GW - ___001___

WORK PLANS
Investigation Report Group 5

March 15, 2012

RECEIVED OCD
2012 MAR 19 A 10: 34

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 25 9311 3809

Re: Supplemental Response to NMED's Approval with Modifications
Group 5 Investigation Report (June 2011)
Western Refining Southwest, Inc., Bloomfield Refinery
EPA ID# NMD089416416

Dear Mr. Kieling:

Pursuant to your Approval with Modifications letter dated November 4, 2011, Western Refining Southwest, Inc., Bloomfield Refinery ("Western") has prepared the following response to comment No. 4. In our initial response dated February 9, 2012, Western indicated that a Phase II Investigation Work Plan would be submitted for Group 5; however, as explained below Western believes it would premature to submit the Phase II Investigation Work Plan for Group 5 at this time.

NMED Comment 4 - Section 7.2 (Recommendations), page 40:

Western recommends reassessing the analytical data from the SWMU No. 15 investigation with the background values established by the background study that was completed in the summer of 2011. Western recommends additional delineation in the vicinity of soil boring locations SWMU 15-6, 15-11, 15-12, and 15-13. Western must provide a work plan to conduct additional investigation at SWMU 15. At a minimum, the work plan must propose additional investigation to the water table beneath the site and must propose the collection of soil samples for analysis of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Skinner List Metals, diesel range organics (DRO), gasoline range organics (GRO), motor oil range organics (MRO), and general chemistry. In addition, if groundwater is encountered, groundwater samples must be collected and analyzed with the same analytical suite as the soil samples as well as cyanide, and dissolved iron and manganese. If separate phase hydrocarbons are encountered, Western must collect a sample for fuel fingerprint analysis to characterize the product.

Western Response No. 4: Western is requesting that submittal of the Phase II Investigation Work Plan for Group 5 (SWMU 15) be postponed at this time. It will be more productive to conduct Phase II investigations for the RFI Groups, including Group 5, after the initial investigations and associated reports have been completed for all of the RFI Groups. This will allow time to establish site-specific background concentrations, which may affect subsequent investigation requirements. In addition, information obtained from other initial RFI Group investigations may affect data acquisition requirements in nearby RFI Groups. Conducting a comprehensive Phase II investigation across the facility will facilitate remedy selection for any impacted areas that extend across multiple SWMUs/AOCs (e.g., impacts in shallow groundwater).

If you have questions, then please contact me at (505) 632-4171.

Sincerely,

P.P. Kelly Robinson on behalf of,

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

Enclosure

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

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2012 FEB 10 P 3: 29

February 9, 2012

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

Certified Mail #: 7009 2250 0002 3833 5148 (To NMED)
Certified Mail #: 7009 2250 0002 3833 5155 (To OCD)

Re: Response to NMED's Approval with Modifications
Investigation Report Group 5 (SWMU No. 15 Tank Farm Area)
Western Refining Southwest, Inc., Bloomfield Refinery
EPA ID# NMD089416416
HWB-WRB-11-006

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 November 4, 2011 on the above referenced investigation report.

NMED Comment No. 1: Section 3.2 (Background Information Research), page 9:

***Western's Statement**: "[d]ocuments containing the results of previous investigations and subsequent routine groundwater monitoring data from monitoring wells were reviewed to facilitate development of the Group 5 Investigation Work Plan. The previously collected data provides valuable information on the overall subsurface conditions, including hydrogeology and contaminant distribution within groundwater. The data collected under this investigation supplements the historical groundwater data and provides SWMU-specific information regarding contaminant occurrence and distribution within soils and groundwater."*

***NMED's Comment**: In future work plans and reports, provide references and citations for all investigations used as background information for work plans and reports. Provide the reference for the investigation mentioned in the statement in a response letter.*

Western Response No. 1: The reference for the investigations discussed in Section 3.2 and on page 4 of Section 2.1 is included in Section 8 ("References") of the Investigation Report and is as follows:

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

This document was only directly referenced in the text on page 12 of Section 4.2 but will be referenced directly with each use in future documents.

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

NMED Comment No. 2: Section 4.3 (Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment, SWMU 15-12), page 17:

***Western's Statement**: "[t]he PID readings were low (2.3-3.2 ppm) over the upper eight feet but increased to 280 in the 10 to 12' interval and reached a maximum value of 1,325 ppm in the 14-16' interval. The PID reading decreased to 235 ppm in the 18 to 20' interval."*

***NMED's Comment**: The 18 to 20 foot depth exhibited a PID reading of 235, but Western did not continue to advance the boring past this depth. In the response letter, explain why the boring was not advanced deeper than 20 feet or until the Nacimiento Formation was encountered. In all future investigations, if the field screening evidence indicates increasing or relatively high levels of contamination, Western must continue to advance the soil boring beneath the water table, until field screening indicates decreasing contaminant levels or until the drilling equipment hits refusal, or explain why drilling was discontinued.*

Western Response No. 2: The decision was made to terminate the boring at a depth of 20 feet based on the PID readings that had decreased from 1,325 ppm in the overlying 14-16' interval to 235 ppm in the 18-20' interval. The field data indicated that the vertical extent of impact had reduced significantly from the most impacted layer (i.e., 14-16') and that the vertical extent of the impacted soils had been characterized. A review of the analytical results for soil sample SWMU 15-12 (18-20') indicates that none of the constituents exceed the respective screening levels, and nearly all of the organic constituents are non-detect.

Field screening is used as a tool for identifying potential areas of impacted soils, and such results often determine the intervals from which soil samples are collected for analytical confirmation. Extending field screening to below the zone of saturation for soil sampling purposes provides limited technical value in delineating potential source areas in soil because of technical limitation of screening saturated soil samples.

In future investigations, Western will continue to advance soil borings if the field screening evidence indicates increasing or relatively high levels of contamination, consistent with the requirements of the respective approved investigation work plan.

NMED Comment No. 3: Section 4.3 (Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment, SWMU 15-13), page 17:

***Western's Statement:** "[a] maximum PID reading of 1,727 ppm was recorded from a depth of 12 to 14'. A silt deposit present from the land surface to a depth of eight feet graded to clayey silt, which persisted to a depth of 12' bgl. Silty sand is present from 12 to 16' bgl and grades to gravelly sand, which continued to the termination depth of 28' bgl."*

***NMED's Comment**: Detected VOC concentrations decreased with depth in several of the borings exhibiting high PID readings. In the response letter, state whether or not boring SWMU 15-13 followed this same trend. In future work plans and reports, include discussions of all field screening information in the appropriate sections of the documents.*

Western Response No. 3: The trend of decreasing PID readings with depth was not observed in boring SWMU 15-13. This is noted in the second and third sentences of this paragraph – "The boring was originally planned to have a termination depth of ten feet but due to the presence of potential impacts, the boring was extended to the depth of saturation. An odor and elevated PID reading (334 ppm) was observed from the lower portion of the zero to two foot interval and these field indications of potential impacts continued throughout the full depth of the boring."

NMED Comment No. 4: Section 7.2 (Recommendations), page 40:

***NMED Comment**: Western recommends reassessing the analytical data from the SWMU No. 15 investigation with the background values established by the background study that was completed in the summer of 2011. Western recommends additional delineation in the vicinity of soil boring locations SWMU 15-6, 15-11, 15-12, and 15-13. Western must provide a work plan to conduct additional investigation at SWMU 15. At a minimum, the work plan must propose additional investigation to the water table beneath the site and must propose the collection of soil samples for analysis of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Skinner List Metals, diesel range organics (DRO), gasoline range organics (GRO), motor oil range organics (MRO), and general chemistry. In addition, if groundwater is encountered, groundwater samples must be collected and analyzed with the same analytical suite as the soil samples as well as cyanide, and dissolved iron and manganese. If separate phase hydrocarbons are encountered, Western must collect a sample for fuel fingerprint analysis to characterize the product.*

Western Response No. 4: As requested, Western will submitted an investigation work plan on or before March 19, 2012 for the additional delineation of impacts identified in the areas of borings SWMU 15-6, 15-11, 15-12, and 15-13, considering the results of the background investigation.

NMED Comment No. 5: Section 7.2 (Recommendations), page 41:

***Western's Statement**: "[w]ith the combination of groundwater data collected from previously existing wells and the new groundwater samples recently collected, the impacts to groundwater within the tank farm have been adequately characterized to support final remedy selection. No further investigation of groundwater within the tank farm is recommended at this time."*

***NMED's Comment**: Western asserts that previous and current data have adequately characterized the groundwater in the SWMU that supports their final remedy. However, Western does not discuss a remedy or reference a submittal with plans for a remedy. Provide a discussion regarding potential remedies in the response letter.*

Western Response No. 5: Western did not discuss potential remedies for the groundwater impacts beneath SWMU No. 15 in the Site Investigation Report because the plume of impacted groundwater extends beyond SWMU No. 15 to other areas of the refinery property and it will be necessary to develop a final remedy for groundwater that encompasses all affected areas. While the groundwater impacts beneath SWMU No. 15 have been adequately characterized to support selection of a final remedy, other areas (e.g., SWMU Groups 8 and 9) are still subject to further investigation that could affect a final remedy decision for groundwater.

It is likely that the final remedy for groundwater will incorporate the existing interim measures (e.g., the slurry wall and recovery of phase separate hydrocarbon using recovery wells) combined with monitored natural attenuation; however, until planned investigations in the remaining areas of the site are completed, it is premature to get any more specific regarding potential remedies. Western anticipates that NMED will provide notification pursuant to Provision VI.C.1 that a Corrective Measures Evaluation is required for groundwater, but requests that NMED not provide such notification until all groundwater investigations have been completed.

NMED Comment No. 6: Table 1 (Historical Subsurface Soil Vapor Concentrations):

***NMED's Comment**: Western provides a table summarizing the historical subsurface soil vapor concentrations from a previous investigation, but a reference document is not cited. Provide replacement pages for the tables with the response letter that provides the reference in the table notes.*

Western Response No. 6: The reference document is the same document discussed above in response to Comment No. 1. The reference has been added to the revised tables, which are enclosed. It should be noted that the reference source, which depicts the subsurface soil vapor concentrations, was included on Figure 3 in the previous submitted investigation report dated July 2011.

NMED Comment No. 7: Table 2 (Historical Groundwater Analyses):

***NMED's Comment**: Table 2 provides a summary of the historical groundwater data. In several cells of the table,"--" was not defined. In future documents, define all symbols in all tables.*

Western Response No. 7: The symbol "--" will be defined in future tables.

NMED Comment No. 8: Table 3 (Group 5 Soil Boring Samples-Vapor Screening Results):

***NMED's Comment**: Western provides a summary of the soil boring sample vapor screening results but it is not clear when these screening results were collected. In future work plans and reports, provide collection dates for the screening data and include a note identifying the instrument and its detection range used to collect the screening level readings.*

Western Response No. 8: The vapor screening results reported in Table 3 were collected on the same date and time as when the soil borings were completed. The soil sample collection dates, which are the same as the date of the vapor readings, are reported in Table 7 (Group 5 Soil Analytical Results Summary) and are also included in the discussion of the soil screening results in Section 4.3 and are recorded on the soil boring logs inclued in Appendix C – Borings Logs. The instrument used to collect the field vapor readings is described in Appendix A – Field Methods.

NMED Comment No. 9: Figures 4 (Cross Section A-A', West to East), 5 (Cross Section B-B', North to South), and 6 (Cross Section C-C', North to South):

***NMED's Comment**: Figures 4, 5, and 6 are missing screened intervals for the following monitoring wells, MW-1, MW-3, MW-5, MW-6, MW-41, MW-42, MW-44, MW-52, and RW- 42. Provide replacement pages with the missing information and ensure all well information is available on all figures in future documents.*

Western Response No. 9: The screen intervals are not available for the listed wells. The cross sections have been revised for to include a note that screen intervals are not available for the affected wells.

NMED Comment No. 10: Appendix B (Survey Data):

***NMED's Comment**: Appendix B provides survey data for the soil borings and new monitoring wells from the investigation. However, in Section 3.4 (Surveys), Western does not discuss the survey point locations for the new monitoring wells (e.g., north side of the PVC casing or the* *highest location on the PVC casing). In future documents, Western must describe the location of the measuring points for all monitoring wells.*

> **Western Response No. 10:** In future documents, Western will describe the location of measuring points for monitoring wells.

Please find enclosed the respective replacement pages as requested in the November 4, 2011 letter from NMED. An investigation work plan covering the additional investigation requested in the Tank Farm will be submitted on or before March 12, 2012, as specified.

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

Sincerely,

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

Enclosures

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

Replacement Pages for the Group 5 Investigation Report (July 2011)

Table 1
Historical Subsurface Soil Vapor Concentrations
Group 5 Investigation Report
Western Refining Southwest - Bloomfield Refinery

SAMPLE ID	PROBE HOLE	DEPTH (FEET)	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	m&p-XYLENE	o- XYLENE	TVOC	COMMENTS
BLANK-01	NA	NA	12/9/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-02	NA	NA	12/9/93	<1	<1	<1	<1	<1	0	QC-Probe Rod Blank
SG-09	PH-05	3	12/9/93	<1	<1	<1	<1	<1	0	
SG-10	PH-05	8	12/9/93	<1	<1	<1	<1	<1	1	
SG-10(D)	PH-05	8	12/9/93	<1	<1	<1	<1	<1	1	QC-Injection Duplicate
BLANK-03	NA	NA	12/9/93	<1	<1	<1	<1	<1	0	QC-System Blank
SG-11	PH-06	3	12/9/93	<1	<1	<1	<1	<1	0	
SG-12	PH-06	7.5	12/9/93	<1	<1	<1	<1	<1	3	
SG-13	PH-07	3	12/9/93	<1	<1	<1	<1	<1	1	
SG-14	PH-07	9	12/9/93	<1	<1	<1	<1	<1	1	
SG-15	PH-08	3	12/9/93	<1	<1	<1	<1	<1	0	
SG-16	PH-08	8	12/9/93	<1	<1	<1	<1	<1	0	
SG-17	PH-09	3	12/9/93	<1	1	<1	<1	<1	2	
SG-18	PH-09	10	12/9/93	<1	<1	<1	<1	<1	0	
SG-19	PH-10	3	12/9/93	<1	<1	<1	<1	<1	0	
SG-20	PH-10	10	12/9/93	<1	<1	<1	<1	<1	0	
SG-20(D)	PH-10	10	12/9/93	<1	<1	<1	<1	<1	0	QC-Duplicate Injection
BLANK-04	NA	NA	12/9/93	<1	<1	<1	<1	<1	0	QC-System Blank
SG-21	PH-11	3	12/9/93	<1	<1	<1	<1	<1	1	
SG-22	PH-11	10	12/9/93	<1	<1	<1	<1	<1	3	
SG-23	PH-12	3	12/9/93	<1	<1	<1	<1	<1	1	
SG-24	PH-12	10	12/9/93	<1	<1	<1	<1	<1	1	
SG-25	PH-13	3	12/9/93	<1	<1	<1	<1	<1	0	
SG-26	PH-13	10	12/9/93	<1	<1	<1	<1	<1	0	
SG-27	PH-14	3	12/9/93	<1	<1	<1	<1	<1	1	
SG-28	PH-14	10	12/9/93	<1	<1	<1	<1	<1	0	

Table 1
Historical Subsurface Soil Vapor Concentrations
Group 5 Investigation Report
Western Refining Southwest - Bloomfield Refinery

SAMPLE ID	PROBE HOLE	DEPTH (FEET)	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	m&p-XYLENE	o- XYLENE	TVOC	COMMENTS
SG-28(D)	PH-14	10	12/9/93	<1	<1	<1	<1	<1	0	QC-Duplicate Injection
BLANK-05	NA	NA	12/9/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-06	NA	NA	12/10/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-07	NA	NA	12/10/93	<1	<1	<1	<1	<1	0	QC-Probe Rod Blank
SG-29	PH-15	3	12/10/93	<1	2	<1	<1	<1	25	
SG-30	PH-15	9	12/10/93	<1	61	<1	19	9	1108	
SG-31	PH-16	3	12/10/93	<1	<1	<1	<1	<1	0	
SG-32	PH-16	9	12/10/93	<1	<1	<1	<1	<1	0	
SG-33	PH-17	3	12/10/93	<1	<1	<1	<1	<1	0	
SG-34	PH-17	9	12/10/93	<1	<1	<1	1	<1	2	
SG-35	PH-18	3	12/10/93	<1	2	<1	1	<1	3	
SG-36	PH-18	9	12/10/93	<1	<1	<1	<1	<1	0	
SG-37	PH-19	3	12/10/93	<1	3	<1	2	<1	3	
SG-38	PH-19	9	12/10/93	<1	<1	<1	<1	<1	0	
SG-38(D)	PH-19	9	12/10/93	<1	<1	<1	<1	<1	0	QC-Duplicate Injection
BLANK-08	NA	NA	12/10/93	<1	<1	<1	<1	<1	0	QC-System Blank
SG-39	PH-20	3	12/10/93	<1	<1	<1	<1	<1	0	
SG-40	PH-20	9	12/10/93	<1	77	13	39	14	345	
SG-41	PH-21	3	12/10/93	<1	<1	<1	<1	<1	0	
SG-42	PH-21	9	12/10/93	<1	<1	<1	<1	<1	0	
SG-43	PH-22	3	12/10/93	<1	<1	<1	<1	<1	0	
SG-44	PH-22	9	12/10/93	35	1508	199	2260	95	6474	
SG-45	PH-23	3	12/10/93	<1	11	3	8	2	23	
SG-46	PH-23	9	12/10/93	<1	2	<1	1	<1	3	
SG-47	PH-24	3	12/10/93	16	115	27	145	36	721	
SG-48	PH-24	9	12/10/93	88	271	63	331	62	1571	

Table 1
Historical Subsurface Soil Vapor Concentrations
Group 5 Investigation Report
Western Refining Southwest - Bloomfield Refinery

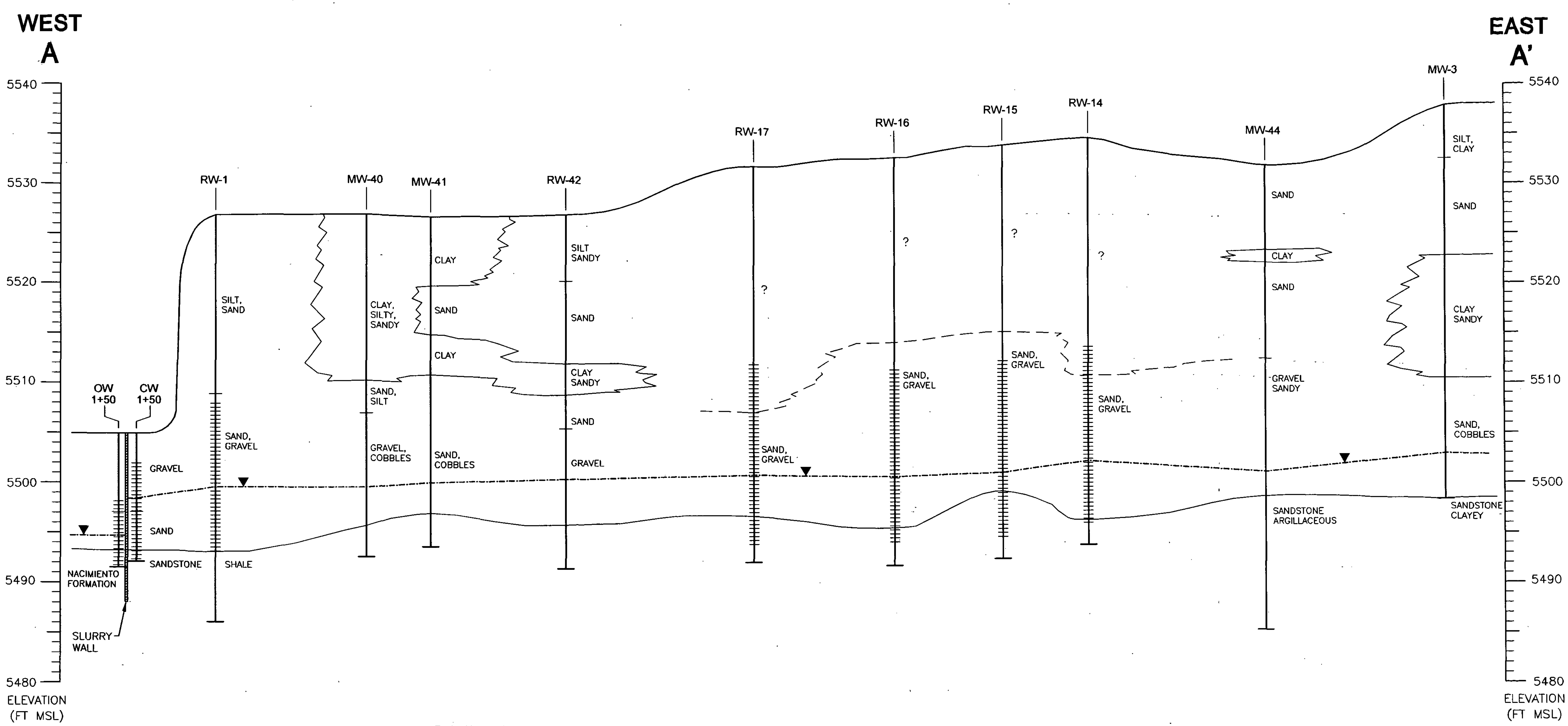
SAMPLE ID	PROBE HOLE	DEPTH (FEET)	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	m&p-XYLENE	o- XYLENE	TVOC	COMMENTS
SG-48(D)	PH-24	9	12/10/93	91	272	60	313	60	1547	QC-Duplicate Injection
BLANK-09	NA	NA	12/10/93	<1	<1	<1	<1	<1	0	QC-System Blank
SG-49	PH-25	3	12/10/93	91	76	9	55	7	41	
SG-50	PH-25	9	12/10/93	447	532	82	538	61	2519	
SG-51	PH-26	3	12/10/93	1	<1	2	11	2	36	
SG-52	PH-26	9	12/10/93	27	14	<1	16	2	97	
SG-52(D)	PH-26	9	12/10/93	27	15	1	17	2	100	QC-Duplicate Injection
BLANK-10	NA	NA	12/10/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-11	NA	NA	12/11/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-12	NA	NA	12/11/93	<1	<1	<1	<1	<1	0	QC-Probe Rod Blank
SG-53	PH-27	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-54	PH-27	9	12/11/93	<1	<1	<1	<1	<1	1	
SG-55	PH-28	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-56	PH-28	9	12/11/93	<1	<1	<1	<1	<1	0	
SG-57	PH-29	3	12/11/93	<1	<1	<1	1	<1	1	
SG-58	PH-29	9	12/11/93	<1	<1	<1	<1	<1	0	
SG-61	PH-31	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-62	PH-31	9	12/11/93	<1	<1	<1	<1	<1	0	
SG-62(D)	PH-31	9	12/11/93	<1	<1	<1	<1	<1	0	QC-Duplicate Injection
BLANK-13	NA	NA	12/11/93	<1	<1	<1	<1	<1	0	QC-System Blank
SG-63	PH-32	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-64	PH-32	9	12/11/93	<1	<1	<1	2	<1	2	
SG-65	PH-33	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-66	PH-33	10	12/11/93	<1	<1	<1	<1	<1	0	
SG-67	PH-34	3	12/11/93	<1	<1	<1	<1	<1	1	

Table 1
Historical Subsurface Soil Vapor Concentrations
Group 5 Investigation Report
Western Refining Southwest - Bloomfield Refinery

SAMPLE ID	PROBE HOLE	DEPTH (FEET)	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	m&p-XYLENE	o- XYLENE	TVOC	COMMENTS
SG-68	PH-34	9	12/11/93	<1	<1	<1	<1	<1	0	
SG-71	PH-36	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-72	PH-36	9	12/11/93	7	6	2	12	<1	35	
SG-72(D)	PH-36	9	12/11/93	7	7	2	12	<1	37	QC-Duplicate Injection
BLANK-14	NA	NA	12/11/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-15	NA	NA	12/12/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-16	NA	NA	12/12/93	<1	<1	<1	<1	<1	0	QC-Probe Rod Blank
SG-78	PH-40	3	12/12/93	<1	<1	<1	<1	<1	0	
SG-79	PH-40	8.5	12/12/93	<1	<1	<1	<1	<1	0	
SG-80	PH-41	3	12/12/93	<1	<1	<1	<1	<1	0	
SG-81	PH-41	8.5	12/12/93	<1	<1	<1	<1	<1	0	
SG-82	PH-42	3	12/12/93	<1	<1	<1	<1	<1	0	
SG-83	PH-42	9	12/12/93	<1	<1	<1	<1	<1	0	
SG-83(D)	PH-42	9	12/12/93	<1	<1	<1	<1	<1	0	QC-Duplicate Injection
BLANK-17	NA	NA	12/12/93	<1	<1	<1	<1	<1	0	QC-System Blank

Notes:
NA = Not applicable
QC = Quality Control
D = Duplicate analysis
<1 = Not detected at lower quanitfiable limit
units = Micrograms per liter of headspace vapor analyzed
TVOC = Total volatile organic content

Source: RCRA Facility Investigation/Corrective Measures Study Report, Bloomfield Refining Company, #50 County Road 4990, Bloomfield, NM, November 8, 1994; Groundwater Technology, Inc.



EXPLANATION

MW-3 ← WELL IDENTIFICATION

← WELL

← SCREEN INTERVAL

LITHOLOGIC CONTACTS

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

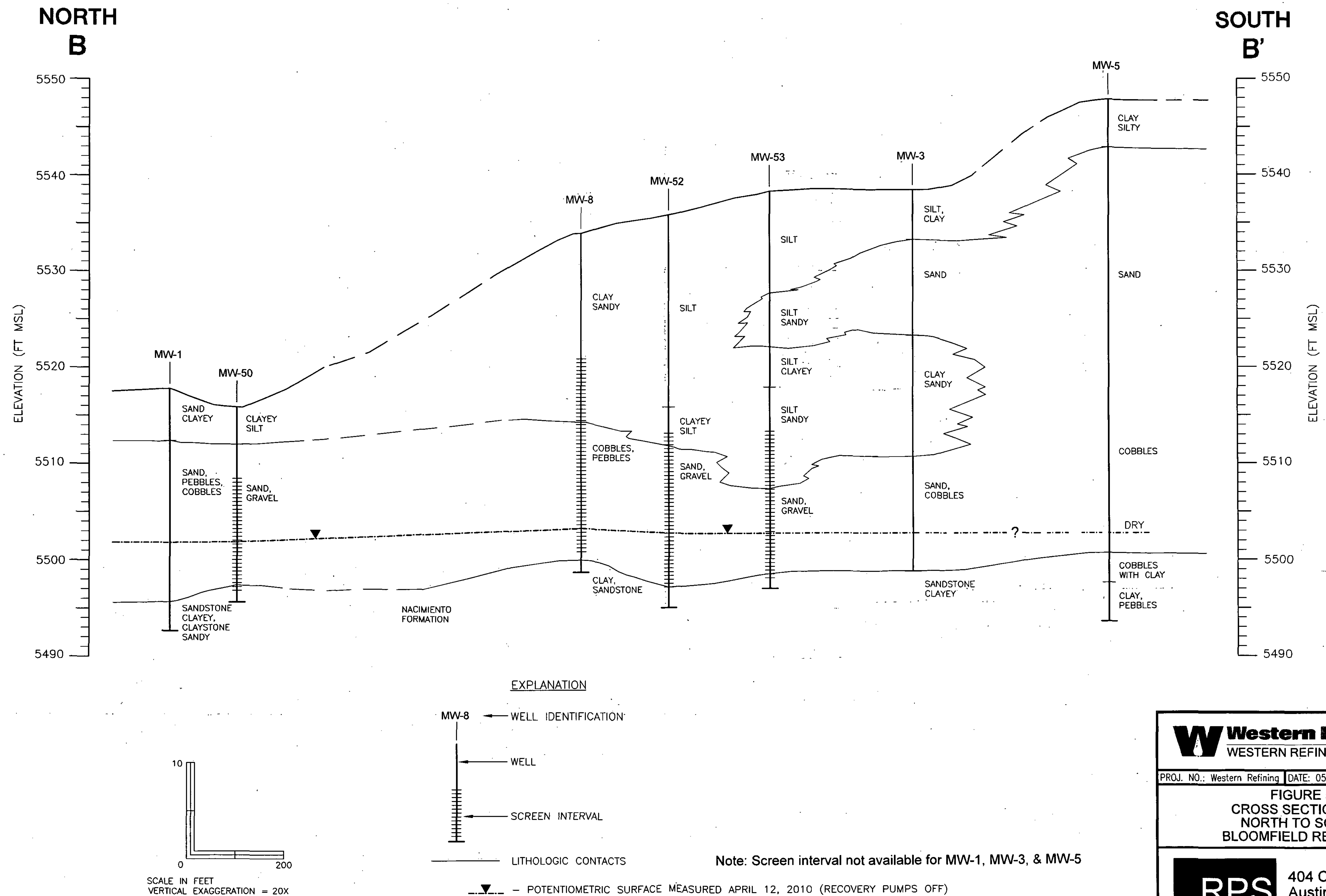
Note: Screen interval not available for MW-3, MW-40, MW-41, MW-44, & RW-42

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 05/15/11	FILE: WestRef–B93

FIGURE 4
CROSS SECTION A-A'
WEST TO EAST
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



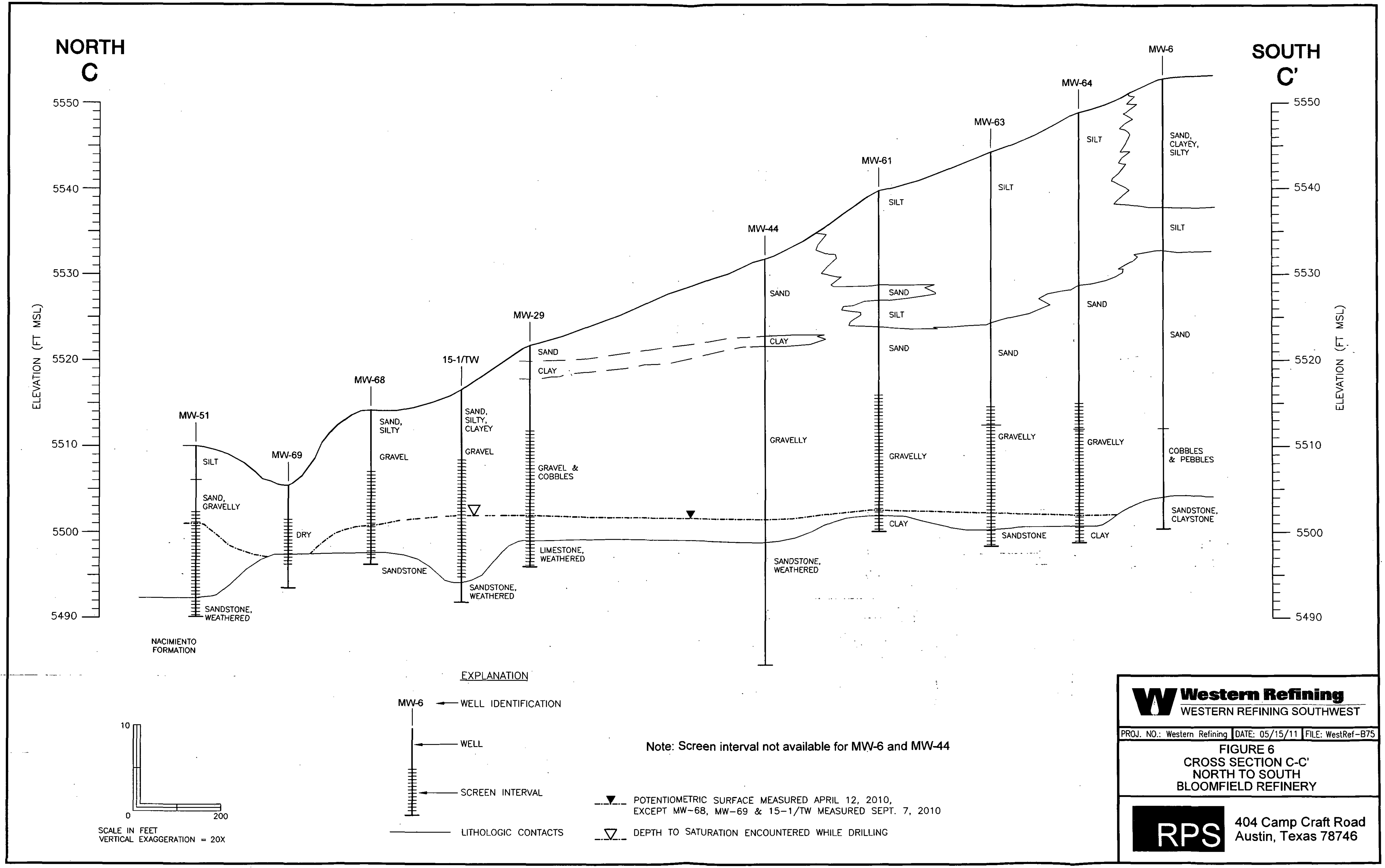
Note: Screen interval not available for MW-1, MW-3, & MW-5

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 05/15/11	FILE: WestRef-B94

FIGURE 5
CROSS SECTION B-B'
NORTH TO SOUTH
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746


NORTH
C
SOUTH
C'
ELEVATION (FT MSL)
5550
5540
5530
5520
5510
5500
5490
MW-51
MW-69
MW-68
15-1/TW
MW-29
MW-44
MW-61
MW-63
MW-64
MW-6
SILT
SAND, GRAVELLY
SANDSTONE, WEATHERED
NACIMIENTO FORMATION
DRY
SAND, SILTY
GRAVEL
SANDSTONE
SAND, SILTY, CLAYEY
GRAVEL & COBBLES
LIMESTONE, WEATHERED
SAND
CLAY
GRAVELLY
SAND, CLAYEY, SILTY
COBBLES & PEBBLES
SANDSTONE, CLAYSTONE
EXPLANATION
MW-6 WELL IDENTIFICATION
WELL
SCREEN INTERVAL
LITHOLOGIC CONTACTS
10
0
200
SCALE IN FEET
VERTICAL EXAGGERATION = 20X
Note: Screen interval not available for MW-6 and MW-44
POTENTIOMETRIC SURFACE MEASURED APRIL 12, 2010, EXCEPT MW-68, MW-69 & 15-1/TW MEASURED SEPT. 7, 2010
DEPTH TO SATURATION ENCOUNTERED WHILE DRILLING
Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining
DATE: 05/15/11
FILE: WestRef-B75
FIGURE 6
CROSS SECTION C-C'
NORTH TO SOUTH
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746

BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
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RON CURRY
Secretary

SARAH COTTRELL
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

July 19, 2010

Mr. Randy Schmaltz
Environmental Manager
Western Refining, Southwest, Inc.
Bloomfield Refinery
P.O. Box 159
Bloomfield, New Mexico 87413

RE: APPROVAL
INVESTIGATION WORK PLAN GROUP 5
WESTERN REFINING SOUTHWEST INC., BLOOMFIELD REFINERY
EPA ID# NMD089416416
HWB-GRCB-09-005

Dear Mr. Schmaltz:

The New Mexico Environment Department (NMED) has received Western Refining Southwest, Inc., Bloomfield Refinery (Western) *Investigation Work Plan Group 5 (SWMU No. 15 Tank Farm Area)* (Work Plan) revised July 2010. NMED hereby approves the Work Plan. Western must submit the Investigation Report summarizing the results of implementation of the Work Plan to NMED on or before June 1, 2011. The Investigation Report must be prepared in accordance with the applicable portions of Section X.C 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 Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
C. Chavez, OCD
A. Hains, Western
File: HWB-GRCB-09-005 and Reading 2010

From: Monzeglio, Hope, NMENV
Sent: Tuesday, June 08, 2010 4:36 PM
To: Schmaltz, Randy
Cc: Kieling, John, NMENV; Cobrain, Dave, NMENV; Chavez, Carl J, EMNRD; Hains, Allen
Subject: Group 5
Attachments: GRCB 09-005 NOD Invest Wk Pl Grp 5 May-10.pdf

Randy

The hard copy will go out in the mail tomorrow.

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
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RON CURRY
Secretary

SARAH COTTRELL
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

June 9, 2010

Mr. Randy Schmaltz
Environmental Manager
Western Refining, Southwest, Inc.
Bloomfield Refinery
P.O. Box 159
Bloomfield, New Mexico 87413

**RE: NOTICE OF DISAPPROVAL
INVESTIGATION WORK PLAN GROUP 5
WESTERN REFINING SOUTHWEST INC., BLOOMFIELD REFINERY
EPA ID# NMD089416416
HWB-GRCB-09-005**

Dear Mr. Schmaltz:

The New Mexico Environment Department (NMED) has received Western Refining Southwest, Inc., Bloomfield Refinery (Western) *Investigation Work Plan Group 5 (SWMU No. 15 Tank Farm Area)* (Work Plan) dated June 2009, and NMED hereby issues this Notice of Disapproval (NOD). Western must address the following comments.

Comment 1

Western submitted a letter dated May 26, 2010 proposing changes to the Group 5 Work Plan. The changes address sampling depths, collection of QA/QC samples, and the location for an additional monitoring well. NMED hereby approves the changes as proposed. All changes addressed in the May 26, 2010 letter must be included in the revised Work Plan.

Comment 2

In Section 2 (Background), page 2-1 and 2-2, Western lists each tank and its contents. Since this Work Plan was submitted, the refinery is no longer operating and the contents of tanks that are still in use may have changed. Western must revise the tank list and the contents as applicable in the revised Work Plan.

Comment 3

In Section 3.1 (Surface Conditions), page 3-1, Western states "[n]orth of the refinery, surface water flows in a southeasterly direction toward the San Juan River."

Western clarified this statement in their response to NMED's September 3, 2010 Notice of Disapproval for the Group 4 Investigation Work Plan. In the revised Work Plan, Western must revise this statement to match the response to the Group 4 Investigation Work Plan.

Comment 4

Western discusses surface and subsurface conditions in Sections 3.1 and 3.2, but does not include the specific surface and subsurface conditions of Solid Waste Management Unit (SWMU) 15 (Tank Farm Area). Western must revise the above Sections to incorporate SWMU 15. Reference NMED's September 3, 2009 NOD Group 4 Investigation Work Plan, Comment 10.

Comment 5

In Section 5.2 (Soil Sampling), page 5-2, Western states "[s]ince there is the potential for constituents to have been released to soils at known locations at SWMU No. 15, a judgmental sampling design is appropriate. Examples of these areas are documented spills that accumulated in low areas within tank dikes and areas with previous subsurface soil vapor samples (see discussion in Section 2) indicating the presence of petroleum hydrocarbons. Six soil borings are proposed for locations that have documented spills from individual tanks (Tanks 18, 19, 26, the former location of Tank 22, and the roof drain collection area between Tanks 11 and 12) and the location with the highest subsurface soil vapor concentrations at Tank 27 (Figure 9)."

The roof drain collection system between Tanks 11 and 12 is not discussed in Section 2 or in any other section in the Work Plan. Western must revise the Work Plan to provide a description of the roof drain collection system between Tanks 11 and 12.

Comment 6

In Section 5.2 (Soil Sampling), page 5-2, the Permittee states "[t]hirty four surface samples (0-6" and 18-24") will be collected at 17 other potential areas of concern (e.g., low areas within the tank dikes where historical undocumented spilled materials would have collected) as shown on Figure 9." Western states in the following paragraph that "[t]he 17 surface soil sample locations will terminate at a depth of 24 [inches], unless Western elects to extend the sampling deeper based on field screening results."

NMED approves the changes proposed in the May 26, 2010 letter regarding this section. Soil samples collected from the 17 sample locations will terminate at a depth of 24 to 36 inches if completed by hand auger or at a depth of six feet at locations installed with a drill rig, unless extended based on field screening. Western must revise the Work Plan accordingly.

Comment 7
In Section 5.3.2 (Groundwater and Vadose Zone Vapor Sampling), page 5-4, Western states "[i]n addition, if any of the other six soil borings encounter groundwater, then a groundwater sample will be collected for analysis prior to plugging the boring." If groundwater is encountered in any of the borings, a groundwater sample must be collected for analysis prior to plugging the boring. Western must revise the Work Plan to include this revision.

Comment 8
Western proposed to install an additional monitoring well in the May 26, 2010 letter referenced in Comment 1. Western must revise the Work Plan to incorporate the installation of the additional monitoring well.

Comment 9
Western included historical groundwater analyses in Table 2. The text in the Table is small and difficult to read. In the revised Work Plan, Western must revise this table to be legible. This applies to all future submittals.

Western must address all comments contained in this NOD and submit a revised Work Plan to NMED on or before July 19, 2010. The revised Work Plan must be submitted with a response letter that details where all revisions have been made, cross-referencing NMED's numbered comments. In addition, an electronic version of the revised work plan must be submitted that identifies where all changes have been made in redline strikeout format.

If you have any questions regarding this letter, please contact Hope Monzeglio of my staff at (505) 476-6045.

Sincerely,

James Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
D. Cobrain, NMED HWB
C. Chavez, OCD
A. Hains, Western
File: HWB-GRCB-09-005 and Reading 2010

July 2, 2010

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 June 9, 2010 NOTICE OF DISAPPROVAL
Investigation Work Plan Group 5
Western Refining Southwest, Inc., Bloomfield Refinery
EPA ID# NMD089416416
HWB-GRCB-09-005

Dear Mr. Bearzi:

Western Refining Southwest, Inc., Bloomfield Refinery has prepared the following responses to your comments (dated June 9, 2010) 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 (June 2009).

Comment 1

Western submitted a letter dated May 26, 2010 proposing changes to the Group 5 Work Plan. The changes address sampling depths, collection of QA/QC samples, and the location for an additional monitoring well. NMED hereby approves the changes as proposed. All changes addressed in the May 26, 2010 letter must be included in the revised Work Plan.

Response 1

All changes proposed in the May 26, 2010 letter have been included. This includes the following items:

- The references to the addition of a second permanent monitoring well have been added in Sections 4.1, 5.1, 5.3.1, 5.3.2, and 5.3.3.
- Changes to the depth of the soil borings and soil sample collection depths appear in Section 5.2
- Changes regarding the chemical analyses for soil samples are included in Section 5.8.
- Revisions to the type and number of QA/QC samples appear in Sections 5.2 and 5.3.4.
- Figure 9 was revised to add the proposed location for the second permanent monitoring well and the legend was revised to more accurately reflect the installation of soil borings instead of surface soil sample locations.

Comment 2

In Section 2 (Background), page 2-1 and 2-2, Western lists each tank and its contents. Since this Work Plan was submitted, the refinery is no longer operating and the contents of tanks that are still in use may have changed. Western must revise the tank list and the contents as applicable in the revised Work Plan.

Response 2

Section 2 has been revised to note that the refinery has suspended petroleum refining operations and to indicate the projected changes in the types of materials stored in the tanks as the result of the suspension of refining operations. A reference to the suspension of refining operations was also included in Section 1.

Comment 3

In Section 3.1 (Surface Conditions), page 3-1, Western states "[n]orth of the refinery, surface water flows in a southeasterly direction toward the San Juan River."

Western clarified this statement in their response to NMED's September 3, 2010 Notice of Disapproval for the Group 4 Investigation Work Plan. In the revised Work Plan, Western must revise this statement to match the response to the Group 4 Investigation Work Plan.

Response 3

The statement in Section 3.1 regarding surface water flows north of the refinery has been revised to match the earlier revisions made to the Group 4 Investigation Work Plan.

Comment 4

Western discusses surface and subsurface conditions in Section 3.1 and 3.2, but does not include the specific surface and subsurface conditions of Solid Waste Management Unit (SWMU) 15 (Tank Farm Area). Western must revise the above Sections to incorporate SWMU 15. Reference NMED's September 3, 2009 NOD Group 4 Investigation Work Plan, Comment 10.

Response 4

Sections 3.1 and 3.2 were revised to include information specific to SWMU No. 15.

Comment 5

In Section 5.2 (Soil Sampling), page 5-2, Western states "[s]ince there is the potential for constituents to have been released to soils at known locations at SWMU No. 15, a judgmental sampling design is appropriate. Examples of these areas are documented spills that accumulated in low areas within tank dikes and areas with previous subsurface soil vapor samples (see discussion in Section 2) indicating the presence of petroleum hydrocarbons. Six soil borings are proposed for locations that have documented spills from individual tanks (Tanks 18, 19, 26, the former tank location of Tank 22, and the roof drain collection area between Tanks 11 and 12) and the location with the highest subsurface soil vapor concentrations at Tank 27 (Figure 9)."

The roof drain collection system between Tanks 11 and 12 is not discussed in Section 2 or in any other section in the Work Plan. Western must revise the Work Plan to provide a description of the roof drain collection system between Tanks 11 and 12.

Response 5

A discussion on the roof drain collection system at Tanks 11 and 12 has been added to Section 2.0.

Comment 6

In Section 5.2 (Soil Sampling), page 5-2, the Permittee states "[t]hirty four surface samples (0-6" and 18-24") will be collected at 17 other potential areas of concern (e.g., low areas within the tank dikes where historical undocumented spilled materials would have collected) as shown on Figure 9." Western states in the following paragraph that "[t]he 17 surface soil sample locations *will terminate at a depth of 24 [inches], unless Western elects to extend the sampling deeper based on field screening results."*

NMED approves the changes proposed in the May 26, 2010 letter regarding this section. Soil samples collected from the 17 sample locations will terminate at a depth of 24 to 36 inches if completed by hand auger or at a depth of six feet at locations installed with a drill rig, unless extended based on field screening. Western must revise the Work Plan accordingly.

Response 6

Section 5.2 has been revised pursuant to the May 26th letter. The 17 shallow soil borings will terminate at a depth of 24 to 36" if not accessible to a drilling rig, otherwise these borings will be drilled to a minimum depth of six feet.

Comment 7

In Section 5.3.2 (Groundwater and Vadose Zone Vapor Sampling), page 5-4, Western states "[i]n addition, if any of the other six soil borings encounter groundwater, then a groundwater sample will be collected for analysis prior to plugging the boring." If groundwater is encountered in any of the borings, a groundwater sample must be collected for analysis prior to plugging the boring. Western must revise the Work Plan to include this revision.

Response 7

The text in Section 5.3.2 has been revised so that a ground water sample will be collected from all soil borings that encounter ground water.

Comment 8

Western proposed to install an additional monitoring well in the May 26, 2010 letter referenced in Comment 1. Western must revise the Work Plan to incorporate the installation of the additional monitoring well.

Response 8

Sections 4.1, 5.1, 5.3.1, 5.3.2, and 5.3.3 and Figure 9 have been revised to reflect the installation of the additional monitoring well.

Comment 9

Western included historical groundwater analyses in Table 2. The text in the Table is small and difficult to read. In the revised Work Plan, Western must revise this table to be legible. This applies to all future submittals.

Response 9

The font size has been increased in Table 2 to make it easier to read.

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
Dave Cobrain – NMED HWB
John Kieling – NMED HWB
Laurie King – EPA Region 6
Allen Hains – Western Refining El Paso
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INVESTIGATION WORK PLAN
Group 5 (SWMU No. 15 Tank Farm Area)

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

June 2009
(Revised July 2010)

James R. Schmaltz
Environmental Manager

Western Refining Southwest, Inc.
Bloomfield Refinery

Scott T. Crouch, P.G.
Senior Consultant

RPS
404 Camp Craft Rd.
Austin, Texas 78746

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Executive Summary

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

Pursuant to the terms and conditions of an Order issued on July 27, 2007 by the New Mexico Environment Department (NMED) to San Juan Refining Company and Giant Industries Arizona, Inc. for the Bloomfield Refinery, this Investigation Work Plan has been prepared for the SWMUs designated as Group 5. A Class I modification to the facility's RCRA permit 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 and groundwater samples, which will be analyzed for potential site-related constituents. The Investigation Work Plan includes specific sampling locations, sample collection procedures, and analytical methods. The scope of the proposed investigation is based, in part, on the results of previous site investigation activities.

SWMU Group 5 covers the refinery tank farm located east of the processing units, which is identified as SWMU No. 15 Tank Farm Area in the NMED Order. 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 SWMU. This Investigation Work Plan has been developed to collect the necessary data to meet the requirements of the Order.

Section 1
Introduction

The Bloomfield Refinery is located immediately south of Bloomfield, New Mexico in San Juan County (Figure 1). The physical address is #50 Road 4990, Bloomfield, New Mexico 87413. The Bloomfield Refinery is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 44 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north where the San Juan River intersects Tertiary terrace deposits.

The Bloomfield Refinery is a crude oil refinery currently owned by 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; however, the refinery suspended petroleum refining operations in November 2009 but continues to operate as a petroleum storage terminal. Various process units operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, sulfur recovery, merox treater, catalytic polymerization, and diesel hydrotreating. Products produced at the refinery included gasoline, diesel fuels, jet fuels, kerosene, propane, butane, naphtha, residual fuel, fuel oils, and LPG.

On July 27, 2007, the New Mexico Environment Department (NMED) issued an Order to San Juan Refining Company and Giant Industries Arizona, Inc. ("Western") requiring investigation and corrective action at the Bloomfield Refinery. This Investigation Work Plan has been prepared for the Solid Waste Management Unit (SWMU) designated as Group 5 in the Order, which includes SWMU No. 15 Tank Farm Area. The location of SWMU No. 15 is shown on Figure 2. Photographs of select locations within the tank farm are included in Appendix A.

The purpose of the site investigation is to determine and evaluate the presence, nature, and extent of releases of contaminants in accordance with 20.4.1.500 New Mexico Administrative Code (NMAC) incorporating 40 Code of Federal Regulations (CFR) Section 264.101. The investigation activities will be conducted in accordance with Section IV of the Order.

Section 2
Background

This section presents background information for the SWMU, including a review of historical waste management and product storage activities to identity the following:

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

SWMU No. 15 Tank Farm Area

The crude oil and product storage tanks were constructed when the refinery was built in the late 1950s. There is no information available on exactly which tanks were first constructed or what materials were stored in each tank but the tank farm has always been located in the same general area and has only been used to store crude oil and refined petroleum products. The main portion of the tank farm lies just east of the processing units and along the north side of County Road #4990. In addition, there are three smaller tanks located on the north side of the processing units that are identified as SWMU No. 14 Tanks 3, 4, and 5 but these tanks are not part of the Group 5 investigation.

When petroleum refining operations were suspended in November 2009, there were 17 tanks used to store petroleum products and three tanks used to store crude oil in SWMU No. 15. One additional tank (Tank #22) was used to store gasoline and has since been removed from the Refinery. A list of each of the tanks with the type of material stored in each prior to November 2009 is provided below with the projected future use indicated in brackets;

- Tank #11 – reformate [unleaded gasoline];
- Tank #12 – cat/poly gas [unleaded gasoline];
- Tank #13 – unleaded gasoline [unleaded gasoline];
- Tank #14 – unleaded gasoline [unleaded gasoline];
- Tank #17 – reduced crude oil [out-of-service];
- Tank #18 – off-road diesel [diesel];
- Tank #19 – ultra low sulfur diesel [diesel];
- Tank #20 – sweet naphtha [sweet naphtha];
- Tank #22 – gasoline (tank removed);
- Tank #23 – base gas [unleaded gasoline];
- Tank #24 – ultra low sulfur diesel [diesel];
- Tank #25 – ultra low sulfur diesel [diesel];

- Tank #26 – sweet naphtha (kerosene prior to 1988) [out-of-service];
- Tank #27 – slurry oil [out-of-service];
- Tank #28 – crude oil [crude oil];
- Tank #29 – light cycle oil (earlier storage of leaded gasoline) [gasoline/diesel – transmix];
- Tank #30 – low sulfur diesel (earlier storage of leaded gasoline) [gasoline/diesel – transmix];
- Tank #31 – crude oil [crude oil];
- Tank #32 – reformate [unleaded gasoline];
- Tank #35 – reformer feed [unleaded gasoline]; and
- Tank #36 – gasoline [unleaded gasoline].

There have been several documented surface spills within the tank farm, as described below:

- 1984 – 880 barrels of naphtha spilled within tank dike (individual tank not specified) with 800 barrels recovered;

- 1985 – 400 barrels of unleaded gasoline released and all but 20 barrels recovered - location not specified other than within tank farm;

- 1985 – 140 barrels of diesel spilled inside the diked area around Tank 19 with 60 barrels recovered;

- 1986 – 20 barrels of naphtha spilled with over 19 barrels recovered - no specific location;

- 1987 – 290 barrels of regular gasoline spilled with "most" reported as recovered - no specific location;

- 1989 – 100 barrels of unidentified product spilled at Tank 22 with 99+ barrels recovered;

- 1991 – 180 barrels of Jet A spilled at Tank 26 with 120 barrels recovered; and

- 2008 - 20 barrels of diesel/water mix spilled at Tank 18 with 16 barrels recovered.

Additional possible sources of releases within the tank farm are leaks from the bottom of storage tanks. Based on the permeable nature of the subsurface soils and general lack of laterally continuous low permeable strata within the tank farm, it is likely that leaks from tank floors would migrate vertically and have little, if any, expression in soils beyond the footprint of the tank. Tanks with possible subsurface releases identified from inspection of the floors include Tanks 17, 18, 19, 20, 23, 24, 25, 26, 29, 30, and 31. The roof drain collection system between Tanks 11 and 12 has also been identified as a potential area of concern. Tanks 11 and 12 are constructed with a roof drain connection that is equipped with a manually operated valve. A hose connects to the roof drain of each tank and discharges to the common below-grade concrete sump that is located between the two tanks.

Past investigations completed as part of the RCRA Facility Investigation conducted pursuant to the Administrative Consent Order issued on April 10, 1992 by the United States Environmental Protection Agency evaluated potential impacts to soil and ground water at the tank farm area. The soil investigation consisted of a soil gas survey, which included the installation of 33 borings within and near the tank farm area (Figure 8). Soil gas samples were collected from two depth horizons, shallow (3 to 4 feet) and deep (7.5 to 10 feet). The samples were analyzed using a portable gas chromatograph for benzene, toluene, ethylbenzene, and xylene (BTEX) and for total volatile organic content (TVOC). The results for the samples collected in the area of the tank farm are provided in Table 1. Most of the samples contained very low to non-detect concentrations of volatile organics with the highest levels measured in the deeper sample interval in the southwestern portion of the tank farm at locations PH-22, PH-24, and PH-25, which are near Tanks 24, 25, and 27.

Impacts to ground water within the tank farm were documented in the 1980s and recovery wells (RW-14, RW-15, RW-16, and RW-17) were installed in August, 1990. Additional monitoring wells (MW-21, MW-29, MW-30, and MW-44) were installed in 1994 and 1998 within the tank farm to further delineate impacts to ground water. The locations of these wells are shown on Figure 9 and the historical analytical results from ground water samples collected from these wells are summarized in Table 2.

Section 3
Site Conditions

The surface and subsurface conditions that could affect the fate and transport of any contaminants are discussed below. This information is based on recent visual observations and historical subsurface investigations.

3.1 Surface Conditions

Regionally, the surface topography slopes toward the floodplain of the San Juan River, which runs along the northern boundary of the refinery complex. To the south of the refinery, the drainage is to the northwest. North of the refinery, across the San Juan River, surface water flows in a southeasterly direction toward the San Juan River. The portion of the refinery property, where the process units and SWMU No. 15 (i.e., 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, which marks the southern boundary of the floodplain.

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

The refinery complex is bisected by County Rd #4990 (Sulivan Road), which runs east-west. The process units, SWMU No. 15 Tank Farm Area (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, 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 land surface within SWMU No. 15 is primarily bare soil with gravel roads The area between the refinery and the San Juan River does have limited vegetation on steep slopes that do not support dense vegetation.

3.2 Subsurface Conditions

Numerous soil borings and monitoring wells have been completed across the refinery property during previous site investigations and installation of the slurry wall, which runs along the northern and western refinery boundary. Based on the available site-specific and regional subsurface information, the site is underlain by the Quaternary Jackson Lake terrace deposits, which unconformably overlie the Tertiary Nacimiento Formation. The Jackson Lake deposits consist of fine grained sand, silt and clay that grades to coarse sand, gravel and cobble size material closer to the contact with the Nacimiento Formation. The Jackson Lake Formation is over 40 feet thick near the southeast portion of the site and generally thins to the northwest toward the San Juan River. The Nacimiento Formation is primarily composed of fine grained materials (e.g., carbonaceous mudstone/claystone with interbedded sandstones) with a reported local thickness of approximately 570 feet (Groundwater Technology Inc., 1994).

Figures 3 and 4 present cross-sections of the shallow subsurface based on borings logs from on-site monitoring well completions. The boring logs for wells RW-17, RW-16, RW-14, and MW-44 on Figure 3 depict the shallow subsurface stratigraphy beneath SWMU No. 15. The uppermost aquifer is under water table conditions and occurs within the sand and gravel deposits of the Jackson Lake Formation. The Nacimiento Formation functions as an aquitard at the site that prevents contaminants from migrating to deeper aquifers. The potentiometric surface as measured in August 2008 is presented as Figure 5 and shows the groundwater flowing to the northwest across SWMU No. 15. The depth to groundwater within SWMU No. 15 is approximately 32 feet below ground surface.

Previous investigations have identified and delineated impacts to groundwater from historical site operations. Figure 6 shows the distribution of SPH in the subsurface based on the apparent thickness of SPH measured in monitoring wells. Based on fluid level measurements, there was 0.14 feet of SPH measured in the far northwest corner of SWMU No. 15 in August 2008. Dissolved-phase impacts are depicted on Figure 7. BTEX constituents are detected in groundwater samples collected from within SWMU No. 15 at concentrations above the screening levels.

Section 4
Scope of Services

4.1 Anticipated Activities

Pursuant to Section IV of the Order, a scope of services has been developed to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil and groundwater samples will be collected at the SWMU No. 15 Tank Farm Area. Soil borings will be installed and samples collected as discussed in Section 5.2. The installation of two monitoring wells and collection of groundwater samples are described in Section 5.3.

4.2 Background Information Research

Documents containing the results of previous investigations and subsequent routine groundwater monitoring data from monitoring wells were reviewed to facilitate development of this work plan. The previously collected data provide detailed information on the overall subsurface conditions, including hydrogeology and contaminant distribution within groundwater on a site-wide basis. The data collected under this scope of services will supplement the existing soil and groundwater information and provide SWMU-specific information regarding contaminant occurrence and distribution within soils and groundwater.

4.3 Collection and Management of Investigation Derived Waste

Drill cuttings, excess sample material and decontamination fluids, and all other investigation derived waste (IDW) associated with soil borings will be contained and characterized using methods based on the boring location, boring depth, drilling method, and type of contaminants suspected or encountered. All purged groundwater and decontamination water will be disposed in the refinery wastewater treatment system upstream of the API Separator. An IDW management plan is included as Appendix B.

4.4 Surveys

The horizontal coordinates and elevation of each surface sampling location; the surface coordinates and elevation of each boring or test pit; the top of each monitoring well casing, and the ground surface at each monitoring well location; and the locations of all other pertinent structures will be determined by a registered New Mexico professional land surveyor in accordance with the State Plane Coordinate System (NMSA 1978 47-1-49-56 (Repl. Pamp. 1993)). The surveys will be conducted in accordance with Sections 500.1 through 500.12 of the

Regulations and Rules of the Board of Registration for Professional Engineers and Surveyors Minimum Standards for Surveying in New Mexico. Horizontal positions will be measured to the nearest 0.1-ft and vertical elevations will be measured to the nearest 0.01-ft.

Section 5
Investigation Methods

The purpose of the site investigation is to determine and evaluate the presence, nature, and extent of releases of contaminants. Guidance on selecting and developing sampling plans as provided in *Guidance for Choosing a Sampling Design for Environmental Data Collection* (EPA, 2000) was utilized to select the appropriate sampling strategy.

5.1 Drilling Activities

Soil and monitoring well borings will be drilled using either hollow-stem auger or if necessary, air rotary methods including ODEX. Monitoring well construction/completions 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 boring will be drilled five feet below the water table or to refusal, whichever is reached first. The soil borings to be completed as permanent monitoring wells will be drilled to the top of bedrock (Nacimiento Formation) at an anticipated completion depth ranging between 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 as described in Section 4.4. The boring locations will be measured to the nearest foot, and locations will be recorded on a scaled site map upon completion of each boring.

5.2 Soil Sampling

Since there is the potential for constituents to have been released to soils at known locations at SWMU No. 15, a judgmental sampling design is appropriate. Examples of these areas are documented spills that accumulated in low areas within tank dikes and areas with previous subsurface soil vapor samples (see discussion in Section 2) indicating the presence of petroleum hydrocarbons. Six ten-foot soil borings are proposed for locations that have documented spills from individual tanks (Tanks 18, 19, 26, the former location of Tank 22, and the roof drain collection area between Tanks 11 and 12) and the location with the highest subsurface soil vapor concentrations at Tank 27 (Figure 9). An estimated 34 soil samples will be collected at 17 other potential areas of concern (e.g., low areas within tank dikes where historical undocumented spilled materials would have collected) as shown on Figure 9.

The six ten-foot soil borings will be drilled to a minimum depth of ten feet, or five feet below the deepest detected contamination, whichever is deeper, unless saturation is encountered at a shallower depth which will result in termination of the soil sample collection effort. The 17 shallow soil borings will terminate at a depth of 24" to 36" if completed by hand auger or at a depth of six feet at borings installed with a drilling rig, unless Western elects to extend the sampling deeper based on field screening results. The decision to use a hand auger vs. a drilling rig will be based on accessibility. 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 5.2.1. Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below in Section 5.4.

Discrete soil samples will be collected for laboratory analyses from within the following intervals:

- 0-6" (at soil borings with evidence of significant impacts near the land surface);
- 6-24" (all soil borings);

- > 24" (from the interval in each soil boring with the greatest apparent degree of contamination, based on field observations and field screening);
- From the 6" interval at the top of saturation (applicable only to borings that reach saturation); and
- Any additional intervals as determined based on field screening results.

Quality Assurance/Quality Control (QA/QC) samples will be collected to monitor the validity of the soil sample collection procedures as follows:

- Four field duplicates will be collected.

5.2.1 Soil Sample Field Screening and Logging

Samples obtained from the borings will be screened in the field on 2.5 foot intervals for evidence of contaminants. Field screening results will be recorded on the exploratory boring logs and will be used to aid in the selection of soil samples for laboratory analysis. The primary screening methods include: (1) visual examination, (2) olfactory examination, and (3) headspace vapor screening for volatile organic compounds. Additional screening for site- or release-specific characteristics such as pH or for specific compounds using field test kits may be conducted where appropriate.

Visual screening includes examination of soil samples for evidence of staining caused by petroleum-related compounds or other substances that may cause staining of natural soils such as elemental sulfur or cyanide compounds. Headspace vapor screening targets volatile organic compounds and involves placing a soil sample in a plastic sample bag or a foil sealed container allowing space for ambient air. The container will be sealed and then shaken gently to expose the soil to the air trapped in the container. The sealed container will be allowed to rest for a minimum of 5 minutes while vapors equilibrate. Vapors present within the sample bag's headspace will then be measured by inserting the probe of the instrument in a small opening in the bag or through the foil. The maximum value and the ambient air temperature will be recorded on the field boring log for each sample.

The monitoring instruments will be calibrated each day to the manufacturer's standard for instrument operation. A photo-ionization detector (PID) equipped with a 10.6 or higher electron volt (eV) lamp or a combustible gas indicator will be used for VOC field screening. Field screening results may be site-and boring-specific and the results may vary with instrument type, the media screened, weather conditions, moisture content, soil type, and type of contaminant. Conditions capable of influencing the results of field screening will be recorded on the field logs.

The physical characteristics of the samples (such as mineralogy, ASTM soil classification, moisture content, texture, color, presence of stains or odors, and/or field screening results), depth where each sample was obtained, method of sample collection, and other observations will be recorded in the field log by a qualified geologist or engineer. Detailed logs of each boring will be completed in the field by a qualified engineer or geologist. Additional information, such as the presence of water-bearing zones and any unusual or noticeable conditions encountered during drilling, will be recorded on the logs.

5.3 Groundwater Water Monitoring

5.3.1 Groundwater Levels

Groundwater level and SPH thickness measurements will be obtained at the new monitoring wells 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 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.

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 and Vadose Zone Vapor Sampling

Groundwater has been sampled at monitoring wells located within and adjacent to the tank farm and analyzed for potential site-related constituents from as early as 1984. Based on the fact that there are numerous wells that provide information on water quality across the tank farm, only two new permanent monitoring wells are proposed for the northeast corner of the tank farm as shown on Figure 9. In addition, if any of the other soil borings encounter groundwater, then a groundwater sample will be collected for analysis prior to plugging the boring.

The new permanent monitoring wells will be developed once all new soil borings have been completed or possibly earlier. Groundwater samples will initially be obtained from the newly constructed monitoring wells no later than five days after the completion of well development. Prior to collection of groundwater samples from the new monitoring wells, a total well vapor sample will be field monitored for percent carbon dioxide and oxygen. Pursuant to Section VIII.A.8. of the Order, the vapor monitoring will be conducted by sealing the top of the well with a cap containing a sample port. Polyethylene tubing will be used to connect the sample port to a low-velocity pump, if necessary, or directly to a field instrument that is capable of measuring percent carbon dioxide and oxygen. The field vapor measurements, date and time of each measurement, and the instrument used will be recorded on a vapor monitoring data sheet.

A second round of groundwater 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.

5.3.3 Well Purging

The new permanent monitoring wells 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 the 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 containers prepared 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 one sample per sampling event at permanent monitoring wells; and
- 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.

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+

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 based on the historical operations at individual locations. The quality of data required is consistent across locations and is specified in Section VIII.D.7.c of the Order. In general, method detection limits should be 20% or less of the applicable background levels, cleanup standards and screening levels.

Additional DQOs include precision, accuracy, representativeness, completeness, and comparability. Precision is a measurement of the reproducibility of measurements under a given set of circumstances and is commonly stated in terms of standard deviation or coefficient of variation (EPA, 1987). Precision is also specific to sampling activities and analytical performance. Sampling precision will be evaluated through the analyses of duplicate field samples and laboratory replicates will be utilized to assess laboratory precision.

Accuracy is a measurement in the bias of a measurement system and may include many sources of potential error, including the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques (EPA, 1987). An evaluation of the accuracy will be performed by reviewing the results of field/trip blanks, matrix spikes, and laboratory QC samples.

Representativeness is an expression of the degree to which the data accurately and precisely represent the true environmental conditions. Sample locations and the number of samples have been selected to ensure the data is representative of actual environmental conditions. Based on SWMU specific conditions, this may include either biased (i.e., judgmental) locations/depths or unbiased (systematic grid samples) locations, as discussed in Section 5.2 for soils 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.

Section 6
Monitoring and Sampling Program

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, 2000, Guidance on Choosing a Sampling Design for Environmental Data Collection, EPA/240/R-02/005, EPA QA/G-5S, 168 p.

EPA, 2006, Guidance on Systematic Planning Using the Data Quality Objectives Process, United States Environmental Protection Agency, Office of Environmental Information; EPA/240/B-06/001, p. 111.

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

NMED, 2007, State of New Mexico Environment Department v. San Juan Refining Company and Giant Industries, Inc.; Order July 27, 2007, p. 133.

Tables

Table 1
Subsurface Soil Vapor Concentrations
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

SAMPLE ID	PROBE HOLE	DEPTH (FEET)	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	m&p-XYLENE	o- XYLENE	TVOC	COMMENTS
BLANK-01	NA	NA	12/9/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-02	NA	NA	12/9/93	<1	<1	<1	<1	<1	0	QC-Probe Rod Blank
SG-09	PH-05	3	12/9/93	<1	<1	<1	<1	<1	0	
SG-10	PH-05	8	12/9/93	<1	<1	<1	<1	<1	1	
SG-10(D)	PH-05	8	12/9/93	<1	<1	<1	<1	<1	1	QC-Injection Duplicate
BLANK-03	NA	NA	12/9/93	<1	<1	<1	<1	<1	0	QC-System Blank
SG-11	PH-06	3	12/9/93	<1	<1	<1	<1	<1	0	
SG-12	PH-06	7.5	12/9/93	<1	<1	<1	<1	<1	3	
SG-13	PH-07	3	12/9/93	<1	<1	<1	<1	<1	1	
SG-14	PH-07	9	12/9/93	<1	<1	<1	<1	<1	1	
SG-15	PH-08	3	12/9/93	<1	<1	<1	<1	<1	0	
SG-16	PH-08	8	12/9/93	<1	<1	<1	<1	<1	0	
SG-17	PH-09	3	12/9/93	<1	1	<1	<1	<1	2	
SG-18	PH-09	10	12/9/93	<1	<1	<1	<1	<1	0	
SG-19	PH-10	3	12/9/93	<1	<1	<1	<1	<1	0	
SG-20	PH-10	10	12/9/93	<1	<1	<1	<1	<1	0	
SG-20(D)	PH-10	10	12/9/93	<1	<1	<1	<1	<1	0	QC-Duplicate Injection
BLANK-04	NA	NA	12/9/93	<1	<1	<1	<1	<1	0	QC-System Blank
SG-21	PH-11	3	12/9/93	<1	<1	<1	<1	<1	1	
SG-22	PH-11	10	12/9/93	<1	<1	<1	<1	<1	3	
SG-23	PH-12	3	12/9/93	<1	<1	<1	<1	<1	1	
SG-24	PH-12	10	12/9/93	<1	<1	<1	<1	<1	1	
SG-25	PH-13	3	12/9/93	<1	<1	<1	<1	<1	0	
SG-26	PH-13	10	12/9/93	<1	<1	<1	<1	<1	0	
SG-27	PH-14	3	12/9/93	<1	<1	<1	<1	<1	1	
SG-28	PH-14	10	12/9/93	<1	<1	<1	<1	<1	0	

Table 1
Subsurface Soil Vapor Concentrations
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

SAMPLE ID	PROBE HOLE	DEPTH (FEET)	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	m&p-XYLENE	o- XYLENE	TVOC	COMMENTS
SG-28(D)	PH-14	10	12/9/93	<1	<1	<1	<1	<1	0	QC-Duplicate Injection
BLANK-05	NA	NA	12/9/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-06	NA	NA	12/10/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-07	NA	NA	12/10/93	<1	<1	<1	<1	<1	0	QC-Probe Rod Blank
SG-29	PH-15	3	12/10/93	<1	2	<1	<1	<1	25	
SG-30	PH-15	9	12/10/93	<1	61	<1	19	9	1108	
SG-31	PH-16	3	12/10/93	<1	<1	<1	<1	<1	0	
SG-32	PH-16	9	12/10/93	<1	<1	<1	<1	<1	0	
SG-33	PH-17	3	12/10/93	<1	<1	<1	<1	<1	0	
SG-34	PH-17	9	12/10/93	<1	<1	<1	1	<1	2	
SG-35	PH-18	3	12/10/93	<1	2	<1	1	<1	3	
SG-36	PH-18	9	12/10/93	<1	<1	<1	<1	<1	0	
SG-37	PH-19	3	12/10/93	<1	3	<1	2	<1	3	
SG-38	PH-19	9	12/10/93	<1	<1	<1	<1	<1	0	
SG-38(D)	PH-19	9	12/10/93	<1	<1	<1	<1	<1	0	QC-Duplicate Injection
BLANK-08	NA	NA	12/10/93	<1	<1	<1	<1	<1	0	QC-System Blank
SG-39	PH-20	3	12/10/93	<1	<1	<1	<1	<1	0	
SG-40	PH-20	9	12/10/93	<1	77	13	39	14	345	
SG-41	PH-21	3	12/10/93	<1	<1	<1	<1	<1	0	
SG-42	PH-21	9	12/10/93	<1	<1	<1	<1	<1	0	
SG-43	PH-22	3	12/10/93	<1	<1	<1	<1	<1	0	
SG-44	PH-22	9	12/10/93	35	1508	199	2260	95	6474	
SG-45	PH-23	3	12/10/93	<1	11	3	8	2	23	
SG-46	PH-23	9	12/10/93	<1	2	<1	1	<1	3	
SG-47	PH-24	3	12/10/93	16	115	27	145	36	721	
SG-48	PH-24	9	12/10/93	88	271	63	331	62	1571	

Table 1
Subsurface Soil Vapor Concentrations
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

SAMPLE ID	PROBE HOLE	DEPTH (FEET)	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	m&p-XYLENE	o- XYLENE	TVOC	COMMENTS
SG-48(D)	PH-24	9	12/10/93	91	272	60	313	60	1547	QC-Duplicate Injection
BLANK-09	NA	NA	12/10/93	<1	<1	<1	<1	<1	0	QC-System Blank
SG-49	PH-25	3	12/10/93	91	76	9	55	7	41	
SG-50	PH-25	9	12/10/93	447	532	82	538	61	2519	
SG-51	PH-26	3	12/10/93	1	<1	2	11	2	36	
SG-52	PH-26	9	12/10/93	27	14	<1	16	2	97	
SG-52(D)	PH-26	9	12/10/93	27	15	1	17	2	100	QC-Duplicate Injection
BLANK-10	NA	NA	12/10/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-11	NA	NA	12/11/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-12	NA	NA	12/11/93	<1	<1	<1	<1	<1	0	QC-Probe Rod Blank
SG-53	PH-27	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-54	PH-27	9	12/11/93	<1	<1	<1	<1	<1	1	
SG-55	PH-28	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-56	PH-28	9	12/11/93	<1	<1	<1	<1	<1	0	
SG-57	PH-29	3	12/11/93	<1	<1	<1	1	<1	1	
SG-58	PH-29	9	12/11/93	<1	<1	<1	<1	<1	0	
SG-61	PH-31	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-62	PH-31	9	12/11/93	<1	<1	<1	<1	<1	0	
SG-62(D)	PH-31	9	12/11/93	<1	<1	<1	<1	<1	0	QC-Duplicate Injection
BLANK-13	NA	NA	12/11/93	<1	<1	<1	<1	<1	0	QC-System Blank
SG-63	PH-32	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-64	PH-32	9	12/11/93	<1	<1	<1	2	<1	2	
SG-65	PH-33	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-66	PH-33	10	12/11/93	<1	<1	<1	<1	<1	0	
SG-67	PH-34	3	12/11/93	<1	<1	<1	<1	<1	1	

Table 1
Subsurface Soil Vapor Concentrations
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

SAMPLE ID	PROBE HOLE	DEPTH (FEET)	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	m&p-XYLENE	o- XYLENE	TVOC	COMMENTS
SG-68	PH-34	9	12/11/93	<1	<1	<1	<1	<1	0	
SG-71	PH-36	3	12/11/93	<1	<1	<1	<1	<1	0	
SG-72	PH-36	9	12/11/93	7	6	2	12	<1	35	
SG-72(D)	PH-36	9	12/11/93	7	7	2	12	<1	37	QC-Duplicate Injection
BLANK-14	NA	NA	12/11/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-15	NA	NA	12/12/93	<1	<1	<1	<1	<1	0	QC-System Blank
BLANK-16	NA	NA	12/12/93	<1	<1	<1	<1	<1	0	QC-Probe Rod Blank
SG-78	PH-40	3	12/12/93	<1	<1	<1	<1	<1	0	
SG-79	PH-40	8.5	12/12/93	<1	<1	<1	<1	<1	0	
SG-80	PH-41	3	12/12/93	<1	<1	<1	<1	<1	0	
SG-81	PH-41	8.5	12/12/93	<1	<1	<1	<1	<1	0	
SG-82	PH-42	3	12/12/93	<1	<1	<1	<1	<1	0	
SG-83	PH-42	9	12/12/93	<1	<1	<1	<1	<1	0	
SG-83(D)	PH-42	9	12/12/93	<1	<1	<1	<1	<1	0	QC-Duplicate Injection
BLANK-17	NA	NA	12/12/93	<1	<1	<1	<1	<1	0	QC-System Blank

Notes:
NA = Not applicable
QC = Quality Control
D = Duplicate analysis
<1 = Not detected at lower quanitfiable limit
units = Micrograms per liter of headspace vapor analyzed
TVOC = Total volatile organic content

Table 2
Historical Groundwater Analyses
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Sample Location	Date	Benzene	Toluene	EthylBenzene	Xylene	MTBE	Acenaphthene	Bis(2-ethylexyl) phthalate	2,4 Dimethyl phenol	Fluorene	2-Methylnaph thalene	Naphthalene	Phenanthrene	Phenol	Arsenic	Barium	Cadmium	Calcium	Chromium
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Screening Level (mg/l)		0.005 [2]	0.75 [1]	0.7 [2]	0.62 [1]	0.012 [3]	2.2 [3]	0.006 [3]	0.73 [3]	1.5 [3]	0.15 [3]	0.14 [3]	--	0.005 [1]	0.01 [2]	1 [1]	0.005 [2]	--	0.05 [1]
MW-3	Apr-99	0.005	ND	0.005	0.029	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Oct-99	ND	0.001	ND	ND	--	--	--	--	--	--	ND	--	--	--	--	--	--	--
	Sep-00	ND	ND	ND	ND	--	--	--	--	--	--	ND	--	--	--	--	--	--	--
	Sep-01	ND	ND	ND	ND	--	--	--	--	--	--	ND	--	--	--	--	--	--	--
	Aug-02	<0.001	<0.001	<0.001	0.003	NR[2]	--	--	--	--	--	ND	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Aug-03	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--	<0.02	0.3	<0.002	490	<0.006
	Mar-04	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	--	--	--	--	--	--	--	--	NS[1]	NS[1]	NS[1]	--	NS[1]
	Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-05	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--	<0.020	0.018	<0.002	480	<0.006
	Apr-06	<0.001	<0.001	<0.001	<0.003	<0.0025	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-06	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	--	--	--	--	--	--	--	--	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Apr-07	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-07	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	--	--	--	--	--	--	--	--	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Apr-08	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-08	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	--	--	--	--	--	--	--	--	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
RW-15	Apr-99	14	25	6.9	35.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Oct-99	7.4	9.2	2.7	17.1	--	--	--	--	--	--	0.59	--	--	--	--	--	--	--
	Sep-00	7.6	14	3.3	14	--	--	--	--	--	--	0.89	--	--	--	--	--	--	--
	Sep-01	9	17	4.4	25	--	--	--	--	--	--	0.82	--	--	--	--	--	--	--
	Aug-02	12	19	3.8	22	NR[2]	--	--	--	--	--	0.58	--	--	NR[2]	NR[2]	NR[2]	--	NR[2]
	Aug-03	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	NR[2]	NR[2]	NR[2]	--	NR[2]
	Mar-04	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-04	9.4	15	2.8	22	<0.25	--	--	--	--	--	--	--	--	<0.020	1.2	<0.002	--	<0.006
	Apr-05	9.0	11.0	2.5	19.0	<0.10	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-05	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	NR[1]	NR[1]	NR[1]	--	NR[1]
	Apr-06	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-06	20.0	20.0	7.2	43.0	<0.38	--	--	--	--	--	--	--	--	NR[2]	NR[2]	NR[2]	--	<0.006
	Apr-07	6.8	2.9	3	15	<0.62	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-07	6.9	6.2	3.5	20	0.03	<0.05	<0.075	0.078	<0.05	0.33	0.35	0.068	0.11	<0.020	1.8	<0.002	--	<0.006
	Apr-08	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-08	6.0	1.0	4.1	21.0	0.03	<0.01	<0.01	0.013	<0.01	0.079	0.28	<0.01	0.018	<0.020	1.5	<0.002	--	<0.006
RW-17	Aug-02	1.9	ND	1.3	11	--	--	--	--	--	--	1.4	--	--	--	--	--	--	--

Table 2
Historical Groundwater Analyses
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Sample Location	Date	Benzene	Toluene	EthylBenzene	Xylene	MTBE	Acenaphthene	Bis(2-ethylexyl) phthalate	2,4 Dimethyl phenol	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Phenol	Arsenic	Barium	Cadmium	Calcium	Chromium
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Screening Level (mg/l)		0.005 [2]	0.75 [1]	0.7 [2]	0.62 [1]	0.012 [3]	2.2 [3]	0.006 [3]	0.73 [3]	1.5 [3]	0.15 [3]	0.14 [3]	--	0.005 [1]	0.01 [2]	1 [1]	0.005 [2]	--	0.05 [1]
MW-21	Aug-02	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	NR[2]	NR[2]	NR[2]	--	NR[2]
	Aug-03	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	NR[1]	NR[1]	NR[1]	--	NR[1]
	Mar-04	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-04	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	<0.020	0.029	<0.0020	--	<0.0060
	Apr-05	**0.13**	<0.0025	0.025	0.028	**0.041**	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-05	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	NR[1]	NR[1]	NR[1]	--	NR[1]
	Apr-06	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-06	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	NR[1]	NR[1]	NR[1]	--	NR[1]
	Aug-07	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	NR[1]	NR[1]	NR[1]	--	NR[1]
	Apr-08	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-08	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	--	--	--	--	--	--	--	--	NR[1]	NR[1]	NR[1]	--	NR[1]
MW-29	Aug-02	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	NR[2]	NR[2]	NR[2]	--	NR[2]
	Aug-03	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	NR[2]	NR[2]	NR[2]	--	NR[2]
	Mar-04	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-04	<0.0005	<0.0005	<0.0005	<0.0005	0.0026	--	--	--	--	--	--	--	--	<0.020	0.039	<0.002	--	<0.006
	Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	0.0037	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-05	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	NR[1]	NR[1]	NR[1]	--	NR[1]
	Apr-06	<0.001	<0.001	<0.001	<0.003	0.0045	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-06	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	NR[2]	NR[2]	NR[2]	--	NR[2]
	Apr-07	<0.001	<0.001	<0.001	<0.002	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-07	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	--	--	--	--	--	--	--	--	NS[3]	NS[3]	NS[3]	--	NS[3]
	Apr-08	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-08	<0.001	<0.001	<0.001	<0.0015	0.001	--	--	--	--	--	--	--	--	<0.020	0.072	<0.0020	--	<0.0060
MW-30	Aug-02	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	NR[2]	NR[2]	NR[2]	--	NR[2]
	Aug-03	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	NR[2]	NR[2]	NR[2]	--	NR[2]
	Mar-04	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-04	**1.7**	0.37	**1.9**	**2.5**	<0.10	--	--	--	--	--	--	--	--	<0.020	0.24	<0.002	--	0.0073
	Apr-05	**5.7**	**3.7**	**4.4**	**12.0**	<0.10	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-05	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	NR[2]	NR[2]	NR[2]	--	NR[2]
	Apr-06	**3.5**	**1.4**	**2.6**	**6.8**	<0.620	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-06	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	--	--	--	--	--	--	--	--	NR[2]	NR[2]	NR[2]	--	NR[2]
	Aug-07	**6.0**	**2.9**	**4.0**	**16.0**	<0.02	<0.01	<0.015	<0.01	<0.01	0.14	**0.44**	<0.01	<0.01	<0.020	0.89	<0.002	--	<0.006
	Apr-08	**6.0**	**2.4**	**3.5**	**13.0**	<0.15	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-08	**6.7**	**6.7**	**4.5**	**18.0**	<0.1	<0.01	<0.01	0.019	<0.01	**0.21**	**0.59**	<0.01	<0.01	<0.020	0.72	<0.0020	--	<0.0060

Table 2
Historical Groundwater Analyses
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Sample Location	Date	Benzene	Toluene	EthylBenzene	Xylene	MTBE	Acenaphthene	Bis(2-ethylexyl) phthalate	2,4 Dimethyl phenol	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Phenol	Arsenic	Barium	Cadmium	Calcium	Chromium
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Screening Level (mg/l)		0.005 [2]	0.75 [1]	0.7 [2]	0.62 [1]	0.012 [3]	2.2 [3]	0.006 [3]	0.73 [3]	1.5 [3]	0.15 [3]	0.14 [3]	--	0.005 [1]	0.01 [2]	1 [1]	0.005 [2]	--	0.05 [1]
MW-31	Aug-02	NR^2	NR^2	NR^2	NR^2	NR^2	--	--	--	--	--	--	--	--	NR^2	NR^2	NR^2	--	NR^2
	Aug-03	NR^2	NR^2	NR^2	NR^2	NR^2	--	--	--	--	--	--	--	--	NR^2	NR^2	NR^2	--	NR^2
	Mar-04	NR^2	NR^2	NR^2	NR^2	NR^2	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-04	3.7	0.4	0.32	1.2	<0.25	--	--	--	--	--	--	--	--	<0.02	0.35	<0.002	--	<0.0088
	Apr-05	2.6	0.0062	0.45	1.2	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-05	NR^2	NR^2	NR^2	NR^2	NR^2	--	--	--	--	--	--	--	--	NR^2	NR^2	NR^2	--	NR^2
	Apr-06	6.1	1.5	0.94	4.5	<0.120	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-06	NR^2	NR^2	NR^2	NR^2	NR^2	--	--	--	--	--	--	--	--	NR^2	NR^2	NR^2	--	NR^2
	Apr-07	4.3	<0.10	1.4	4.7	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-07	NS^3	NS^3	NS^3	NS^3	NS^3	--	--	--	--	--	--	--	--	NS^2	NS^2	NS^2	--	NS^2
	Apr-08	NS^2	NS^2	NS^2	NS^2	NS^2	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-08	4.0	0.018	1.4	3.0	<0.01	--	--	--	--	--	--	--	--	<0.020	1.1	<0.0020	--	<0.0060
MW-44	Aug-02	NR^2	NR^2	NR^2	NR^2	NR^2	--	--	--	--	--	--	--	--	NR^2	NR^2	NR^2	--	NR^2
	Aug-03	NR^2	NR^2	NR^2	NR^2	NR^2	--	--	--	--	--	--	--	--	NR^2	NR^2	NR^2	--	NR^2
	Mar-04	NR^2	NR^2	NR^2	NR^2	NR^2	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-04	<0.0005	<0.0005	<0.0005	<0.0005	0.0048	--	--	--	--	--	--	--	--	<0.020	0.084	<0.0020	--	0.1
	Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	0.0041	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-05	NR^2	NR^2	NR^2	NR^2	NR^2	--	--	--	--	--	--	--	--	NR^1	NR^1	NR^1	--	NR^1
	Apr-06	<0.001	<0.001	<0.001	<0.003	0.0028	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-06	NR^2	NR^2	NR^2	NR^2	NR^2	--	--	--	--	--	--	--	--	NR^2	NR^2	NR^2	--	NR^2
	Apr-07	<0.001	0.006	0.003	0.034	<0.0025	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-07	NS^3	NS^3	NS^3	NS^3	NS^3	--	--	--	--	--	--	--	--	NS^3	NS^3	NS^3	--	NS^3
	Apr-08	NS^2	NS^2	NS^2	NS^2	NS^2	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-08	<0.001	<0.001	<0.001	<0.0015	0.0018	--	--	--	--	--	--	--	--	<0.020	<0.020	<0.0020	--	<0.0060

NS^1= Well is Dry or Not Enough Water to Sample- No Sample
NS^2 = Not Sampled due to approved Facility-Wide Monitoring Plan
NS^3 = Sample Inadvertently not Collected this Sampling Event
NR^1= No Sample Required - Well Contains Separate Phase Hydrocarbon
NR^2 = No Sample Required per OCD and NMED pre-2007 Conditions
1 - New Mexico Water Quality Control Commission Standard for Ground Water
2 - Safe Drinking Water Act Maximum Contaminant Level
3 - EPA Region VI Human Health Medium-Specific Screening Levels -Tap Water

Table 2
Historical Groundwater Analyses
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Sample Location	Date	Copper	Iron	Lead	Magnesium	Manganese	Potassium	Selenium	Silver	Mercury	DRO	GRO	Fluoride	Chloride	Nitrite	Bromide	NO3	Phosphorus	Sulfate	CO2	ALK
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Screening Level (mg/l)		--	1 [1]	0.015 [2]	--	0.2 [1]	--	0.05 [1]	0.05 [1]	0.002 [1]	1.72 [1]	--	--	250 [1]	1 [2]	--	10 [2]	--	600 [1]	--	--
MW-3	Apr-99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Oct-99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**15.5**	--	--	--	--
	Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**41**	--	**980**	--	--
	Sep-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Aug-02	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Aug-03	<0.006	0.27	<0.005	140	**0.58**	10	0.024	<0.005	--	NR[2]	NR[2]	0.17	**1400**	**41**	22	NS[1]	<0.50	NS[1]	NS[1]	--
	Mar-04	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-04	--	--	NS[1]	--	--	--	NS[1]	NS[1]	NS[1]	NR[2]	NR[2]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Apr-05	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-05	<0.006	0.047	<0.005	130	**0.43**	7.6	<0.050	<0.005	--	NR[2]	NR[2]	0.33	**1200**	<0.50	4.5	**42**	<0.50	**2300**	680	680
	Apr-06	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-06	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Apr-07	--	--	--	--	--	--	--	--	--	NS[1]	NS[1]	--	--	--	--	--	--	--	--	--
	Aug-07	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[2]	NS[2]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Apr-08	--	--	--	--	--	--	--	--	--	NS[1]	NS[1]	--	--	--	--	--	--	--	--	--
	Aug-08	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
RW-15	Apr-99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Oct-99	--	**23.8**	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	--
	Sep-00	--	**3.42**	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	2.26	--	--
	Sep-01	--	**5.7**	--	--	--	--	--	--	--	--	--	--	--	--	--	4.2	--	ND	--	--
	Aug-02	--	**5.2**	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	4.9	NR[2]	50	NR[2]	NR[2]
	Aug-03	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Mar-04	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-04	--	--	<0.005	--	--	--	<0.05	<0.005	<0.0002	NR[2]	NR[2]	0.3	**460**	<0.10	6.7	<0.10	<0.50	3.4	1100	NR[2]
	Apr-05	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-05	--	--	NR[1]	--	--	--	NR[1]	NR[1]	NR[1]	NR[2]	NR[2]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-06	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-06	--	--	<0.005	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	<0.50	**370**	<0.50	7.6	NS[2]	<2.5	<2.5	1200	1200
	Apr-07	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-07	--	--	<0.005	--	--	--	<0.05	<0.005	<0.0002	NR[2]	NR[2]	0.32	**400**	<2.0	8.4	<0.10	<0.50	<0.50	1300	1300
	Apr-08	--	--	--	--	--	--	--	--	--	NS[2]	NS[2]	--	--	--	--	--	--	--	--	--
	Aug-08	--	--	NR[2]	--	--	--	<0.05	<0.005	<0.0002	**2.3**	62	0.29	**420**	<2.0	7.8	<0.10	<0.50	0.76	1200	1200
RW-17	Aug-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2
Historical Groundwater Analyses
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Sample Location	Date	Copper	Iron	Lead	Magnesium	Manganese	Potassium	Selenium	Silver	Mercury	DRO	GRO	Fluoride	Chloride	Nitrite	Bromide	NO3	Phosphorus	Sulfate	CO2	ALK
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Screening Level (mg/l)		--	1[1]	0.015[2]	--	0.2[1]	--	0.05[1]	0.05[1]	0.002[1]	1.72[1]	--	--	250[1]	1[2]	--	10[2]	--	600[1]	--	--
MW-21	Aug-02	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Aug-03	--	--	NR[1]	--	--	--	NR[1]	NR[1]	NR[1]	NR[2]	NR[2]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Mar-04	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-04	--	--	<0.005	--	--	--	<0.05	<0.005	<0.0002	NR[2]	NR[2]	0.18	**420**	<0.10	3.4	<0.10	<0.50	**1400**	600	NR[2]
	Apr-05	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-05	--	--	NR[1]	--	--	--	NR[1]	NR[1]	NR[1]	NR[2]	NR[2]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-06	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-06	--	--	NR[1]	--	--	--	NR[1]	NR[1]	NR[1]	NR[2]	NR[2]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-07	--	--	NR[1]	--	--	--	NR[1]	NR[1]	NR[1]	NR[2]	NR[2]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-08	--	--	--	--	--	--	--	--	--	NS[2]	NS[2]	--	--	--	--	--	--	--	--	--
	Aug-08	--	--	NR[1]	--	--	--	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
MW-29	Aug-02	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Aug-03	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Mar-04	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-04	--	--	<0.005	--	--	--	<0.05	<0.005	<0.0002	NR[2]	NR[2]	0.31	35	<0.10	<0.10	0.6	<0.50	150	210	NR[2]
	Apr-05	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-05	--	--	NR[1]	--	--	--	NR[1]	NR[1]	NR[1]	NR[2]	NR[2]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-06	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-06	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Apr-07	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-07	--	--	NS[3]	--	--	--	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]
	Apr-08	--	--	--	--	--	--	--	--	--	NS[2]	NS[2]	--	--	--	--	--	--	--	--	--
	Aug-08	--	--	<0.0050	--	--	--	<0.25	<0.0050	<0.00020	<1.0	<0.05	0.36	57	<0.10	0.4	0.99	<0.50	160	200	210
MW-30	Aug-02	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Aug-03	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Mar-04	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-04	--	--	0.011	--	--	--	<0.05	<0.005	0.0002	NR[2]	NR[2]	0.18	**360**	<0.10	5.6	<0.10	<0.50	**720**	1200	NR[2]
	Apr-05	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-05	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Apr-06	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-06	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Aug-07	--	--	<0.005	--	--	--	<0.05	<0.005	<0.0002	NR[2]	NR[2]	0.17	240	<0.10	4.7	<0.10	<0.50	76	1500	1400
	Apr-08	--	--	--	--	--	--	--	--	--	**7.3**	68	--	--	--	--	--	--	--	--	--
	Aug-08	--	--	<0.0050	--	--	--	<0.25	<0.0050	<0.00020	**6.3**	80	0.15	210	<0.10	5.6	<0.10	<0.50	12	1500	1400

Table 2
Historical Groundwater Analyses
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Sample Location	Date	Copper	Iron	Lead	Magnesium	Manganese	Potassium	Selenium	Silver	Mercury	DRO	GRO	Fluoride	Chloride	Nitrite	Bromide	NO3	Phosphorus	Sulfate	CO2	ALK
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Screening Level (mg/l)		--	1[1]	0.015[2]	--	0.2[1]	--	0.05[1]	0.05[1]	0.002[1]	1.72[1]	--	--	250[1]	1[2]	--	10[2]	--	600[1]	--	--
MW-31	Aug-02	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Aug-03	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Mar-04	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-04	--	--	<0.005	--	--	--	<0.05	<0.005	0.0002	NR[2]	NR[2]	0.19	**370**	<0.10	7.2	0.14	<0.50	**750**	1200	1400
	Apr-05	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-05	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Apr-06	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-06	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Apr-07	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-07	--	--	NS[2]	--	--	--	NS[2]	NS[2]	NS[2]	NS[3]	NS[3]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Apr-08	--	--	--	--	--	--	--	--	--	NS[2]	NS[2]	--	--	--	--	--	--	--	--	--
	Aug-08	--	--	<0.0050	--	--	--	<0.050	<0.0050	<0.00020	<1.0	<0.05	0.15	**740**	<1.0	17	<0.10	<0.50	6.4	1100	1100
MW-44	Aug-02	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Aug-03	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Mar-04	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-04	--	--	**0.036**	--	--	--	<0.05	<0.0050	0.0003	NR[2]	NR[2]	0.3	210	<0.10	0.79	<0.10	<0.50	**2800**	400	NR[2]
	Apr-05	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-05	--	--	NR[1]	--	--	--	NR[1]	NR[1]	NR[1]	NR[2]	NR[2]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-06	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-06	--	--	NR[2]	--	--	--	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Apr-07	--	--	--	--	--	--	--	--	--	NR[2]	NR[2]	--	--	--	--	--	--	--	--	--
	Aug-07	--	--	NS[3]	--	--	--	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]
	Apr-08	--	--	--	--	--	--	--	--	--	NS[2]	NS[2]	--	--	--	--	--	--	--	--	--
	Aug-08	--	--	<0.0050	--	--	--	<0.25	<0.0050	<0.00020	<1.0	<0.05	0.62	72	<0.10	0.28	<0.10	<0.50	**3000**	360	350

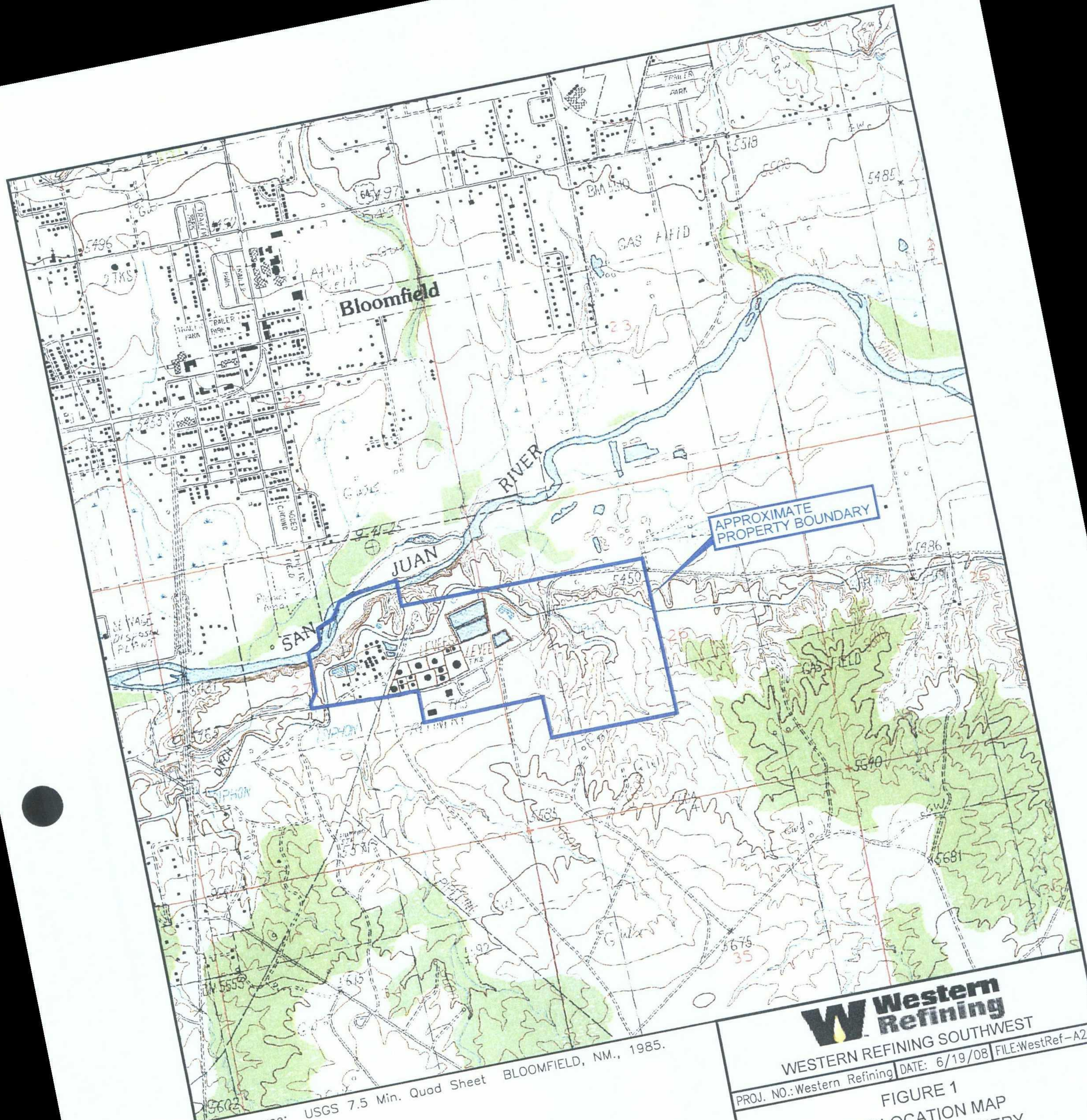
NS[1]= Well is Dry or Not
NS[2] = Not Sampled due
NS[3] = Sample Inadvert
NR[1]= No Sample Requ
NR[2] = No Sample Requ
1 - New Mexico Water
2 - Safe Drinking Water
3 - EPA Region VI Hum

Table 3
Field Measurement Summary
SWMU Group 5 Investigation Work Plan
Western Refining Southwest - Bloomfield Refinery

Well ID:	Date Sampled:	E.C. (umhos/cm)	pH (s.u.)	Temperature (deg F)	DO (mg/L)	ORP (--)
MW-3	Aug-08	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Aug-07	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Apr-07	NS[1]	NS[1]	NS[1]	NR[2]	NR[2]
	Aug-06	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
RW-15	Aug-08	3206.0	6.90	62.0	NS[2]	NS[2]
	Aug-07	3181.0	7.00	64.8	0.7	248
	Apr-07	3220.0	6.79	59.7	NR[2]	NR[2]
	Aug-06	3149.3	7.0	61.0	3.3	231.0
RW-17	Aug-08	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Aug-07	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Apr-07	3061	6.97	69.3	NR[2]	NR[2]
	Aug-06	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
MW-21	Aug-08	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-07	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-07	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-06	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
MW-29	Aug-08	917.0	7.0	62.1	NS[2]	NS[2]
	Aug-07	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Apr-07	1669	6.91	59.7	NR[2]	NR[2]
	Aug-06	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
MW-30	Aug-08	2935	6.94	65.3	NS[2]	NS[2]
	Apr-08	2930	6.82	62.2	NS[2]	NS[2]
	Aug-07	2995	6.98	65.8	1.6	209
	Apr-07	3713	6.79	60.8	NR[2]	NR[2]
	Aug-06	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
MW-31	Aug-08	4144.0	7.0	62.4	NS[2]	NS[2]
	Aug-07	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Apr-07	4024	6.96	64.0	NR[2]	NR[2]
	Aug-06	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
MW-44	Aug-08	5099.0	6.91	62.4	NS[2]	NS[2]
	Aug-07	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]
	Apr-07	5319	6.71	58.4	NR[2]	NR[2]
	Aug-06	NR[2]	NR[2]	NR[2]	NR[2]	NR[2]

Notes:
deg F = degrees Fahrenheit
E.C. = electrical conductivity
mg/L = milligrams per liter
ORP = Oxidation Reduction Potential
DO - dissolved oxygen
s.u. = standard units (recorded by portable pH meter)
NS[1]= Well is Dry or Not Enough Water to Sample- No Sample
NS[2] = Not Sampled due to approved Facility-Wide Monitoring Plan
NR[1]= No Sample Required - Well Contains Separate Phase Hydrocarbon
NR[2] = No Sample Required per OCD and NMED pre-2007 Conditions

Figures



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

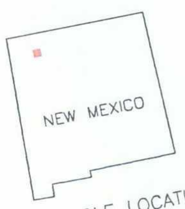
Western Refining

WESTERN REFINING SOUTHWEST

WESTERN REFINING SOUTHWEST	DATE: 6/19/08	FILE:WestRef-A25
PROJ. NO.:Western Refining		

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

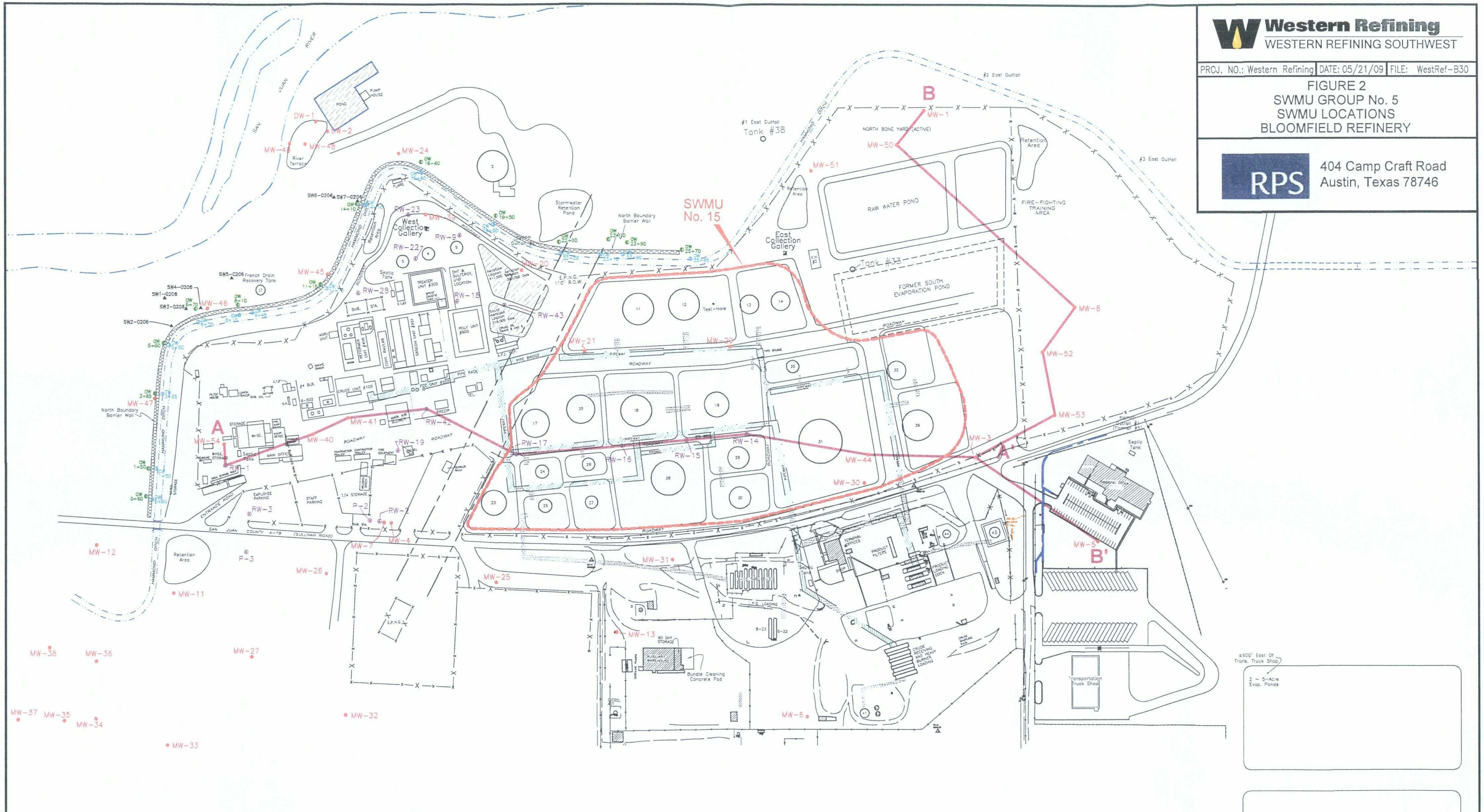
RPS
404 Camp Craft Road
Austin, Texas 78746



QUADRANGLE LOCATION

N

0 2000
SCALE IN FEET



Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 05/21/09	FILE: WestRef-B30

FIGURE 2
SWMU GROUP No. 5
SWMU LOCATIONS
BLOOMFIELD REFINERY

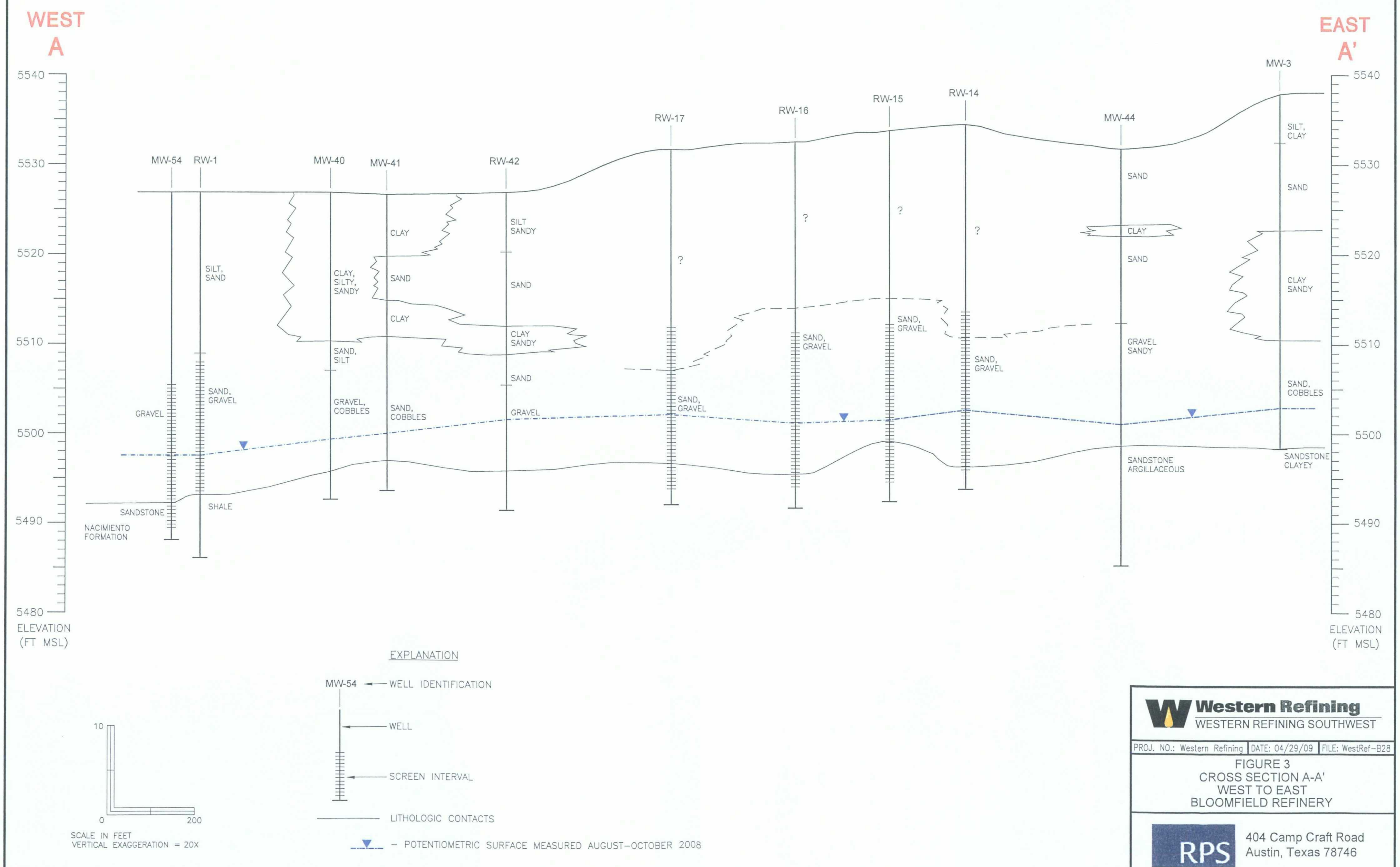
RPS
404 Camp Craft Road
Austin, Texas 78746

LEGEND

- MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- RW-1 ◉ RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
- OW 1+50 ● OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
- CW -50 ● COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
- SW1-0206 ▲ SUMP WELL LOCATION AND IDENTIFICATION NUMBER
- P-2 PIEZOMETER IDENTIFICATION
- UNDER GROUND PIPE-WAY
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- A —— A' CROSS SECTION LINE
- X — X FENCE

N

0 300
SCALE IN FEET

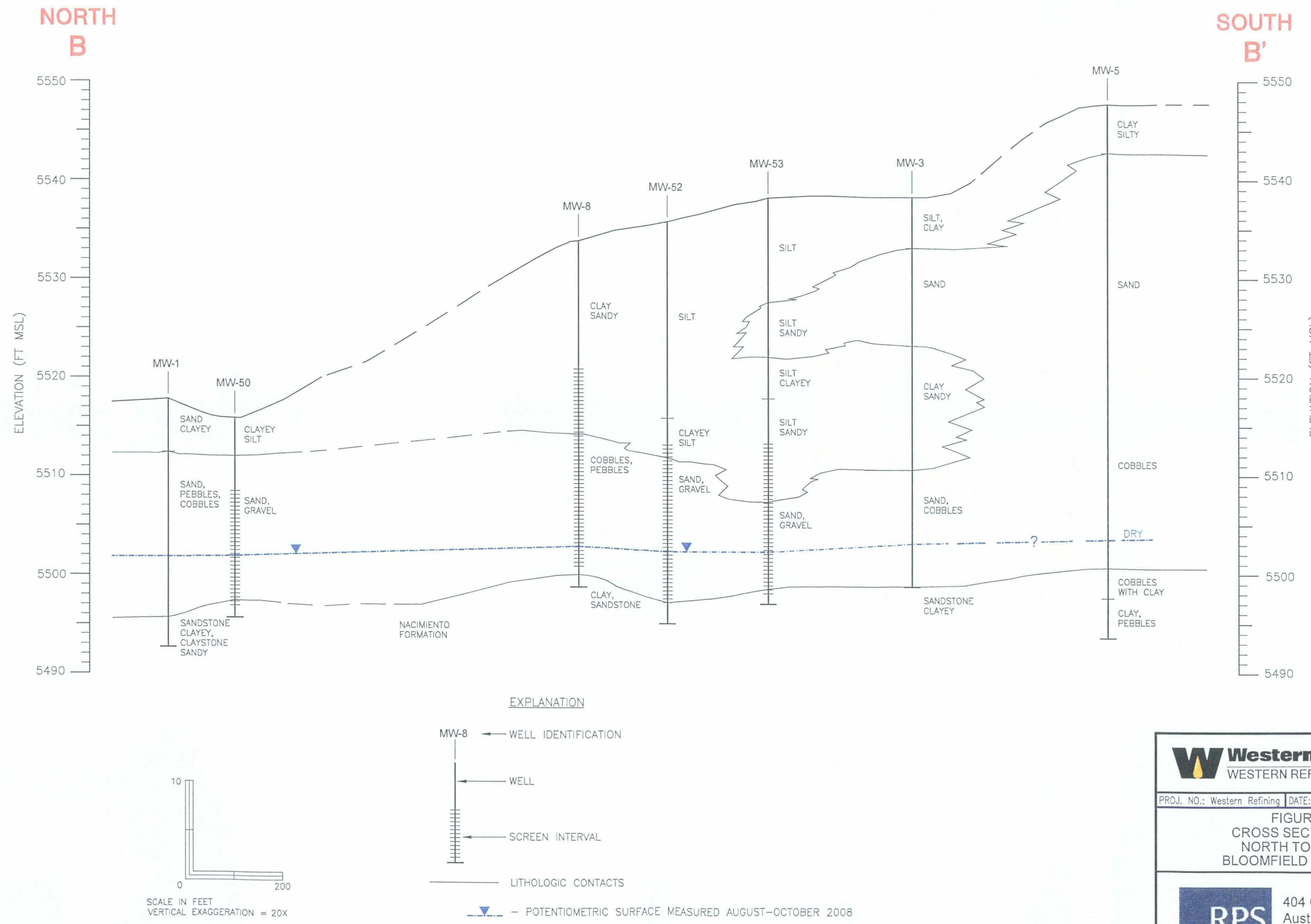


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 04/29/09	FILE: WestRef–B28

FIGURE 3
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: 04/29/09	FILE: WestRef-B29

FIGURE 4
CROSS SECTION B-B'
NORTH TO SOUTH
BLOOMFIELD REFINERY

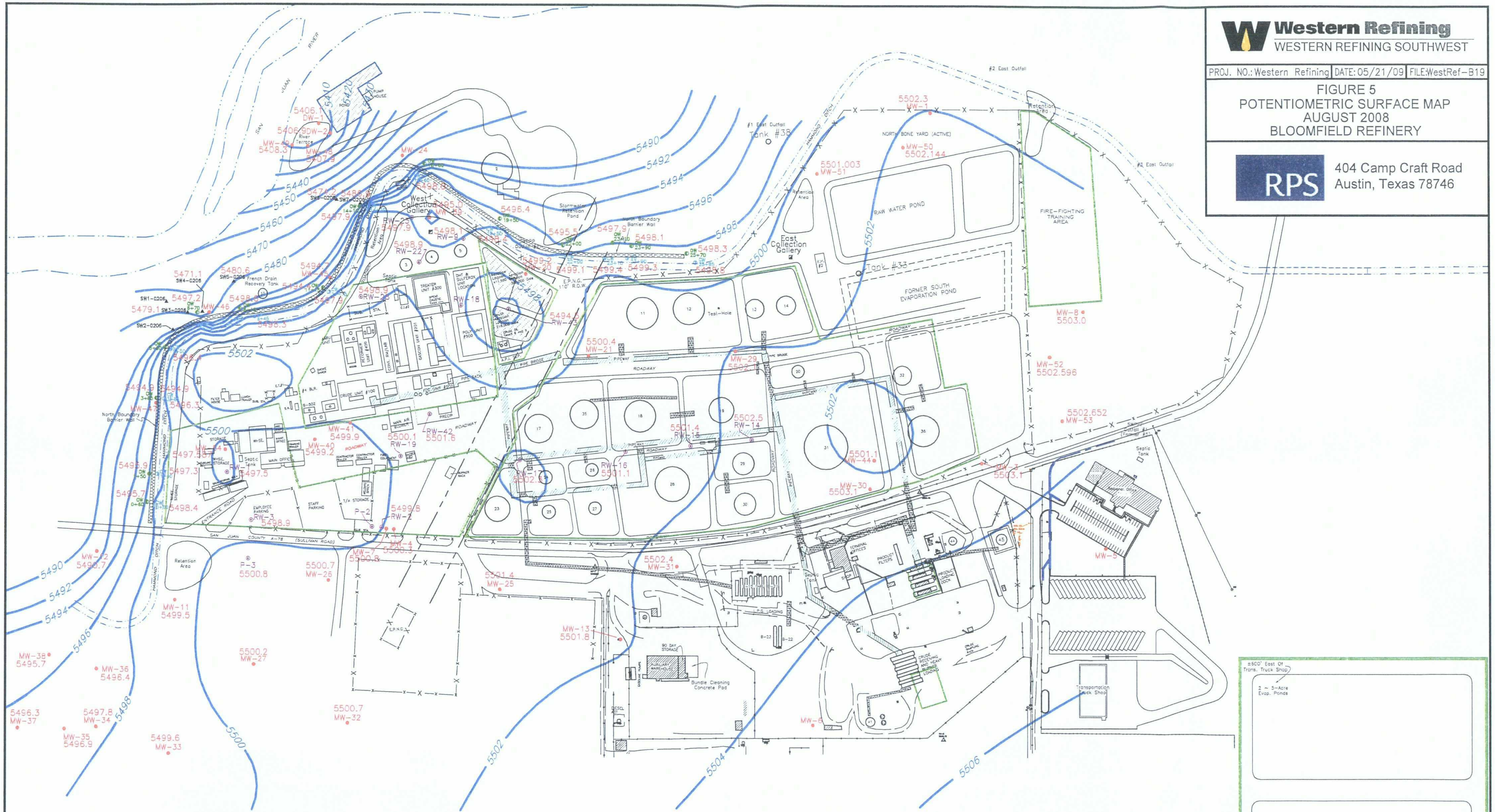
RPS
404 Camp Craft Road
Austin, Texas 78746

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 05/21/09 | FILE: WestRef-B19

FIGURE 5
POTENTIOMETRIC SURFACE MAP
AUGUST 2008
BLOOMFIELD REFINERY

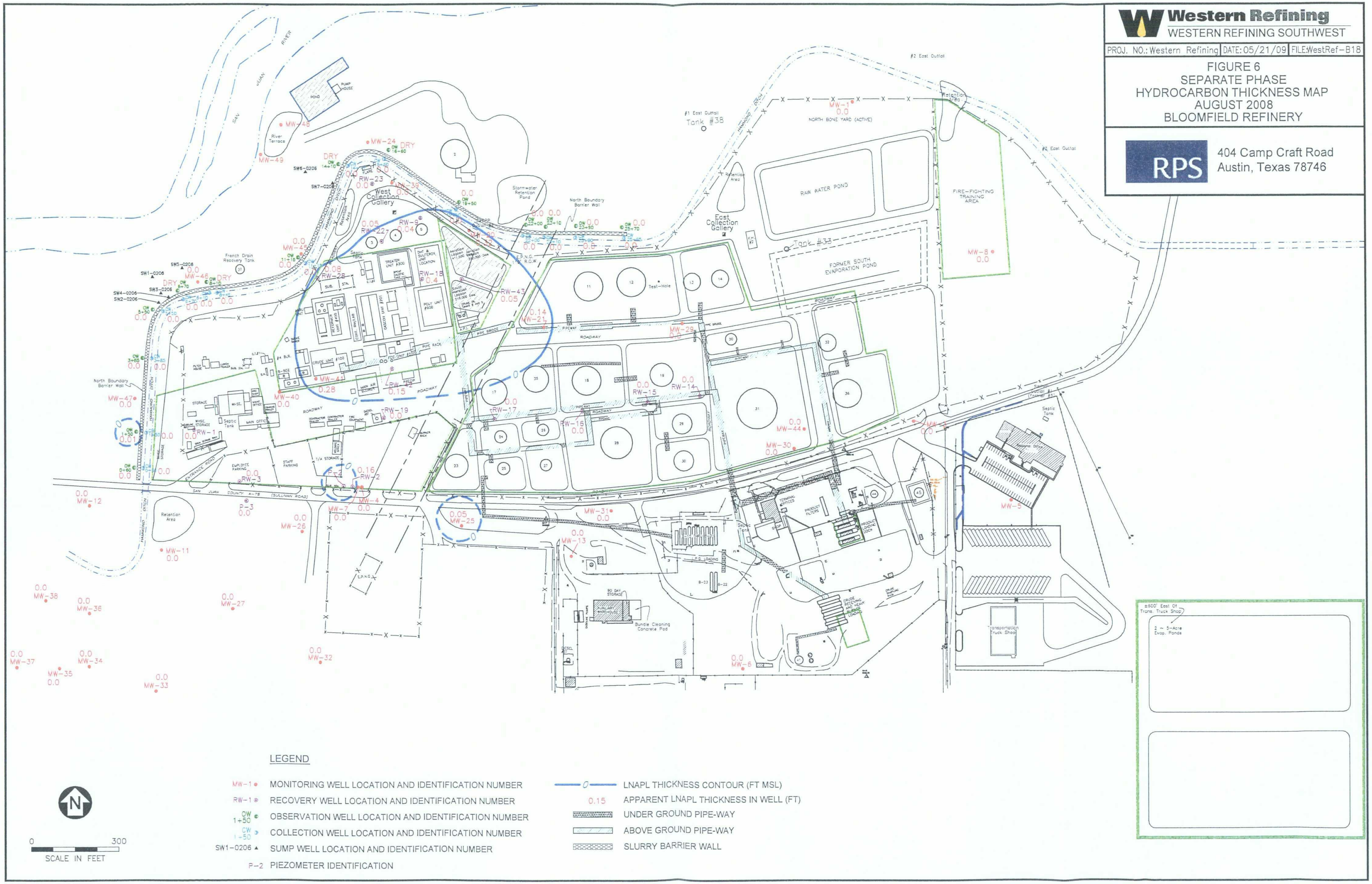
RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

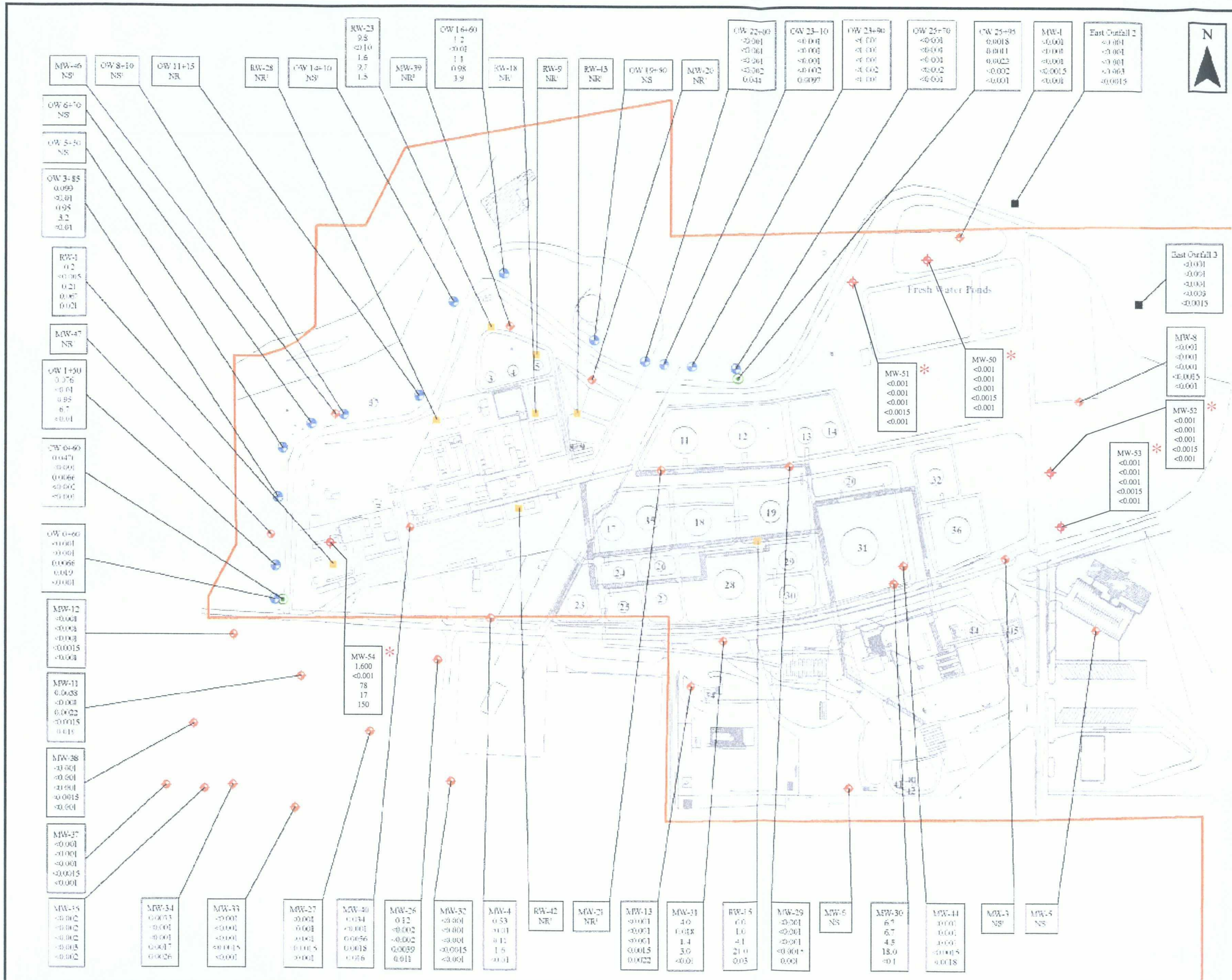
MW-1	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
RW-1	RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
OW 1+50	OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
CW 1+50	COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
SW1-0206	SUMP WELL LOCATION AND IDENTIFICATION NUMBER
P-2	PIEZOMETER IDENTIFICATION
5500	CONTOUR OF GROUNDWATER ELEVATION (FT MSL)
5502.5	GROUNDWATER ELEVATION (FT MSL) (AUGUST 2008) [MW-50 TO MW-54 MEASURED 10/28/2008]
	UNDER GROUND PIPE-WAY
	ABOVE GROUND PIPE-WAY
	SLURRY BARRIER WALL

0 300
SCALE IN FEET



LEGEND

MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
RW-1 ⊛	RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
OW 1+50 ◉	OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
CW 1+50 ›	COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
SW1-0206 ▲	SUMP WELL LOCATION AND IDENTIFICATION NUMBER
P-2	PIEZOMETER IDENTIFICATION
—0—	LNAPL THICKNESS CONTOUR (FT MSL)
0.15	APPARENT LNAPL THICKNESS IN WELL (FT)
	UNDER GROUND PIPE-WAY
	ABOVE GROUND PIPE-WAY
	SLURRY BARRIER WALL



Map Source: Western Refining Southwest, Inc. 2008 Facility-Wide Groundwater Monitoring Report, Fig 14.

0 360
APPROXIMATE SCALE IN FEET

Legend

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

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

Notes:

All concentrations in milligrams per liter (mg/L)

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

NS² = Sample Inadvertently not Collected this Sampling Event

NR¹ = No Sample Required - Well Contains Separate Phase Hydrocarbon

NR² = No Sample Required per OCD and NMED Conditions

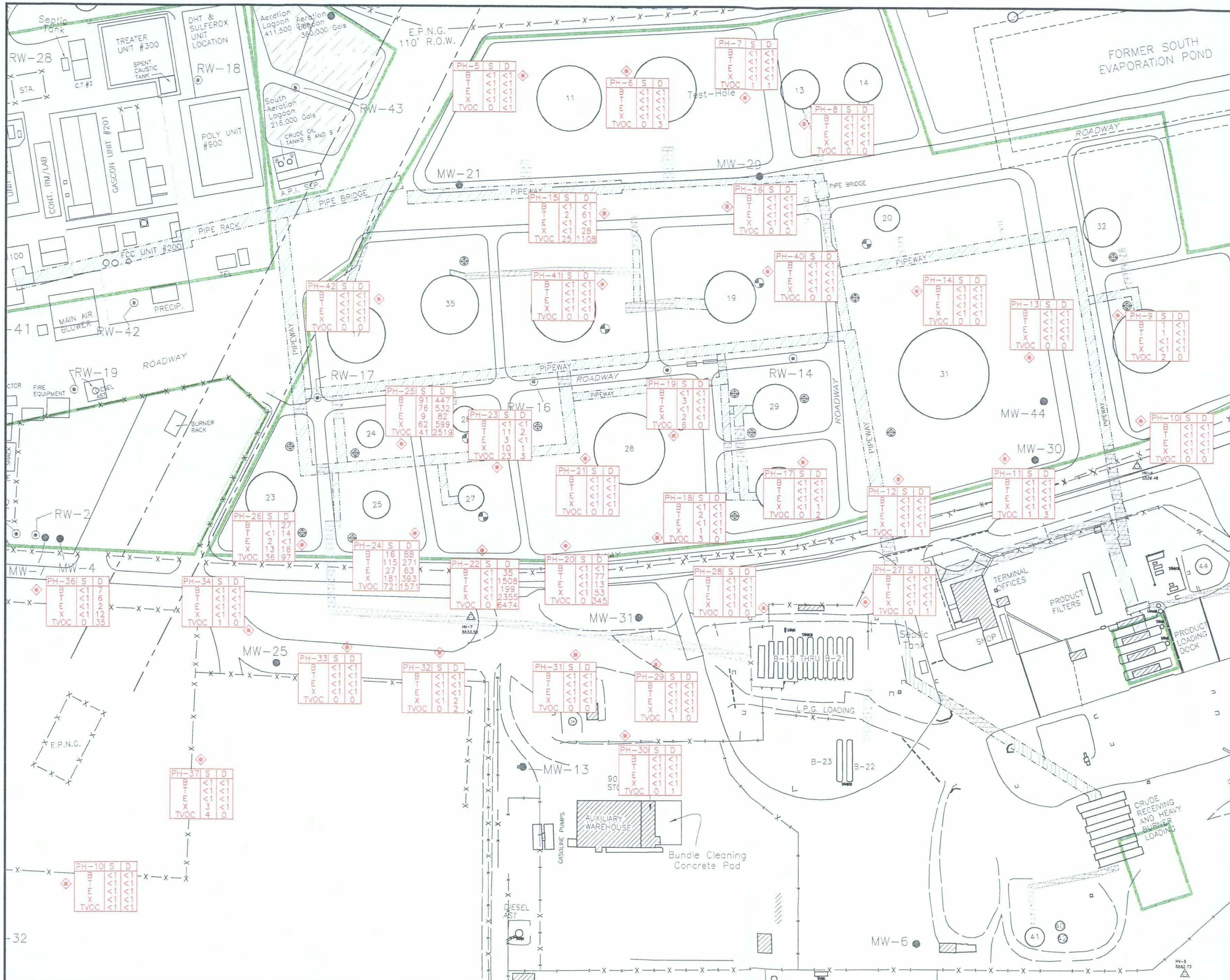
* = October 2008, All Other Samples Collected August 2008

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 04/01/10 | FILE: WestRef-B58

FIGURE 7
DISSOLVED-PHASE
GROUNDWATER DATA
AUGUST AND OCTOBER 2008
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



SOURCE:
RCRA FACILITY INVESTIGATION / CORRECTIVE MEASURES STUDY REPORT, BLOOMFIELD REFINING COMPANY, #50 COUNTY RD 4990, BLOOMFIELD, NEW MEXICO; PROJ. No. 023353014, NOV. 8, 1994, GROUNDWATER TECHNOLOGY, INC.

0 — 150
SCALE IN FEET

LEGEND

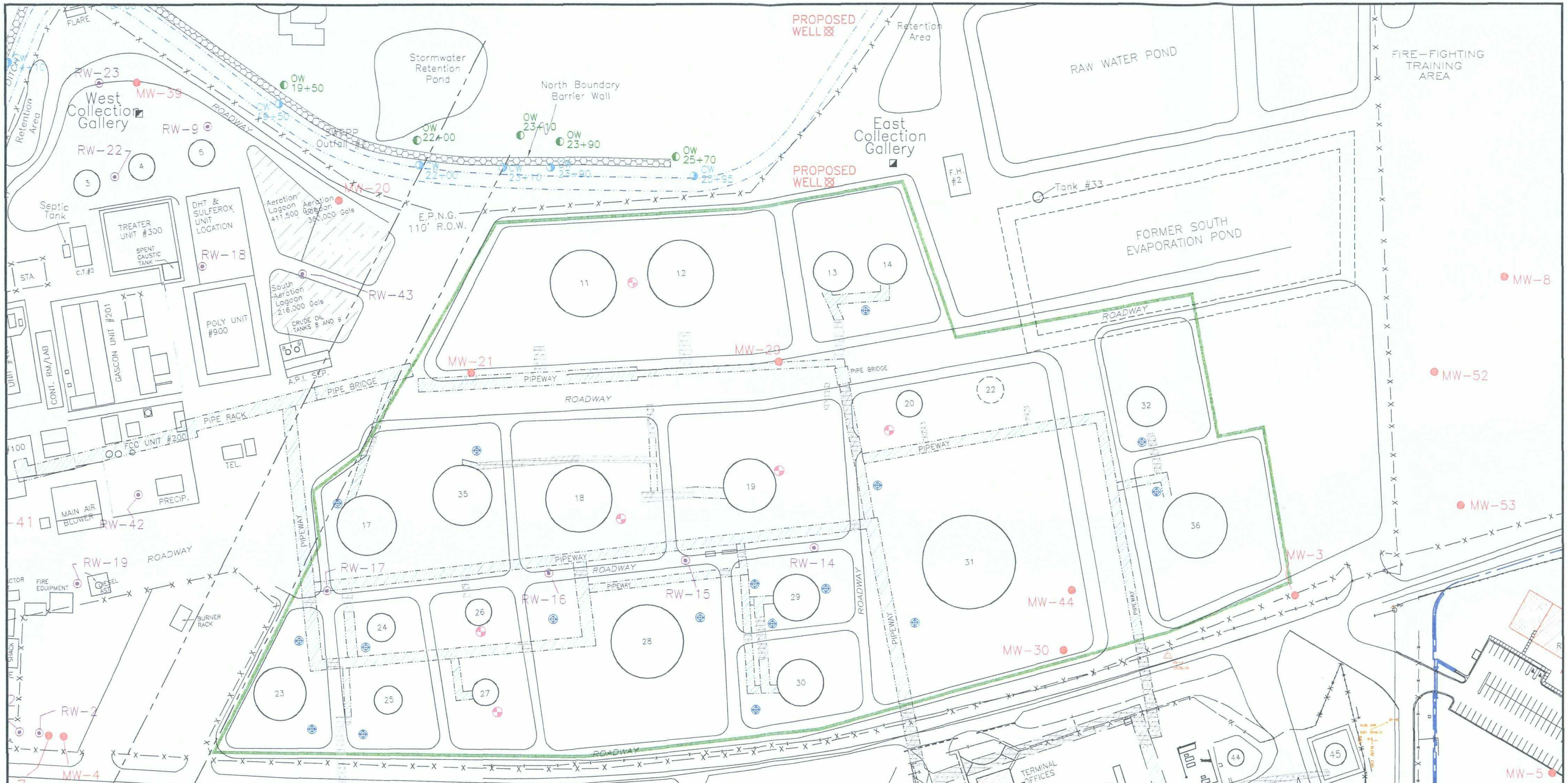
- PH-10 — SOIL VAPOR SAMPLE LOCATION AND IDENTIFICATION NUMBER
- SURFACE SOIL SAMPLE LOCATION
- SOIL BORING LOCATION
- PROPOSED MONITORING WELL LOCATION
- MW-30 — MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- RW-14 — RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
- CW 22+00 — COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
- UNDER GROUND PIPE-WAY
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 05/26/09	FILE: WestRef-B34

FIGURE 8
SUBSURFACE SOIL VAPOR CONCENTRATIONS
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

- SHALLOW SOIL BORING LOCATION
- TEN-FOOT SOIL BORING LOCATION
- PROPOSED MONITORING WELL LOCATION
- MW-30 MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- RW-14 RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
- CW 22+00 COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
- UNDER GROUND PIPE-WAY
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- FORMER TANK LOCATION
- —x—x— FENCE

N

0 150
SCALE IN FEET

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 05/24/10	FILE: WestRef-B33

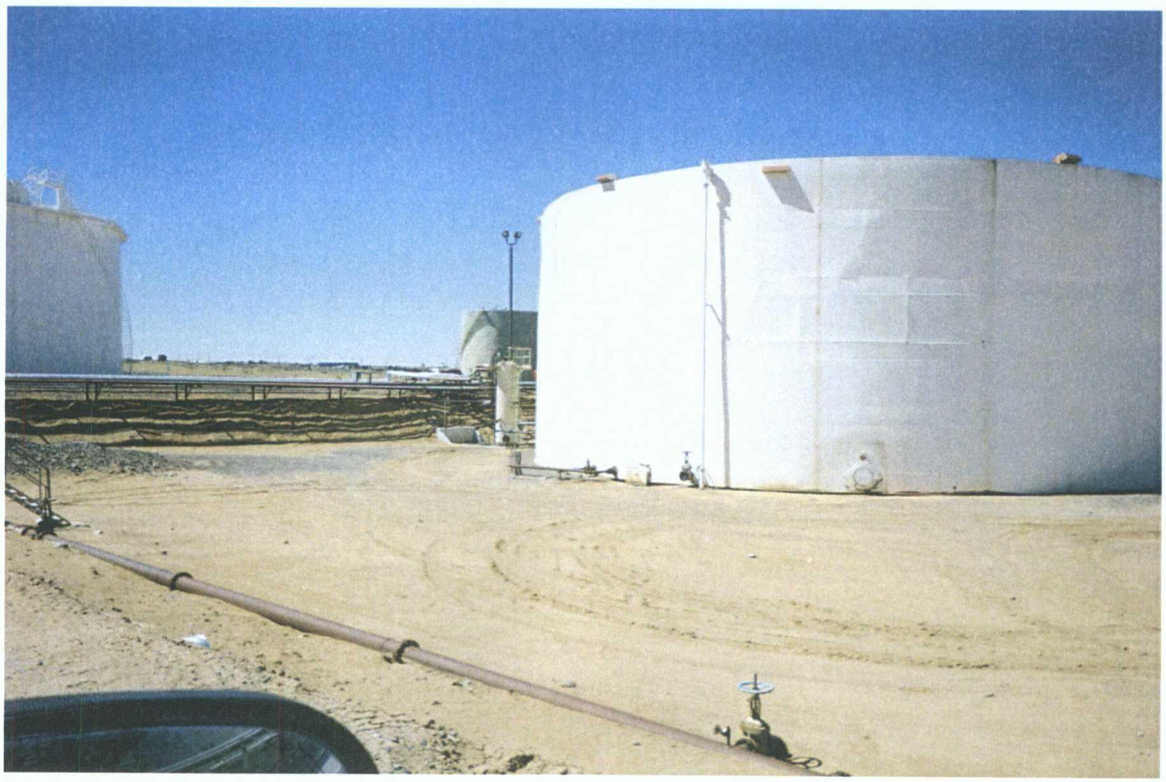
FIGURE 9
SWMU No. 15
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

Appendix A

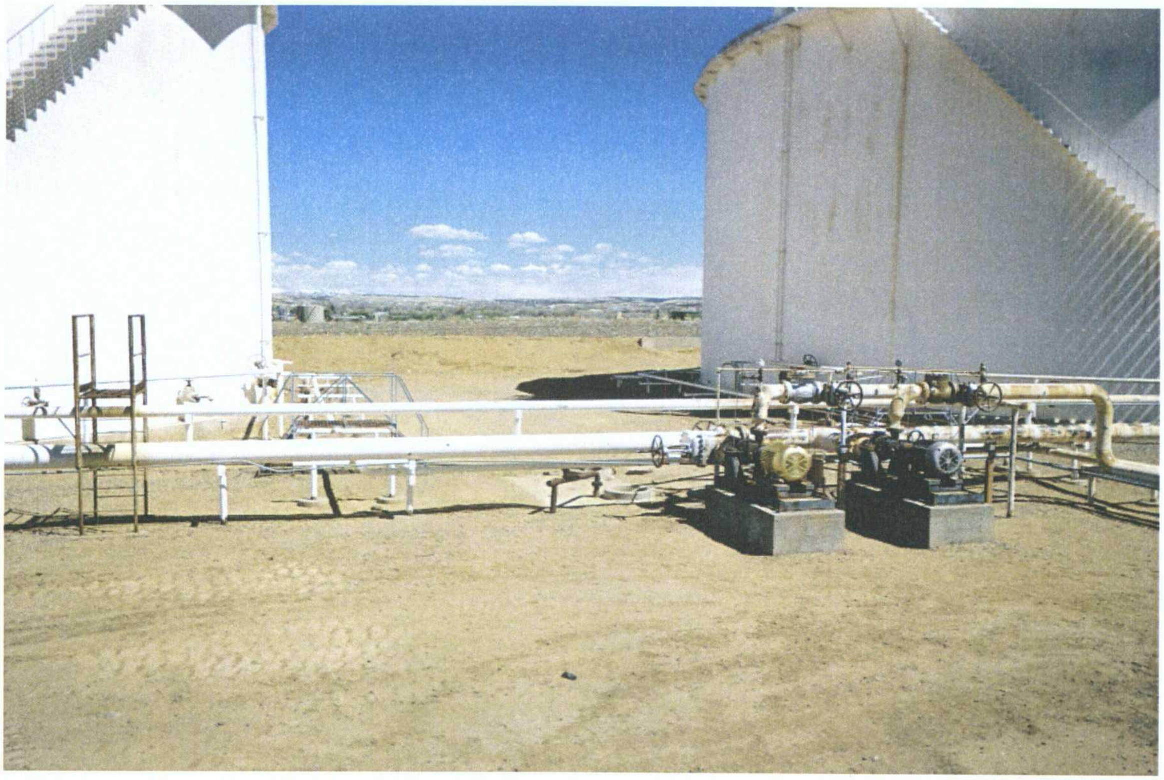
Photographs

Bloomfield Refinery
Looking northeast at Tank 20.



Bloomfield Refinery
East side of Tank 18, looking southwest

Bloomfield Refinery
Photo taken from west side of Tank 26, looking southeast.



Bloomfield Refinery
Tank11 on left and Tank 12 on right, looking north

Appendix B

Investigation Derived Waste (IDW) Management Plan

IDW Management Plan

All IDW will be properly characterized and disposed of in accordance with all federal, State, and local rules and regulations for storage, labeling, handling, transport, and disposal of waste. If soils are found to be non-hazardous and concentrations of constituents are less than the NMED residential soil screening levels, then soils may be reused on-site pursuant to the approval of the NMED. The IDW may be characterized for disposal based on the known or suspected contaminants potentially present in the waste. It is assumed that there are no listed wastes present in environmental media at any of the planned investigation areas.

A dedicated decontamination facility will be setup prior to any sample collection activities. The decontamination facility will be designed so as to capture and contain all decontamination fluids (e.g., wash water and rinse water) and foreign materials washed off the sampling equipment. The fluids will be pumped directly into suitable storage containers (e.g., labeled 55-gallon drums), which will be located at satellite accumulation areas until the fluids are disposed in the refinery wastewater treatment system upstream of the API separator. The solids captured in the decontamination facility will be shoveled into 55-gallon drums and stored at the designated satellite accumulation area pending proper waste characterization for off-site disposal.

Drill cuttings generated during installation of soil borings 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 include TPH and polynuclear aromatic hydrocarbons.

Purge water generated during groundwater sampling activities will be containerized in 55-gallons 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.