzo(b)fluoranthene	ND	1.0	mg/kg
Benzo(g,h,i)perylene	ND	1.0	mg/kg
Benzo(k)fluoranthene	ND	1.0	mg/kg
Chrysene	ND	1.0	mg/kg
ibenz(a,h)anthracene	ND	1.0	mg/kg
Fluoranthene	ND	1.0	mg/kg
Fluorene	ND	1.0	mg/kg
Indeno(1,2,3-cd)pyrene	ND	1.0	mg/kg
Naphthalene	ND	1.0	mg/kg
Phenanthrene	ND	1.0	mg/kg
Pyrene	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
2,4,6-Tribromophenol	65	19 - 122
2-Fluorobiphenyl	62	30 - 115
2-Fluorophenol	57	25 - 121
Nitrobenzene-d5	58	23 - 120
Phenol-d6	75	24 - 113
Terphenyl-d14	46	18 - 137

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8270, Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, November 1990.

Analyst RRD

Reviewed

Inter-Mountain Laboratories, Inc.

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Bozeman, Montana 59715

EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client: GIANT REFINING COMPANY
Sample ID: 96E-3-5
Project ID: Bloomfield, NM
Lab ID: B965847 0396G01328
Matrix: Soil

Date Reported: 07/31/96
Date Sampled: 07/11/96
Date Received: 07/16/96
Date Extracted: 07/23/96
Date Analyzed: 07/25/96

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/kg
1,1,2,2-Tetrachloroethane	ND	1.0	mg/kg
1,1,2-Trichloroethane	ND	1.0	mg/kg
1,1-Dichloroethane	ND	1.0	mg/kg
1,1-Dichloroethene	ND	1.0	mg/kg
1,2-Dichloroethane	ND	1.0	mg/kg
1,2-Dichloropropane	ND	1.0	mg/kg
2-Butanone (MEK)	ND	5.0	mg/kg
2-Hexanone	ND	1.0	mg/kg
4-Methyl-2-pentanone (MIBK)	ND	1.0	mg/kg
Acetone	ND	5.0	mg/kg
Benzene	ND	1.0	mg/kg
Bromodichloromethane	ND	1.0	mg/kg
Bromoform	ND	1.0	mg/kg
Bromomethane	ND	1.0	mg/kg
Carbon Disulfide	ND	1.0	mg/kg
Carbon Tetrachloride	ND	1.0	mg/kg
Chlorobenzene	ND	1.0	mg/kg
Chloroethane	ND	1.0	mg/kg
Chloroform	ND	1.0	mg/kg
Chloromethane	ND	1.0	mg/kg
cis-1,3-Dichloropropene	ND	1.0	mg/kg
Dibromochloromethane	ND	1.0	mg/kg
Ethylbenzene	ND	1.0	mg/kg
m,p-Xylene	ND	1.0	mg/kg
Methylene chloride	ND	5.0	mg/kg
o-Xylene	ND	1.0	mg/kg
Styrene	ND	1.0	mg/kg
Tetrachloroethene (PCE)	ND	1.0	mg/kg
Toluene	ND	1.0	mg/kg

Continued

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8240
VOLATILE ORGANIC COMPOUNDS

Client: GIANT REFINING COMPANY
Sample ID: 96E-3-5
Project ID: Bloomfield, NM
Lab ID: B965847 0396G01328
Matrix: Soil

Date Reported: 07/31/96
Date Sampled: 07/11/96
Date Received: 07/16/96
Date Extracted: 07/23/96
Date Analyzed: 07/25/96

Parameter	Result	PQL	Units
Continued			
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg
Vinyl Chloride	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
1,2-Dichloroethane-d4	95	70 - 121
romofluorobenzene	110	74 - 121
Toluene-d8	109	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, Rev. 1, November 1992.

Analyst F.D 7/31/96

Reviewed

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

EPA METHOD 8270
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	GIANT REFINING COMPANY			
Sample ID:	96E-3-5		Date Reported:	07/29/96
Project ID:	Bloomfield, NM		Date Sampled:	07/11/96
Lab ID:	B965847	0396G01328	Date Received:	07/16/96
Matrix:	Soil		Date Extracted:	07/23/96
			Date Analyzed:	07/26/96

Parameter	Result	PQL	Units
3-Methylcholanthrene	ND	1.0	mg/kg
Acenaphthene	ND	1.0	mg/kg
Acenaphthylene	ND	1.0	mg/kg
Anthracene	ND	1.0	mg/kg
Benzo(a)anthracene	ND	1.0	mg/kg
Benzo(a)pyrene	ND	1.0	mg/kg
Benzo(b)fluoranthene	ND	1.0	mg/kg
Benzo(g,h,i)perylene	ND	1.0	mg/kg
Benzo(k)fluoranthene	ND	1.0	[illegible]
Chrysene	ND	1.0	[illegible]
Dibenz(a,h)anthracene	ND	1.0	[illegible]
Fluoranthene	ND	1.0	mg/kg
Fluorene	ND	1.0	mg/kg
Indeno(1,2,3-cd)pyrene	ND	1.0	mg/kg
Naphthalene	ND	1.0	mg/kg
Phenanthrene	ND	1.0	mg/kg
Pyrene	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
2,4,6-Tribromophenol	64	19 - 122
2-Fluorobiphenyl	53	30 - 115
2-Fluorophenol	49	25 - 121
Nitrobenzene-d5	49	23 - 120
Phenol-d6	72	24 - 113
Terphenyl-d14	47	18 - 137

ND - Not Detected at Practical Quantitation Level (PQL)

Reference: Method 8270, Gas Chromatography/Mass Spectrometry for Semivolatile Organics, Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, November 1990.

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

LAB QA/QC
EPA METHOD 8240
METHOD BLANK

Date Analyzed: 07/26/96
Lab ID: MBS06205
Matrix: Sand
Date Extracted: 07/23/96

Parameter	Result	PQL	Units
1,1,1-Trichloroethane	ND	1.0	mg/kg
1,1,2,2-Tetrachloroethane	ND	1.0	mg/kg
1,1,2-Trichloroethane	ND	1.0	mg/kg
1,1-Dichloroethane	ND	1.0	mg/kg
1,1-Dichloroethene	ND	1.0	mg/kg
1,2-Dichloroethane	ND	1.0	mg/kg
1,2-Dichloropropane	ND	1.0	mg/kg
2-Butanone (MEK)	ND	5.0	mg/kg
2-Hexanone	ND	1.0	mg/kg
4-Methyl-2-pentanone (MIBK)	ND	1.0	mg/kg
Acetone	ND	5.0	mg/kg
Benzene	ND	1.0	mg/kg
Bromodichloromethane	ND	1.0	mg/kg
Bromoform	ND	1.0	mg/kg
Bromomethane	ND	1.0	mg/kg
Carbon Disulfide	ND	1.0	mg/kg
Carbon Tetrachloride	ND	1.0	mg/kg
Chlorobenzene	ND	1.0	mg/kg
Chloroethane	ND	1.0	mg/kg
Chloroform	ND	1.0	mg/kg
Chloromethane	ND	1.0	mg/kg
cis-1,3-Dichloropropene	ND	1.0	mg/kg
Dibromochloromethane	ND	1.0	mg/kg
Ethylbenzene	ND	1.0	mg/kg
m,p-Xylene	ND	1.0	mg/kg
Methylene chloride	ND	5.0	mg/kg
o-Xylene	ND	1.0	mg/kg
Styrene	ND	1.0	mg/kg
Tetrachloroethene (PCE)	ND	1.0	mg/kg
Toluene	ND	1.0	mg/kg
trans-1,2-Dichloroethene	ND	1.0	mg/kg
trans-1,3-Dichloropropene	ND	1.0	mg/kg
Trichloroethene (TCE)	ND	1.0	mg/kg

Continued

1160 Research Drive
Bozeman, Montana 59715

LAB QA/QC
EPA METHOD 8240
METHOD BLANK

Date Analyzed: 07/26/96
Lab ID: MBS06205
Matrix: Sand
Date Extracted: 07/23/96

Parameter	Result	PQL	Units
Continued			
Vinyl Chloride	ND	1.0	mg/kg
Xylenes (total)	ND	1.0	mg/kg

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
1,2-Dichloroethane-d4	100	70 - 121
Bromofluorobenzene	106	74 - 121
Toluene-d8	105	81 - 117

ND - Not Detected at Practical Quantitation Level (PQL)

Inter-Mountain Laboratories, Inc.

1160 Research Drive
Bozeman, Montana 59715

LAB QA/QC
٩ METHOD 8240
LAB CONTROL SAMPLE

Date Analyzed: 07/26/96
Lab ID: LCS96205
Matrix: Sand
Date Extracted 07/23/96

Parameter	Spike Added (mg/kg)	Sample Result (mg/kg)	LCS Result (mg/kg)	LCS % Recovery	QC Limits Rec.
1,4-Dichlorobenzene	2.0	0	1.5	75	70 -130
1,1,2-Trichloroethane	2.0	0	2.0	100	70 -130
1,2-Dibromoethane (EDB)	2.0	0	1.8	90	70 -130
1,2-Dichloroethane	2.0	0	1.8	90	70 -130
1,2-Dichloropropane	2.0	0	1.7	85	70 -130
Benzene	2.0	0	1.8	90	70 -130
Bromoform	2.0	0	1.1	55 *	70 -130
Carbon Tetrachloride	2.0	0	1.5	75	70 -130
cis-1,3-Dichloropropene	2.0	0	1.7	85	70 -130
·rachloroethene (PCE)	2.0	0	1.6	80	70 -130
·ichloroethene (TCE)	2.0	0	2.0	100	70 -130
Vinyl Chloride	2.0	0	1.2	60 *	70 -130

QUALITY CONTROL - Surrogate Recovery	%	QC Limits
Bromofluorobenzene	121	74 -121
1,2-Dichloroethane-d4	94	70 -121
Toluene-d8	109	81 -117

Spike Recovery: 2 out of 12 outside QC limits.
Surrogates: Surrogate Recoveries within QC Limits.

Analyst E.D. 7/31/96

Reviewed

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

August 28, 1996

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-258-604

Mr. Lynn Shelton
Environmental Manager
Giant Industries
P.O. Box 159
Bloomfield, NM 87413

RE: **Closure Plan for the Unlined Evaporation Lagoons and the Spray Evaporation Area. Date August 13, 1996.**

Dear Mr. Shelton:

The New Mexico Oil Conservation Division (OCD) has reviewed the above captioned plan from Giant regarding the closure/modification of the "Unlined Evaporation Lagoons/Spray Evaporation Area." **The OCD approves of the closure and modification as proposed with the following conditions:**

1. The monitoring and sampling of monitoring wells MW-1 and MW-5 will continue as previously approved. When the CMS (dated December 21, 1995) is approved, OCD will be open to reconsidering the continued monitoring of MW-1 and MW-5.

2. Any discharge/spill or leak that is a result of the modification/construction will be reported to the OCD Aztec District office at (505)-334-6178 pursuant to WQCC 1203 and OCD Rule 116.

Please note, OCD approval does not relieve Giant for liability should this closure/modification result in contamination to surface water, groundwater, or the environment. Further, OCD approval does not relieve Giant from responsibility with other Federal, State, or Local Regulations that may apply. Public notice was not issued because this modification was part of the previous discharge plan renewal conditions.

If Giant has any questions regarding this matter please feel free to call me at (505)-827-7152.

Sincerely,

Roger Anderson

Roger C. Anderson
Bureau Chief

xc: Mr. Denny Foust - Environmental Geologist

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. 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 area will be setup prior to any sample collection activities. The decontamination pad will be constructed 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 pad 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 and monitoring wells 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 TPH and polynuclear aromatic hydrocarbons.

Purge water generated during groundwater sampling activities will be containerized in 55-gallon drums and then disposed in the refinery wastewater treatment system upstream of the API separator. 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.