AP - 110

FACILITY-WIDE GROUND WATER MONITORING WORK PLAN

2013

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey, Division Director
Oil Conservation Division

JUNE 26, 2014

Dan Crawford
Environmental Manager
Navajo Refining Company, L.L.C.
501 East Main Street
Artesia, New Mexico 88210

RE: Navajo Refining Company, L.L.C. (AP-110): "Lea/Lovington Refinery" Facility-Wide Groundwater Monitoring Work Plan dated July 2013 & Owner/Operator Letter dated June 20, 2014, in Lea County, New Mexico

Dear Mr. Crawford:

The New Mexico Oil Conservation Division (OCD) is in receipt of Navajo Refining Company, L.L.C.'s letter (letter) dated June 20, 2014 related to the Facilty-Wide Groundwater Monitoring Work Plan (FWGWMWP). The letter responded to the OCD letter dated May 16, 2014.

OCD has completed its review of the letter and responds with references to pages and sections below where it seeks to provide further communication and/or clarification of its position relative to the owner/operator responses.

1) Page 3 OCD Cover Letter Comment 3 Response: On Abatement Plans in New Mexico, OCD must approve plug/abandonment of wells under an Abatement Plan (see 19.15.30.14(B)(C) NMAC). Properly constructed wells are not prone to becoming conduits to ground water within a Well Head Protection Area (WHPA). RW-1, MW-1, MW-6 and MW-7 serve to support contaminant hydrogeologic activities, i.e., back-up well for monitoring, hydrogeologic gradient determinations, discrete sample depth capability within the aquifer, piezometric and/or potentiometric measurements. A recovery well, i.e., RW-1, is designed for extraction of contaminants in ground water.

2) Page 4 OCD Cover Letter Comment 7 Response: The OCD does not condone the presence or persistence of toxic pollutants, i.e., BTEX (20.6.2.7(ww) NMAC) detected in ground water to rely on capture by water supply wells located at the facility. It is also true that any BTEX above the WQCC WQ Standards and exhibiting an increasing concentration trend are of utmost concern. OCD requires an active approach to capturing pollutants before they are captured by water supply wells.

3) Page 6 OCD Work Plan Comment 5 Response: OCD relies on WQCC Standards in ground water in accordance with WQCC Regulations, i.e., 20.6.2.3103 NMAC. OCD does not utilize SSLs to evaluate the potential for contaminants in soil to migrate to ground water above WQCC Standards. OCD generally applies its BTEX and TPH cleanup criteria in soils and a 20x DF to WQCC WQ Standards to generate an acceptable soil criteria based on the depth to water table. OCD may utilize SSLs where the depth to water table warrants.

4) Page 7 OCD Plan "Appendix B" Comment 2": Same as No. 3 above. All spills/releases shall be cleaned up. The operator's use of the term "OCD RALs" appear to refer to BTEX, TPH, etc. referenced from OCD's spill guidance document. Operators shall rely on best professional judgment, i.e., soil staining, olfactory senses, etc. to cleanup releases to the environment.

5) Page 9 OCD Report Comment 1 Response: Same as No. 2 above. The persistence of toxic pollutants, i.e., BTEX, in ground water may warrant continued investigation, i.e., MWs, to identify the source of contamination. The ground water standard in water media is the greater of WQCC WQ Standards, i.e., 20.6.2.3103 NMAC Criteria or background. In the event background has not been determined, it is the WQCC WQ Standards that must be met.

6) Page 10 OCD Report Comment 3 Response: There are MWs upgradient and cross-gradient to the process area and MW-11. These MWs should be monitored at a frequency that confirms the source(s) of BTEX is limited to the process area and determines through monitoring that it does not contain a significant source(s) requiring remediation.

   The operator appears to be stipulating a condition that OCD must approve a "refinery investigation report" before it will propose appropriate corrective actions in a "Phase 2 Abatement Plan Proposal". OCD has handled the ground water abatement plan under the former GW-028 Discharge Permit, before it was redacted and the facility was transitioned to the current Abatement Plan (AP-110); therefore, the operator should know that historical investigation reports shall be considered approved by OCD, and the increasing BTEX concentration above WQCC Standards observed in ground water is what first precipitated OCD to make comments about corrective action(s) to address it.

7) Pages 10 – 11 OCD Report Comment 4 Response: OCD agrees with the operator's rationale for monitoring MW-18 annually.

8) Pages 11 – 12 OCD Report Comment 5: While MW-2 appears to be located hydrogeologically downgradient from Tank 1201A, it appears to reflect natural ground water conditions and does not appear to be impacted by contamination; therefore, it may serve to be representative of background or an undisturbed geologic source of ground water at the facility. MW-15 appears to detect contamination from an upgradient source(s).

9) Page 12 Closing: OCD agrees and requires that changes be made in their entirety based on the letter and this OCD letter dated June 26, 2014.

If you have any questions, please contact me at (505) 476-3490, mail at the address below, or email at CarlJ.Chavez@state.nm.us. Thank you.

Sincerely,

Carl J. Chávez
Environmental Engineer

cc: OCD Hobbs District Office

505 East Huntland Drive
Suite 250
Austin, TX 78752

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512.329.8750 FAX

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July 31, 2013

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive,
Santa Fe, New Mexico 87505

Re: Proposed Facility-Wide Groundwater Monitoring Work Plan, Navajo Refining Company, Lea Refinery, Lovington, New Mexico, AP-110

Dear Mr. Chavez:

On behalf of Navajo Refining Company (NRC), TRC Environmental Corporation (TRC) is submitting the enclosed *Facility-Wide Groundwater Monitoring Work Plan* (FWGWMWP) for the Navajo Lea Refinery (Site) located in Lovington, Lea County, New Mexico. The FWGWMWP includes modifications to the current groundwater monitoring program that was developed in accordance with the Groundwater Discharge Permit (GW-014) issued by the New Mexico Oil Conservation Division (OCD). The OCD rescinded the Groundwater Discharge Permit on February 9, 2012, and requested the submittal of a FWGWMWP in an e-mail on April 3, 2013. The groundwater monitoring program proposed in the FWGWMWP is based on an evaluation of historical and current groundwater monitoring data at the Site. This letter summarizes the current groundwater monitoring program, provides an evaluation of the historical and current groundwater monitoring data, and describes proposed modifications to the groundwater monitoring program based on the results of the evaluation.

The following summarizes the proposed modifications to the existing groundwater monitoring program:

- The sampling frequency is proposed to be reduced from semi-annual to annual for eleven wells and no sampling for four wells.

- Alkalinity, pH, and specific conductivity are proposed to be removed from the monitoring program as laboratory analytes.

- The number of laboratory analytes (beyond alkalinity, pH, and specific conductivity) is proposed to be reduced for one or both events for 27 monitor and recovery wells.

CURRENT GROUNDWATER MONITORING PROGRAM

The groundwater monitoring program at the Lea Refinery currently consists of semi-annual groundwater gauging and sampling and annual reporting as follows:

- Semi-annual gauging of depth to water, depth to light non-aqueous phase liquid (LNAPL), if present, and total well depth of all site monitoring wells (MW-1 through MW-29) and one recovery well (RW-1).

- Semi-annual groundwater sampling of all 29 monitoring wells (MW-1 through MW-29), one recovery well (RW-1), and three water supply wells (WW-North, WW-South, and WW-East) using low-flow/low-stress sampling techniques.

- Semi-annual laboratory analysis of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total mercury, dissolved metals, anions, total dissolved solids (TDS), alkalinity, pH, and specific conductivity.

A site plan showing the monitoring well locations is included as Figure 2-1 of the attached FWGWMWP.

EVALUATION OF GROUNDWATER MONITORING DATA

Historical groundwater elevation data indicates groundwater flows radially (southeast, south, and north/northwest) towards a cone of depression located near three active water supply wells (WW-North, WW-South, and WW-East) at the central portion of the Site. The cone of depression is created by pumping groundwater from the three refinery water supply wells. The water produced from these wells is not used for drinking. Natural groundwater flow (i.e., if active pumping from the water supply wells ceased) is to the southeast.

Groundwater monitoring data collected from June 2009 to June 2013 indicate that (1) light non-aqueous phase liquid (LNAPL) is not present and has not been detected at the Site since 2009; (2) dissolved-phase chemicals of concern (COCs) are generally present at concentrations above the New Mexico Water Quality Control Commission (WQCC) groundwater standards in the central and northwest areas of the Site; and (3) dissolved-phase COC concentrations are generally stable to decreasing across the Site. Further evaluation of the current and historical COC concentrations is provided below:

- Concentrations of VOCs and SVOCs generally have exhibited stable to decreasing trends, with the exception of fluctuating concentrations in wells MW-6, MW-11, and MW-13 ,which are all located within the central portion of the Site (i.e., are not located along the refinery boundaries). However, VOC and SVOC concentrations have not been detected above

laboratory reporting limits in MW-6 and MW-13 since February 2012. Further, no VOCs or SVOCs were detected at concentrations above WQCC standards in February 2013.

- Concentrations of metals have generally exhibited stable to decreasing trends, with the exception of fluctuating metal concentrations in MW-7, MW-11, MW-14, and WW-East. However, no metals have historically been detected at concentrations above WQCC standards in WW-East, nor have they been detected above WQCC standards in MW-14 since July 2011. Metal concentrations in February 2013 exceeded WQCC standards in wells MW-1, MW-6, MW-7, MW-11, MW-13, and MW-29 located in the northwestern interior portions of the Site and in well MW-15, which is located along the upgradient (northwestern) Site boundary.

- Concentrations of anions have generally exhibited stable to decreasing trends, with the exception of fluctuating nitrate/nitrite concentrations in well MW-25. Anion concentrations in February 2013 exceeded WQCC standards in MW-8, MW-13, MW-23, and MW-25 located in the northwestern and central interior portions of the Site and in wells MW-3, MW-15, MW-19, MW-24, MW-28 located along the upgradient (northwest) and crossgradient (northeast and southwest) Site boundaries.

- Concentrations of TDS have generally exhibited stable to decreasing trends, with the exception of fluctuating concentrations in MW-8, MW-13, MW-15, MW-19, and MW-23. TDS concentrations in February 2013 exceeded WQCC standards in wells MW-8, MW-13, MW-23, and WW-South located in the northwestern and central interior portions of the Site and in well MW-19 located along the crossgradient (southwest) Site boundary.

In consideration of the groundwater flow patterns at the site, the following observations can be made:

- Elevated metal and anion concentrations in MW-15 can be attributed to off-Site sources or naturally occurring water quality based on groundwater flow and downgradient monitoring well concentrations. Well MW-15 is located upgradient of all refinery process areas on the northwest Site boundary and has consistently exhibited higher metal and anion concentrations than in wells located immediately downgradient (MW-2, MW-4, and MW-16).

- No COC concentrations have exceeded WQCC standards in wells located along the southern portion of the refinery (MW-5, MW-14, and MW-22), which is the natural downgradient boundary of the Site. The dissolved-phase COC plume is delineated within the Site boundaries.

In June 2013 TRC personnel sampled four City of Lovington wells located north and northwest of the Site to evaluate background water quality and potential upgradient sources of COCs. Analytical results from the City of Lovington wells indicated that no COCs were present at concentrations above WQCC standards. However, the City of Lovington water supply wells are screened much deeper (maximum screen depth of 257 feet bgs) than the Site monitoring wells (maximum screen depth of 130 feet bgs) and the pump intake depths of City of Lovington water supply wells are unknown. Therefore, the groundwater samples collected from the City of Lovington water supply wells may not be representative of the uppermost groundwater bearing unit northwest of the Site. No further sampling of upgradient City of Lovington wells is planned at this time. Additional monitor wells may be installed northwest of the Site.

Wells MW-12 and MW-17 were replaced and well MW-30 was installed at the northwestern portion of the Site in June 2013. The well replacement, well installation, and laboratory analytical results from the upgradient City of Lovington water supply wells will be summarized in the forthcoming *Groundwater Source Investigation and Background Evaluation Report* to be submitted to OCD by the end of 2013.

PROPOSED GROUNDWATER MONITORING PROGRAM

Based on the evaluation of historic groundwater monitoring data, the sampling and analysis scope for the current groundwater monitoring program can be reduced yet maintain the objectives of the monitoring program to determine and monitor groundwater flow direction and gradient and monitor the nature and extent of dissolved-phase COCs in groundwater. The proposed groundwater monitoring program presented in the FWGWMWP was developed based on the following criteria for each well:

1. Location relative to the Site boundaries, dissolved-phase COC exceedance zone, and Site water supply wells;

2. The current or historical presence of groundwater COCs at concentrations above WQCC standards; and

3. Groundwater COC concentration trends over time.

Based on the above criteria, the FWGWMWP includes a reduction in the sampling and analysis scope as described below. Wells MW-12 and MW-17, replaced in June 2013, and well MW-30, installed in June 2013, are included in the proposed monitoring program.

The rationale for the proposed sampling and analysis reductions at each well are detailed in Table 2-1 of the attached FWGWMWP. The February and August groundwater monitoring plans are depicted on Figures 2-2 and 2-3 of the attached FWGWMWP, respectively.

Sampling and Gauging Frequency

The FWGWMWP proposes a reduction in the sampling frequency of eleven wells (MW-4, MW-5, MW-9, MW-14, MW-16, MW-18, MW-20, MW-21, MW-22, MW-23, and MW-24) from semi-annual to annual and to cease sampling of four wells (MW-7, MW-10, MW-26, and RW-1). Wells MW-7 and RW-1 are recommended to be removed from the sampling plan because they are located immediately adjacent to well MW-1, which will continue to be sampled on a semi-annual basis.

The sampling frequency for wells exhibiting decreasing or stable concentration trends, wells located within the interior of the Site, or wells located immediately adjacent to other wells can be reduced while maintaining the effectiveness of the program to delineate and monitor COC concentrations and trends. The wells located at the perimeter of the monitoring network are critical for delineation and concentration trend monitoring. As such, these perimeter wells are proposed to be sampled on a semi-annual to annual basis.

Laboratory Analytical List

Currently, VOCs, SVOCs, total mercury, dissolved metals, anions, TDS, alkalinity, pH, and specific conductivity are analyzed on a semi-annual basis. However, this sampling plan was developed before the installation of many of the wells in the current network and without a historic perspective of the relevant groundwater COCs.

The analysis plan proposed in the FWGWMWP eliminates laboratory analysis of alkalinity, pH, and specific conductance. Alkalinity is not a COC relevant to groundwater quality at the Site and can be eliminated from the sampling program. Laboratory analysis of pH and specific conductance are unnecessary considering they are more accurately measured in the field during low-flow purging and therefore should be removed from the analysis plan as a laboratory analyte (pH and specific conductance will continue to be measured in the field).

The target analytes for wells exhibiting decreasing or stable concentration trends or wells located within the interior of the plume can be reduced while maintaining the effectiveness of the program to delineate and monitor COC concentrations and trends. Beyond the removal of alkalinity, pH, and specific conductance as laboratory analytes, the laboratory analysis plan proposed in the FWGWMWP has been further reduced in 27 monitor or recovery wells.

CLOSING

The proposed sampling and analysis scope presented in the attached FWGWMWP was designed to meet the objectives of the monitoring program to monitor groundwater flow direction and gradient and monitor the nature and extent of dissolved-phase COCs in groundwater. The proposed plan is based on a majority of the Site wells having exhibited stable or decreasing COC

concentration trends since groundwater monitoring began in June 2009. In the event that increasing COC concentrations are identified, the groundwater monitoring contingency plan presented in the FWGWMWP will be utilized. Wells installed after the date of this submittal will be sampled on a semi-annual basis until a concentration history has been developed.

Pending OCD review and approval of the FWGWMWP, the previous groundwater monitoring program will be used during upcoming groundwater monitoring events.

If you have any questions regarding this letter, please do not hesitate to contact Robert Combs of NRC at (575) 746-5382, Bryan Gilbert of TRC at (512) 684-3104, or Julie Speer at (512) 684-3148.

Sincerely,

Bryan Gilbert, P.G.
Project Manager

Sincerely,

Julie Speer, E.I.T.
Associate Project Manager

cc: Robert Combs, Navajo Refining Company, Artesia, New Mexico
Michael Holder, Navajo Refining Company, Artesia, New Mexico
Arsin Sahba, TRC, Austin, Texas

Attachment

FACILITY-WIDE GROUNDWATER MONITORING WORK PLAN

The HollyFrontier Companies
Navajo Refining Company
Lea Refinery
Lovington, New Mexico

July 2013

Prepared for:

HOLLYFRONTIER
Navajo Refining Company
Artesia, New Mexico

Prepared by:

TRC
TRC Environmental Corporation
Austin, Texas

Facility-Wide Groundwater Monitoring Work Plan

The HollyFrontier Companies
Navajo Refining Company
Lea Refinery
Lovington, New Mexico

Prepared for:

Navajo Refining Company
Artesia, New Mexico

Prepared by:

TRC Environmental Corporation
Austin, Texas

TRC Project No. 196364

July 2013

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1.0 INTRODUCTION

The purpose of this Facility-Wide Groundwater Monitoring Work Plan (FWGWMWP) is to detail proposed groundwater monitoring activities at the Navajo Refining Company (NRC) Lea Refinery (Site) located at 7406 South Main Street in Lovington, New Mexico. This FWGWMWP summarizes the current groundwater monitoring program, provides an evaluation of the historical groundwater monitoring data, provides a proposed modified groundwater monitoring program based on the results of that evaluation, and presents a groundwater monitoring contingency plan. A site location map is provided in Figure 1-1.

The following summarizes the proposed modifications to the existing groundwater monitoring program:

- The sampling frequency is proposed to be reduced from semi-annual to annual for ten wells and no sampling for four wells.
- Alkalinity, pH, and specific conductivity are proposed to be removed from the monitoring program as laboratory analytes.
- The number of laboratory analytes (beyond alkalinity, pH, and specific conductivity) is proposed to be reduced for one or both events for 27 monitor and recovery wells.

The proposed modified sampling schedule can be found in Table 2-1. The current groundwater monitoring program, an evaluation of the historical and current groundwater monitoring data, and a description of the proposed modifications to the groundwater monitoring program are detailed in the cover letter to this FWGWMWP.

1.1 Site Background

The NRC Lea Refinery is located approximately five miles south of Lovington in Lea County, New Mexico. The facility is operated by NRC and consists of refining operations and includes Holly Energy Partners (HEP) pipeline and receiving stations.

The groundwater monitoring program at the NRC Lea Refinery currently consists of semi-annual groundwater gauging of wells, semi-annual groundwater sampling of wells, and annual reporting. Monitoring activities were previously conducted in general accordance with the Groundwater Discharge Permit (GW-014) issued by the New Mexico Oil Conservation Division (OCD), which was rescinded by the OCD on February 9, 2012.

1.2 Field Sampling Plan Contents

This FWGWMWP describes the procedures to be followed during routine groundwater monitoring activities. The guidance includes instructions for well gauging, groundwater

sampling, managing investigation-derived waste (IDW), decontamination, analytical requirements, data collection rationale, and quality assurance/quality control (QA/QC) requirements. A contingency plan in the event groundwater chemical of concern (COC) concentrations increase is also included. Field forms are included in Appendix A. Guidance for release response is presented in Appendix B.

COUNTY RD-96

S MAIN ST

East Lovington Oil Field

NEW MEXICO LOVINGTON

NEW MEXICO LOVINGTON SE

S MAIN ST

COUNTY RD-78

COUNTY RD-78

W

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LEGEND

SITE

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FEET

SOURCE:
U.S.G.S. 7.5 MINUTE QUAD
LOVINGTON, NEW MEXICO 2010
LOVINGONT SE, NEW MEXICO 2010

SITE LOCATION MAP

NAVAJO REFINING COMPANY
LEA REFINERY LOVINGTON, NM

PROJECT NO:	MXD: Figure 1-1
AUTHOR: RLB	DATE: 7/25/2013

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329-6080

FIGURE
1-1

2.0 MONITORING PROGRAM SUMMARY

The proposed groundwater monitoring program will consist of semi-annual gauging of all monitoring wells, semi-annual or annual groundwater sampling of select monitoring wells and water supply wells, and annual reporting. The objectives of the monitoring program are to determine and monitor groundwater flow direction and gradient and monitor the nature and extent of dissolved-phase COCs in groundwater. Figure 2-1 presents the location of the monitoring and water supply wells that are part of the groundwater monitoring program.

2.1 Scheduling and Notification

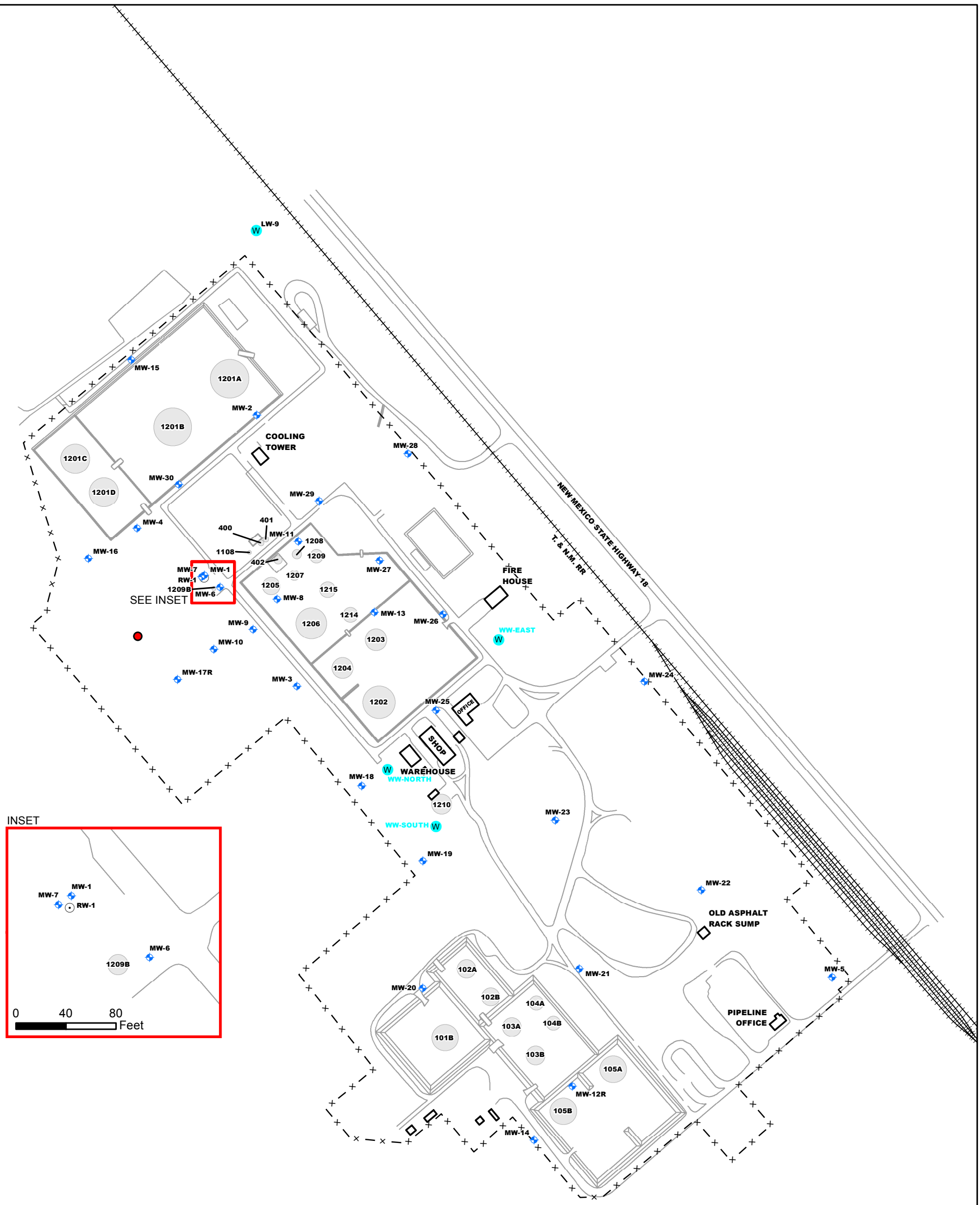
Semi-annual groundwater monitoring will be conducted in February and August of each calendar year. Wells selected for additional analytes (i.e., the annual event) will be sampled during the August semi-annual monitoring event. OCD will be notified of the monitoring schedule prior to each monitoring event.

2.2 Gauging Requirements

Synoptic fluid level gauging will be completed semi-annually at all monitoring and recovery wells. Wells will be gauged for depth to light non-aqueous phase liquids (LNAPL) (if present), depth to water, and total depth (if scheduled for sampling and no LNAPL is present). Dedicated tubing will remain in the well during gauging to minimize disturbance to the water column, if possible. All synoptic well gauging will be completed within one day. Each monitoring well will also be gauged immediately prior to commencing purging/sampling activities.

2.3 Sampling Requirements

Sampling frequency and target analytes for each monitoring well were selected based on historical COC detections, exceedances of New Mexico Water Quality Control Commission (WQCC) groundwater standards, COC concentration trends, and well location relative to the Site boundaries and on-Site water supply wells. Select groundwater samples will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total mercury, dissolved metals, anions, and/or total dissolved solids (TDS). The required sample analytical parameters and sampling frequency for each well are summarized in Table 2-1, Figure 2-2, and Figure 2-3.



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LEGEND

- MONITORING WELL
- WATER WELL
- RECOVERY WELL
- FLARE
- BUILDINGS
- TANKS
- RAIL
- FENCE

N

0 200 400 800

FEET

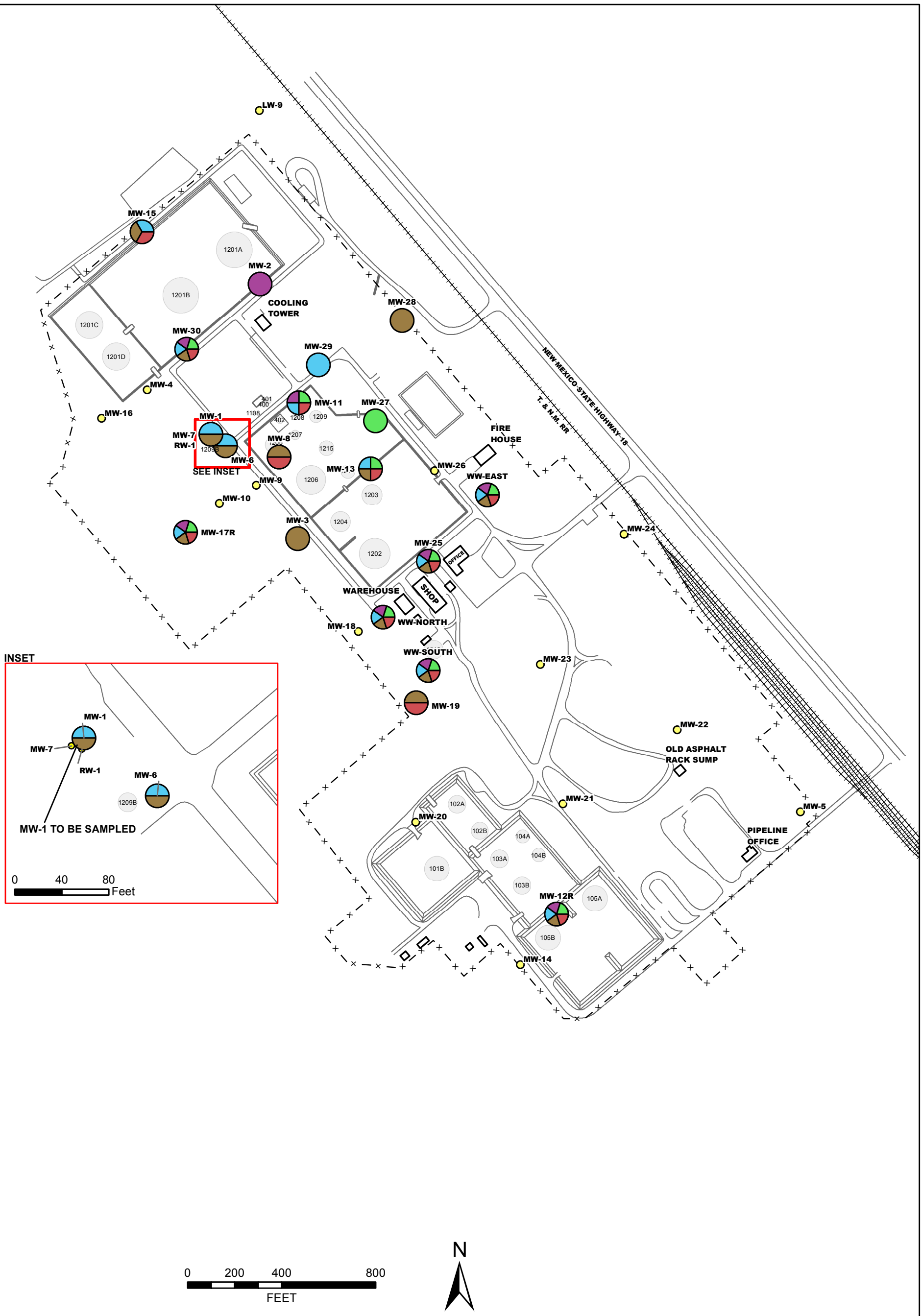
REFINERY SITE PLAN

NAVAJO REFINING COMPANY
LEA REFINERY LOVINGTON, NM

PROJECT NO: 196364.0001	MXD: Figure 2-1
AUTHOR: RLB	DATE: 7/25/2013

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329-6080

FIGURE 2-1



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PIE CHART KEY

- ANALYSIS OF VOCS BY SW8260.
- ANALYSIS OF SVOCS BY SW8270
- ANALYSIS OF DISSOLVED METALS BY SW6020 AND TOTAL METALS (MERCURY) BY SW7470
- ANALYSIS OF ANIONS (CHLORIDE, FLUORIDE, SULFATE, AND NITRATE/NITRITE) BY E300
- ANALYSIS OF TOTAL DISSOLVED SOLIDS BY M2450C
- WELLS NOT SAMPLED DURING THIS SEMI-ANNUAL MONITORING EVENT

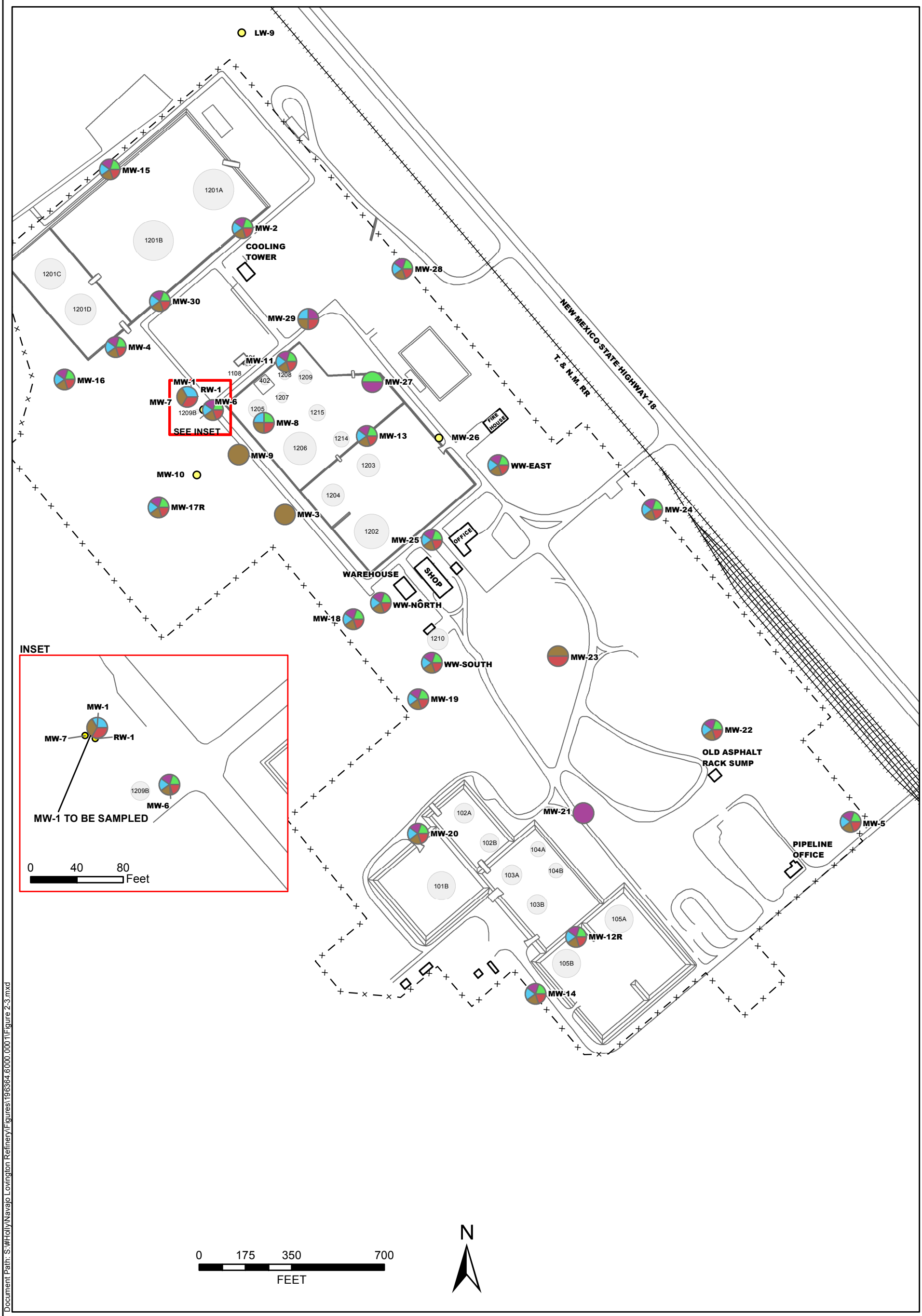
FEBRUARY SAMPLING PLAN

NAVAJO REFINING COMPANY
LEA REFINERY LOVINGTON, NM

PROJECT NO: 196364.0001	MXD: Figure 2-2
AUTHOR: RLB	DATE: 7/25/2013

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329-6080

FIGURE 2-2



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PIE CHART KEY

- ANALYSIS OF VOCS BY SW8260.
- ANALYSIS OF SVOCS BY SW8270
- ANALYSIS OF DISSOLVED METALS BY SW6020 AND TOTAL METALS (MERCURY) BY SW7470
- ANALYSIS OF ANIONS (CHLORIDE, FLUORIDE, SULFATE, AND NITRATE/NITRITE) BY E300
- ANALYSIS OF TOTAL DISSOLVED SOLIDS BY M2450C
- WELLS NOT SAMPLED DURING THIS SEMI-ANNUAL MONITORING EVENT

AUGUST SAMPLING PLAN

NAVAJO REFINING COMPANY
LEA REFINERY LOVINGTON, NM

PROJECT NO: 196364.0001	MXD: Figure 2-3
AUTHOR: RLB	DATE: 7/25/2013

TRC
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FIGURE 2-3

TABLE 2-1. GROUNDWATER SAMPLING PLAN SUMMARY

Monitor Well Number	Proposed Sampling Frequency		Well Location Relative to Site Boundary	Sampling Reduction Rationale
	February Event	August Event		
MW-1	C, D	C, D, E	Interior	VOC, SVOC, anion, and TDS stable to decreasing; no historical VOC or SVOC exceedances
MW-2	B	A, B, C, D, E	Perimeter	All COCs stable to decreasing; no historical VOC, SVOC, or metal exceedances
MW-3	D	D	Interior	All COCs stable to decreasing; no historical VOC, SVOC, metal, or TDS exceedances
MW-4	- - -	A, B, C, D, E	Interior	All COCs stable to decreasing; no historical COC exceedances
MW-5	- - -	A, B, C, D, E	Perimeter	All COCs stable to decreasing; no historical COC exceedances
MW-6	C, D	A, B, C, D, E	Interior	Metals, anions, and TDS stable to decreasing; no VOC, SVOC, anion, or TDS exceedances since March 2011
MW-7	- - -	- - -	Interior	Located immediately adjacent to MW-1 (redundant)
MW-8	D, E	A, C, D, E	Interior	All COCs stable to decreasing; no historical VOC or SVOC exceedances
MW-9	- - -	D	Interior	All COCs stable to decreasing; no historical VOC, SVOC, metal, or TDS exceedances
MW-10	- - -	- - -	Interior	All COCs stable to decreasing; no historical COC exceedances
MW-11	A, B, C, E	A, B, C, D, E	Interior	Anions and TDS stable to decreasing
MW-12	A, B, C, D, E	A, B, C, D, E	Perimeter	All COCs stable to decreasing; no historical COC exceedances; well replaced in June 2013
MW-13	A, C, D, E	A, B, C, D, E	Interior	Metals and anions stable to decreasing
MW-14	- - -	A, B, C, D, E	Perimeter	VOCS, SVOCs, anions, and TDS stable to decreasing; no historical VOC, SVOC, anion, or TDS exceedances
MW-15	C, D, E	A, B, C, D, E	Perimeter	Upgradient boundary well; VOCs, SVOCs, anions, and metals stable to decreasing; no historical VOC or SVOC exceedances
MW-16	- - -	A, B, C, D, E	Perimeter	Upgradient boundary well; all COCs stable to decreasing; no historical COC exceedances
MW-17	A, B, C, D, E	A, B, C, D, E	Perimeter	All COCs stable to decreasing; no historical VOC, SVOC, and metal exceedances; well replaced in June 2013
MW-18	- - -	A, B, C, D, E	Perimeter	All COCs stable to decreasing; no historical VOC, SVOC, and metal exceedances
MW-19	D, E	A, B, C, D, E	Perimeter	VOC, SVOC, metals, and anions stable to decreasing; no historical VOC, SVOC, and metal exceedances
MW-20	- - -	A, B, C, D, E	Perimeter	All COCs stable to decreasing; no historical VOC, SVOC, anions, and metal exceedances
MW-21	- - -	B	Interior	All COCs stable to decreasing; no historical VOC, SVOC, anions, and metal exceedances
MW-22	- - -	A, B, C, D, E	Perimeter	All COCs stable to decreasing; no historical COC exceedances
MW-23	- - -	D, E	Interior	VOCs, SVOCs, metals, and anions stable to decreasing; no historical VOC, SVOC, anions, and metal
MW-24	- - -	A, B, C, D, E	Perimeter	All COCs stable to decreasing; no historical VOC, SVOC, metal, and TDS exceedances
MW-25	A, B, C, D, E	A, B, C, D, E	Interior	VOCs, SVOCs, metals, and TDS stable to decreasing; no historical VOC or SVOC exceedances
MW-26	- - -	- - -	Interior	All COCs stable to decreasing; no historical VOC, SVOC, anion, and metal exceedances
MW-27	A	A, B	Interior	All COCs stable to decreasing; no historical COC exceedances
MW-28	D	A, B, C, D, E	Perimeter	All COCs stable to decreasing; no historical VOC, SVOC, metal, and TDS exceedances
MW-29	C	B, C, D, E	Interior	All COCs stable to decreasing; no historical VOC and SVOC exceedances
MW-30	A, B, C, D, E	A, B, C, D, E	Interior	Installed in June 2013
RW-1	- - -	- - -	Interior	Recovery well; all COCs stable to decreasing; no historical COC exceedances; located immediately adjacent to MW-1 (redundant well)
North Well	A, B, C, D, E	A, B, C, D, E	Interior	Water supply well; all COCs stable to decreasing; no historical COC exceedances
South Well	A, B, C, D, E	A, B, C, D, E	Interior	Water supply well; all COCs stable to decreasing; no historical VOC, SVOC, and metal exceedances
East Well	A, B, C, D, E	A, B, C, D, E	Interior	Water supply well, VOCs, SVOCs, anions, and TDS stable to decreasing; no historical COC exceedances

Notes:
Wells with measurable LNAPL will not be sampled
All wells will be gauged semi-annually

A	Analysis of VOCs by SW8260.
B	Analysis of SVOCs by SW8270
C	Analysis of dissolved metals by SW6020 and total metals (mercury) by SW7470
D	Analysis of anions (chloride, fluoride, sulfate, and nitrate/nitrite) by E300
E	Analysis of total dissolved solids by M2540c
F	Analysis of total alkalinity by SM2320b
G	Analysis of specific conductivity by M2510b
H	Analysis of pH by SM4500h+b

COCs	Chemicals of Concern
VOCs	Volatile Organic Compounds
SVOCs	Semi-Volatile Organic Compounds
TDS	Total Dissolved Solids
Dissolved Metals	Aluminum, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, uranium, zinc

3.0 GROUNDWATER MONITORING PROCEDURES

Monitoring activities will consist of the following tasks: field documentation, well inspection, well gauging, groundwater purging and sampling, handling of samples for laboratory analysis, QA/QC sampling, and managing IDW. These tasks are described in detail below.

3.1 Field Documentation

Documentation of field activities associated with groundwater monitoring events will be recorded each day in a bound field logbook and associated field sampling forms. Each page of the logbook and field sampling forms will be signed by the person(s) making entries on that page. The following information will be collected during groundwater sampling activities:

- Sampling and oversight personnel identification
- Instrument calibrations
- Well conditions
- Monitoring well measurements including static water level depth, total well depth, and water column height
- Depth to LNAPL, if present
- Weather conditions at the time of sample collection and throughout the sampling event
- Well purging procedures including: equipment, purge volume, rate, and elapsed time
- Water quality parameters recorded during purging including appearance, odor, pH, temperature, conductivity, total dissolved solids (TDS), oxidation-reduction potential (ORP), dissolved oxygen (DO), and turbidity
- Sample collection dates and times
- Reasons for deviating from the sampling and analysis plan (if applicable)

3.2 Well Inspection

During each gauging and sampling event, all monitoring and recovery wells will be inspected for well integrity. The information will be recorded on the groundwater gauging form and the Project Manager will be notified of any significant changes. Each inspection will include:

- Identification of the well
- Inspection of the well pad for deterioration or damage

- Inspection of the protective casing for deterioration or damage
- Inspection of the well casing for deterioration or damage
- Notation of the presence or absence and condition of the padlock and expandable well cap
- Measurement of the total depth of the well

3.3 Well Gauging

The depth to LNAPL, if present, and groundwater will be gauged at each monitoring well prior to sampling. A list of all Site wells is presented in Table 2-1 and well locations are depicted in Figure 2-1. Prior to gauging, each well cap will be removed to allow groundwater to equilibrate with atmospheric pressure. Fluid level measurements will be collected using an oil/water interface probe with an accuracy of 0.01 feet. Measurements will be made from a marked measuring point or the north side of the top of casing (TOC). Data will be recorded in the Fluid Gauging Form included in Appendix A. The oil/water interface probe will be decontaminated before use and between wells following the procedures outlined in Section 3.7.

Fluid Level Gauging Procedures

The following procedure will be used to measure the depths to LNAPL and groundwater:

- The probe will be lowered into the well slowly until the probe alarm sounds or light illuminates, withdraw the tape and lower it again slowly until the alarm is again audible or light again illuminates. Check the depth to fluid on the tape and record the depth to within 0.01 feet. Raise and lower the probe again slowly and repeat measurements for accuracy.
- Well identification, date, time, depth to water, depth to LNAPL (if applicable), and other pertinent observations will be recorded on the Fluid Gauging Form included in Appendix A.

Total Depth Gauging

Total well depth is measured to detect the amount of silt accumulation in a well. This measurement will be collected during sampling events and well inspections. If a well contains LNAPL, the total depth will not be measured. The following procedures will be followed to determine the total depth of the well:

- The oil/water interface probe will be slowly lowered until the bottom of the well is detected.
- The total well depth will be measured when the tape becomes slack for hard bottoms.
- The point of "pick-up" (where the weight of the probe is felt when reeling up the probe) will be used to determine the total depth in the case of soft sediment bottoms.
- The hardness of the bottom of the well will be documented in the field logbook.

3.4 Groundwater Sampling

Groundwater will be purged and sampled using United States Environmental Protection Agency (US EPA) low flow/low stress methods. Data collected during the purging and sampling of each well will be recorded on the Groundwater Sampling Form located in Appendix A.

Groundwater samples will be collected using a Proactive SS Mega-Monsoon® stainless steel submersible pump or equivalent. The monitoring well locations are depicted in Figure 2-1. If present, dedicated tubing will be removed from each well taking care that the tubing does not touch the ground. The pump will be attached to new low-density polyethylene (LDPE) tubing or existing dedicated vinyl tubing and slowly lowered into the well until the approximate middle of the water column is reached. The pump electric cord and tubing will be secured at the top of the well casing to ensure the pump intake remains at the same elevation during purging and sampling. Samples from the on-Site NRC water supply wells will be collected by attaching a hose barb and hose to the sample point (i.e., tap or spigot) located at or near the well head and before the water supply is introduced into any storage tanks or treatment units.

A multi-parameter meter (YSI 556 or equivalent) with flow-through cell and a hand-held turbidity meter will be used during the purging process to monitor for field water quality parameters (pH, temperature, conductivity, TDS, ORP, DO, and turbidity) and demonstrate stabilization. Water quality parameters will be recorded approximately every three minutes during purging. Water quality meters used to measure field parameters will be calibrated each day according to the manufacturer's specifications. The make, model, calibration fluids, and calibration results for the water quality meters will be recorded in the field logbook. The turbidity meter test cell will be triple rinsed with groundwater from the next sample aliquot prior to each reading. An oil/water interface probe will be lowered into the well after the pump is properly suspended and used to record the depth to water. The water quality parameters and depth to water will be recorded on the Groundwater Sampling Form. A description of the water quality (e.g., turbidity, sheen, odor) will be recorded during the purging process.

The purging process will be considered complete and groundwater sampling will commence when at least three of the seven water quality parameters achieve stabilization for three consecutive readings. A stabilization criterion for each parameter is as follows:

- pH ±0.1 unit
- Temperature within 3 percent
- Conductivity within 3 percent
- DO within 10 percent or three consecutive readings below 0.5 mg/L
- TDS within 10 percent
- ORP within 10 millivolts (mV)
- Turbidity within 10 percent nephelometric turbidity units (NTU) or three readings below 5 NTUs

If the well goes dry during purging, a sample will be collected as soon after the water level sufficiently recovers to a level from which a sample can be collected. The samples will be collected in clean, labeled laboratory-supplied containers prepared with the appropriate amount and type of preservative. Samples will be collected in the following order: VOCs, SVOCs, anions, TDS, total mercury, and dissolved metals. The groundwater samples will be submitted for laboratory analysis following the schedule in Table 2-1.

Samples submitted for total mercury analysis will be filtered in the field using a 10-micron filter if the turbidity is greater than 10 NTUs. A 0.45-micron filter will be used to field-filter samples collected for dissolved metals analysis. Field filtering will be documented on the Groundwater Sampling Form and field logbook.

The laboratory sample analyses and frequency is presented in Table 3-1. Table 3-2 presents the laboratory sample container and preservation specifications and analysis hold times. Table 3-3 presents the container labeling nomenclature for the groundwater samples collected.

3.5 Handling of Samples for Laboratory Analysis

The sample containers will be labeled, secured with bubble wrap, placed in a resealable plastic bag, and immediately placed on ice in a cooler and stored below 4° C. The sample labels will include the client name (NRC), site name (Lea Refinery), unique sample identification as presented in Table 3-3, sample collection time and date, preservatives, and the name(s) of the sampler(s). The samples will be secured with packing material and kept below 4° C with double-bagged, wet ice in accordance with laboratory cooler shipping guidelines. The cooler will be secured with packing tape, and a signed and dated custody seal will be placed over the cooler lid

and secured with tape. The samples and a completed chain-of-custody documentation will be shipped via priority overnight delivery to the analytical laboratory. The chain-of-custody forms are to be maintained as a record of sample collection, transfer, shipment, and receipt by the laboratory. The samples may be shipped as a single shipment at the end of the week or throughout the week as is convenient. The laboratory will be informed that samples are being submitted for analysis and it will be confirmed that the samples were received the following day. If samples are shipped on Friday for Saturday delivery, the receiving laboratory will be contacted so provisions can be made for laboratory sample receipt.

3.6 Quality Assurance/Quality Control Sampling

Field QA/QC samples for groundwater will be collected as follows:

- Duplicates: Collected at a frequency of ten percent at the same time and from the same location as the original sample.
- Equipment blanks: Collected from non-dedicated, decontaminated equipment at a frequency of five percent by pouring distilled water over the equipment and collecting the sample in the appropriate laboratory containers.
- Trip blanks: One included in each cooler shipped to the laboratory that contains samples for VOC analyses. The trip blank consists of two 40-ml vials of reagent water provided by the laboratory that were stored in the sample cooler at all times.

The QA/QC samples will be labeled as presented in Table 3-3.

3.7 Decontamination

The interface probe, pump (including electrical cord) and other non-dedicated equipment coming into contact with groundwater will be decontaminated by the following procedures:

1. Remove LNAPL, if present, with an absorbent pad.
2. Remove any solids to the degree possible with a brush and tap or distilled water. Wash with a brush, laboratory-grade non-phosphate detergent (e.g., Liquinox, Alconox), and potable tap water. Allow excess soap to drain off the equipment when finished.
3. Rinse with potable tap water or distilled water.
4. Rinse with 70-percent grade isopropyl alcohol.
5. Rinse with distilled water, preferably by spraying.

All decontamination fluids will be managed per methods discussed in Section 3.8.

3.8 Investigation Derived Waste Disposal

The IDW (e.g., purge water, decontamination water) generated during monitoring activities will be disposed of at the NRC Lea Refinery naphtha sump for recycling or disposal. Miscellaneous IDW (e.g., gloves, bailers) in contact with investigative material deemed to have no or de minimus contamination will be disposed of in a general refuse container. Any IDW deemed to have greater than de minimus contamination will be stored in labeled drums and disposed appropriately on a per case basis.

Table 3-1. Summary of Sample Type, Sample Location, Laboratory Sample Analyses, and Frequency

Sample Type	Location	Analyses	Frequency
Groundwater	Monitoring wells (See Table 2-1)	VOCs, SVOCs, Anions, TDS, Total Metals (mercury), and/or Dissolved Metals (Well specific - see Table 2-1)	See Table 2-1
Duplicate	Monitoring wells	Same as original sample	10 percent
Equipment Blank	Not applicable	VOCs, SVOCs, Anions, TDS, and Total Metals (mercury)	5 percent
Trip Blanks	Not applicable	VOCs	One per cooler containing VOC samples

Dissolved Metals = aluminum, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, uranium, zinc

Table 3-2. Laboratory Sample Specifications

Laboratory Analysis	Method	Sample Container	Preservative & Handling	Holding Time	Lab
VOCs	SW8260	Three 40-mL glass vials with Teflon-lined septum	Cool to 4ºC; HCl	14 days	ALS
SVOCs	SW8270	Two 1-L glass ambers	Cool to 4ºC	7 days	
Metals	SW7470	One 500-mL poly	Cool to 4ºC; HNO_3; Filter sample in field with 10 micron filter if turbidity >10 NTUs	6 months	
Dissolved Metals	SW6020	One 500-mL poly	Cool to 4ºC; HNO_3; Filter sample in field with 0.45 micron filter	6 months	
Chloride	E 300	One 1-L poly	Cool to 4ºC	28 days	
Fluoride					
Sulfate					
TDS	M2540C			7 days	
Nitrate/Nitrite	E 300	One 250-mL poly	Cool to 4ºC; H_2SO_4	28 days	

ALS Laboratory Group, 10450 Stancliff Road, #210, Houston, TX 77099

Table 3-3. Sample Nomenclature

Sample Type	Identification	Notes
Groundwater	MW-xx NN Well	MW = NRC monitoring well xx = designated monitoring well identification number NN = designated water well identification name
Duplicate Groundwater	MW-DUP-zz	zz = sequential duplicate sample per event (start with 1)
Equipment Blanks	EB-mm-dd-yy-z	EB = identifies equipment blank (QA/QC) sample mm-dd-yy = month, day, and year (2 digits each) z = sequential sample collected per day (start with 1 each day)
Trip Blanks	TB-mm-dd-yy-z	TB = identifies trip blank (QA/QC) sample mm-dd-yy = month, day, and year (2 digits each) z = sequential sample collected per day (start with 1 each day)

4.0 ANNUAL FACILITY-WIDE GROUNDWATER MONITORING REPORT

Semi-annual groundwater monitoring from each calendar year will be documented in an *Annual Facility-Wide Groundwater Monitoring Report*. The *Annual Facility-Wide Groundwater Monitoring Report* will include the following:

- Site background summary;
- Summary of groundwater monitoring activities conducted during the reporting period;
- Data tables summarizing groundwater elevation and analytical results collected during the reporting period;
- Maps depicting water surface elevation, LNAPL thickness, if present, and groundwater COC concentration contours;
- Summary of sampling activities of the East Water Well and Tank 1210, if conducted;
- Plots of groundwater elevations and groundwater COC concentrations over time;
- Copies of laboratory analytical reports;
- QA/QC evaluation of the laboratory analytical results;
- A brief summary of releases and remediation conducted during the reporting period; and
- Conclusions and recommendations for the next reporting period.

The *Annual Facility-Wide Groundwater Monitoring Report* will be submitted to the OCD by March 15th of each year.

5.0 Groundwater Monitoring Contingency Plan

Groundwater COC concentrations are regularly evaluated as part of routine groundwater monitoring activities. To aid in the evaluation process, plots of concentration over time for detected COCs are updated after each groundwater monitoring event and provided in *Annual Facility-Wide Groundwater Monitoring Reports*. In the event that increasing COC concentrations are identified, NRC will do the following:

1. Evaluate validity of data by performing quality assurance review of field and laboratory quality control.

2. Perform re-sampling, if deemed appropriate.

3. Evaluate concentration over time plots to determine if there is a statistically valid concentration increase or whether there are other factors affecting concentrations (e.g., seasonal fluctuations, groundwater fluctuations, etc.).

4. Investigate the potential source of the increasing COC concentrations by evaluating the condition of potential sources (e.g., is there a leaking pipe nearby).

5. Investigate the potential source by collecting subsurface soil and/or groundwater data.

6. If the potential source of the increasing COC concentrations is determined to be located at the refinery, implement corrective actions to mitigate the source.

7. If COC concentrations in wells located along the southeast (i.e., downgradient) refinery boundary exceed WQCC Standards for COCs contributed by the refinery, sample City of Lovington water supply wells located southwest (i.e., downgradient) of the Site.

8. If the potential source of the increasing COC concentrations is determined to be located at the Site, determine and execute the appropriate response actions.

6.0 References

EPA, 1996. *Low Stress (Low Flow) Purging And Sampling Procedure for the Collection of Ground Water Samples From Monitoring Wells*.

Puls and Barcelona, 1996. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures.*

APPENDIX A

TRC FIELD FORMS

FLUID GAUGING FORM

TRC	Project #		Date & Time	Start	
	Site	Lea Refinery		Finish	
On-site TRC Personnel :					

Well ID	Depth to Water (BTOC)	Depth to LNAPL (BTOC)	Other Observations
MW-1			
MW-2			
MW-3			
MW-4			
MW-5			
MW-6			
MW-7			
MW-8			
MW-9			
MW-10			
MW-11			
MW-12R			
MW-13			
MW-14			
MW-15			
MW-16			
MW-17R			
MW-18			
MW-19			
MW-20			
MW-21			
MW-22			
MW-23			
MW-24			
MW-25			
MW-26			
MW-27			
MW-28			
MW-29			
MW-30			
RW-1			

GROUNDWATER SAMPLING FORM: LOW-FLOW, LOW-STRESS METHOD

TRC	Sample Location	
	Date	
	Client	Navajo Refining Company
	Site	Lea Refinery

Static Depth to Water (ft)		Sample Collection Time	
Total Purge Volume (gal)		Purge Method	
Total Depth (ft)		Sample Method	
Screen Depth Interval (ft)		Water Description	
Pump Intake Depth (feet)		Sampling Personnel	

Time (min)	Volume Purged (L)	Flow Rate (L/min)	Depth to Water (ft)	Drawdown (ft)	pH (SU) +/- 0.1	Temp © +/- 0.1	Conductivity (u-siemens/cm) +/- 3%	TDS (ppm) +/- 10%	ORP (mV) +/- 10 mV	Dissolved Oxygen (mg/L) +/- 10%	Turbidity (NTUs) +/- 10%

Form Date: 01/24/07 Initial _____ Date _____ Page _____ of _____

APPENDIX B

RELEASE RESPONSE GUIDANCE

The objective of the Release Response Guidance described in this section is to provide guidance on the initial release response, notification requirements, and initial assessment for the Navajo Refining Company (NRC) Lea Refinery in Lovington, New Mexico (Site). The guidance is based on Mexico Oil Conservation District (OCD) rules and guidance pursuant to Title 19 of the New Mexico Administrative Code (NMAC), Natural Resources and Wildlife, Chapter 15 (Oil and Gas), Sections 29 and 30 (Release Notification and Remediation, respectively).

The sequence of tasks for the Release Response Guidance will be as follows, with further descriptions below:

- Identify and eliminate the source of the release.
- Conduct initial response and notification.
- Perform immediate recovery of release.
- Determine if excavation is appropriate and safe.
- Collect confirmation soil samples from the release area or excavation.
- Compare soil chemical of concern (COC) concentrations to OCD remediation action levels (RALs) or New Mexico Environment Department (NMED) soil screening levels (SSLs).
- If soil COC concentrations are below RALs and/or SSLs, no further action is required and the final Form C-141 form is submitted to OCD.
- If soil COC concentrations are above RALs and/or SSLs, additional responses may be required.

A copy of Form C-141 is included as Attachment 1. A Release Response Guidance Procedural Checklist is included as Attachment 2.

While the procedures included herein are default, the NRC Environmental Department must be contacted following all releases to confirm the appropriate and safe path forward.

1.0 INITIAL RELEASE RESPONSE AND NOTIFICATION

If practicable, released liquids should be immediately recovered using a vacuum truck while released heavy oils (e.g., asphalt and gas-oil) should be recovered via excavation. It may also be appropriate to collect samples of the released substance for laboratory analysis.

Release notifications will be performed in accordance with NMAC 19.15.3.116 *Release Notification and Corrective Action*. Releases are categorized as follows:

- Major Release: at least 25 barrels and/or release results in fire, reaches water course, endangers public health, or results in substantial property damage – provide immediate verbal notice within one hour and timely written notice within one week
- Minor Release: 5 to 25 barrels – provide verbal notice within one day and timely written notice within one week

Verbal notifications are to be provided to the OCD district office and the Environmental Bureau Chief and should include the information requested on Form C-141 (Attachment 1) as part of the notification.

Written notifications are to be provided to the OCD district office and the Environmental Bureau Chief and should include Form C-141, additional comments, and corrections to any previous verbal notification provided as part of the notification.

2.0 INITIAL INSPECTION AND EXCAVATION

Following the release and any initial recovery, the potentially affected soils beneath the release should be inspected to determine if excavation of shallow soils is appropriate and safe.

In the case of a release of fluids other than petroleum hydrocarbons (e.g. cooling tower water, etc.), observations of potential impacts (i.e., odor, staining, or elevated photoionization detector [PID] readings) may not be useful to determine if excavation is appropriate. Thus, the response will proceed as follows:

1. Discuss potential hazards with the NRC Health and Safety Department before entering and assessing the release area.
2. Initial soil samples will be collected for laboratory analysis prior to any excavation as discussed in Section 3.
3. The extent of the release will be mapped on Site plans/aerial photographs, photographs of the initial release will be taken, and stakes will be used to demarcate the release boundaries.

In the case of a release of petroleum hydrocarbons, the standard practice is to excavate visible soil contamination and screen the excavation via observations of potential impacts. If petroleum hydrocarbons were released, the response should proceed as follows:

1. Discuss potential hazards with the NRC Health and Safety Department before entering and assessing the release area.
2. Surface soils will be inspected for potential hydrocarbon impacts via observations of hydrocarbon staining or odor and elevated PID readings.

3. The release area will be inspected to ensure excavation will not endanger any sensitive infrastructure (e.g. buried pipelines, buried cables, storage tanks, electric lines, buildings, etc.).
4. The extent of the release will be mapped on Site plans/aerial photographs, photographs of the initial release will be taken, and stakes will be used to demarcate the release boundaries.
5. Excavation of surface soils will be conducted if warranted based on Steps 1 and 2 until no impacts are observed or until practicable.
6. Confirmation soil samples will be collected as discussed in Section 3.

Wastes generated as a result of cleanup activities will be properly managed in accordance with all local, state, and federal regulations and Site procedures.

3.0 SOIL CONFIRMATION SAMPLING

Discrete (not composite) confirmation soil samples will be collected from the affected area for laboratory analysis. All soil samples should be handled with Nitrile gloves and new gloves should be used for each sample location. For hydrocarbon releases, selection of the precise sample location may be determined by using a PID. Releases that are not expected to contain petroleum hydrocarbons will be characterized by laboratory analysis.

Following initial response activities, confirmation soil samples will be collected to determine if cleanup activities were sufficient in the following manner:

- For releases without initial excavation – 5 samples minimum
    - Initial soil confirmation soil samples will be collected at a rate of one sample for every 400 square feet of surface soil potentially affected by the release (biased to the soil that is most impacted).
    - If necessary, soil confirmation samples will also be collected every 20 linear feet immediately (i.e., one foot) outside the perimeter of affected soils to delineate the lateral extent of the release in the event the initial soil sample analytical results exceeded RALs or SSLs.
- For releases with initial excavation – 5 samples minimum
    - Initial confirmation soil samples will be collected from the bottom of the excavation at a rate of one sample for every 400 square feet of excavation (biased to the soil that is most impacted).
    - Soil confirmation samples will also be collected every 20 linear feet along the sidewall of the excavation if the excavation is at least 6-inches in depth. If the

excavation is less than 6-inches in depth, soil samples will be collected every 20 linear feet immediately (i.e., one foot) outside the perimeter of the excavation to delineate the lateral extent of the release.

- For releases to ditches, soil samples should be taken every 20 linear feet and analyzed separately.
- Additional samples may be required for further delineation where deemed necessary.
- Soil samples will be analyzed according to Table 1.

It is anticipated that only surface and vadose soils will be affected by any release because the depth to groundwater beneath the Site is approximately 100 feet below ground surface (bgs).

For releases where excavation is not practicable (e.g. large releases, located within immediate proximity to sensitive infrastructure, pipe racks, etc.) additional assessment may be conducted as discussed in Section 5.

4.0 DEVELOPMENT OF RALS AND SSLS

Analytical results for benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH) will be compared to the OCD RALs as listed in the OCD's *Guidelines for Remediation of Leaks, Spills and Releases* dated August 13, 1993. As discussed therein, the RALs for benzene, BTEX, and TPH are determined using a ranking score based on the depth to groundwater, the proximity to a wellhead protection area, and distance to a surface water body (there are no surface water bodies within 1,000 feet of the Site). The depth to groundwater (which generally ranges from 95 to 105 feet bgs at the Site) will be determined by gauging the nearest existing monitoring well. Wellhead protection areas at the Site are based on the above referenced OCD Guidelines and shown on Figure 1. A 1,000-foot wellhead protection area is provided for City of Lovington well LW-9, located immediately northeast of the Site, while 200-foot wellhead protection areas are provided for Site water supply wells WW-North, WW-South, and WW-East even though water from these wells is not used for drinking. The RALs for the different ranking criteria are presented below.

OCD Soil Recommended Action Levels

COC	Total Ranking Score		
	>19	**10 - 19**	**0 - 9**
Benzene (mg/kg)	10	10	10
BTEX (mg/kg)	50	50	50
TPH (mg/kg)	100	1,000	5,000

Notes:

mg/kg – milligrams per kilogram

BTEX – benzene, toluene, ethylbenzene, and xylenes

If within wellhead protection areas shown on Figure 1, add ranking score of 20.

If groundwater is at depth of 50 to 99 feet, add ranking score of 10.

If is greater than depth of 100 feet, add ranking score of 0.

If analyzed, other COC concentrations will be compared to their respective Industrial/Occupational and leaching to groundwater SSLs in the NMED's *Risk Assessment Guidance for Site Investigations and Remediation* dated February 2012 (updated June 2012) (http://www.nmenv.state.nm.us/HWB/documents/NMED_RA_Guidance_for_SI_and_Remediation_Feb_2012_.pdf).

If confirmation soil sample analytical results indicate that COC concentrations are below RALs and/or SSLs and no further action is necessary, a final C-141 form and letter summarizing response actions and assessment will be prepared and submitted to OCD to document successful completion of response actions. The final Form C-141 will include, at a minimum, the following: photographs of the excavated area; Site plans/aerial photographs depicting the soil sample locations, affected area, and excavation limits; laboratory analytical reports; and waste manifests.

If confirmation soil sample analytical results indicate COC concentrations are above RALs and/or SSLs, a determination will be made to conduct additional response action and confirmation sampling. If it is determined that limited additional response action (e.g., over-excavation) is needed, additional confirmation soil sampling and data evaluation will be conducted as discussed above. Otherwise, additional assessment may be required as discussed in Section 5.

5.0 ADDITIONAL ASSESSMENT

Additional assessment may be warranted based on the following criteria:

- the volume and type of substance released;
- the nature and extent of soil COC concentrations;
- surface soil conditions;
- the proximity of existing monitor wells; and
- the proximity to existing infrastructure that could preclude additional response.

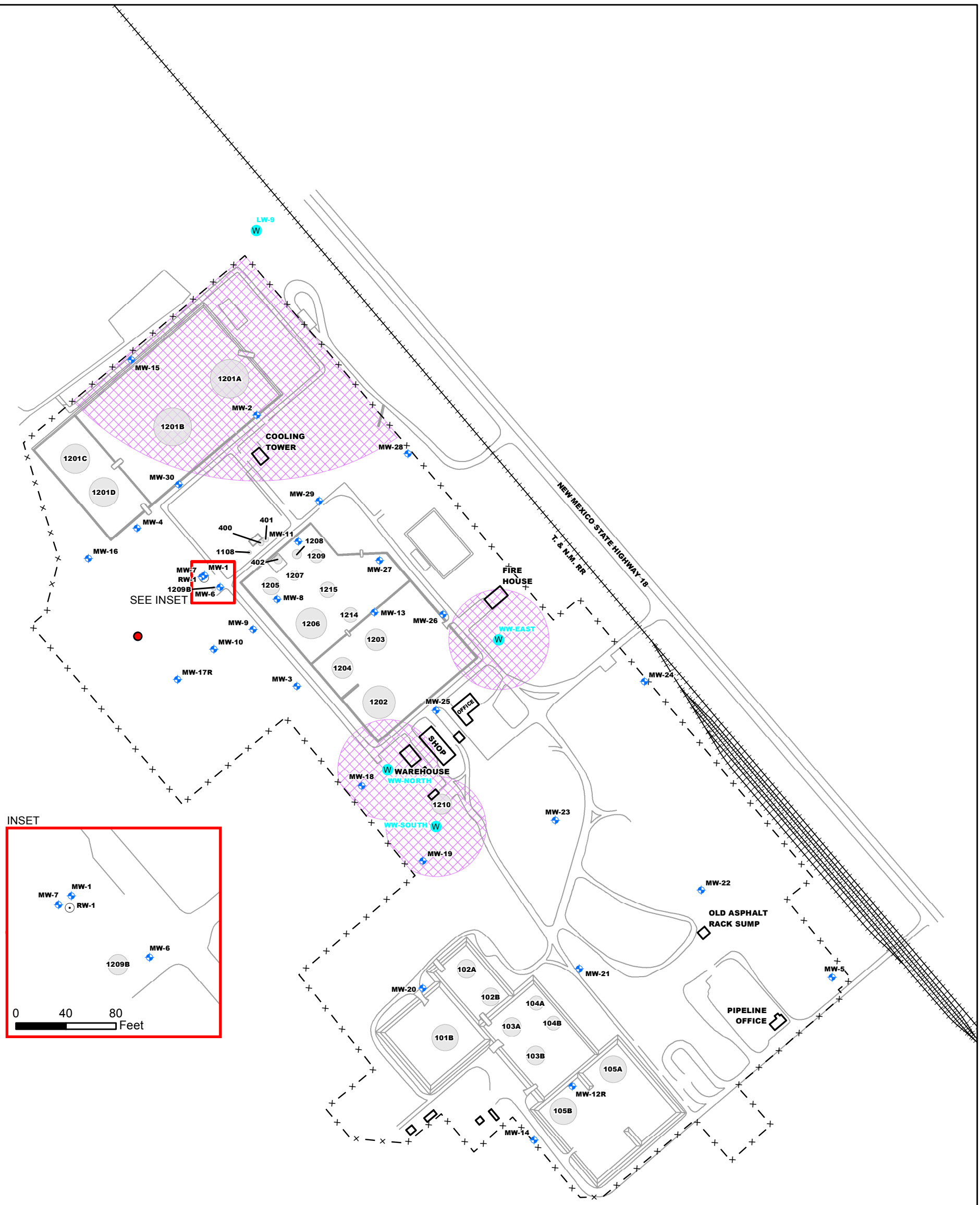
Assessment will be conducted in accordance with the OCD's aforementioned *Guidelines for Remediation of Leaks, Spills and Releases* to complete source area characterization and determine what, if any, additional response may be required.

Groundwater sampling may be warranted if the vertical extent of soil COC concentrations above RALs and/or SSLs is not delineated. Table 1 identifies the groundwater COCs to be analyzed based on the substance released.

An evaluation of potential risk and development of Site-specific SSLs may also be performed in accordance with the NMED's *Risk Assessment Guidance for Site Investigations and Remediation* dated February 2012 (updated June 2012).

The results of additional assessment activities and risk evaluation will be summarized in a letter to be submitted to OCD. Based on the results of the assessment, no further action will be requested or additional response and assessment actions will be proposed.

Figure



NOTES:

1. WATER SUPPLY WELLS WW-NORTH, WW-SOUTH AND WW-EAST CONSIDERED "PRIVATE DOMESTIC SOURCES".
2. WATER FROM WATER SUPPLY WELLS WW-NORTH, WW-SOUTH AND WW-EAST NOT USED FOR DRINKING.

LEGEND

- MONITORING WELL
- WATER WELL
- RECOVERY WELL
- FLARE
- BUILDINGS
- TANKS
- WELLHEAD PROTECTION AREAS
- RAIL
- FENCE

N

0 200 400 800
FEET

WELLHEAD PROTECTION PLAN

NAVAJO REFINING COMPANY
LEA REFINERY LOVINGTON, NM

PROJECT NO: 196364.6000.0001	MXD: Figure-1
AUTHOR: RBLAISDELL	DATE: 7/25/2013

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329-6080

FIGURE 1

Document Path: S:\#Holly\Navajo Lovington Refinery\Figures\196364.6000.0001\Figure-1.mxd

Table

Table 1. Recommended Analytical Methods for Released Substances
Release Response Guidance
Lea Refinery, Lovington, New Mexico

Released Substance	Soil COCs and Analytical Methods	Groundwater COCs and Analytical Methods
Naphtha, Kerosene, Diesel, Gas-Oil, Crude Oil, Asphalt, Slop, API Slop, Heavy Slop, Petroleum Distillate, Casing Head	BTEX by EPA SW-846 Method 8260	BTEX by EPA SW-846 Method 8260
		SVOCs by EPA SW-846 Method 8270
	TPH by EPA SW-846 Method 8015 (GRO, DRO, ORO)	TPH by EPA SW-846 Method 8015 (GRO, DRO, ORO)
		[2]Metals by EPA SW-846 Method 6020 / 7471
		Anions by EPA SW-846 Method E300
Process Water (effluent)	BTEX by EPA SW-846 Method 8260C	BTEX by EPA SW-846 Method 8260
	TPH by EPA SW-846 Method 8015 (GRO, DRO, ORO)	TPH by EPA SW-846 Method 8015 (GRO, DRO, ORO)
Caustic 20%, Caustic (Spent)	pH by EPA SW-846 Method 945D	Field pH by multi-parameter meter
Cooling Tower Water	Anions by EPA SW-846 Method E300	Anions by EPA SW-846 Method E300
	[1]Metals by EPA SW-846 Method 6020 / 7471	[2]Metals by EPA SW-846 Method 6020 / 7471

Notes:
1 – Metals to be analyzed in soils are consistent with those currently monitored in groundwater during semi-annual events and include aluminum, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, uranium, and zinc.
2 – Metals to be analyzed in groundwater are consistent with those currently monitored in groundwater during semi-annual events and include dissolved aluminum, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, uranium, and zinc and total mercury.
COC – contaminants of concern
EPA – Environmental Protection Agency
SVOCs – semi-volatile organic compounds
GRO – gasoline range organics
DRO – diesel range organics
ORO – oil range organics
BTEX – benzene, toluene, ethylbenzene, and total xylenes
TPH – total petroleum hydrocarbons
RCRA – Resource Conservation and Recovery Act

Attachment 1

Form C-141

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

☐ Initial Report ☐ Final Report

Name of Company	Contact
Address	Telephone No.
Facility Name	Facility Type

Surface Owner	Mineral Owner	API No.

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County

Latitude_____ **Longitude**_____

NATURE OF RELEASE

Type of Release	Volume of Release	Volume Recovered
Source of Release	Date and Hour of Occurrence	Date and Hour of Discovery
Was Immediate Notice Given? ☐ Yes ☐ No ☐ Not Required	If YES, To Whom?	
By Whom?	Date and Hour	
Was a Watercourse Reached? ☐ Yes ☐ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

Describe Area Affected and Cleanup Action Taken.*

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature:	OIL CONSERVATION DIVISION	
Printed Name:	Approved by Environmental Specialist:	
Title:	Approval Date:	Expiration Date:
E-mail Address:	Conditions of Approval:	Attached ☐
Date: Phone:		

* Attach Additional Sheets If Necessary

Attachment 2

Release Response Guidance Procedural Check List

Attachment 2
Release Response Guidance Procedural Check List
Navajo Refining Company, Lea Refinery, Lovington, New Mexico

- ☐ Have liquids been contained and recovered? If not, do so.
- ☐ What was spilled? _____
- ☐ How much was spilled? Barrels _____ Dimensions of affected area? _____
- ☐ Major or minor release? _____
- ☐ Have appropriate internal and external notifications been made?
- ☐ Have photographs been taken of the spill?
- ☐ Do samples of the spilled product need to be submitted for laboratory analysis? If yes, do so.
- ☐ Is the spill located within a wellhead protection area shown on Figure 1?
- ☐ Is excavation of surface soils appropriate or safe? If so, excavate.
- ☐ If initial excavation is not appropriate or safe, have soil samples been collected? (one sample for every 400 square feet of potentially affected area and one sample per 20 linear feet outside perimeter of potentially affected area)
- ☐ If excavation is conducted, has visibly contaminated soil been excavated? If petroleum hydrocarbons released, field screen via observations of hydrocarbon staining/odors and with PID.
- ☐ If excavation is conducted, have confirmation soil samples been collected? (one sample for every 400 square feet of excavation bottom and one sample per 20 linear feet of excavation sidewall)
- ☐ Have contaminated soils been properly managed?
- ☐ Were samples analyzed in accordance with Table 1?
- ☐ Do soil sample COC concentrations meet appropriate RALs or SSLs? If not, determine if additional excavation is appropriate or safe.
- ☐ Draw map and note relevant features, soil sample locations and depths, stockpile locations, etc.