GW - ____001_______

WORK PLAN
GROUP 9

(SWMUs 12 API Separator; 13 Process Area; 14 Tanks 3-5; & 27 Waste Water Collection System)

June 2011

Western Refining
LOGISTICS

WNR LISTED NYSE

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2013 SEP 18 P 1:5?

September 16, 2013

John Kieling, Chief
New Mexico Environmental Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Certified Mail #: 7011 3500 0000 2169 0649

**Re: Group 9 Investigation Report Request for Extension
Western Refining Southwest, Inc. – Bloomfield Refinery
EPA ID# NMD089416416**

Dear Mr. Kieling:

On May 7, 2013 Western Refining Southwest, Inc. – Bloomfield Refinery ("Western") received approval from the New Mexico Environment Department Hazardous Waste Bureau ("NMED-HWB") of the Group 9 Investigation Work Plan dated March 2012. The approval letter states that the Group 9 Investigation Report is to be submitted by January 24, 2014. Western is requesting approval to extend the Group 9 Investigation Report deadline due to safety concerns.

Currently the Bloomfield facility is in the process of dismantling and relocating three of the former refinery process units that have been sold to Holly Refining's Woods Cross Facility. The areas within the Bloomfield facility where these activities are taking place includes some of the same areas in which soil borings are to be installed as part of the approved Group 9 investigation activities. During a progress meeting with the Holly Refining contractor and Western representatives, it was indicated that the estimated date of completion of the Process Unit Relocation Project is by April 2014.

In order to have access to the approved drilling locations associated with Group 9 and to address the safety concerns, Western is requesting approval to extend the Group 9 Investigation Report submittal so that the investigation drilling efforts could commence following completion of the Process Unit Relocation Project. Western anticipates that the field activities associated with Group 9 will take approximately six weeks to complete due to the number of boring locations and samples to be collected. Following receipt of the analytical reports, Western anticipates an additional ten weeks would be needed to complete a quality control review of the data, and complete the Group 9 Investigation Report for submittal. With this said Western requests approval to extend the Group 9 Investigation Report submittal to October 31, 2014.

If you have any questions or would like to further discuss this request, please contact me at (505) 632-4171 or Randy.Schmaltz@wnr.com.

Sincerely,

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

cc: D. Cobrain (NMED)
N. Dhawan (NMED)
C. Chavez (OCD)
A. Hains (WNR)

August 5, 2013

Via Email and Certified Mail 7010 1670 0001 3141 0286, Return Receipt Requested

Mr. John E. Kieling
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 2
Santa Fe, NM 87505-6303

Re: API Separator Leak Detection Units
Western Refining Company Southwest, Inc. ("Western")
Gallup Refinery
EPA ID #NMD000333211

Dear Mr. Kieling:

On July 8, 2013, you sent a letter to Western's Gallup Refinery on behalf of the Hazardous Waste Bureau ("Bureau") requesting certain information about the new API Separator ("NAPIS") and its designated leak detection units ("LDUs"). The purpose of this letter is to respond within the time limitation you stated.

As a threshold matter, we would like to provide some clarification to the description of the LDU's in the letter. In 2007, 316 stainless steel liner inserts were installed inside both concrete bays in the NAPIS. Prior to the installation of the 316 stainless steel liners, the internal concrete cracks and joints were filled with epoxy grout and the internal concrete walls were sealed with an impermeable flexible coating system, Pelseal (fluoroelastomer). After internal repairs were made and the coating system applied, the concrete bays now serve as secondary containment. Leak detection system units were installed at this time between the stainless steel liners and the coated internal concrete bays. There is a leak detection system unit on the West Bay (West LDU), East Bay (East LDU) and on the oil sump (Oil Sump LDU).

To respond to your inquiries for information, we have broken down our responses to the following specific requests:

(i) a proposed approach to determine the source of fluid in the LDUs;

- (ii) a proposed approach to evaluate for releases to surrounding soils and groundwater;
- (iii) a proposed remedy to eliminate any possible leakage;
- (iv) a discussion of whether or not there is an inspection schedule for the NAPIS to check the liner;
- (v) as-built drawings of the NAPIS showing the LDUs;
- (vi) a description of the LDUs;
- (vii) a description of the methods used to collect fluid samples;
- (viii) identification of when water was first detected in the LDUs;
- (ix) a discussion of whether fluid present in the LDUs has ever been removed; and
- (x) a discussion of any measures to determine the source of the leaks.

We will address each request in the order set forth above.

(i) Western has taken the following steps to investigate the source of and reasons for fluid in the LDUs.

1. Western recommenced weekly inspections during which we take depth to water measurements and schedule LDUs to be pumped as necessary.
2. Western pumped out all LDUs and dropped directly inside the East Bay a timed release wax dye cone to determine if the fluorescent dye is picked up in the LDUs.
3. Fluorescent dye was also added to the process sewer sewer box upstream of the NAPIS as a secondary test.
4. The west bay of the NAPIS is currently shut down for mechanical repairs. During this time the west bay will be completely drained and the internal stainless steel liner will be inspected for leaks or signs of any maintenance requirements.

At this time, we have not completed our evaluation steps and have not yet drawn a conclusion about the source of and reasons for fluid in the LDUs. We plan to continue with additional dye testing and will be evaluating the results.

(ii) Western has engaged in the following activities relating to evaluation of whether there are releases from the NAPIS to the environment. Western installed six monitoring wells around the new API at the direction of NMED in 2007 and 2008, four of which continue to be monitored routinely in accordance with the Facility Wide Ground Water Monitoring Plan approved in August of 2010. The LDUs were added to the Ground Water Sampling event beginning in 2010 as part of the Facility Wide Ground Water Monitoring Plan. The four ground water monitoring wells located around the NAPIS unit monitor for the presence of contaminants in the ground water from possible leaks from the NAPIS unit.

Western is not proposing to conduct sampling of soils surrounding the NAPIS at this time. As discussed below, Western has noted minor staining of soils immediately adjacent to the new API; however, until the evaluation of potential on-going leaks is completed we do not believe that sampling of soils is beneficial.

Based on the analytical results, only NAPIS-2 monitoring well indicates detection levels greater than the applicable standards for BTEX and MTBE constituents. It is our conclusion based on well depth, depth to water, analytical results and quarterly monitoring that the fluids detected in the leak detection units are not a source of contamination for ground water. Comparisons of the monitoring wells NAPIS-1 (located up-gradient/east side), NAPIS-2 (down-gradient/west side) and the East and West LDUs which are located between these two monitoring wells indicate that the up-gradient well NAPIS-1 is free of hydrocarbons. Analytical results for the contaminants detected in NAPIS-2 do not indicate an increase in concentration levels that would be expected if the NAPIS was leaking into the ground water. BTEX concentration levels in the LDUs are at least 100 times more than the levels found in the down-gradient monitoring wells, namely NAPIS-2. Quarterly depth to water measurements in all four monitoring wells remained constant however the liquid levels in the "stand-pipe" of the LDUs fluctuated considerably. The water table in this area is approximately 9 -10 feet below the ground surface. NAPIS- 1 total depth is 13.53 feet and NAPIS-2 total depth is 13.61 feet, and the East LDU and West LDU are approximately 8 to 9 feet below ground surface.

(iii) Western is still in the process of evaluating the source of potential leaks to the LDUs as described in (i) above. At this time, there is no indication of releases from the NAPIS to groundwater. We have observed minor historical staining in small areas where there is some seepage from cracks in the concrete exterior. Western's focus at this time is to identify the source of leaks into the LDUs and then develop and implement a remedy for those leaks.

(iv) The LDUs are sampled and inspected on a quarterly basis for 8021B plus MTBE, 8015B and WQCC Metals. The stainless steel liners inside the bays of the NAPIS can only be visually inspected by taking the NAPIS unit out of service. The concrete wall exterior of the NAPIS is visually inspected on a daily basis during the operators' rounds.

(v) By April 25, 2013 email, Kristin Van Horn of the Bureau requested a figure showing the location of the NAPIS LDUs. Western, provided drawings of the NAPIS showing the LDUs by April 26, 2013 email. For your convenience, we have attached those drawings to this letter. We do not have an "as built" drawing for the NAPIS showing the LDUs.

(vi) The LDUs are identified as East LDU, West LDU, and Oil Sump LDU.

The East LDU is located on the southeast corner of the East Bay. Pipe material is 304 stainless steel and cap is 4 inch schedule 80 PVC slip on. The diameter of the pipe is 4 inch and total depth (from top to bottom) is 11.82 feet. Ground level elevation to the top of the pipe is 2.86 feet with 8.96 feet below ground surface.

The West LDU is located on the southwest corner of the West Bay. Pipe material is 304 stainless steel and cap is 4 inch schedule 80 PVC slip on. The diameter of pipe is 4 inch and total depth (from top to bottom) is 12.77 feet. Ground level elevation to the top of the pipe is 4.49 feet with 8.28 feet below ground surface.

The Oil Sump LDU is located on the northeast corner of the west bay. Pipe material is 304 stainless steel and cap is 4 inch schedule 80 PVC slip on. The diameter of pipe is 4 inch and total depth (from top to bottom) is 7.25 feet. Ground level elevation to the top of the pipe is 3.29 feet with 2.67 feet below ground surface.

The bottom of the NAPIS is approximately 8 feet (on the north side) to 11 feet (south side) below ground surface.

(vii) Each LDU is gauged for a depth to water (DTW) measurement to determine the water level inside the standpipe. If a water level is detected, a grab sample is collected using a new disposable polyethylene bailer. The bailer is lowered slowly inside the standpipe until a sufficient amount of liquid is retained inside the bailer for sample collection. Samples are collected in appropriate containers selected for the specific analysis requested. Samples are labeled and a custody seal applied to each container. LDUs not sampled due to an insufficient water level or found dry, are recorded in a field log specific to each unit. All samples collected are recorded in a field report or field log. Chain of Custody (COC) forms are completed at the end of each sampling day, prior to the transfer of samples off site, and accompany the samples during shipment to the laboratory. A custody seal is affixed to the lid of the shipping container. Copies of all COC forms generated are kept on site. All remaining purged water inside the bailer is placed inside a 5 gallon bucket and drained into the refinery waste water treatment system upstream of the API separator.

(viii) The West LDU has been in operation since 2004 and fluid has been detected since 2004 to present day. In 2007 when the stainless steel liners were installed inside the East Bay and West Bay, the original LDU on the West Bay was modified with a new standpipe and higher stick-up length. The East LDU and Oil Sump LDU were installed at that time as well. Inspection records indicate that fluid was first recorded in the Oil Sump LDU on June 26, 2009 and in the East LDU on December 9, 2008.

(ix) Since October 1, 2004, the West LDU has been inspected for fluids. If fluid is observed, a depth to water measurement is taken and recorded. A Work Request ticket is written for the maintenance department to use on-site vacuum truck to pump out fluid from the standpipe. West LDU was inspected on a bi-weekly basis from October 1, 2004 through December 16, 2004. From 2005 through 2007, inspections were done monthly which included pumping of the LDU if necessary. Inspections continued from 2009 through 2012 where fluid was first detected in the East LDU in 2008 and in the Oil Sump LDU in January of 2009 at which time fluids were removed from all LDUs. All three LDUs have been put back on a weekly inspection schedule and if fluids are detected at a sufficient level it is removed via a vacuum truck.

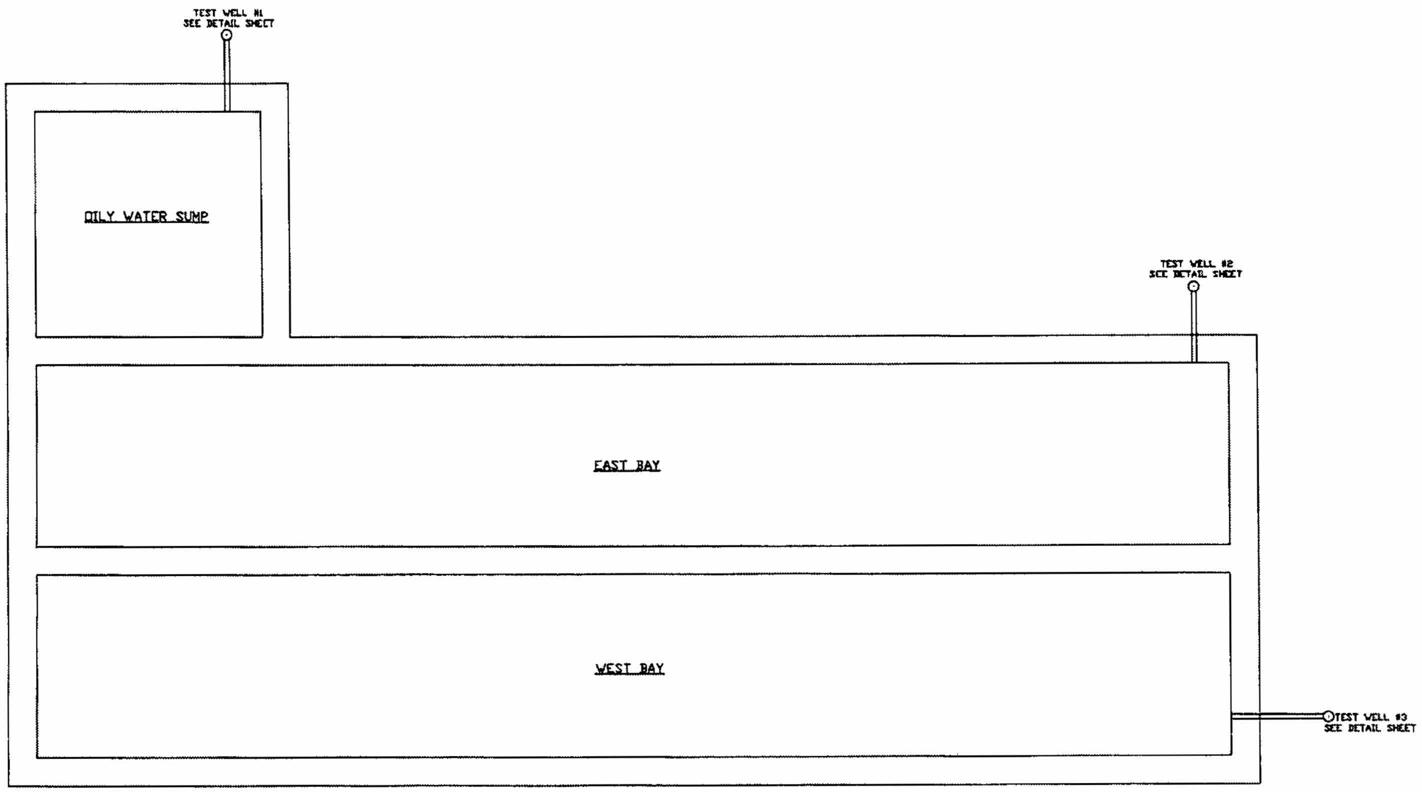
(x) Please see the responses to (i) and (ii) above.

Please note Western reserves all applicable rights and defenses relevant to this matter, including supplementation or modification of the preceding information as appropriate. If you have any questions, please contact me. In addition, we stand ready to meet with you and your staff should the Bureau have any concerns regarding the preceding response.

Sincerely,

Ed Riege
Environmental Manager

cc: T. Blaine, P.E., NMED HWB
D. Cobrain, NMED HWB
N. Dhawan, NMED HWB
A. Allen, WRG
A. Haines, WRG
C. Chavez, OCD
G. von Gonten, OCD

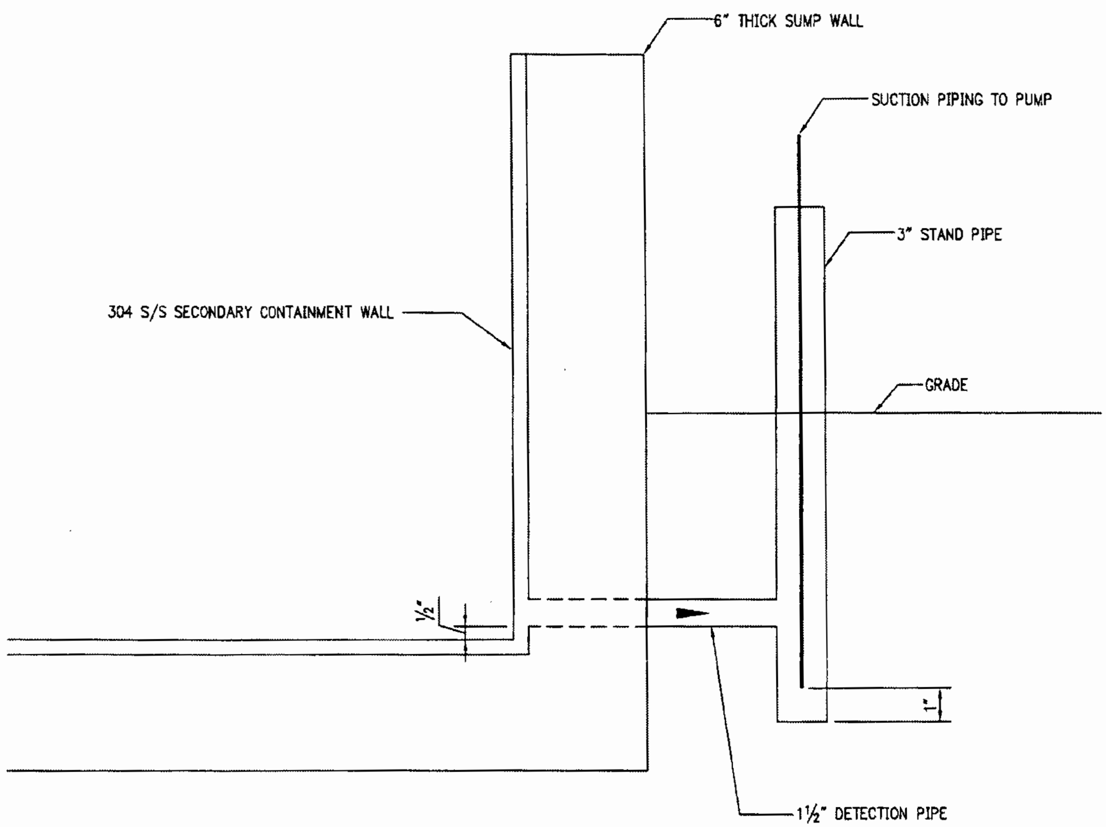


TEST WELL LOCATION PLAN

Western Refining
Gallup Refinery

API SEPERATOR & OW SYSTEM
API WATER PUMP-OUT
TEST WELLS

RFE No:		INSP/RT/UT:
DRN. BY: LJB	DATE: 4/26/13	WELD SPEC:
CHK'D. BY:	DATE:	PAINT:
APP'D. BY:	DATE:	CAD REF:
DRAWING NO. Z84-2/24/13	SHEET	REV 0



Western Refining
Gallup Refinery

API SEPERATOR & OW SYSTEM
API WATER PUMP-OUT
TEST WELL DETAIL

RFE No:		INSP/RT/UT:
DRN. BY: LJB	DATE: 4/26/13	WELD SPEC:
CHK'D. BY:	DATE:	PAINT:
APP'D. BY:	DATE:	CAD REF:
DRAWING NO. TEST WELL	SHEET 1	REV 0

Western Refining
LOGISTICS

WNR
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March 7, 2012

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

Certified Mail #: 7009 0820 0000 0482 9078

Re: Response to NMED Comments dated October 21, 2011
GROUP 9 (SWMU NO. 12 API SEPARATOR, SWMU NO. 13 PROCESS AREA, and SWMU NO. 14 TANKS 3, 4, and 5), and SWMU NO. 27 WASTEWATER COLLECTION SYSTEM
WESTERN REFINING SOUTHWEST, INC., BLOOMFIELD REFINERY
EPA ID# NMD089416416
HWB-WRB-11-004

Dear Mr. Kieling:

Western Refining Southwest, Inc., Bloomfield Refinery has prepared the following responses to your comments received on the referenced investigation work plan.

NMED Comment No. 1: Section 2 (Background), pages 3-8

Section 2 describes the historical information for each SWMU in Group 9. List possible constituents of concern (COCs) identified during previous investigations in the response letter.

Western Response No. 1: As noted in the investigation work plan, there have not been any previous investigations of soils, so the possible COCs identified during previous investigations are identified for groundwater. The historical groundwater analyses are presented in Table 1 of the investigation work plan. The detected conti, which could be considered "possible constituents of concern", are as follows; benzene, ethylbenzene, toluene, xylene, diesel range organics, gasoline range organics, methyl tertiary butyl ether, arsenic, barium, cadmium, chromium, iron, lead, manganese, mercury, zinc, fluoride, chloride, nitrite, nitrate, and sulfate.

NMED Comment No. 2: Section 2 (Background), SWMU No. 13 (Process Area), page 5

Western's Statement: "[t]he FCC Gas Concentration Unit fractionates the products from the FCC reactor into fuel gas, cat gas (which is a gasoline blendstock), LCO (which is blended diesel), and #6 burner fuel."

NMED's Comment: *In future reports, be consistent with spelling out acronyms and provide a list of acronyms at the beginning of all work plans and reports.*

Western Response No. 2: A new list of acronyms and revised the Table of Contents is enclosed.

NMED Comment No. 3: Section 5.2 (Soil Sampling), pages 13-15

Western must propose to drill all soil borings to the water table. Western must collect soil samples at 2.5 foot intervals from the ground surface to the water table and at the water table and all soil samples submitted to the laboratory for analysis must be analyzed for those constituents in Comment 6. One additional soil boring location has been added south of the Crude Oil Tanks 8 and 9 and the API Separator (see attached figure).

In addition, NMED has selected five soil boring locations to be completed as monitoring wells since refinery operations have ceased and the Process Area can now be accessed (see attached figure). In the proposed areas, the depth to groundwater is approximately 19 feet. Western does not need to sample groundwater encountered during the drilling activities unless a monitoring well is completed in the boring. If product is encountered, Western must collect a sample and conduct a fingerprint analysis to characterize the product. The groundwater samples collected from the newly installed monitoring wells must be analyzed for all constituents listed in Comment 6. Revise the Work Plan accordingly.

> **Western Response No. 3:** Sections 4.1, 5.1, and 5.2 have been revised to specify that all soil borings will be drilled to the water table, with borings to be completed as monitoring wells drilled to the top of the Nacimiento Formation. The additional soil borings have been added to the discussion in Section 5.2 and on Figure 9. Five of the soil borings will now be completed at permanent monitoring wells as discussed in Sections 5.2 and 5.3 and indicated on Figure 9. Pursuant to discussions with your staff, product samples will not be collected for fingerprint analysis.

NMED Comment No. 4: Section 5.2 (Soil Sampling), page 15

Section 5.2 lists the depths of sample collection. The Permittee must clarify that the first sample listed in bullet 1 (0-6 inches) will be collected from the native soil immediately below the gravel fill in the revised Work Plan.

> **Western Response No. 4:** The text in Section 5.2 has been revised to clarify that the first soil sample will be collected from native soil and not gravel fill material. The sample collection interval for the second sample (6-24") has also been revised to address the concern over the potential presence of gravel fill material.

NMED Comment No. 5: Section 5.3 (Ground Water Monitoring), page 16

Western's Statement: "no groundwater samples are proposed under this Scope of Work." NMED's Comment: Historically, SWMU No. 13 (Process Area) has been inaccessible because of refinery operations. Because refinery operations have ceased, Western must install monitoring wells to characterize the contaminants within this area. In the revised Work Plan, the Permittee must discuss well installation and development and propose to complete the soil borings marked in the attached figure as monitoring wells (see also Comment 3).

> **Western Response No. 5:** The work plan has been revised to include additional subsections under Section 5.3 to discuss measurement of fluid levels (5.3.1), groundwater and vadose zone vapor sampling (5.3.2), well purging (5.3.3), and groundwater sample collection (5.3.4). Well installation has been added to Section 5.1 Drilling Activities.

NMED Comment No. 6: Section 5.8 (Chemical Analyses), page 19

Section 5.8 discusses the proposed analyses for the soil samples. The Permittee proposes volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH) as gasoline range organics (GRO), diesel range organics (DRO), and motor oil range organics (MRO), the Skinner List Metals, and cyanide. The Permittee states that only soil samples collected at the former tetraethyl lead (TEL) storage buildings will be analyzed for total lead and those samples collected near the cooling towers will be analyzed for total chromium. The Skinner List Metals includes both lead and chromium and the Permittee must propose to analyze all soil samples accordingly. In addition, groundwater sample analysis must be included in this section. Groundwater samples obtained from the newly installed monitoring wells must be analyzed for VOCs, SVOCs, GRO, DRO, MRO, Skinner List Metals, cyanide, iron, manganese, and general chemistry parameters. Include these analytical parameters for groundwater samples in the revised Work Plan.

Western Response No. 6: The discussion in Section 5.8 pertaining to soil analyses actually states, "Only the soil samples collected at the former tetraethyl lead storage buildings will be analyzed for tetraethyl lead in addition to total lead and only the soil samples collected near the cooling towers will be analyzed for chromium VI in addition to total chromium." All soil samples will be analyzed for the full Skinner list of metals. Additional analyses for tetraethyl lead and chromium VI are specified for locations where these constituents may have been handled.

Groundwater analyses have been included in Section 5.8 as directed. In addition, the water sample collected from the new well installed near the former tetraethyl lead storage building will also be analyzed for tetraethyl lead and the water sample collected from the new well installed near the cooling towers will also be analyzed for chromium VI.

A new Table 2 has been added that provides historical data on water quality purge parameters.

NMED Comment No. 7: Figure 3 (Separate Phase Hydrocarbon Thickness Map)

Figure 3 depicts a dark blue line east of Tank 45 and west of MW-5 that is not defined in the legend. Define this line or remove it from Figure 3 in the revised Work Plan.

Western Response No. 7: The subject blue line has been removed from the figure.

NMED Comment No. 8: Figures 5 (Cross Section A-A'), 6 (Cross Section B-B'), and 7 (Cross Section C-C')

Figures 5, 6, and 7 contain the cross sections of selected monitoring and recovery wells at the facility, but the figures do not show all information for all the wells (e.g., screened intervals). Figure 5 does not depict the screened intervals for wells MW-3, MW-40, MW-41, MW-44, and RW-42. Figure 6 does not include the screened intervals for MW-1, MW-3, MW-5, and MW-52. Figure 7 does not include the screened intervals for MW-6 and MW-44. Identify the screened intervals for all of the wells depicted in the figures of the revised Work Plan.

Western Response No. 8: The information on the screen intervals is not available for the listed wells. The figures have been revised to include a note in the legend to explain why the screen intervals are not shown on these wells.

NMED Comment No. 9: General Comment regarding submittals

NMED only received one copy of the Investigation Work Plan for Group 9. In accordance with Section X.A (General), paragraph 1, of the July 27, 2007 Order (Order), "[a]ll work plans and reports shall be submitted to [NMED] in the form of two paper copies and an electronic copy." In the future, Western must submit two paper copies and an electronic copy of work plans and reports unless otherwise specified by NMED.

Western Response No. 9: Western apologizes for this omission and will include two paper copies and an electronic copy of all future submittals unless directed otherwise by NMED.

You will please find enclosed the following revised replacement pages and figures and a new Table 2, which have been prepared to address your comments:

- Revised Table of Contents;
- Executive Summary;
- Section 4.1 Anticipated Activities;
- Section 4.4 Surveys;
- Section 5 Investigation Methods;
- Figures 3, 5, 6, 7, and 9; and
- Table 2.

In addition, an electronic version of the revised work plan is enclosed that identifies where all changes have been made in redline strikeout format. If you have questions regarding the above responses or the enclosures, please contact me at (505) 632-4171.

Sincerely,

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

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

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INVESTIGATION WORK PLAN
Group 9 (SWMU No. 12 API Separator, SWMU No. 13 Process Area and SWMU No. 14 Tanks 3, 4 and 5) and SWMU No. 27 Wastewater Collection System

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

June 2011

Revised March 2012

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

Scott T. Crouch, P.G.
Senior Consultant
RPS
1250 South Capital of Texas Highway
Building Three, Suite 200
Austin, Texas 78746

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LIST OF ACRONYMS

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benzene, toluene, ethylbenzene, and xylene (BTEX)

below ground level (bgl)

Code of Federal Regulations (CFR)

Contract Laboratory Program (CLP)

Data Quality Objectives (DQOs)

Environmental Protection Agency (EPA)

Fluid Catalytic Cracker (FCC)

hollow-stem augering (HSA)

hydrogen sulfide (H_2S)

investigation derived waste (IDW)

light cycle oil – (LCO)

liquefied petroleum gas (LPG)

maximum contaminant level (MCL)

monitoring well (MW)

New Mexico Administrative Code (NMAC)

New Mexico Environment Department (NMED)

New Mexico Surveying Act (NMSA)

photoionization detector (PID)

Quality Assurance/Quality Control (QA/QC)

recovery well (RW)

separate phase hydrocarbon (SPH)

Solid Waste Management Units (SWMUs)

total petroleum hydrocarbon (TPH)

total volatile organic content (TVOC)

toxicity characteristic leaching procedure (TCLP)

unified soil classification system (USCS)

Universal Oil Products (UOP)

volatile organic constituent (VOC)

Water Quality Control Commission (WQCC)

Executive Summary

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

Pursuant to the terms and conditions of an Order issued on July 27, 2007 by the New Mexico Environment Department (NMED) to San Juan Refining Company, as owner, and Giant Industries Arizona, Inc., as operator, for the Bloomfield Refinery, this Investigation Work Plan has been prepared for the SWMUs designated as Group 9. SWMU Group 9 includes SWMU No. 12 (API Separator), SWMU No. 13 (Process Area) and SWMU No. 14 (Tanks 3, 4, and 5). This work plan also includes SWMU No. 27 (Wastewater Collection System) and a short segment of SWMU No. 3 (Underground Piping Currently in Use). A Class I modification to the facility's RCRA permit was approved on June 10, 2008 to reflect the name change of the operator of the refinery to Western Refining Southwest, Inc. The operator is now Western Refining Southwest, Inc. – Bloomfield Refinery. The name of the owner of the refinery remained the same – San Juan Refining Company.

The Order requires that San Juan Refining Company and Giant Industries Arizona, Inc. ("Western") determine and evaluate the presence, nature, and extent of historical releases of contaminants at the aforementioned SWMUs. This Investigation Work Plan has been developed to collect the necessary data to meet the requirements of the Order. 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.

Section 4
Scope of Services

4.1 Anticipated Activities

Pursuant to Section IV of the Order, a scope of services has been developed to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective soil samples will be collected at the areas represented by SWMUs No. 12, 13, 14, and 27. There are 22 soil borings proposed within SWMUs No. 12, 13, 14, 27, and a small portion of SWMU No. 3, of which five will be completed as permanent monitoring wells. All of these soil borings will be drilled to the water table and borings to be completed as permanent monitoring wells will be extended to the top of the Nacimiento Formation. In addition, eleven surface soil sample locations are proposed throughout SWMUs No. 13 and No. 27. Soil borings will be installed and samples collected as discussed in Section 5.2. Monitoring wells will be installed and groundwater samples collected for analysis as discussed in Sections 5.1 and 5.3, respectively.

4.2 Background Information Research

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

4.3 Collection and Management of Investigation Derived Waste

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

4.4 Surveys

The horizontal coordinates and elevation of each surface sample location, each soil boring, and the locations of all other pertinent structures will be determined by a registered New Mexico professional land surveyor in accordance with the State Plane Coordinate System (NMSA 1978 47-1-49-56 (Repl. Pamp. 1993)). 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. The survey location for the top of casing on monitoring wells will be the north side of the casing, which will be marked with a permanent marker.

Section 5
Investigation Methods

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

5.1 Drilling Activities

Soil borings will be drilled using either hollow-stem auger or if necessary, air rotary methods including ODEX. The preferred method will be hollow-stem auger to increase the ability to recover undisturbed samples and potential contaminants. The monitoring well construction/ completion will be conducted in accordance with the requirements of Section IX of the Order. 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. All soil borings will be drilled to the top of saturation, with the soil borings to be completed as permanent monitoring wells drilled to the top of bedrock (Nacimiento Formation). The anticipated completion depth ranges from 20 to 30 feet. Soil samples will be collected continuously and logged by a qualified geologist or engineer. Slotted (0.01 inch) PVC well screen will be placed at the bottom of the well and will extend for 10 to 15 feet to ensure that the well is screened across the water table and to the extent possible the entire saturated zone is open to the well, with approximately five feet of screen above the water table. A 10/20 sand filter pack will be installed to two feet over the top of the well screen. Soil samples will be collected continuously and logged by a qualified geologist or engineer.

The drilling and sampling will be accomplished under the direction of a qualified engineer or geologist who will maintain a detailed log of the materials and conditions encountered in each boring. Both sample information and visual observations of the cuttings and core samples will be recorded on the boring log. Known site features and/or site survey grid markers will be used as references to locate each boring prior to surveying the location as described in Section 4.4. The boring locations will be measured to the nearest foot, and locations will be recorded on a scaled site map upon completion of each boring.

5.2 Soil Sampling

Since there is the potential for constituents to have been released to soils at "known" locations (e.g., at locations were catalysts are exchanged from the process units or along the wastewater collection system piping) a judgmental sampling design is appropriate. The locations most likely to have releases from underground piping include pipe connections (e.g., fittings and valves).

The proposed soil boring locations are concentrated along the SWMU No. 3 underground piping, SWMU No. 27 wastewater collection lines, locations of known past releases (e.g., near Tank #5), materials handling areas (e.g., storage area for chlorine source at Catalytic Reformer Unit and the tetraethyl lead storage building), and generally throughout the process area (Figure 9). Soil borings are selected for these areas due to the potential for subsurface releases in addition to potential surface spills. Access for installation of soil borings is limited in some areas of the process area where overhead structures prevent access with a drilling rig.

There are three soil borings proposed around the API separator on the south and west sides. Access is limited to the north, where the South Aeration Lagoon is located very close by and to the east, where a major pipeline easement runs immediately adjacent to the separator. Fourteen soil borings are proposed within the process area, which also covers the wastewater collection system. Five soil borings are included for the area around Tanks 3, 4, and 5. This makes a total of 22 soil borings, which will be drilled to the depth of saturation. Five of the borings to be completed as permanent monitoring wells will be drilled to the top of the Nacimiento Formation.

Eleven locations are proposed for the collection of surface soil samples at areas where surface impacts could have resulted from handling of materials above ground. This includes locations were catalysts are removed from the various process units and near the former tetraethyl lead storage building. The surface samples will be collected from the upper six inches; however, if there is screening evidence of impacts below six inches, then Western may elect to collect deeper samples. The decision to use a hand auger vs. a drilling rig to collect deeper samples 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 soil boring. Soil samples may be collected using decontaminated hand-held stainless steel sampling device (e.g., a hand auger), shelby tube, or thin-wall sampler, or a pre-cleaned disposable sampling device. A portion of the samples will be placed in pre-cleaned, laboratory-prepared sample containers for laboratory chemical analysis. The use of an Encore® Sampler or other similar device will be used during collection of soil samples for VOC analysis. The remaining portions of the sample will be used for logging and field screening as discussed in Section 5.2.1. Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below in Section 5.4.

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

- 0-6" from native soil below any gravel fill material that may be present (at all surface soil sampling locations and at soil borings with evidence of significant impacts near the land surface);
- 6-24" from native soil below any gravel fill material that may be present (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 using a Keck KIR interface probe or similar instrument at each new monitoring well prior to purging in preparation for a sampling event. Measurement data and the date and time of each measurement will be recorded on a site monitoring data sheet. The depth to groundwater and SPH thickness levels will be measured to the nearest 0.01 ft. The depth to groundwater and SPH thickness will be recorded relative to the surveyed location on the well casing rim or other surveyed datum. A corrected water table elevation will be provided in wells containing SPH by adding 0.8 times the measured SPH thickness to the measured water table elevation. During regularly scheduled groundwater monitoring events, groundwater and SPH levels will be measured in all wells within 48 hours of the start of obtaining water level measurements. All automated and manual extraction of SPH and water from recovery wells, observation wells, and collection wells, which is close enough to affect measurements at the new wells, will be discontinued for 48 hours prior to the measurement of water and product levels.

5.3.2 Groundwater and Vadose Zone Vapor Sampling

Five new permanent monitoring wells will be completed at the locations shown on Figure 9. The new permanent monitoring wells will be developed within two weeks of well completion. Groundwater samples will be obtained from the newly constructed monitoring wells, which do not contain PSH, 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 monitoring and sampling will be conducted no sooner than 30 days and not later than 75 days of the initial sampling event if PSH is not present in the well(s). For wells with PSH present during the second monitoring event, only fluid levels will be recorded and no water samples will be collected.

5.3.3 Well Purging

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

5.3.4 Groundwater Sample Collection

Groundwater samples will be collected within 24 hours of the completion of well purging using dedicated bailers or disposal bailers. Alternatively, well sampling may also be conducted in accordance with the NMED's Position Paper *Use of Low-Flow and other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring* (October 30, 2001, as updated). Sample collection methods will be documented in the field monitoring reports. The samples will be transferred to the appropriate, clean, laboratory-prepared containers provided by the analytical laboratory. Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below in Section 5.4.

Groundwater samples intended for metals analysis will be submitted to the laboratory as total and dissolved metals samples. QA/QC samples will be collected to monitor the validity of the groundwater sample collection procedures as follows:

- Field duplicate water samples will be obtained at a frequency of ten percent, with a minimum, of one duplicate sample per sampling event; 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.
3. Each cooler or other container will be delivered directly to the analytical laboratory.
4. Glass bottles will be separated in the shipping container by cushioning material to prevent breakage.
5. Plastic containers will be protected from possible puncture during shipping using cushioning material.
6. The chain-of-custody form and sample request form will be shipped inside the sealed storage container to be delivered to the laboratory.
7. Chain-of-custody seals will be used to seal the sample-shipping container in conformance with EPA protocol.
8. Signed and dated chain-of-custody seals will be applied to each cooler prior to transport of samples from the site.
9. Upon receipt of the samples at the laboratory, the custody seals will be broken, the chain-of-custody form will be signed as received by the laboratory, and the conditions of the samples will be recorded on the form. The original chain-of-custody form will remain with the laboratory and copies will be returned to the relinquishing party.
10. Copies of all chain-of-custody forms generated as part of sampling activities will be maintained on-site.

5.5 Decontamination Procedures

The objective of the decontamination procedures is to minimize the potential for cross-contamination. A designated decontamination area will be established for decontamination of drilling equipment and reusable sampling equipment. The drilling rig will be decontaminated prior to entering the site or unit. Drilling equipment or other exploration equipment that may come in contact with the borehole will be decontaminated by high pressure washing prior to drilling each new boring.

Sampling or measurement equipment, including but not limited to stainless steel sampling tools and split-barrel or core samplers, will be decontaminated in accordance with the following procedures or other methods approved by the Department before each sampling attempt or measurement:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;
2. Rinse with potable tap water;
3. Wash with nonphosphate detergent or other detergent approved by the Department (examples include Fantastik™, Liqui-Nox®);
4. Rinse with potable tap water; and
5. Double rinse with deionized water.

All decontamination solutions will be collected and stored temporarily as described in Section 4.3. Decontamination procedures and the cleaning agents used will be documented in the daily field log.

5.6 Field Equipment Calibration Procedures

Field equipment requiring calibration will be calibrated to known standards, in accordance with the manufacturers' recommended schedules and procedures. At a minimum, calibration checks will be conducted daily, or at other intervals approved by the Department, and the instruments will be recalibrated, if necessary. Calibration measurements will be recorded in the daily field logs. If field equipment becomes inoperable, its use will be discontinued until the necessary repairs are made. In the interim, a properly calibrated replacement instrument will be used.

5.7 Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded in a field log book. The original field forms will be maintained at the facility. Copies of the completed forms will be maintained in a bound and sequentially numbered field file for reference during field activities.

Indelible ink will be used to record all field activities. Photographic documentation of field activities will be performed, as appropriate. The daily record of field activities will include the following:

1. Site or unit designation;
2. Date;
3. Time of arrival and departure;
4. Field investigation team members including subcontractors and visitors;
5. Weather conditions;
6. Daily activities and times conducted;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log, as appropriate;
10. Field monitoring data, including health and safety monitoring;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage or disposal; and
14. Signature of personnel completing the field record.

5.8 Chemical Analyses

All samples collected for laboratory analysis will be submitted to an accredited laboratory. The laboratory will use the most recent standard EPA and industry-accepted analytical methods for target analytes as the testing methods for each medium sampled. Chemical analyses will be performed in accordance with the most recent EPA standard analytical methodologies and extraction methods.

All soil and 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.

Soil and groundwater samples will also be analyzed for the following metals and cyanide using the indicated analytical methods. The groundwater samples will be analyzed for both total and dissolved metals. Only the soil samples collected at the former tetraethyl lead storage buildings and the water sample collected from the new well installed on the south side of the former tetraethyl lead storage building will be analyzed for tetraethyl lead in addition to total lead, and only the soil samples collected near the cooling towers and the water sample collected from the new well installed on the west side of the cooling towers will be analyzed for chromium VI in addition to total chromium.

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
Chromium VI	SW-846 Method 3060A
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.4/335.2 mod
Lead	SW-846 method 6010/6020
Tetraethyl lead	SW-846 method 8270C
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 to determine if there has been a release of contaminants at the individual SWMUs.

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

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

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

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

Completeness is defined as the percentage of measurements taken that are actually valid measurements, considering field QA and laboratory QC problems. EPA Contract Laboratory

Program (CLP) data has been found to be 80-85% complete on a nationwide basis and this has been extrapolated to indicate that Level III, IV, and V analytical techniques will generate data that are approximately 80% complete (EPA, 1987). As an overall project goal, the completeness goal is 85%; however, some samples may be critical base on location or field screening results and thus a sample–by-sample evaluation will be performed to determine if the completeness goals have been obtained.

Comparability is a qualitative parameter, which expresses the confidence with which one data set can be compared to another. Industry standard sample collection techniques and routine EPA analytical methods will be utilized to help ensure data are comparable to historical and future data. Analytical results will be reported in appropriate units for comparison to historical data and cleanup levels.

Section 6
Schedule

This investigation Work Plan will be implemented 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 sampling) -- four weeks;
- Laboratory analyses – eight weeks;
- Data reduction and validation – three 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 7
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.

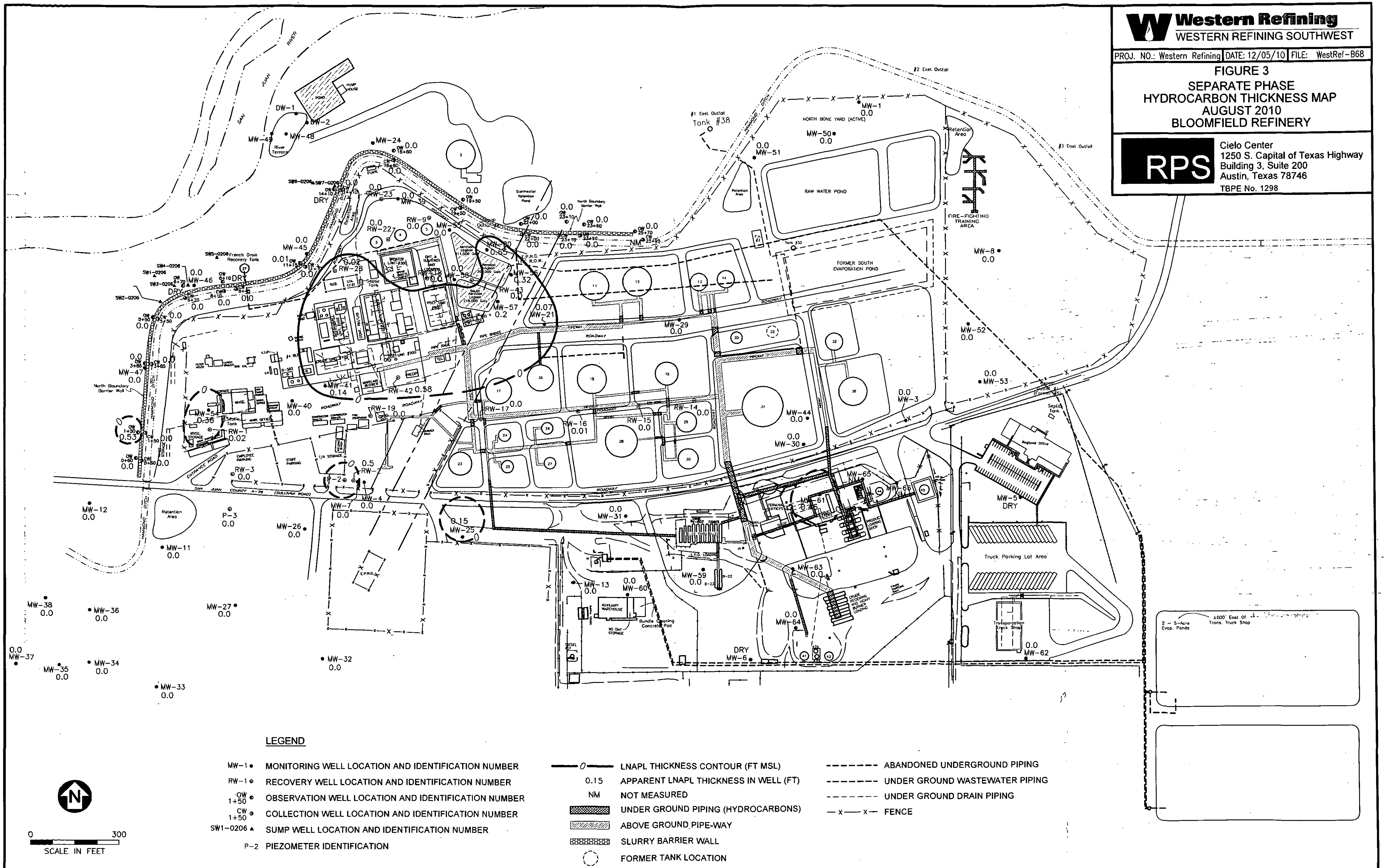
Tables

Table 2
Field Measurement Summary
SWMU Group 9 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
CW14+10	08/17/05	3502	6.93	69	>13.0	2739*
	05/11/05	4103	6.85	58	6.5	3353*
MW #40	Aug-08	**2827.0**	**6.9**	**68.4**	**NS[2]**	**NS[2]**
	Aug-07	**NR[1]**	**NR[1]**	**NR[1]**	**NR[1]**	**NR[1]**
	Apr-07	**3103**	**6.95**	**64.7**	**NR[2]**	**NR[2]**
MW #41	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	**2928**	**6.91**	**66.8**	**NR[2]**	**NR[2]**
RW #9	Aug-08	**NR[1]**	**NR[1]**	**NR[1]**	**NR[1]**	**NR[1]**
	Aug-07	**2908.0**	**6.97**	**65.5**	**0.5**	**245**
	Apr-07	**5624.0**	**6.75**	**59.1**	**NR[2]**	**NR[2]**
RW #19	Aug-08	**NS[2]**	**NS[2]**	**NS[2]**	**NS[2]**	**NS[2]**
	Aug-07	**NR[1]**	**NR[1]**	**NR[1]**	**NR[1]**	**NR[1]**
	Apr-07	**2825**	**6.80**	**62.1**	**NR[2]**	**NR[2]**
RW #22	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	**1926**	**6.81**	**59.7**	**NR[2]**	**NR[2]**
RW #23	Aug-08	**1596.0**	**7.03**	**65.8**	**NS[2]**	**NS[2]**
	Aug-07	**NR[1]**	**NR[1]**	**NR[1]**	**NR[1]**	**NR[1]**
	Apr-07	**NR[1]**	**NR[1]**	**NR[1]**	**NR[1]**	**NR[1]**

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
* - total dissolved solids

Figures



Western Refining

WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 12/05/10 | FILE: WestRef-B68

FIGURE 3
SEPARATE PHASE HYDROCARBON THICKNESS MAP
AUGUST 2010
BLOOMFIELD REFINERY

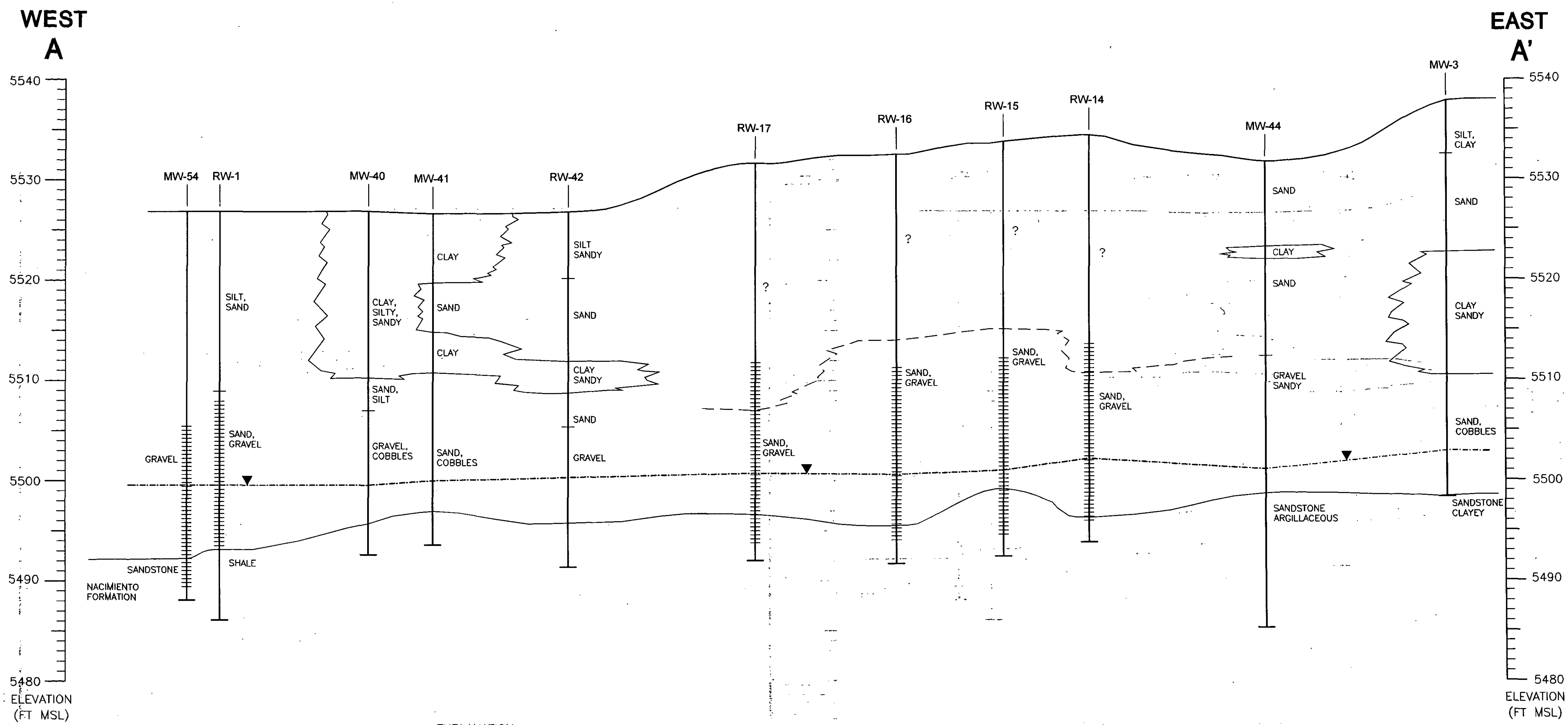
RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

LEGEND

- MW-1 • MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- RW-1 ⊚ RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
- OW 1+50 • OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
- CW 1+50 • COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
- SW1-0206 ▲ SUMP WELL LOCATION AND IDENTIFICATION NUMBER
- P-2 PIEZOMETER IDENTIFICATION
- —0— LNAPL THICKNESS CONTOUR (FT MSL)
- 0.15 APPARENT LNAPL THICKNESS IN WELL (FT)
- NM NOT MEASURED
- UNDER GROUND PIPING (HYDROCARBONS)
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- FORMER TANK LOCATION
- ABANDONED UNDERGROUND PIPING
- UNDER GROUND WASTEWATER PIPING
- UNDER GROUND DRAIN PIPING
- —x—x— FENCE

N

0 300
SCALE IN FEET



EXPLANATION

MW-54 ← WELL IDENTIFICATION

WELL

SCREEN INTERVAL

LITHOLOGIC CONTACTS

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

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

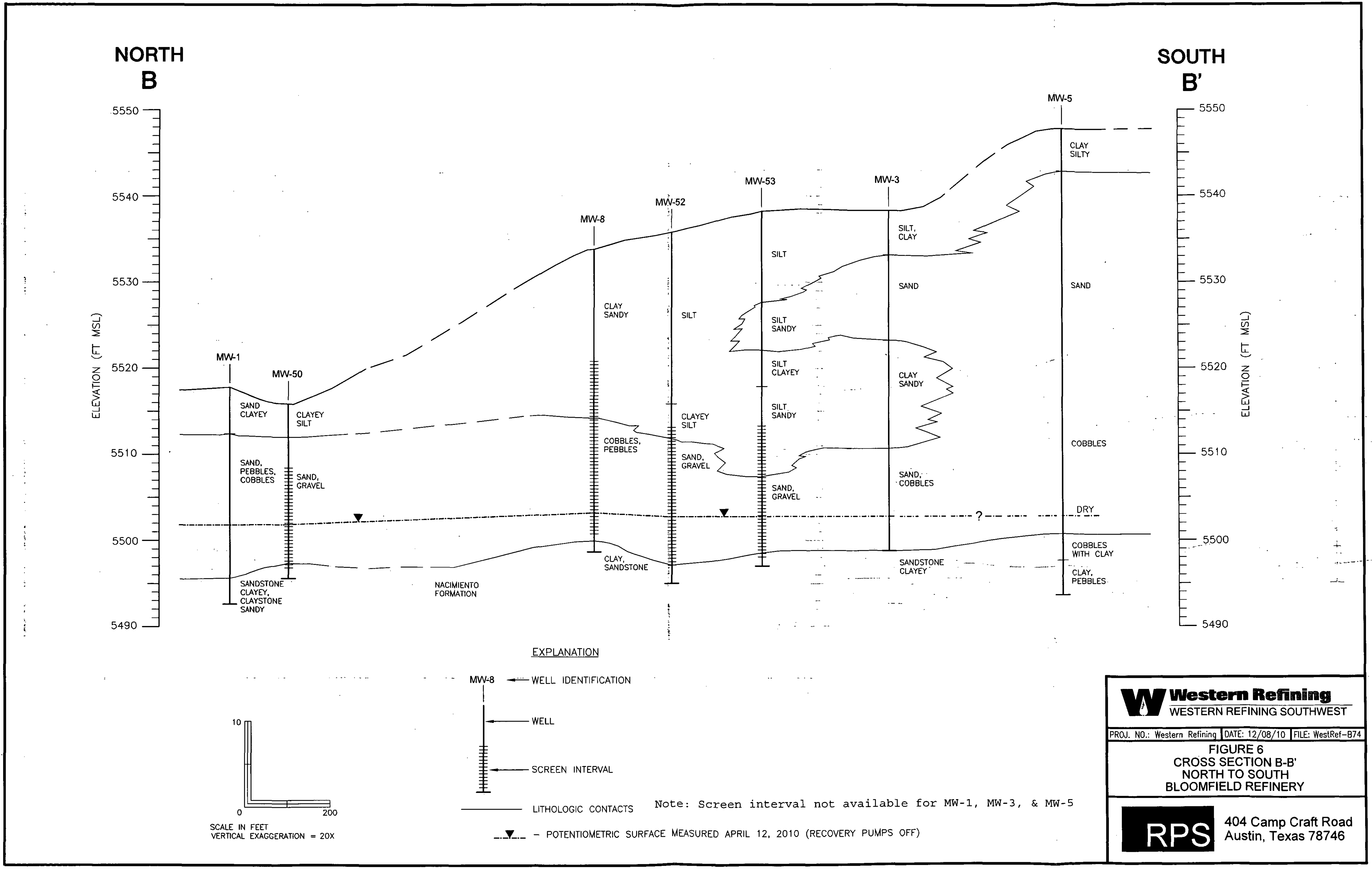
10
0
200
SCALE IN FEET
VERTICAL EXAGGERATION = 20X

Western Refining
WESTERN REFINING SOUTHWEST

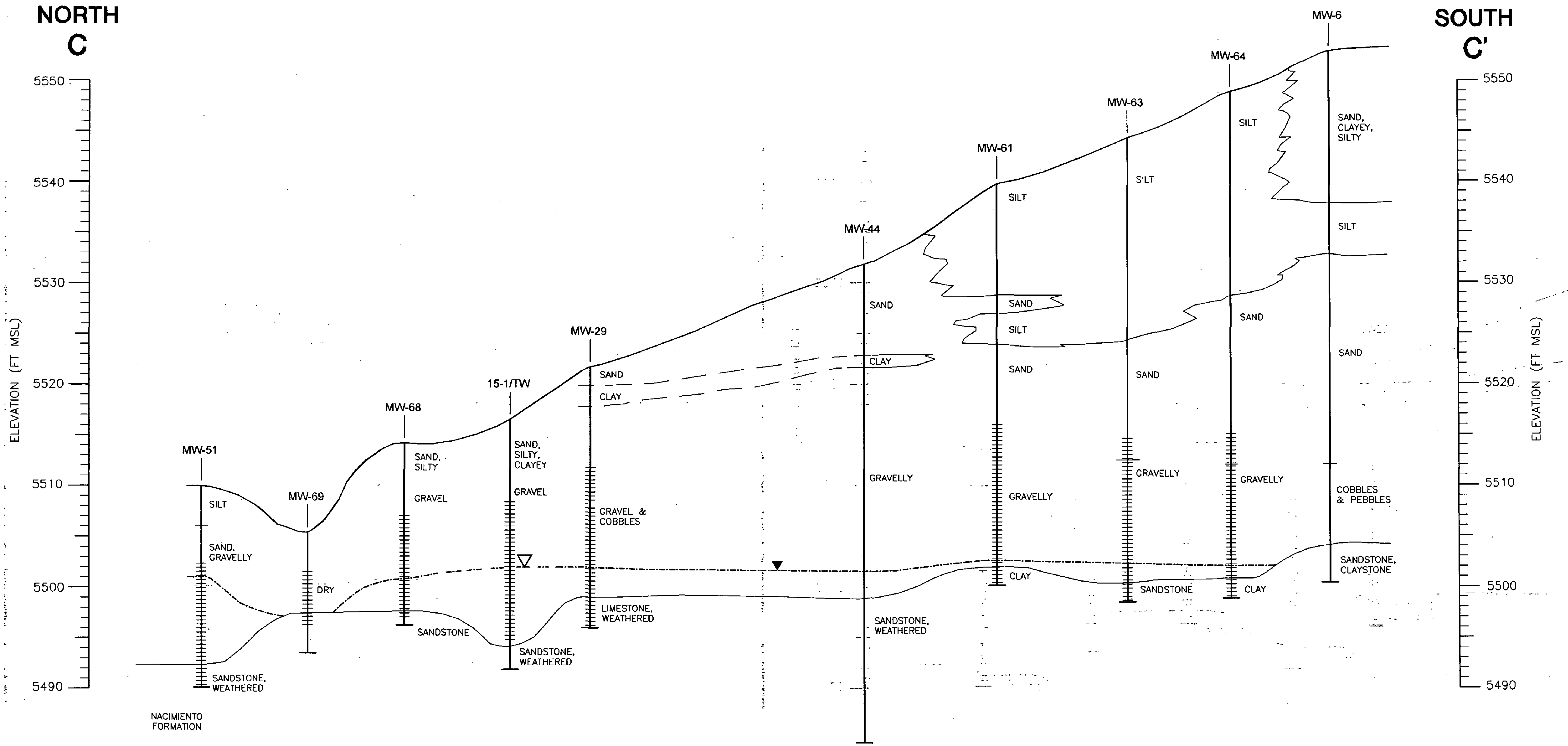
PROJ. NO.: Western Refining	DATE: 12/08/10	FILE: WestRef-B73

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

RPS
404 Camp Craft Road
Austin, Texas 78746



NORTH
B
SOUTH
B'
ELEVATION (FT MSL)
5550
5540
5530
5520
5510
5500
5490
MW-1
MW-50
MW-8
MW-52
MW-53
MW-3
MW-5
SAND CLAYEY
CLAYEY SILT
SAND, PEBBLES, COBBLES
SAND, GRAVEL
SANDSTONE CLAYEY, CLAYSTONE SANDY
NACIMIENTO FORMATION
CLAY SANDY
COBBLES, PEBBLES
CLAY, SANDSTONE
SILT
CLAYEY SILT
SAND, GRAVEL
SILT SANDY
SILT CLAYEY
SILT, CLAY
SAND
CLAY SANDY
SAND, COBBLES
SANDSTONE CLAYEY
CLAY SILTY
COBBLES
DRY
COBBLES WITH CLAY
CLAY, PEBBLES
?
EXPLANATION
MW-8 ← WELL IDENTIFICATION
WELL
SCREEN INTERVAL
LITHOLOGIC CONTACTS
– POTENTIOMETRIC SURFACE MEASURED APRIL 12, 2010 (RECOVERY PUMPS OFF)
Note: Screen interval not available for MW-1, MW-3, & MW-5
10
0
200
SCALE IN FEET
VERTICAL EXAGGERATION = 20X
Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining
DATE: 12/08/10
FILE: WestRef-B74
FIGURE 6
CROSS SECTION B-B'
NORTH TO SOUTH
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746



10
0
200
SCALE IN FEET
VERTICAL EXAGGERATION = 20X

EXPLANATION

MW-6 ← WELL IDENTIFICATION

← WELL

← SCREEN INTERVAL

LITHOLOGIC CONTACTS

Note: Screen intervals not available for MW-6 & 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: 12/08/10	FILE: WestRef-875

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

RPS
404 Camp Craft Road
Austin, Texas 78746

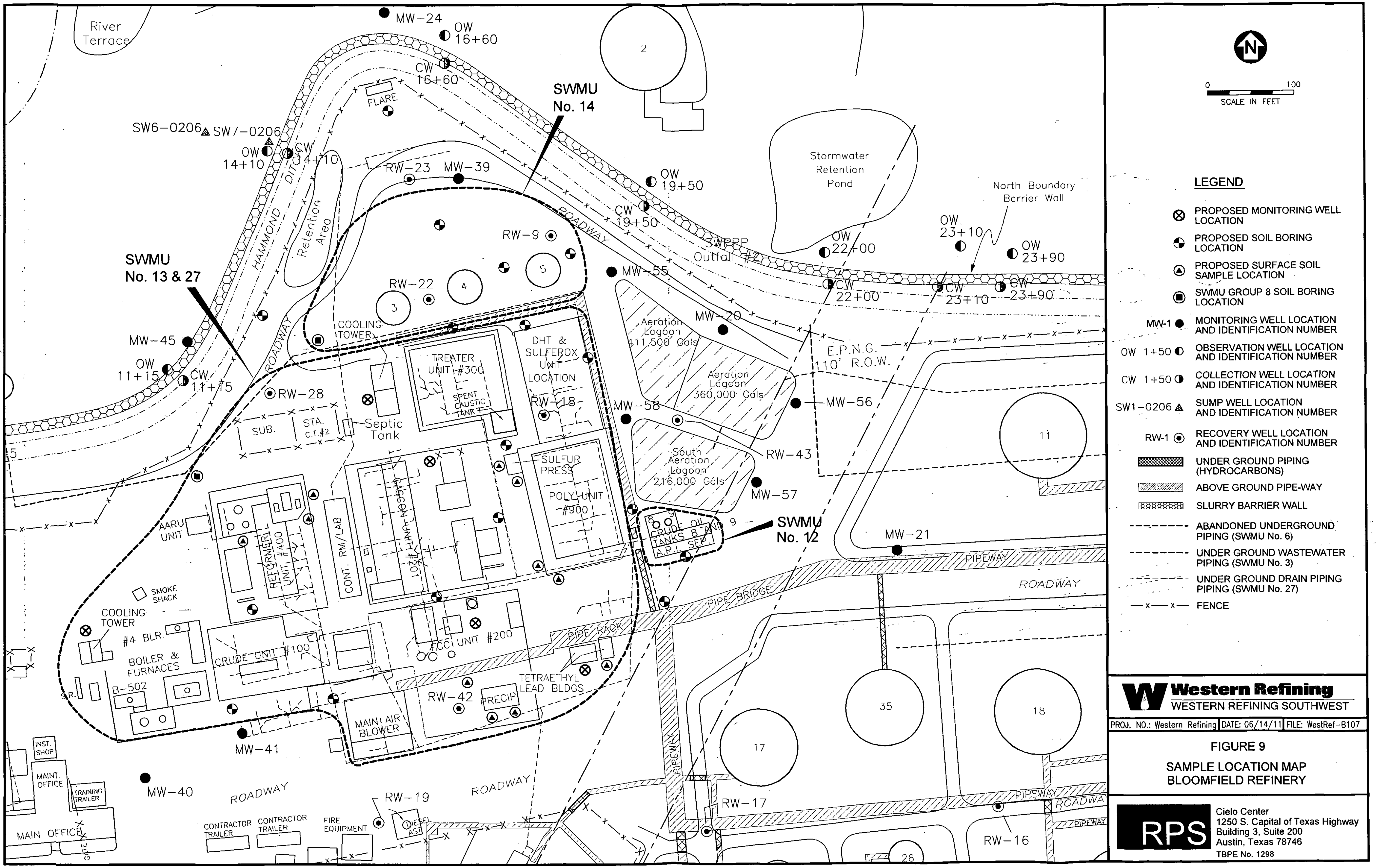


FIGURE 9
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY

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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SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

DAVE MARTIN
Secretary

BUTCH TONGATE
Acting Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

October 21, 2011

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

RE: NOTICE OF DISAPPROVAL
INVESTIGATION WORK PLAN
GROUP 9 (SWMU NO. 12 API SEPARATOR, SWMU NO. 13 PROCESS AREA, AND SWMU NO. 14 TANKS 3, 4, AND 5), AND SWMU NO. 27 WASTEWATER COLLECTION SYSTEM
WESTERN REFINING SOUTHWEST, INC., BLOOMFIELD REFINERY
EPA ID# NMD089416416
HWB-WRB-11-004

Dear Mr. Schmaltz:

The New Mexico Environment Department (NMED) has received Western Refining Southwest, Inc., Bloomfield Refinery's (Western) *Investigation Work Plan Group 9 (SWMU No. 12 API Separator, SMWU No. 13 Process Area, and SWMU No. 14 Tanks 3, 4, and 5) and SWMU No. 27 Wastewater Collection System* (Work Plan), dated June 2011. NMED has reviewed the Work Plan and hereby issues this Notice of Disapproval (NOD) with the following comments.

1. Section 2 (Background), pages 3-8

NMED's Comment: Section 2 describes the historical information for each SWMU in Group 9. List possible constituents of concern (COCs) identified during previous investigations in the response letter.

2. Section 2 (Background), SWMU No. 13 (Process Area), page 5

Western's Statement: "[t]he FCC Gas Concentration Unit fractionates the products from the FCC reactor into fuel gas, cat gas (which is a gasoline blendstock), LCO (which is blended diesel), and #6 burner fuel."

NMED's Comment: In future reports, be consistent with spelling out acronyms and provide a list of acronyms at the beginning of all work plans and reports.

3. Section 5.2 (Soil Sampling), pages 13-15

NMED's Comment: Western must propose to drill all soil borings to the water table. Western must collect soil samples at 2.5 foot intervals from the ground surface to the water table and at the water table and all soil samples submitted to the laboratory for analysis must be analyzed for those constituents in Comment 6. One additional soil boring location has been added south of the Crude Oil Tanks 8 and 9 and the API Separator (*see* attached figure).

In addition, NMED has selected five soil boring locations to be completed as monitoring wells since refinery operations have ceased and the Process Area can now be accessed (*see* attached figure). In the proposed areas, the depth to groundwater is approximately 19 feet. Western does not need to sample groundwater encountered during the drilling activities unless a monitoring well is completed in the boring. If product is encountered, Western must collect a sample and conduct a fingerprint analysis to characterize the product. The groundwater samples collected from the newly installed monitoring wells must be analyzed for all constituents listed in Comment 6. Revise the Work Plan accordingly.

4. Section 5.2 (Soil Sampling), page 15

NMED's Comment: Section 5.2 lists the depths of sample collection. The Permittee must clarify that the first sample listed in bullet 1 (0-6 inches) will be collected from the native soil immediately below the gravel fill in the revised Work Plan.

5. Section 5.3 (Ground Water Monitoring), page 16

Western's Statement: "no groundwater samples are proposed under this Scope of Work."

NMED's Comment: Historically, SWMU No. 13 (Process Area) has been inaccessible because of refinery operations. Because refinery operations have ceased, Western must install monitoring wells to characterize the contaminants within this area. In the revised Work Plan, the Permittee must discuss well installation and development and propose to complete the soil borings marked in the attached figure as monitoring wells (*see* also Comment 3).

6. Section 5.8 (Chemical Analyses), page 19

NMED's Comment: Section 5.8 discusses the proposed analyses for the soil samples. The Permittee proposes volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH) as gasoline range organics (GRO), diesel range organics (DRO), and motor oil range organics (MRO), the Skinner List Metals, and cyanide. The Permittee states that only soil samples collected at the former tetraethyl lead (TEL) storage buildings will be analyzed for total lead and those samples collected near the cooling towers will be analyzed for total chromium. The Skinner List Metals includes both lead and chromium and the Permittee must propose to analyze all soil samples accordingly.

In addition, groundwater sample analysis must be included in this section. Groundwater samples obtained from the newly installed monitoring wells must be analyzed for VOCs, SVOCs, GRO, DRO, MRO, Skinner List Metals, cyanide, iron, manganese, and general chemistry parameters. Include these analytical parameters for groundwater samples in the revised Work Plan.

7. Figure 3 (Separate Phase Hydrocarbon Thickness Map)

NMED's Comment: Figure 3 depicts a dark blue line east of Tank 45 and west of MW-5 that is not defined in the legend. Define this line or remove it from Figure 3 in the revised Work Plan.

8. Figures 5 (Cross Section A-A'), 6 (Cross Section B-B'), and 7 (Cross Section C-C')

NMED's Comment: Figures 5, 6, and 7 contain the cross sections of selected monitoring and recovery wells at the facility, but the figures do not show all information for all the wells (e.g., screened intervals). Figure 5 does not depict the screened intervals for wells MW-3, MW-40, MW-41, MW-44, and RW-42. Figure 6 does not include the screened intervals for MW-1, MW-3, MW-5, and MW-52. Figure 7 does not include the screened intervals for MW-6 and MW-44. Identify the screened intervals for all of the wells depicted in the figures of the revised Work Plan.

9. General Comment regarding submittals

NMED's Comment: NMED only received one copy of the Investigation Work Plan for Group 9. In accordance with Section X.A (General), paragraph 1, of the July 27, 2007 Order (Order), "[a]ll work plans and reports shall be submitted to [NMED] in the form of two paper copies and an electronic copy." In the future, Western must submit two paper copies and an electronic copy of work plans and reports unless otherwise specified by NMED.

Western must address all comments contained in this NOD and submit replacement pages for the revised Work Plan to NMED on or before **March 12, 2012**. The replacement pages 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 Leona Tsinnajinnie of my staff at (505) 476-6057.

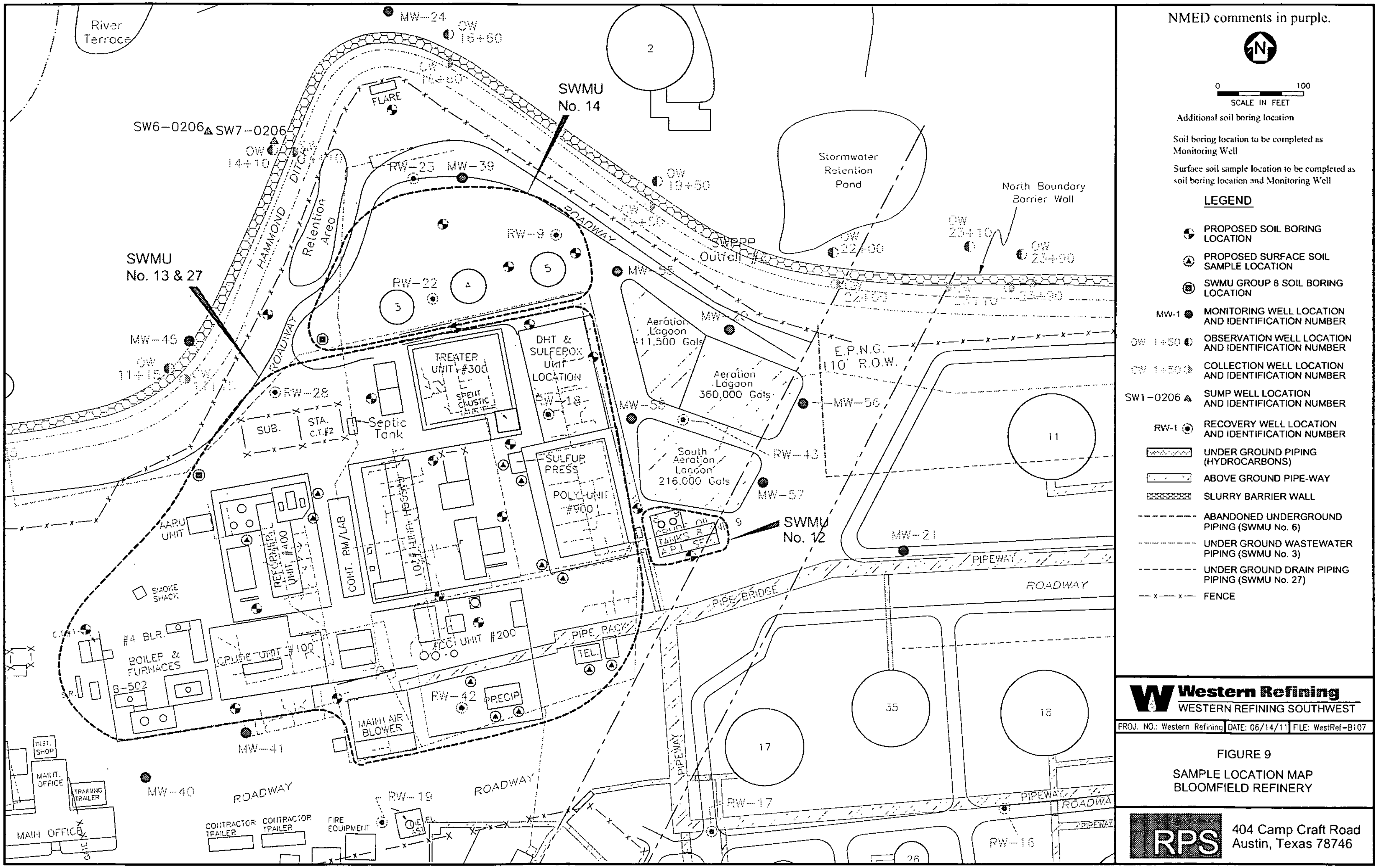
Sincerely,

John E. Kieling
Acting Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
L. Tsinnajinnie, NMED HWB
C. Chavez, OCD
A. Hains, Western

File: HWB-WRB-11-004 and Reading

NMED MARK-UP OF FIGURE 9



Western Refining LOGISTICS

WNR NYSE

RECEIVED OCD

2011 JUN 29 A 11:08

June 27, 2011

John Kieling, Acting Bureau Chief
New Mexico Environmental Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

UPS Mail #: **7009 3410 000 3636 2220**

Re: Giant Refining Company, Bloomfield Refinery Order No. HWB 07-34(CO) Group 9 and SWMU No. 27 Investigation Work Plan

Dear Mr. Kieling:

Western Refining Southwest Inc. - Bloomfield Refinery submits the referenced Investigation Work Plan pursuant to Section IV.B.7 of the July 2007 HWB Order. The Investigation Work Plan covers Group No. 9, which includes Solid Waste Management Unit (SWMU) No. 12 API Separator, SWMU No. 13 Process Area, and SWMU No. 14 Tanks 3, 4, and 5. This Work Plan also includes investigation activities associated with SWMU No. 27 Wastewater Collection System. The Investigation Work Plan was developed and formatted to meet the requirements of Section X.B of the July 2007 HWB Order.

If you have any questions or would like to discuss the Investigation Work Plan, please contact me at (505) 632-4171 or Randy.Schmaltz@wnr.com.

Sincerely,

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

cc: D. Cobrain (NMED)
C. Chavez (OCD) ✓
A. Hains (WNR)

RPS
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INVESTIGATION WORK PLAN
Group 9 (SWMU No. 12 API Separator, SWMU No. 13 Process Area and SWMU No. 14 Tanks 3, 4 and 5) and SWMU No. 27 Wastewater Collection System

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

June 2011

James R. Schmaltz
Environmental Manager

Western Refining Southwest, Inc.
Bloomfield Refinery

Scott T. Crouch, P.G.
Senior Consultant

RPS
404 Camp Craft Rd.
Austin, Texas 78746

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Executive Summary

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

Pursuant to the terms and conditions of an Order issued on July 27, 2007 by the New Mexico Environment Department (NMED) to San Juan Refining Company, as owner, and Giant Industries Arizona, Inc., as operator, for the Bloomfield Refinery, this Investigation Work Plan has been prepared for the SWMUs designated as Group 9. SWMU Group 9 includes SWMU No. 12 (API Separator), SWMU No. 13 (Process Area) and SWMU No. 14 (Tanks 3, 4, and 5). This work plan also includes SWMU No. 27 (Wastewater Collection System) and a short segment of SWMU No. 3 (Underground Piping Currently in Use). A Class I modification to the facility's RCRA permit was approved on June 10, 2008 to reflect the name change of the operator of the refinery to Western Refining Southwest, Inc. The operator is now Western Refining Southwest, Inc. – Bloomfield Refinery. The name of the owner of the refinery remained the same – San Juan Refining Company.

The Order requires that San Juan Refining Company and Giant Industries Arizona, Inc. ("Western") determine and evaluate the presence, nature, and extent of historical releases of contaminants at the aforementioned SWMUs. This Investigation Work Plan has been developed to collect the necessary data to meet the requirements of the Order. The planned investigation activities include collection of soil samples, which will be analyzed for potential site-related constituents. The Investigation Work Plan includes specific sampling locations, sample collection procedures, and analytical methods.

Section 1
Introduction

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

The Bloomfield Refinery is a crude oil refinery currently owned by San Juan Refining Company, and it is operated by Western Refining Southwest, Inc. – Bloomfield Refinery. The Bloomfield Refinery has an approximate refining capacity of 18,000 barrels per day; however, the refinery suspended petroleum refining operations in November 2009 but continues to operate as a petroleum storage terminal. Various process units operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, sulfur recovery, merox treater, catalytic polymerization, and diesel hydrotreating. Products produced at the refinery included gasoline, diesel fuels, jet fuels, kerosene, propane, butane, naphtha, residual fuel, fuel oils, and LPG.

On July 27, 2007, the New Mexico Environment Department (NMED) issued an Order to San Juan Refining Company and Giant Industries Arizona, Inc. ("Western") requiring investigation and corrective action at the Bloomfield Refinery. This Investigation Work Plan has been prepared for the Solid Waste Management Units (SWMUs) designated as Group 9 in the Order, which includes SWMU No. 12 (API Separator), SWMU No. 13 (Process Area) and SWMU No. 14 (Tanks 3, 4, and 5). There are some additional limited runs of underground piping (SWMU No. 3) and the Wastewater Collection System (SWMU No. 27) that are located in and near the Process Area (SWMU No. 13). These pipelines/sewers will also be investigated with the Group 9 SWMUs. The locations of SWMUs No. 12, 13, 14, 27, and the portion of SWMU No. 3 near the Process Units are shown on Figure 2. Photographs are included for these SWMUs 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 SWMUs, including a review of historical waste management and product storage/handling activities to identity the following:

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

SWMU No. 3 - Underground Piping Currently in Use

The majority of the underground piping at the refinery is considered to still be in use even though petroleum refining operations have recently been suspended and the property is currently used as a petroleum terminal. The terminal operations still include most of the same or similar transfer and storage operations of refined products, crude oil, and wastewater. Figure 2 shows the underground lines that are included in SWMU No. 3. The majority of SWMU No. 3 is being investigated as part of Group 8; however, there is a short segment of active underground piping, which runs along the northern boundary of SWMU No. 13 (Process Area) and the southern boundary of SWMU No. 14 (Tanks 3, 4, and 5), that will be investigated with the Group 9 SWMUs. SWMU No. 3 is not discussed separately in some of the subsequent sections of this work plan, as it is considered to be located within the area cover by SWMUs 13 and 14. This pipeline transfers recovered groundwater from Tank 37 (French drain recovery tank) to the northeast corner of the Diesel Hydrotreater Unit where it discharges into SWMU No. 27 (Wastewater Collection System), which in turns flows to SWMU No. 12 (API Separator).

The pipeline consists of 4 inch steel and PVC and it was most recently hydrotested for potential leaks in July 2010. The pipeline passed the test without any indication of leaks. There are no documented historical releases from the pipeline. No previous investigations of soils have been documented for this area but groundwater conditions in area have been previously investigated and two nearby recovery wells (RW-22 and RW-28) are currently in operation to recovery historical impacts from unidentified sources. Historical groundwater analyses from nearby monitoring and recovery wells are included in Table 1.

SWMU No. 12 - API Separator

The API Separator is located immediately south of the aeration lagoons and at the southeast corner of the process units (Figure 2). The separator is an in-ground concrete structure that was placed into service before 1989. The Wastewater Collection System (SWMU No. 27) and additional wastewater pipelines enter the API Separator on the western end and water discharges from the east end of the API Separator where it flows through the benzene strippers before discharging to the aeration basins. The API separator relies upon gravity separation (i.e., the specific gravity difference between the oil and the wastewater). The difference in specific gravity between oil and the wastewater is much smaller than the specific gravity difference between the suspended solids and water. Therefore, most of the suspended solids will settle to the bottom of the separator as a sediment layer, the oil will rise to the top of the separator, and the wastewater will be the middle layer between the oil on top and the solids on the bottom. The oil layer is skimmed off and recovered for reprocessing. The sediment layer is removed annually and managed in accordance with Hazardous Waste Regulations.

There have not been any documented historical releases from the API Separator. No previous investigations of soils have been conducted in the immediate area of the API Separator. Historical impacts to groundwater in the general area have been documented since the 1990s (Groundwater Technology Inc., 1994). Historical analyses from nearby recovery, monitoring, and observation wells are provided in Table 1.

SWMU No. 13 - Process Area

The Process Area is located in the northwestern portion of the refinery property, immediately west of the aeration lagoons (Figure 2). The process units have been located in the same area since the refinery was first started in the 1950s, with additional units added over time. There are a number of different processing units located in this area and a short description of each follows.

The Crude Unit has a design capacity of 16,800 barrels per day. The crude unit is the initial stage in the refiniing process. In the Crude Unit, raw crude oil is converted into straight run gasoline, kerosene, diesel, reduced crude, naphtha, and liquefied petroleum gases (LPGs) in a distillation process. The hydrocarbon materials enter and leave the Crude Unit through aboveground piping.

The Fluid Catalytic Cracker (FCC) Unit utilizes a stacked type of Universal Oil Products (UOP) regenerator technology. Reduced crude from the crude unit is used to feed the FCC unit. The feed is heated via an exchanger and mixed with recycle (fractionation tower bottoms) and side cut heavy gas oil. This combination is then mixed with hot regenerated catalyst and is vaporized in the riser entering the bottom of the reactor. As the vapor rises in the reactor, cracking takes place with carbon deposited on the catalyst. Spent catalyst leaves the reactor through a steam stripping leg and flows to the regenerator where air is blown in and carbon is burned off reactivating the catalysts. Cracked products leave the reactor and go to the fractionators via aboveground piping where they are separated into gas, LPG, gasoline, light gas, and heavy gas oil. Zeolite, bauxite, silica-alumina, and aluminum hydrosilica are all catalysts commonly used in an FCCU unit. Although catalyst is regenerated within the unit, excess spent catalyst is periodically (e.g., a few times each year) removed from the unit and either placed in the on-site landfill or disposed off-site at a permitted landfill. Handling of the catalyst takes place on the south side of the FCC unit.

The FCC Gas Concentration Unit fractionates the product from the FCC reactor into fuel gas, cat gas (which is a gasoline blendstock), LCO (which is blended with diesel), and #6 burner fuel. Propylenes and butlylenes are also recovered from fuel gas. No catalysts or other none petroleum hydrocarbon materials are added to the process within the FCC Gas Con. Unit.

An Electrostatic Precipitator is used to remove fine particles from the various air streams. For example, FCC catalyst fines (broken catalyst particles) in the air stream from the regenerator are directed via aboveground piping to the electrostatic precipitator. At the precipitator, particulate air flows between electrically charged plates that attract the fine particles in the gas due to static electricity. The charge on the plates cycle, thus allowing the particles to fall into hoppers at the bottom of the precipitator. The fines collected in the hoppers are either sent off-site for disposal, or are disposed of at the on-site landfill (SWMU No. 16).

The Catalytic Reformer Unit is a UOP semi-regenerative design that produces high octane (94-95) motor fuel (platformate) from naphtha. Catalytic reforming employs a series of reactions conducted over a platinum or platinum/rhenium catalyst to change or reform the structure of hydrocarbons. The naphtha charge is heated and passed through a series of reactors containing platinum/rhenium to produce a high octane gasoline called reformate and platformate which are used in gasoline blending. The naphtha feed, reformate and reformate are piped to and from the Reformer Unit in aboveground piping. The reactors go through a regeneration cycle about every eighteen months where hot gas is used to burn off carbon deposited on the catalyst to reactivate it. The organic material is completely consumed in the regeneration process.

Catalytic polymerization occurs at the Cat Poly Unit, where olefins (e.g., propylene and butylenes) are converted into high octane poly mers. Olefins from the gas concentration section of the FCC Unit are caustic are routed to the Cat Poly reactors, which a contain phosphoric catalysts. The phosphoric catalyst removes the impurities of the feed material. The only external handling of materials that occurs at the Cat Poly Unit is exchange of the phosphoric catalyst, which occurs approximately every six months at the southwest corner of the unit.

There are four treating units within Treater Unit #300; Merox LPG, saturate LPG, JP-4, and sour water stripper. All of these units perform the same function; removal of hydrogen sulfides and impurities from products by using sodium hydroxide. All piping is aboveground.

The SulFerox Unit is used to remove hydrogen sulfide from various gas streams. SulFerox® is a redox process where H_2S is oxidized to elemental sulfur while ferric ions are reduced. The primary materials handling activity is the removal of elemental sulfur from the sulfur press. The elemental sulfur was historically placed in an on-site landfill. A diesel hydrotreater is also located in the same area and is used to reduce the sulfur content of diesel fuel to meet on-road transportation fuel requirements.

The primary types of wastes and/or contaminants handled in the various process units include primarily petroleum hydrocarbons and catalysts used in the various reaction processes, as discussed above. In addition, compounds used as a source of chlorine ions (e.g., tetrachloroethene) were used in limited quantities at the Catalytic Reformer Unit. Tetraethyl lead was used as an octane booster until the late 1980s.

There is only one documented spill within the Process Area and this occurred in 1986. A new 6" diesel line was installed in the low piperack just east of the Crude Unit, but two flanges were not adequately tightened and the line leaked when first placed into service. Approximately 150 barrels of diesel were release and 50 barrels were recovered. Other smaller undocumented spills may have occurred over time but most of the units are built over a concrete floor with containment berms. There are drains within the units to collect any smaller spills and the drains are part of SWMU No. 27 (Wastewater Collection System), which is discussed below.

No prior investigations of soil conditions have been conducted in the Process Area; however, previous investigations have identified and delineated impacts to groundwater from historical site operations (Groundwater Technology Inc., 1994). The earliest known well in the area was RW-18, which was installed in the eastern portion of the process area in August 1990. Additional wells present in the area include recovery wells RW-28 and RW-24, monitoring wells MW-41, MW-55, and MW-58, and collection and observation wells along the slurry wall that is present just northwest of the process area. Historical analyses of groundwater samples collected from the area are presented in Table 1. Figure 3 shows the distribution of separate phase hydrocarbon (SPH) in the subsurface based on the apparent thickness of SPH measured in monitoring wells. Most of the process area is shown to be present over a plume of measureable SPH. Dissolved-phase impacts are depicted on Figure 4.

<u>SWMU No. 14 - Tanks 3, 4, and 5</u>

These three product storage tanks are located immediately north of the process area (Figure 2). Each of the tanks has a storage capacity of 10,000 barrels. The tanks have been used to store reformate, jet fuel (JP-4 and Jet-A), and unleaded gasoline. There have been two documented spills at the tanks as follows:

- On February 4, 1993 an estimated 45 barrels of reformate were released as the result of overfilling Tank #5. Forty three barrels were recovered, resulting in an estimated loss of only two barrels; and
- On March 3, 2000 an estimated 550 barrels of reformate were released as the result of overfilling Tank #5. Five hundred barrels were recovered with an estimated loss of 50 barrels.

While there have not been any documented soils investigations in the area of the tanks, groundwater impacts were documented as early as 1986 with the installation of RW-9 just north of Tank #5. Additional recovery wells RW-22 and RW-23 were added in July 1993. Other wells in the area include MW-39 and MW-55, and collection and observation wells along the slurry wall to the west, north, and northeast. Figure 3 shows the distribution of separate phase hydrocarbon (SPH) in the subsurface based on the apparent thickness of SPH measured in monitoring wells. Measureable SPH is present in wells just south of the Tanks in the process area but has not been present in wells nearest the Tanks in recent monitoring events. Dissolved-phase impacts are depicted on Figure 4.

SWMU No. 27 – Wastewater Collection System.

The Wastewater Collection System is present throughout the process area. It includes a series of drains placed in the concrete floors within the various process units and sumps also located throughout the process area. The collection system flows to the immediately adjacent API Separator. As the Wastewater Collection System is located within the process area, the type and characteristics of all waste and all potential contaminants handled in the Wastewater Collection System, the known and possible sources of contamination, and known extent of contamination is the same as that discussed above for SWMU No. 13 (Process Area). There are no documented releases from the wastewater collection system.

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 SWMUs subject to this investigation work plan (i.e., SWMUs No. 12, 13, 14, 27, and part of SWMU No. 3) are located, is generally of low relief with an overall northwest gradient of approximately 0.02 ft/ft. The refinery sits on an alluvial floodplain terrace deposit and there is a steep bluff (approx. drop of 90 feet) at the northern boundary of the refinery where the San Juan River intersects the floodplain terrace, which marks the southern boundary of the floodplain.

There are two locally significant arroyos, one immediately east and another immediately west of the refinery. These arroyos collect most of the surface water flows in the area, thus significantly reducing surface water flows across the refinery and in particular the area subject to this investigation work plan. 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 API separator, process units, Tanks 3, 4, and 5, and the wastewater collection and 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 near the API separator is primarily gravel and with some smaller paved areas. Most of the land surface throughout the process areas, where the wastewater collection system is also located, is covered by concrete with curbs to contain spills within the individual units. The land surface around Tanks 3, 4, and 5 is covered with gravel. The area between the refinery and the San Juan River does have limited vegetation on steep slopes that do not support dense vegetation.

3.2 Subsurface Conditions

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

Figures 5, 6 and 7 present cross-sections of the shallow subsurface based on borings logs from on-site monitoring well completions. The uppermost aquifer is under water table conditions and occurs within the sand and gravel deposits of the Jackson Lake Formation. The Nacimiento Formation functions as an aquitard at the site that prevents contaminants from migrating to deeper aquifers. The potentiometric surface as measured in August 2009 is presented as Figure 8 and shows the groundwater flowing to the northwest across the area of SWMUs No. 12, 13, 14, and 27. The depth to groundwater varies from approximately 50 feet in the southern portion of the refinery property to less than 17 feet in the northern portion of the refinery, to the north of the raw water pond. The significant change in the depth to groundwater across the site is predominantly a factor of the change in the land surface elevation across the site and not due a steep hydraulic gradient. The depth of groundwater varies from 25 to 30 feet in the area of SWMUs No. 12, 13, 14, and 27.

Section 4
Scope of Services

4.1 Anticipated Activities

Pursuant to Section IV of the Order, a scope of services has been developed to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective soil samples will be collected at the areas represented by SWMUs No. 12, 13, 14, and 27. There are 20 soil borings proposed within SWMUs No. 12, 13, 14, 27, and a small portion of SWMU No. 3. All of these soil borings will be drilled to a minimum depth of ten feet. In addition, twelve surface soil sample locations are proposed throughout SWMU No. 13. Soil borings will be installed and samples collected as discussed in Section 5.2.

4.2 Background Information Research

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

4.3 Collection and Management of Investigation Derived Waste

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

4.4 Surveys

The horizontal coordinates and elevation of each surface sample location, each soil boring, and the locations of all other pertinent structures will be determined by a registered New Mexico professional land surveyor in accordance with the State Plane Coordinate System (NMSA 1978

47-1-49-56 (Repl. Pamp. 1993)). The surveys will be conducted in accordance with Sections 500.1 through 500.12 of the Regulations and Rules of the Board of Registration for Professional Engineers and Surveyors Minimum Standards for Surveying in New Mexico. Horizontal positions will be measured to the nearest 0.1-ft and vertical elevations will be measured to the nearest 0.01-ft.

Section 5
Investigation Methods

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

5.1 Drilling Activities

Soil borings will be drilled using either hollow-stem auger or if necessary, air rotary methods including ODEX. The preferred method will be hollow-stem auger to increase the ability to recover undisturbed samples and potential contaminants. The drilling equipment will be properly decontaminated before drilling each boring.

The NMED will be notified as early as practicable if conditions arise or are encountered that do not allow the advancement of borings to the specified depths or at planned sampling locations. Appropriate actions (e.g., installation of protective surface casing or relocation of borings to a less threatening location) will be taken to minimize any negative impacts from investigative borings. Soil samples will be collected continuously and logged by a qualified geologist or engineer.

The drilling and sampling will be accomplished under the direction of a qualified engineer or geologist who will maintain a detailed log of the materials and conditions encountered in each boring. Both sample information and visual observations of the cuttings and core samples will be recorded on the boring log. Known site features and/or site survey grid markers will be used as references to locate each boring prior to surveying the location as described in Section 4.4. The boring locations will be measured to the nearest foot, and locations will be recorded on a scaled site map upon completion of each boring.

5.2 Soil Sampling

Since there is the potential for constituents to have been released to soils at "known" locations (e.g., at locations were catalysts are exchanged from the process units or along the wastewater collection system piping) a judgmental sampling design is appropriate. The locations most likely to have releases from underground piping include pipe connections (e.g., fittings and valves).

The proposed soil boring locations are concentrated along the SWMU No. 3 underground piping, SWMU No. 27 wastewater collection lines, locations of known past releases (e.g., near Tank #5), materials handling areas (e.g., storage area for chlorine source at Catalytic Reformer Unit), and generally throughout the process area (Figure 9). Soil borings are selected for these areas due to the potential for subsurface releases in addition to potential surface spills. Access for installation of soil borings is limited in some areas of the process area where overhead structures prevent access with a drilling rig.

There are two soil borings proposed around the API separator on the south and west sides. Access is limited to the north, where the South Aeration Lagoon is located very close by and to the east, where a major pipeline easement runs immediately adjacent to the separator. Thirteen soil borings are proposed within the process area, which also covers the wastewater collection system. Five soil borings are included for the area around Tanks 3, 4, and 5. This makes a total of 20 soil borings, which will be drilled to a minimum depth of ten feet. If there is screening evidence of impacted soils (e.g., petroleum odor, staining, or elevated photo-ionization detector or a combustible gas indicator readings) at ten feet, then the boring will be extended deeper until either there is no evidence of impacts or groundwater is encountered, whichever occurs first.

Twelve locations are proposed for the collection of surface soil samples at areas where surface impacts could have resulted from handling of materials above ground. This includes locations were catalysts are removed from the various process units and near the former tetraethyl lead storage building. The surface samples will be collected from the upper six inches; however, if there is screening evidence of impacts below six inches, then Western may elect to collect deeper samples. The decision to use a hand auger vs. a drilling rig to collect deeper samples 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 soil boring. Soil samples may be collected using decontaminated hand-held stainless steel sampling device (e.g., a hand auger), shelby tube, or thin-wall sampler, or a pre-cleaned disposable sampling device. A portion of the samples will be placed in pre-cleaned, laboratory-prepared sample containers for laboratory chemical analysis. The use of an Encore® Sampler or other similar device will be used during collection of soil samples for VOC analysis. The remaining portions of the sample will be used for logging and field screening as discussed in Section 5.2.1. Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below in Section 5.4.

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

- 0-6" (at all surface soil sampling locations and 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

Groundwater has been sampled at monitoring wells located at the refinery from as early as 1984. Based on the fact that there are numerous wells that provide information on water quality across much of the subject investigation area, no groundwater samples are proposed under this Scope of Work.

5.4 Sample Handling

At a minimum, the following procedures will be used at all times when collecting samples during investigation, corrective action, and monitoring activities:

1. Neoprene, nitrile, or other protective gloves will be worn when collecting samples. New disposable gloves will be used to collect each sample;

2. All samples collected of each medium for chemical analysis will be transferred into clean sample containers supplied by the project analytical laboratory with the exception of soil, rock, and sediment samples obtained in Encore® samplers. Sample container volumes and preservation methods will be in accordance with the most recent standard EPA and industry accepted practices for use by accredited analytical laboratories. Sufficient sample volume will be obtained for the laboratory to complete the method-specific QC analyses on a laboratory-batch basis; and

3. Sample labels and documentation will be completed for each sample following procedures discussed below. Immediately after the samples are collected, they will be stored in a cooler with ice or other appropriate storage method until they are delivered to the analytical laboratory. Standard chain-of-custody procedures, as

described below, will be followed for all samples collected. All samples will be submitted to the laboratory soon enough to allow the laboratory to conduct the analyses within the method holding times. At a minimum, all samples will be submitted to the laboratory within 48 hours after their collection.

Chain-of-custody and shipment procedures will include the following:

1. Chain-of-custody forms will be completed at the end of each sampling day, prior to the transfer of samples off site.
2. Individual sample containers will be packed to prevent breakage and transported in a sealed cooler with ice or other suitable coolant or other EPA or industry-wide accepted method. The drainage hole at the bottom of the cooler will be sealed and secured in case of sample container leakage.
3. Each cooler or other container will be delivered directly to the analytical laboratory.
4. Glass bottles will be separated in the shipping container by cushioning material to prevent breakage.
5. Plastic containers will be protected from possible puncture during shipping using cushioning material.
6. The chain-of-custody form and sample request form will be shipped inside the sealed storage container to be delivered to the laboratory.
7. Chain-of-custody seals will be used to seal the sample-shipping container in conformance with EPA protocol.
8. Signed and dated chain-of-custody seals will be applied to each cooler prior to transport of samples from the site.
9. Upon receipt of the samples at the laboratory, the custody seals will be broken, the chain-of-custody form will be signed as received by the laboratory, and the conditions of the samples will be recorded on the form. The original chain-of-custody form will remain with the laboratory and copies will be returned to the relinquishing party.
10. Copies of all chain-of-custody forms generated as part of sampling activities will be maintained on-site.

5.5 Decontamination Procedures

The objective of the decontamination procedures is to minimize the potential for cross-contamination. A designated decontamination area will be established for decontamination of drilling equipment and reusable sampling equipment. The drilling rig will be decontaminated prior to entering the site or unit. Drilling equipment or other exploration equipment that may come in contact with the borehole will be decontaminated by high pressure washing prior to drilling each new boring.

Sampling or measurement equipment, including but not limited to stainless steel sampling tools and split-barrel or core samplers, will be decontaminated in accordance with the following procedures or other methods approved by the Department before each sampling attempt or measurement:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;

2. Rinse with potable tap water;

3. Wash with nonphosphate detergent or other detergent approved by the Department (examples include Fantastik™, Liqui-Nox®);

4. Rinse with potable tap water; and

5. Double rinse with deionized water.

All decontamination solutions will be collected and stored temporarily as described in Section 4.3. Decontamination procedures and the cleaning agents used will be documented in the daily field log.

5.6 Field Equipment Calibration Procedures

Field equipment requiring calibration will be calibrated to known standards, in accordance with the manufacturers' recommended schedules and procedures. At a minimum, calibration checks will be conducted daily, or at other intervals approved by the Department, and the instruments will be recalibrated, if necessary. Calibration measurements will be recorded in the daily field logs. If field equipment becomes inoperable, its use will be discontinued until the necessary repairs are made. In the interim, a properly calibrated replacement instrument will be used.

5.7 Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded in a field log book. The original field forms will be maintained at the facility. Copies of the completed forms will be maintained in a bound and sequentially numbered field file for reference during field activities. Indelible ink will be used to record all field activities. Photographic documentation of field activities will be performed, as appropriate. The daily record of field activities will include the following:

1. Site or unit designation;
2. Date;
3. Time of arrival and departure;
4. Field investigation team members including subcontractors and visitors;
5. Weather conditions;

6. Daily activities and times conducted;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log, as appropriate;
10. Field monitoring data, including health and safety monitoring;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage or disposal; and
14. Signature of personnel completing the field record.

5.8 Chemical Analyses

All samples collected for laboratory analysis will be submitted to an accredited laboratory. The laboratory will use the most recent standard EPA and industry-accepted analytical methods for target analytes as the testing methods for each medium sampled. Chemical analyses will be performed in accordance with the most recent EPA standard analytical methodologies and extraction methods.

All soil samples will be analyzed by the following methods:

- SW-846 Method 8260 volatile organic compounds;
- SW-846 Method 8270 semi-volatile organic compounds; and
- SW-846 Method 8015B gasoline range (C5-C10), diesel range (>C10-C28), and motor oil range (>C28-C36) organics.

Soil samples will also be analyzed for the following metals and cyanide using the indicated analytical methods. Only the soil samples collected at the former tetraethyl lead storage buildings will be analyzed for tetraethyl lead in addition to total lead and only the soil samples collected near the cooling towers will be analyzed for chromium VI in addition to total chromium.

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
Chromium VI	SW-846 Method 3060A
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.4/335.2 mod
Lead	SW-846 method 6010/6020
Tetraethyl lead	SW-846 method 8270C
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

5.9 Data Quality Objectives

The Data Quality Objectives (DQOs) were developed to ensure that newly collected data are of sufficient quality and quantity to address the projects goals, including Quality Assurance/Quality Control (QA/QC) issues (EPA, 2006). The project goals are established in the Order and are to determine and evaluate the presence, nature, and extent of releases of contaminants at specified SWMUs. The type of data required to meet the project goals includes chemical analyses of soil to determine if there has been a release of contaminants at the individual SWMUs.

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

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

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

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

Completeness is defined as the percentage of measurements taken that are actually valid measurements, considering field QA and laboratory QC problems. EPA Contract Laboratory Program (CLP) data has been found to be 80-85% complete on a nationwide basis and this has been extrapolated to indicate that Level III, IV , and V analytical techniques will generate data that are approximately 80% complete (EPA, 1987). As an overall project goal, the completeness goal is 85%; however, some samples may be critical base on location or field screening results and thus a sample–by-sample evaluation will be performed to determine if the completeness goals have been obtained.

Comparability is a qualitative parameter, which expresses the confidence with which one data set can be compared to another. Industry standard sample collection techniques and routine EPA analytical methods will be utilized to help ensure data are comparable to historical and future data. Analytical results will be reported in appropriate units for comparison to historical data and cleanup levels.

Section 6
Schedule

This investigation Work Plan will be implemented 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 sampling) -- four weeks;
- laboratory analyses – eight weeks;
- data reduction and validation – three 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 7
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 - Historical Groundwater Data
Volatile Organic Analytical Result Summary
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters						
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	DRO (mg/l)	GRO (mg/l)
Screening Levels (mg/l):		0.005 [2]	0.75 [1]	0.7 [2]	0.62 [1]	0.012 [3]	0.2 ^[4]	NE
Well ID:	Date Sampled:							
RW #9	Aug-10	**3.9**	<0.05	0.37	0.55	**2.3**	**8.8**	21
	Apr-10	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Aug-09	**9.5**	<0.02	**0.89**	**2.2**	**3.4**	**14**	47
	Apr-09	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Apr-07	**11**	<0.100	**0.87**	**4.1**	**8.6**		
RW #18	Aug-10	**0.23**	<0.02	0.048	0.093	**1.6**	**910**	11
	Apr-10	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Aug-09	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-09	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Aug-05	**1.2**	<0.1	0.28	0.54	<0.1	NA	NA
	Apr-05	**0.92**	0.16	0.54	**1.1**	**8.9**	NA	NA
RW #22	Apr-07	**9**	<0.100	**2.1**	**11**	**4**	NA	NA
	Apr-05	**9.8**	0.083	**1.8**	**7.9**	**9.6**	NA	NA
RW #23	Aug-10	**4.5**	<0.05	**1.1**	**2.7**	**1.3**	**240**	25
	Apr-10	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Aug-09	**6.2**	<0.05	**1.5**	**2.2**	**1.2**	**36**	36
	Apr-09	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
RW #28	Aug-10	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-10	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Aug-09	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-09	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
MW #39	Apr-07	**0.28**	<0.010	0.56	0.38	<0.025	NA	NA
	Apr-06	**0.28**	0.05	**0.9**	**0.89**	<0.005	NA	NA
	Apr-05	**0.52**	0.057	**1.3**	**1.5**	<0.05	NA	NA
	Aug-04	**0.46**	0.15	0.55	**0.92**	<0.050	NA	NA
MW #40	Aug-10	**0.04**	<0.005	<0.005	<0.0075	0.011	**26**	5.8
	Apr-10	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Aug-09	**0.019**	<0.005	<0.005	<0.0075	**0.013**	**17**	5.4
	Apr-09	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Apr-07	**0.11**	0.026	0.12	0.22	<0.025	NA	NA
MW #41	Apr-07	**0.95**	<0.020	0.12	0.15	**0.51**	NA	NA
RW #42	Aug-10	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-10	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	Aug-09	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-09	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]

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Bloomfield Refinery - Bloomfield, New Mexico

		Parameters						
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	DRO (mg/l)	GRO (mg/l)
Screening Levels (mg/l):		0.005 [2]	0.75 [1]	0.7 [2]	0.62 [1]	0.012 [3]	0.2 [4]	NE
Well ID:	Date Sampled:							
MW #55	Aug-10	**11.0**	0.029	**2.6**	**1.7**	**7.0**	**13.0**	59.0
	May-09	**10**	**0.76**	**1.3**	**1.5**	**1.9**	**5.7**	42
MW #58	Aug-10	**4.5**	<0.02	0.14	<0.03	**15**	**6.6**	29
	May-09	**1.0**	<0.005	0.21	0.32	**18**	**3.5**	21
CW 11+15	Apr-06	**1.70**	<0.020	0.024	0.380	**1.2**	NA	NA
OW 11+15	Aug-10	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Apr-10	**0.15**	<0.01	0.23	<0.03	**1.3**	**1500**	2.5
	Aug-09	**0.33**	<0.01	0.033	<0.03	**1.7**	**60**	3.2
	Apr-09	**0.23**	<0.001	0.034	0.015	**1.1**	**100**	2.7
	Apr-07	**0.84**	<.02	<.02	<.04	**2**	NA	NA
	Aug-06	**0.86**	<0.020	0.026	0.096	**1.8**	**16**	NA
	Apr-06	**0.23**	<0.020	<0.020	<0.060	**1.6**	**15**	NA
	Aug-05	**0.75**	<0.01	0.12	0.27	NA	NA	NA
	May-05	**0.42**	<0.025	0.14	0.52	NA	NA	NA
CW 14+10	Apr-06	**8.80**	<0.100	**1.10**	<0.300	**1.20**	NA	NA
	Aug-05	**6.00**	<0.100	**1.20**	0.24	NA	NA	NA
	May-05	**9.80**	<0.025	**2.10**	**1.30**	NA	NA	NA
OW 14+10	Aug-10	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Apr-10	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Aug-09	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Apr-09	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	May-05	**10.00**	<0.0005	**3.90**	**3.20**	NA	NA	NA
CW 16+60	Apr-06	**6.30**	<0.100	**3.10**	**6.30**	**7.60**	NA	NA
	Aug-05	**6.80**	0.065	**3.10**	**7.10**	NA	NA	NA
	May-05	**5.30**	0.075	**3.80**	**7.30**	NA	NA	NA
OW 16+60	Aug-10	**0.27**	<0.01	0.15	0.07	**0.84**	**11**	5.8
	Apr-10	**0.49**	<0.005	0.43	0.14	**1.50**	**280**	12.0
	Aug-09	**0.75**	<0.01	0.24	0.24	**2.00**	**62**	14.0
	Apr-09	**0.40**	<0.005	0.47	0.17	**2.20**	**36**	7.5
	Apr-07	**3.1**	<.05	**2.0**	**7.2**	**9.0**	NA	NA
CW 19+50	Apr-06	**4.90**	<0.001	**1.30**	**2.60**	**80.0**	NA	NA
	Aug-05	**6.60**	<0.05	**2.80**	**4.30**	NA	NA	NA
	May-05	**4.80**	0.021	**1.70**	**5.10**	NA	NA	NA

Table 1 - Historical Groundwater Data
Volatile Organic Analytical Result Summary
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters						
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	DRO (mg/l)	GRO (mg/l)
Screening Levels (mg/l):		0.005 [2]	0.75 [1]	0.7 [2]	0.62 [1]	0.012 [3]	0.2^[4]	NE
Well ID:	Date Sampled:							
OW 19+50	Aug-10	<0.001	<0.001	<0.001	<0.003	**0.055**	**2.2**	0.065
	Apr-10	<0.001	<0.001	<0.001	<0.003	**0.057**	**1.2**	0.076
	Aug-09	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	Apr-09	<0.001	<0.001	<0.001	0.0034	**0.042**	**12**	0.11
	Apr-07	0.0019	<.001	<.001	<.002	**0.27**	NA	NA
	Apr-06	**0.035**	<0.001	0.012	0.077	**0.18**	**3.4**	NA
	Aug-05	**0.0057**	<0.0005	0.0011	0.0019	NA	NA	NA
	May-05	**1.90**	0.013	**0.86**	**3.20**	NA	NA	NA

Notes:
mg/L = milligram per liter
MW = monitoring well CW = collection well
RW = recovery well OW = observation well
NA = not analyzed
NE = not established GRO - gasoline range organics
MTBE = methyl tertiary butyl ether DRO - diesel range organics
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 Standard for Ground Water (WQCC 20NMAC 6.2.33103)
2 - Safe Drinking Water Act Maximum Contaminant Level
3 - EPA Regional Screening Levels 2009 -Tap Water
4 -NMED 2006 TPH Screening Guidelines Table 2a (unknown oil)

Table 1 - Historical Groundwater Data
Dissolved Metals Analytical Result Summary
Bloomfield Refinery- Bloomfield, New Mexico

		Parameters															
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Selenium (mg/L)	Silver (mg/L)	Sodium (mg/L)	Uranium (mg/L)	Zinc (mg/L)
Screening Level (mg/l)		0.01 [2]	1 [1]	0.005 [2]	NE	0.05 [1]	1 [1]	1 [1]	0.015 [2]	NE	0.2 [1]	NE	0.05 [1]	0.05 [1]	NE	0.03 [1]	10 [1]
Well ID:	Date Sampled:																
RW #9	Aug-10	<0.02	3.2	<0.002	160	<0.006	<0.006	1.5	<0.005	54	2.1	4.6	<0.05	<0.005	520	<0.001	<0.05
	Aug-09	<0.02	0.25	<0.002	140	<0.006	<0.006	2.3	0.007	39	2.2	2.9	<0.05	<0.005	450	<0.001	<0.05
	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]	NR[1]
	Aug-07	<0.020	2.5	<0.002	180	<0.006	<0.006	16.0	0.026	52	4.4	3.0	<0.25	<0.005	400	<0.10	0.084
RW #18	Aug-10	<0.02	0.048	<0.002	110	<0.006	<0.006	3.0	<0.005	98	0.56	7	<0.05	<0.005	1000	<0.001	<0.05
	Aug-09	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]	NR[1]
	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]	NR[1]
	Aug-07	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]	NR[1]
RW #18	Aug-05	<0.02	0.038	<0.002	220	<0.006	<0.006	5	<0.005	64	4.1	4.4	<0.05	<0.005	500	<0.1	0.021
RW #23	Aug-10	<0.02	2.4	<0.002	140	<0.006	<0.006	11	0.006	58	6.1	8.2	<0.05	<0.005	220	<0.001	<0.05
	Aug-09	<0.02	1.3	<0.002	120	<0.006	<0.006	1.1	0.0086	52	4.6	6.8	<0.05	<0.005	200	<0.001	0.058
	Aug-08	<0.02	1.4	<0.002	110	<0.006	<0.006	2.9	0.013	47	4.6	6.3	<0.25	<0.005	170	<0.001	<0.05
	Aug-07	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]	NR[1]
RW #28	Aug-10	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]	NR[1]
	Aug-09	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]	NR[1]
	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]	NR[1]
	Aug-07	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]	NR[1]
MW #39	Aug-04	<0.02	0.15	<0.002	290	<0.006	<0.006	0.18	<0.005	28	0.3	8.7	<0.05	<0.005	750	<0.10	<0.005
MW #40	Aug-10	<0.02	1.7	<0.002	100	<0.006	<0.006	4.6	<0.005	47	2.2	3.8	<0.05	<0.005	500	<0.001	<0.05
	Aug-09	<0.02	1.7	<0.002	86	<0.006	<0.006	6.2	<0.005	41	2.3	3.8	<0.05	<0.005	540	<0.001	0.057
	Aug-08	<0.02	1.8	<0.002	91	<0.006	<0.006	5.5	<0.005	42	2.5	3.5	<0.25	<0.005	520	<0.001	0.063
	Aug-07	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]	NR[1]
RW #42	Aug-10	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]	NR[1]
	Aug-09	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]	NR[1]
	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]	NR[1]
	Aug-07	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]	NR[1]
MW #55	Aug-10	<0.02	2.5	<0.002	180	<0.006	<0.006	12	<0.005	64	6.8	11.0	<0.05	0.005	400	<0.001	<0.05
MW #58	Aug-10	<0.02	1.6	<0.002	150	<0.006	<0.006	8.9	0.0085	49	4.3	4.9	<0.05	<0.005	390	<0.001	<0.05

Notes:
mg/L = milligram per liter
MW = monitoring well
RW = recovery well
NE = not established
NR[1]= No Sample Required - Well Contains Separate Phase Hydrocarbon
1 - New Mexico Water Quality Control Standard for Ground Water
2 - Safe Drinking Water Act Maximum Contaminant Level
3 - EPA Regional Screening Levels -Tap Water

Table 1 - Historical Groundwater Data
Total Metals Analytical Result Summary
Bloomfield Refinery - Bloomfield, New Mexico

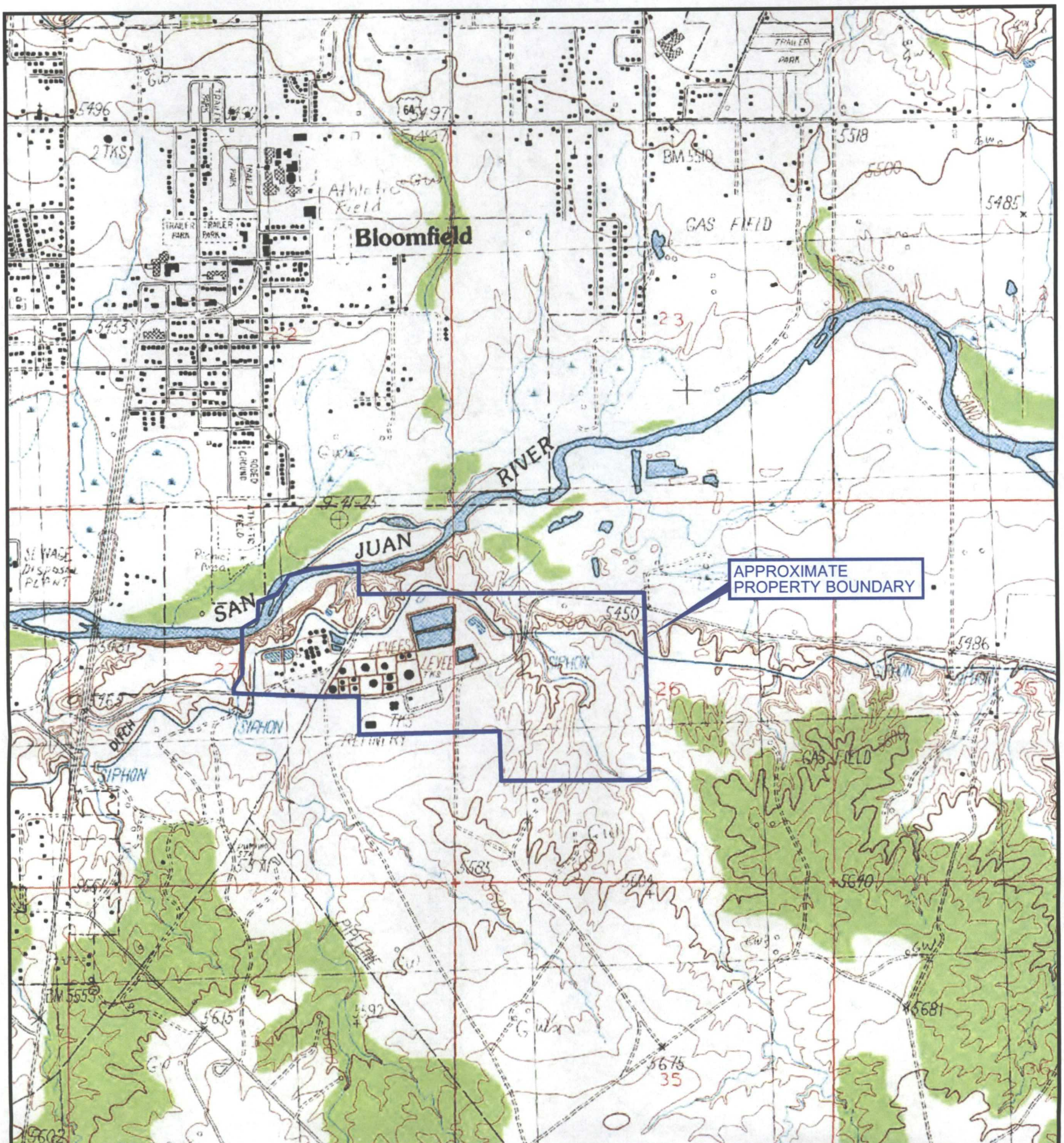
		Parameters							
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Selenium (mg/L)	Silver (mg/L)	Mercury (mg/L)
Screening Level (mg/L):		0.01 [2]	1 [1]	0.005 [2]	0.05 [1]	0.015 [2]	0.05 [1]	0.05 [1]	0.002 [1]
Well ID:	Date Sampled:								
RW #9	Aug-10	<0.02	**3.3**	<0.002	0.007	0.012	<0.05	<0.005	<0.0008
	Aug-09	<0.02	0.23	<0.002	<0.006	<0.005	<0.25	<0.005	<0.0002
	Aug-08	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-07	<0.020	**1.7**	<0.002	<0.006	**0.052**	<0.05	<0.005	<0.0002
RW #18	Aug-05	<0.02	0.038	<.002	**0.32**	0.16	NA	NA	NA
RW #18	Aug-10	<0.02	**1.3**	0.0025	**0.075**	<0.025	<0.25	<0.005	**0.0025**
	Aug-09	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-08	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]
RW #23	Aug-10	<0.02	**2.5**	<0.002	<0.006	**0.067**	<0.05	<0.005	<0.0002
	Aug-09	<0.02	**1.7**	<0.002	<0.006	0.0096	<0.25	<0.005	<0.0002
	Aug-08	<0.02	**1.4**	<0.002	<0.006	0.013	<0.25	<0.005	<0.0002
	Aug-07	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
RW #28	Aug-10	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-09	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-08	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]
MW #39	Aug-04	<0.02	0.71	<0.002	**0.59**	0.019	<0.05	<0.005	0.00021
MW #40	Aug-10	<0.02	**2.3**	<0.002	0.012	0.006	<0.05	<0.005	<0.0002
	Aug-09	<0.02	**2.8**	<0.002	<0.006	0.0075	<0.25	<0.005	<0.0002
	Aug-08	<0.02	**1.8**	<0.002	<0.006	<0.005	<0.25	<0.005	<0.0002
	Aug-07	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
RW #42	Aug-10	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-09	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-08	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]
MW #55	Aug-10	**0.06**	**5.9**	<0.002	**0.054**	**0.3**	<0.05	<0.005	<0.001
MW #58	Aug-10	<0.02	**1.6**	<0.002	<0.006	**0.034**	<0.05	<0.005	<0.001
OW 11+15	8/17/05	**0.038**	0.82	<0.002	<0.006	0.0056	<0.05	<0.005	<0.0002
	5/11/05	**0.037**	**1.9**	<0.002	0.02	**0.028**	<0.05	<0.005	<0.0002
OW 14+10	5/11/05	**0.11**	**11**	<0.002	0.09	**0.73**	<0.05	<0.005	<0.0002
CW 14+10	8/17/05	<0.02	0.12	<0.002	<0.006	0.0055	<0.05	<0.005	<0.0002
	5/11/05	<0.1	0.33	<0.01	<0.03	<0.025	<0.25	<0.025	<0.0002
CW 16+60	8/22/05	<0.02	**1.1**	<0.002	<0.006	0.008	<0.5	<0.005	<0.0002
	5/11/05	<0.02	0.6	<0.002	<0.006	0.01	<0.05	<0.005	<0.0002
OW 19+50	5/10/05	<0.02	0.23	<0.002	<0.006	**0.024**	<0.05	<0.005	<0.0002
CW 19+50	08/17/05	<0.02	0.68	<0.002	<0.006	<0.0005	<0.05	<0.005	<0.0002
	5/10/05	<0.02	0.2	<0.002	<0.006	0.0061	<0.05	<0.005	<0.0002

Notes:
mg/L = milligram per liter
MW = monitoring well
RW = recovey well
NA= not analyzed
NR[1]= No Sample Required - Well Contains Separate Phase Hydrocarbon
1 - New Mexico Water Quality Control Standard for Ground Water
2 - Safe Drinking Water Act Maximum Contaminant Level
3 - EPA Regional Screening Levels -Tap Water

Table 1 - Historical Groundwater Data
General Chemistry Analytical Result Summary
Bloomfield Refinery - Bloomfield, New Mexico

Well ID:	Date Sampled:	Fluoride (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Bromide (mg/L)	Nitrogen (mg/L)	Phosphorus (mg/L)	Sulfate (mg/L)	CO_2 (mg/L)	Alk (mg/L)
Screening Levels (mg/l):		1.6 [1]	250 [1]	1 [2]	NE	10 [2]	NE	600 [1]	NE	NE
RW #9	Aug-10	<1.0	230	<1.0	4.9	<1.0	<5.0	6.3	1300	1300
	Aug-09	<1.0	160	<1.0	4.5	<1.0	<5.0	280	920	1000
	Aug-08	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-07	<2.0	**420**	<2.0	3.9	<2.0	<10	41	1200	1000
RW #18	Aug-10	<2.0	**380**	<2.0	4.3	<2.0	<10	**1700**	950	950
	Aug-09	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-08	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]
	Aug-05	<1.0	110	<5.0	<1.0	<1.0	<5.0	**940**	650	650
RW #23	Aug-10	<1.0	87	<1.0	1.1	<1.0	<5.0	<5.0	900	900
	Aug-09	<1.0	100	<1.0	5.1	<1.0	<5.0	11	860	890
	Aug-08	0.4	76	<0.10	<1.0	<0.10	<0.50	3.2	850	780
	Aug-07	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
RW #28	Aug-10	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-09	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-08	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]
MW #39	Aug-04	0.65	140	<0.10	1.7	<0.10	<0.50	**3100**	35	38
MW #40	Aug-10	0.24	**320**	***15**	4.1	***15**	<0.0025	<0.50	1100	1100
	Aug-09	0.28	**310**	<2.0	4.0	<0.10	<0.50	<0.50	1100	1100
	Aug-08	0.33	**310**	<2.0	4.4	<2.0	<0.50	<0.50	1200	1200
	Aug-07	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
RW #42	Aug-10	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-09	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]	NR[1]
	Aug-08	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]
MW #55	Aug-10	0.35	**470**	***6.1**	4.4	*6.1	<0.50	1.3	1000	1000
	May-09	0.56	77	<1.0	NA	0.32	<0.50	4.0	NA	570
MW #58	Aug-10	0.31	**270**	***5.5**	5	*5.5	<0.50	1.8	1100	1100
	May-09	0.38	**2330**	<1.0	NA	0.14	<0.50	110	NA	800
OW 11+15	8/17/05	0.42	**340**	NA	NA	<0.1	<0.5	25	NA	NA
	5/11/05	0.43	**320**	NA	NA	<0.5	<0.5	130	NA	NA
OW 14+10	5/11/05	0.53	73	NA	NA	<0.5	<0.5	350	NA	NA
CW 14+10	8/17/05	1.6	55	NA	NA	<0.1	<0.5	**1400**	NA	NA
	5/11/05	**2.1**	78	NA	NA	<0.5	<0.5	**2300**	NA	NA
CW 16+60	8/22/05	0.55	150	NA	NA	<0.1	<0.5	2.2	NA	NA
	5/11/05	0.42	150	NA	NA	<0.5	<0.5	150	NA	NA
CW 19+50	8/17/05	0.41	**270**	NA	NA	<0.5	<0.5	140	NA	NA
	5/10/05	0.35	**230**	NA	NA	<0.5	<0.5	260	NA	NA
OW 19+50	8/22/05	0.29	**290**	NA	NA	<0.1	<0.5	**660**	NA	NA
	5/10/05	0.35	**290**	NA	NA	<0.5	<0.5	290	NA	NA

Notes:
Alk = alkalinity, total
CO_2 = Carbon Dioxide
mg/L = milligram per liter
NE = not established
NA = not analyzed
MW = monitoring well
RW = recovery well
CW = collection well
OW = observation well
1 - New Mexico Water Quality Control Standard for Ground Water
2 - Safe Drinking Water Act Maximum Contaminant Level
NR[1]= No Sample Required - Well Contains Separate Phase Hydrocarbon
* - Laboratory analyzed for combined Nitrate (As N) + Nitrite (As N) to meet holdtime



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

0 2000
SCALE IN FEET

QUADRANGLE LOCATION

Western Refining
WESTERN REFINING SOUTHWEST

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

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

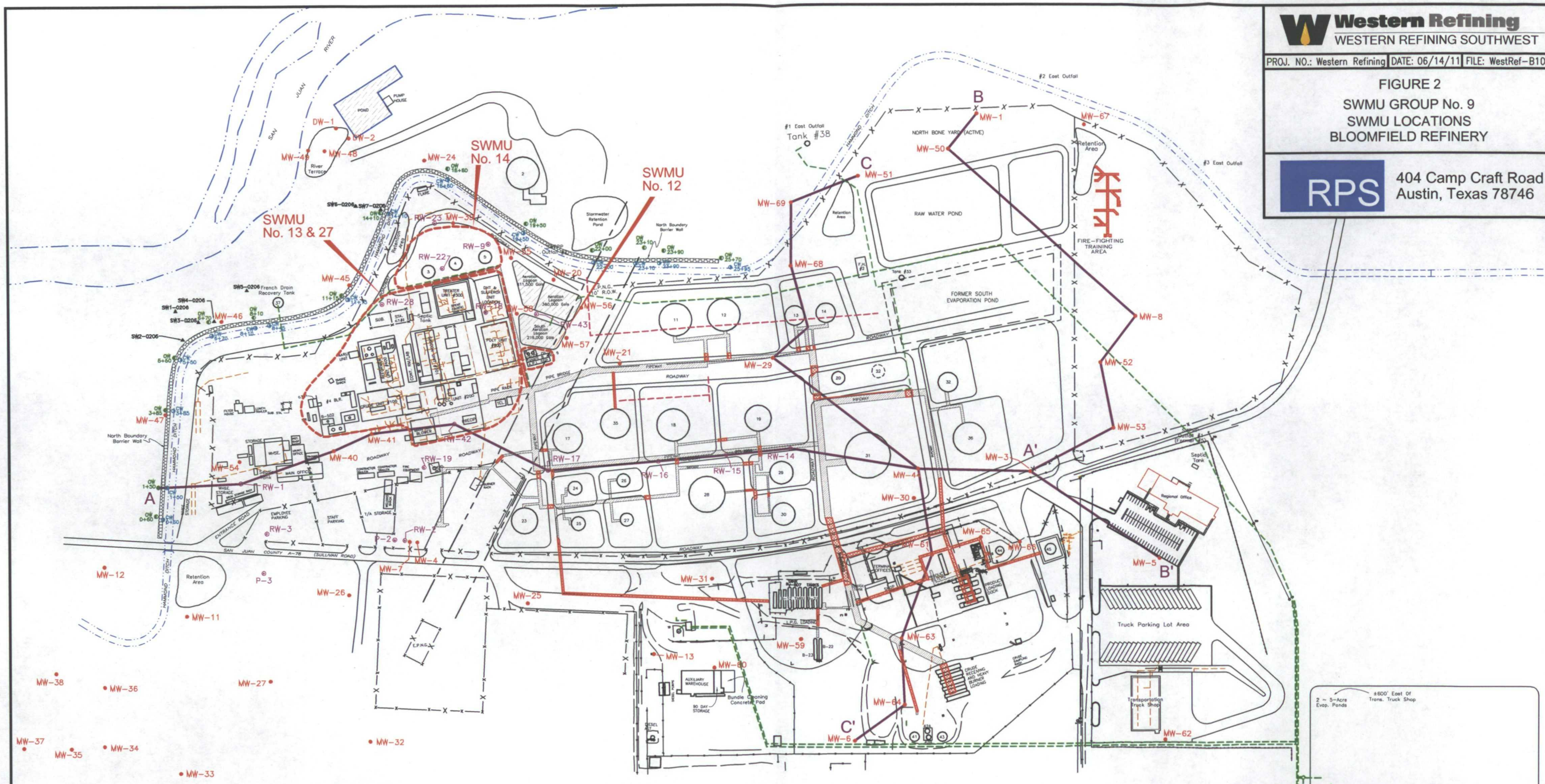
RPS
404 Camp Craft Road
Austin, Texas 78746

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/14/11 | FILE: WestRef–B106

FIGURE 2
SWMU GROUP No. 9
SWMU LOCATIONS
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
OW 1+50 ◐ OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
CW 1+50 ◑ COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
SW1–0206 ▲ SUMP WELL LOCATION AND IDENTIFICATION NUMBER
P–2 PIEZOMETER IDENTIFICATION
RW-1 ◉ RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
UNDER GROUND PIPING (HYDROCARBONS)
ABOVE GROUND PIPE-WAY
SLURRY BARRIER WALL
ABANDONED UNDERGROUND PIPING (SWMU No. 6)
UNDER GROUND WASTEWATER PIPING (SWMU No. 3)
UNDER GROUND DRAIN PIPING (SWMU No. 27)
A——A' LINE OF CROSS SECTION
FORMER TANK LOCATION
—x——x— FENCE

N

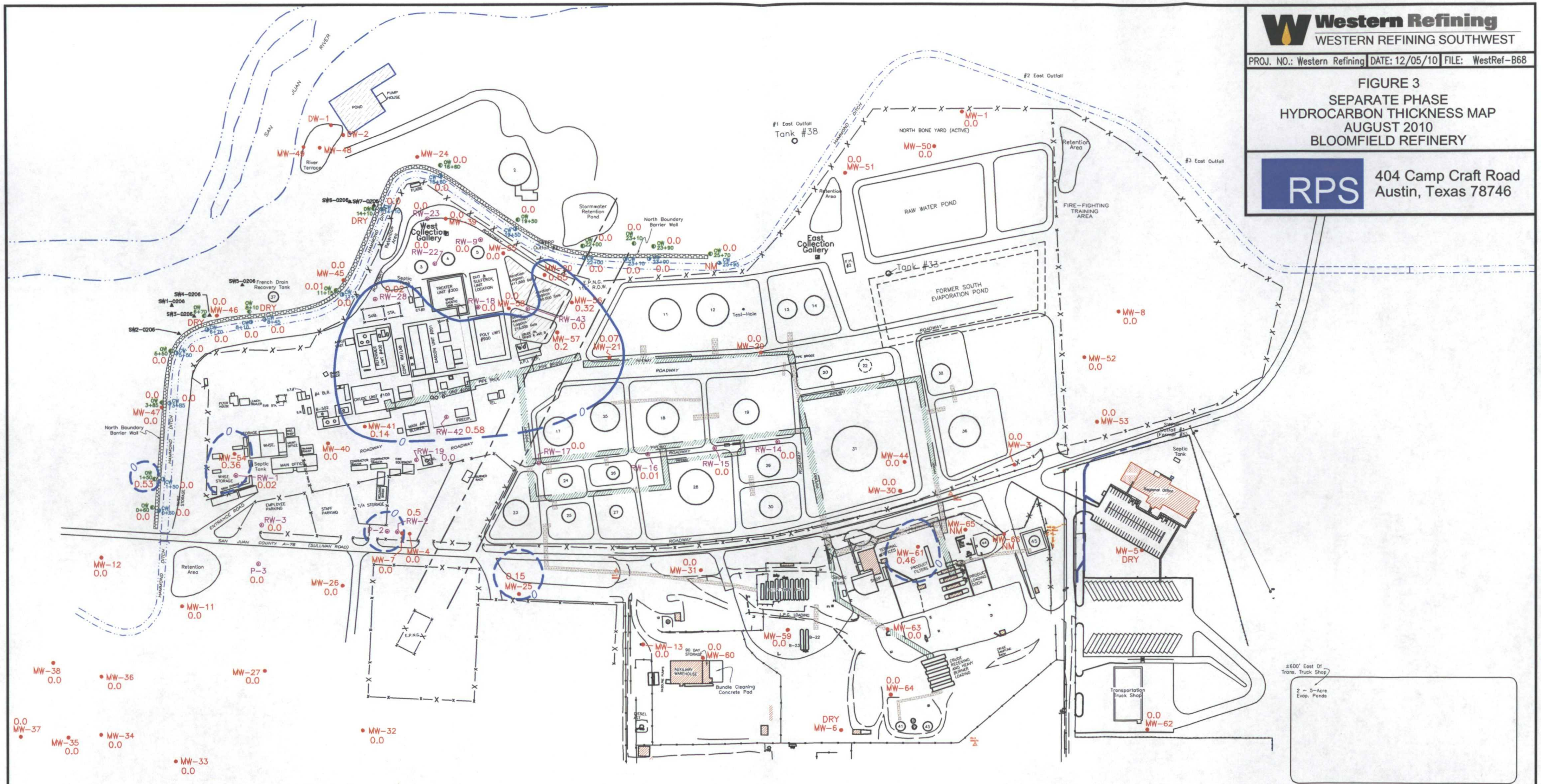
0 300
SCALE IN FEET

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/05/10	FILE: WestRef-B68

FIGURE 3
SEPARATE PHASE
HYDROCARBON THICKNESS MAP
AUGUST 2010
BLOOMFIELD REFINERY

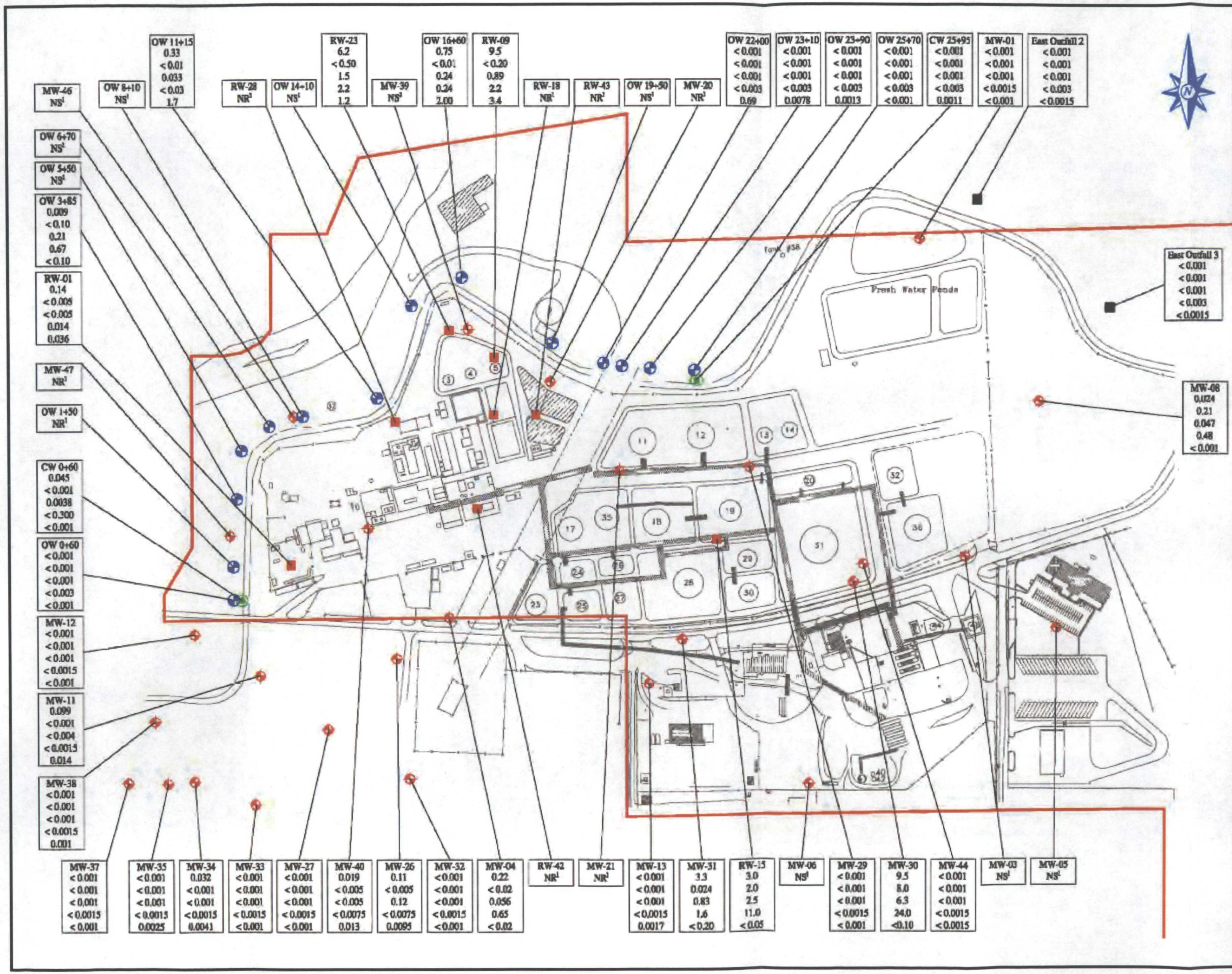
RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

- MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- RW-1 ◎ RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
- OW 1+50 ● OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
- CW 1+50 ◉ COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
- SW1-0206 ▲ SUMP WELL LOCATION AND IDENTIFICATION NUMBER
- P-2 PIEZOMETER IDENTIFICATION
- —0— LNAPL THICKNESS CONTOUR (FT MSL)
- 0.15 APPARENT LNAPL THICKNESS IN WELL (FT)
- NM NOT MEASURED
- UNDER GROUND PIPE-WAY
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- FORMER TANK LOCATION
- —x—x— FENCE

0 — 300
SCALE IN FEET



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

0 — 360 APPROXIMATE SCALE IN FEET

Legend

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

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

Notes:

All concentrations in milligrams per liter (mg/L)

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

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

NS3 = Sample Inadvertently not Collected this Sampling Event.

NR1 = No Sample Required - Well Contains Separate Phase Hydrocarbon

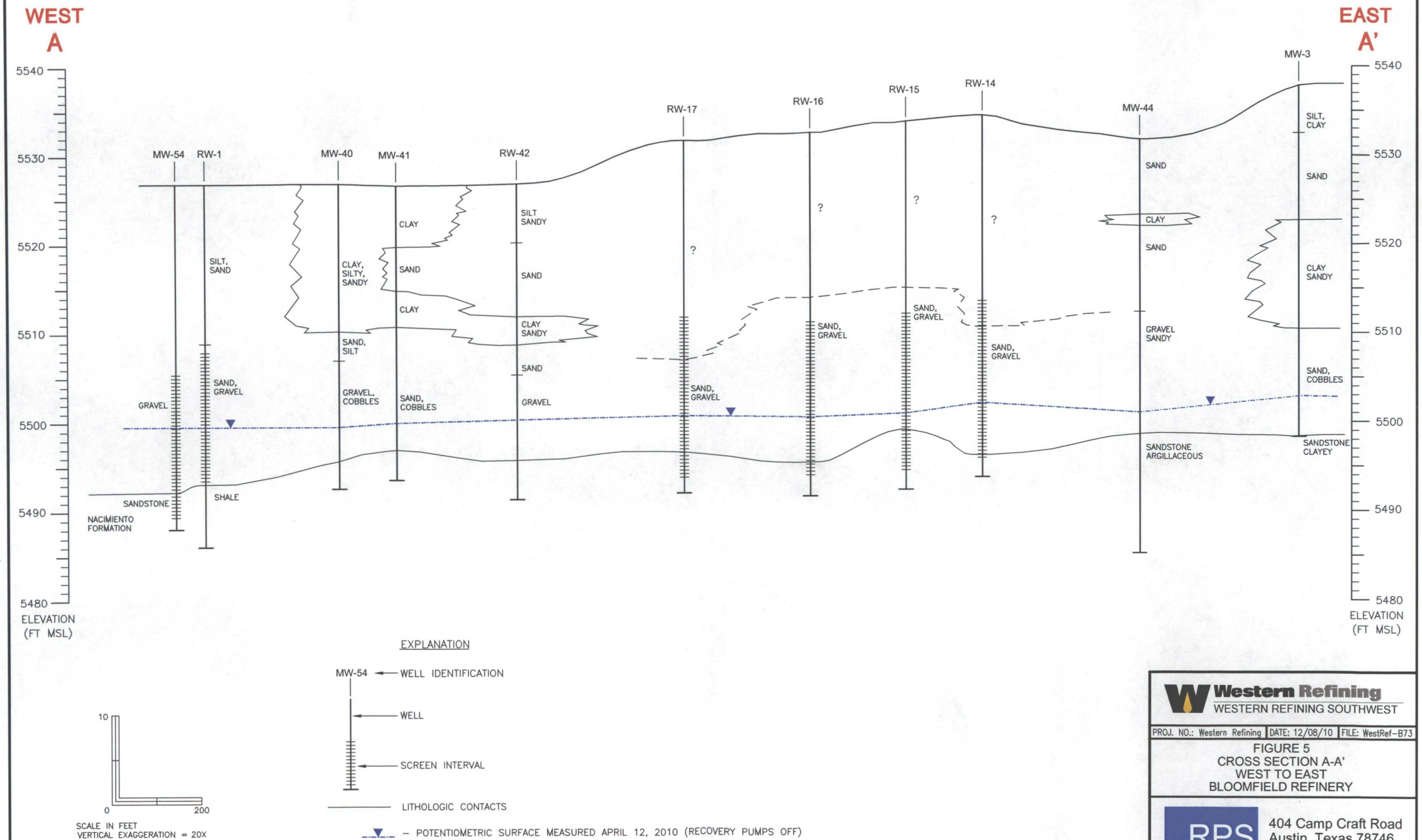
NR2 = No Sample Required per OCD and NMED Conditions

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/05/10	FILE: WestRef-B69

FIGURE 4
DISSOLVED-PHASE GROUNDWATER DATA
AUGUST 2009
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/08/10	FILE: WestRef-B73

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

RPS
404 Camp Craft Road
Austin, Texas 78746

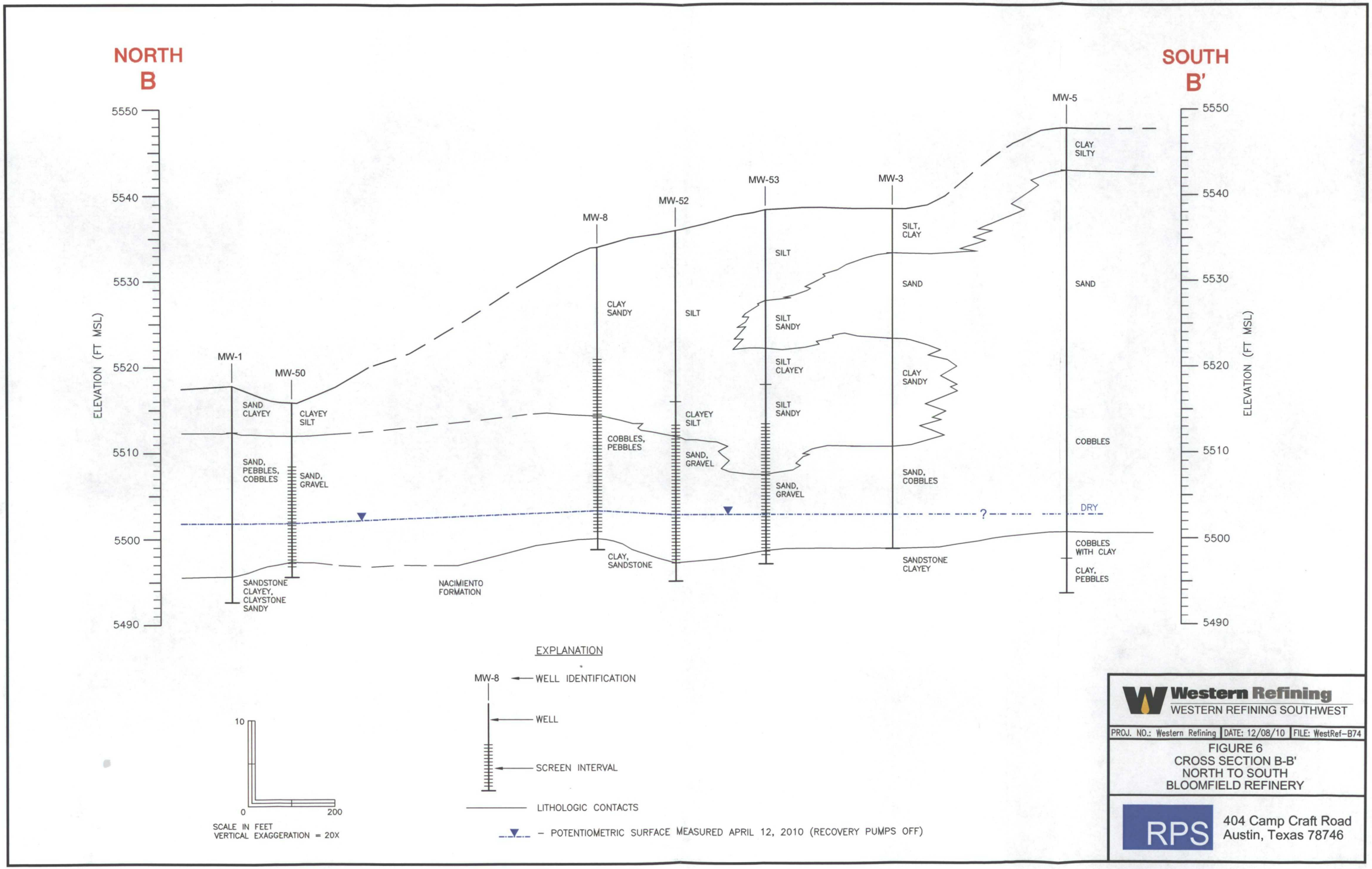
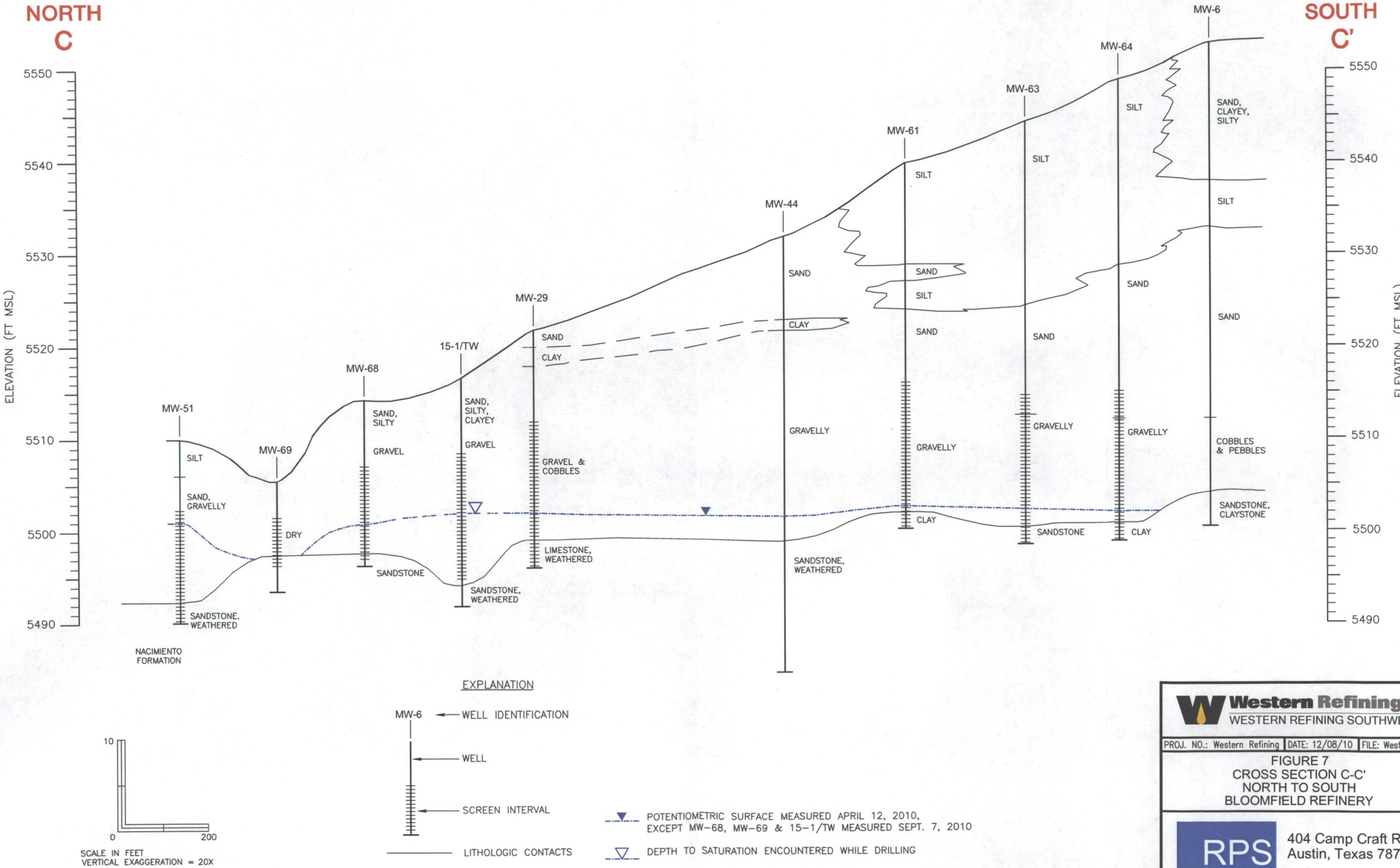


FIGURE 6
CROSS SECTION B-B'
NORTH TO SOUTH
BLOOMFIELD REFINERY

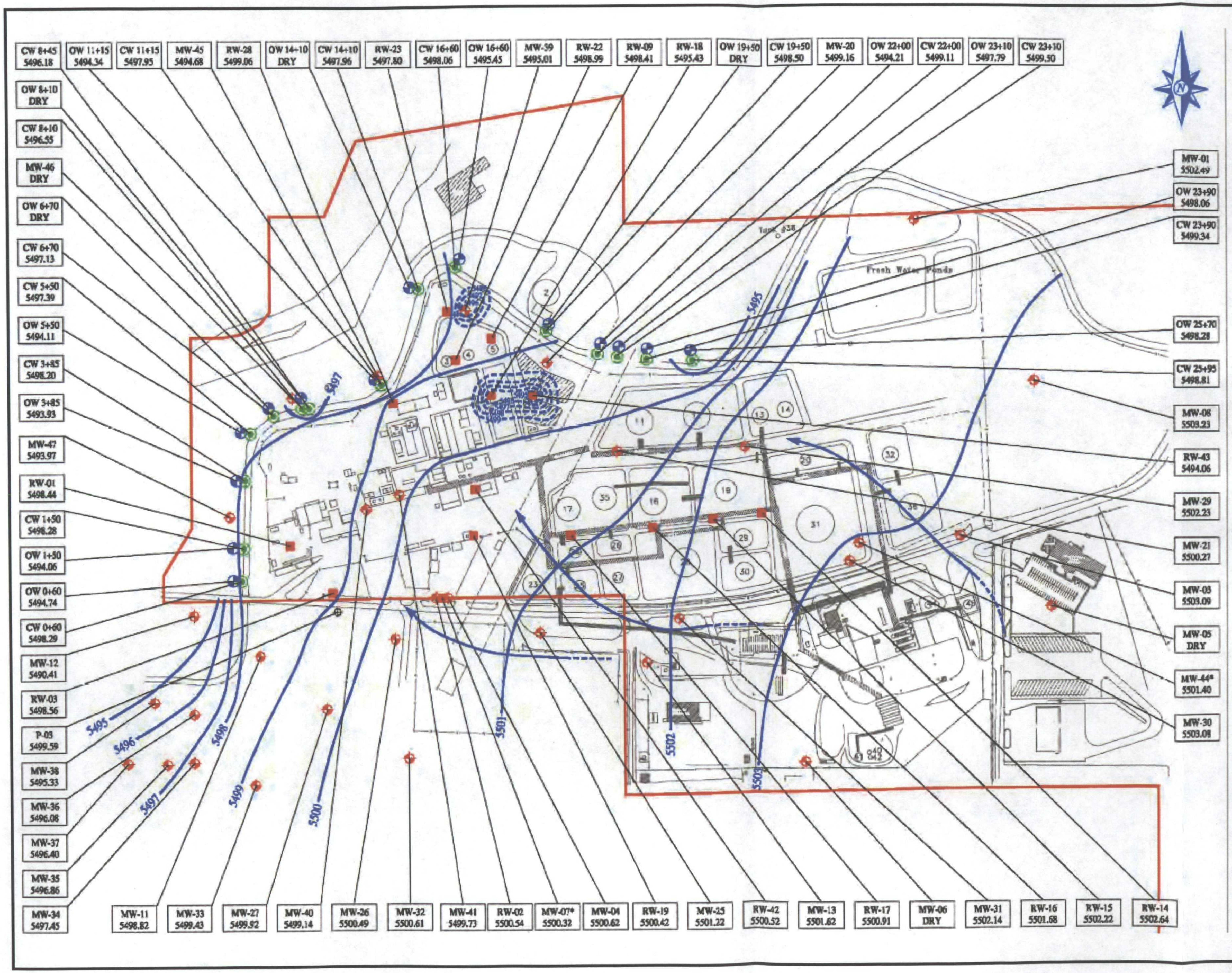


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/08/10	FILE: WestRef-B75

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

RPS
404 Camp Craft Road
Austin, Texas 78746



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

0 360 APPROXIMATE SCALE IN FEET

Legend

- Monitoring Well
- Observation Well
- Recovery Well
- Collection Well
- Piezometer
- Seep
- Site
- Approximate Property Line
- Groundwater Elevation Contours
- Inferred Groundwater Elevation
- Groundwater Flow Direction - Dashed where inferred
- MW-47 5493.97: -Well ID -Groundwater Elevation (ft amsl)

Notes:
* Deeper Well; data not used to contour.

3rd Quarter
August 17th

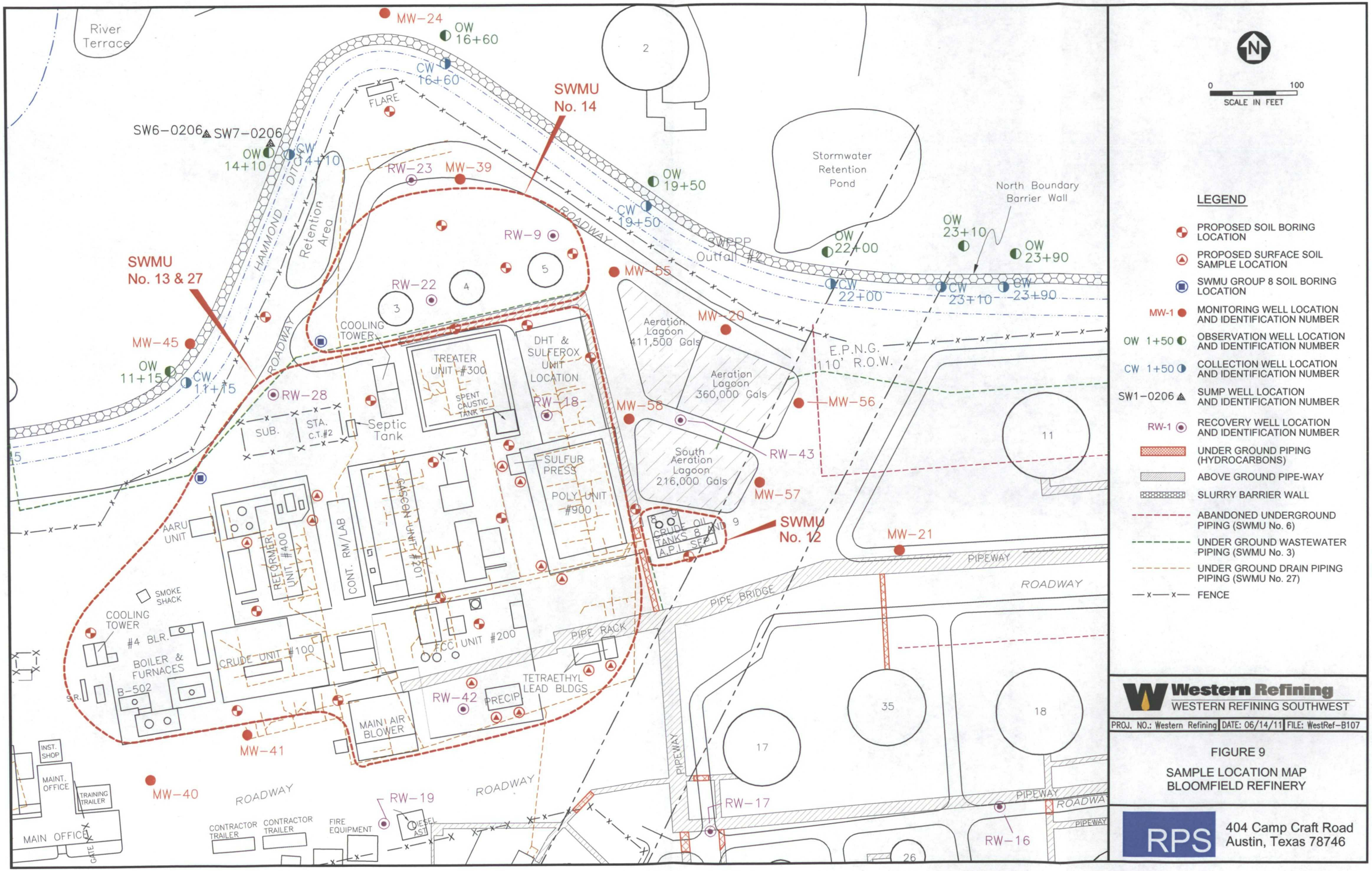
Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/08/10	FILE: WestRef-B76

FIGURE 8

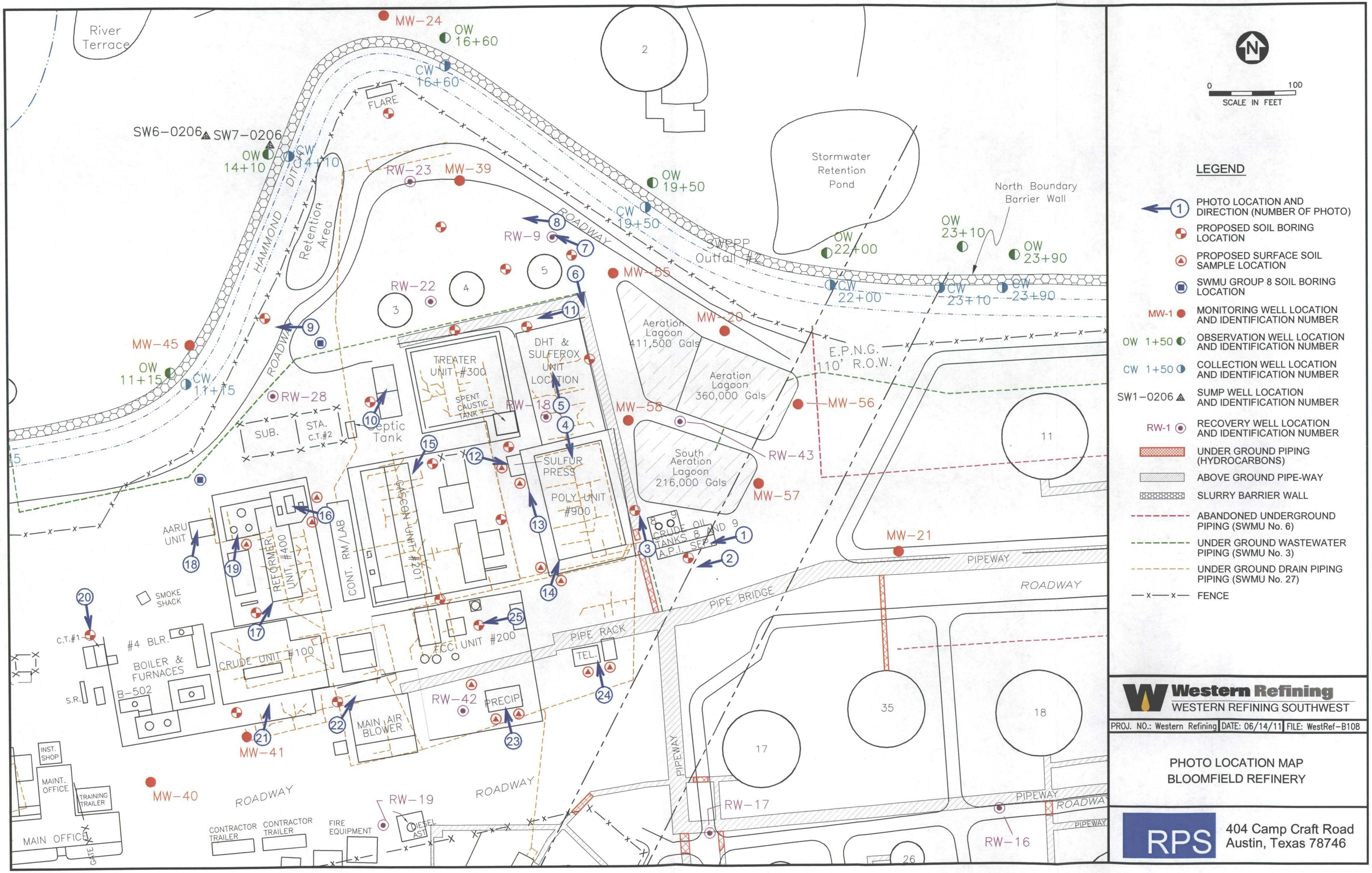
POTENTIOMETRIC SURFACE MAP
AUGUST 2009
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746


River Terrace
MW-24
OW 16+60
CW 16+60
2
SWMU No. 14
FLARE
SW6-0206
SW7-0206
OW 14+10
CW 14+10
HAMMOND DITCH
Retention Area
RW-23
MW-39
Stormwater Retention Pond
North Boundary Barrier Wall
OW 19+50
CW 19+50
ROADWAY
RW-9
SWPPP Outfall #2
OW 22+00
CW 22+00
OW 23+10
CW 23+10
OW 23+90
CW 23+90
SWMU No. 13 & 27
RW-22
3
4
5
MW-55
MW-20
Aeration Lagoon 411,500 Gals
Aeration Lagoon 360,000 Gals
E.P.N.G. 110' R.O.W.
MW-45
OW 11+15
CW 11+15
COOLING TOWER
TREATER UNIT #300
SPENT CAUSTIC TANK
DHT & SULFEROX UNIT LOCATION
RW-18
MW-58
MW-56
RW-28
SUB.
STA. C.T.#2
Septic Tank
SULFUR PRESS
POLY UNIT #900
RW-43
South Aeration Lagoon 216,000 Gals
MW-57
11
AARU UNIT
REFORMER UNIT #400
CONT. RM/LAB
GASCON UNIT #201
CRUDE OIL TANKS 8 AND 9
A.P.I. SEP.
SWMU No. 12
MW-21
PIPEWAY
ROADWAY
PIPE BRIDGE
SMOKE SHACK
COOLING TOWER
#4 BLR.
BOILER & FURNACES
B-502
CRUDE UNIT #100
FCC UNIT #200
PIPE RACK
TETRAETHYL LEAD BLDGS
RW-42
PRECIP
MAIN AIR BLOWER
MW-41
35
18
17
INST. SHOP
MAINT. OFFICE
TRAINING TRAILER
MW-40
ROADWAY
ROADWAY
RW-19
RW-17
RW-16
PIPEWAY
MAIN OFFICE
GATE
CONTRACTOR TRAILER
CONTRACTOR TRAILER
FIRE EQUIPMENT
DIESEL AST
26
N
0 100
SCALE IN FEET
LEGEND
PROPOSED SOIL BORING LOCATION
PROPOSED SURFACE SOIL SAMPLE LOCATION
SWMU GROUP 8 SOIL BORING LOCATION
MW-1 MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
OW 1+50 OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
CW 1+50 COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
SW1-0206 SUMP WELL LOCATION AND IDENTIFICATION NUMBER
RW-1 RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
UNDER GROUND PIPING (HYDROCARBONS)
ABOVE GROUND PIPE-WAY
SLURRY BARRIER WALL
ABANDONED UNDERGROUND PIPING (SWMU No. 6)
UNDER GROUND WASTEWATER PIPING (SWMU No. 3)
UNDER GROUND DRAIN PIPING PIPING (SWMU No. 27)
FENCE
Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining
DATE: 06/14/11
FILE: WestRef-B107
FIGURE 9
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746

Appendix A

Photographs


River Terrace
MW-24
OW 16+60
CW 16+60
FLARE
SW6-0206
SW7-0206
OW 14+10
CW 14+10
HAMMOND DITCH
Retention Area
RW-23
MW-39
ROADWAY
OW 19+50
CW 19+50
SWPPP Outfall #2
Stormwater Retention Pond
North Boundary Barrier Wall
OW 22+00
CW 22+00
OW 23+10
CW 23+10
OW 23+90
CW 23+90
RW-9
RW-22
MW-55
Aeration Lagoon 411,500 Gals
MW-20
Aeration Lagoon 360,000 Gals
E.P.N.G. 110' R.O.W.
MW-45
OW 11+15
CW 11+15
RW-28
TREATER UNIT #300
SPENT CAUSTIC TANK
DHT & SULFEROX UNIT LOCATION
RW-18
MW-58
MW-56
RW-43
South Aeration Lagoon 216,000 Gals
MW-57
SUB.
STA. C.T.#2
Septic Tank
SULFUR PRESS
POLY UNIT #900
CRUDE OIL TANKS 8 AND 9
A.P.I. SEP.
MW-21
PIPEWAY
ROADWAY
AARU UNIT
REFORMER UNIT #400
CONT. RM/LAB
CASCON UNIT #701
PIPE BRIDGE
SMOKE SHACK
C.T.#1
#4 BLR.
BOILER & FURNACES
CRUDE UNIT #100
FCC UNIT #200
PIPE RACK
TEL.
S.R.
B-502
RW-42
PRECIP
MAIN AIR BLOWER
MW-41
INST. SHOP
MAINT. OFFICE
TRAINING TRAILER
MW-40
ROADWAY
ROADWAY
RW-19
CONTRACTOR TRAILER
CONTRACTOR TRAILER
FIRE EQUIPMENT
DIESEL AST
MAIN OFFICE
GATE
PIPEWAY
RW-17
RW-16
PIPEWAY
ROADWAY
PIPEWAY
2
3
4
5
11
17
18
26
35
0
100
SCALE IN FEET
LEGEND
PHOTO LOCATION AND DIRECTION (NUMBER OF PHOTO)
PROPOSED SOIL BORING LOCATION
PROPOSED SURFACE SOIL SAMPLE LOCATION
SWMU GROUP 8 SOIL BORING LOCATION
MW-1 MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
OW 1+50 OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
CW 1+50 COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
SW1-0206 SUMP WELL LOCATION AND IDENTIFICATION NUMBER
RW-1 RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
UNDER GROUND PIPING (HYDROCARBONS)
ABOVE GROUND PIPE-WAY
SLURRY BARRIER WALL
ABANDONED UNDERGROUND PIPING (SWMU No. 6)
UNDER GROUND WASTEWATER PIPING (SWMU No. 3)
UNDER GROUND DRAIN PIPING PIPING (SWMU No. 27)
FENCE
Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining
DATE: 06/14/11
FILE: WestRef-B108
PHOTO LOCATION MAP
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746

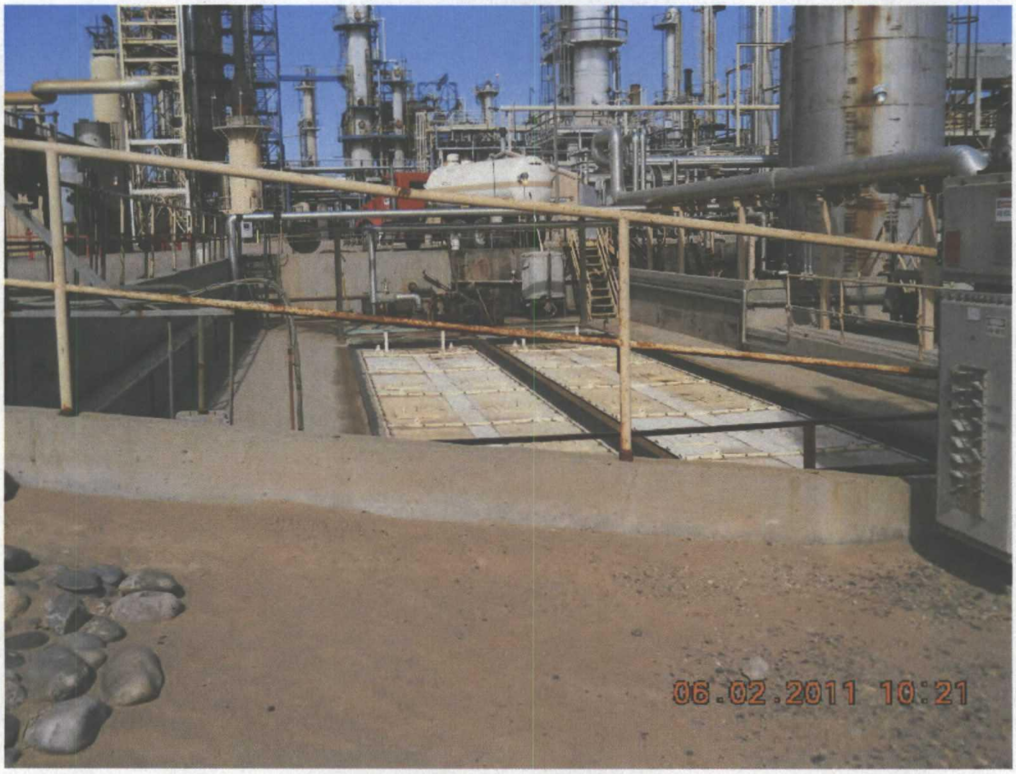


Photo 1 – SWMU 12 (API Separator) as viewed from the east end, looking west.

Photo 2 - SWMU 12 (API Separator) as view from southeast corner, looking west.

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Photo 3 – Looking north along the east side of SWMU 13 (Process Area).

Photo 4 – Looking south from location of RW-18 through the Poly Unit (with SWMU 13).

Photo 5 – Looking north from location of RW-18 through SulFerox Unit (SWMU 13).

Photo 6 – Looking south at SWMU 13, taken from east side of Tank #5.

Photo 7 – Looking northwest from east end of SWMU 14 (Tanks 3, 4, & 5). Recovery well RW-9 in foreground.

Photo 8 – Looking west across SWMU 14; RW-9 in foreground, West Collection Gallery in center of depression.

Photo 9 – Looking west from western side of Tank #3.

Photo 10 – Photo taken in northwestern portion of SWMU 13, looking at west side of cooling tower #2.

Photo 11 – Looking west along north end of SWMU 13 and south side of SWMU 14.

Photo 12 – Looking southeast at sulfur press building within SWMU 13.

Photo 13 – Looking north at sulfur press building, within SWMU 13.

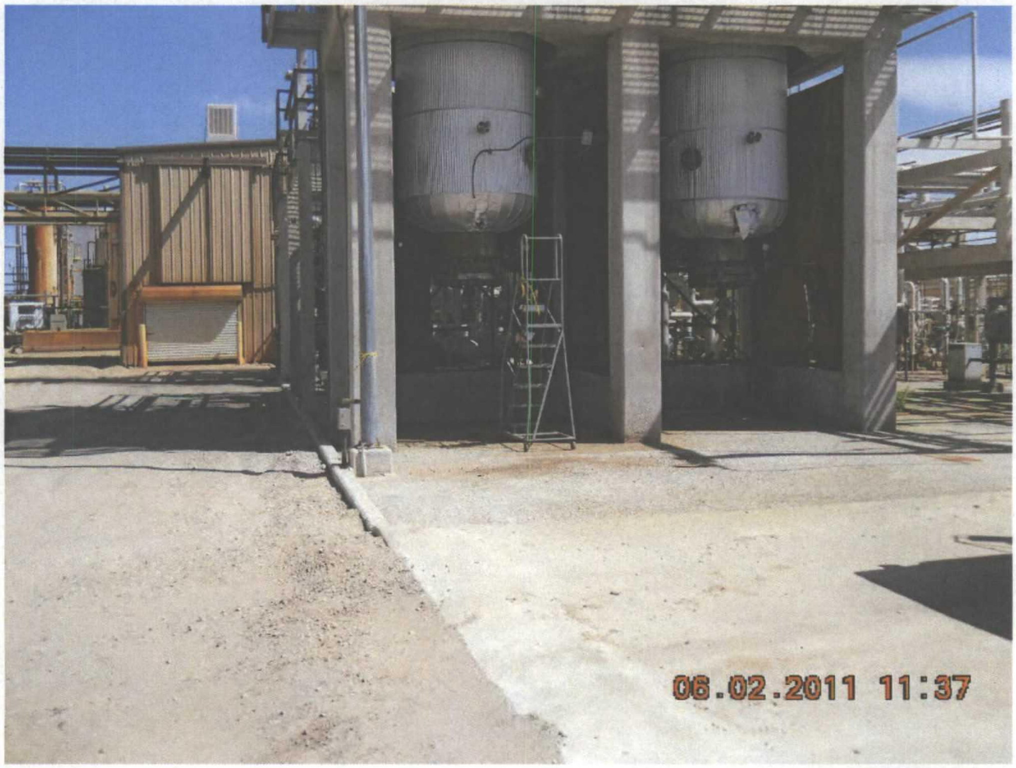

Photo 14 – Looking northeast from south side of Poly Unit, where catalysts are handled.

Photo 15 – Taken from south side of the treater unit, looking southwest at north end of gascon unit.

Photo 16 – Looking northwest from corner of control building at the northeast end of the reformer unit.

Photo 17 – Looking northeast at southwest corner of reformer unit where chlorine source was stored on concrete bermed area.

Photo 18 – looking north at new AARU unit, all aboveground piping and only ran a short time before cessation of operations.

Photo 19 – Looking north at catalyst handling area at reformer unit.

Photo 20 – Looking south at cooling tower #1, west end of SWMU 13.

Photo 21 – Taken from south side of crude unit, looking north.

Photo 22 – Taken along south side of crude unit and west side of main air blower building, looking north.

Photo 23 – Looking north at south side of precipitator.

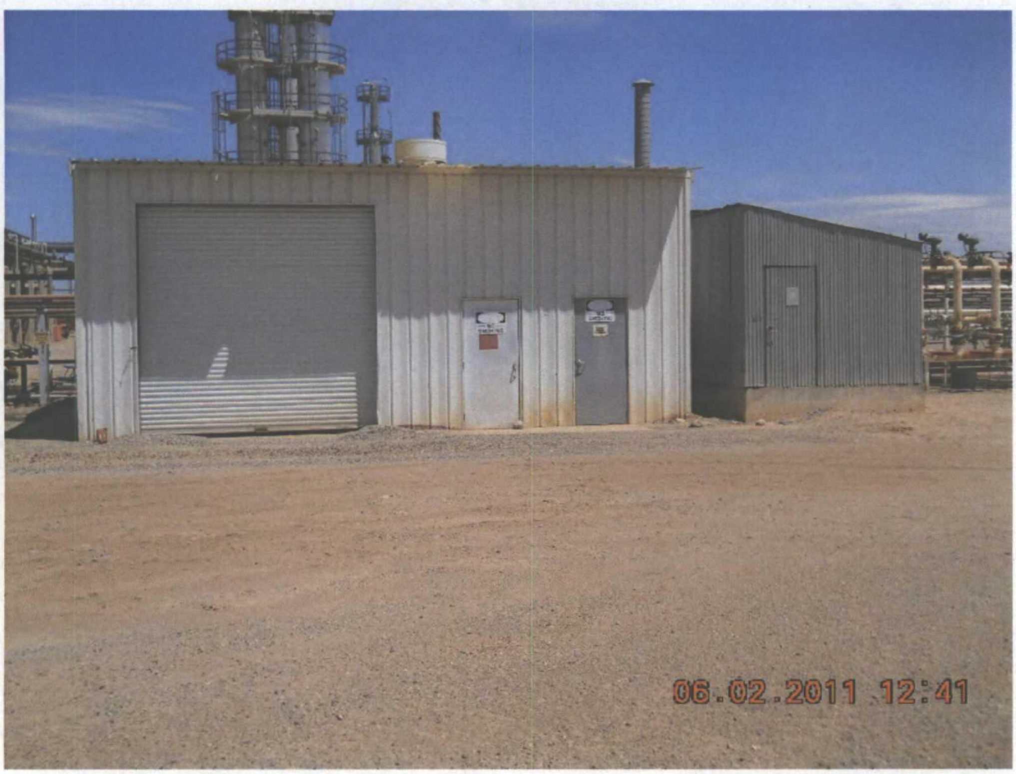

Photo 24 – Looking north at buildings formerly associate with handling of tetraethyl lead.

Photo 25 – Looking west at the east end of the FCC unit.

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 will be placed directly into 55-gallon drums and staged in the satellite accumulation area pending results of the waste characterization sampling. The portion of soil cores, which are not retained for analytical testing, will be placed into the same 55-gallon drums used to store the associated drill cuttings.

The solids (e.g., drill cuttings and used soil cores) will be characterized by testing to determine if there are any hazardous characteristics in accordance with 40 Code of Federal Regulations (CFR) Part 261. This includes tests for ignitability, corrosivity, reactivity, and toxicity. If the materials are not characteristically hazardous, then further testing will be performed pursuant to the requirements of the facility to which the materials will be transported. Depending upon the results of analyses for individual investigation soil samples, additional analyses may include TPH and polynuclear aromatic hydrocarbons.

All miscellaneous waste materials (e.g., discarded gloves, packing materials, etc.) will be placed into the refinery's solid waste storage containers for off-site disposal.