

AP - 110

**REVISED FACILITY-
WIDE GW
MONITORING WORK
PLAN**

December 2015

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Wednesday, March 09, 2016 2:06 PM
To: Combs, Robert (Robert.Combs@hollyfrontier.com)
Cc: Griswold, Jim, EMNRD
Subject: Revised Facility Wide GW Monitoring Work Plan (December 2015)

Robert:

OCD has completed its review of the above subject plan and hereby **approves** the plan with “Conditions of Approval” specified below.

Conditions of Approval:

- 1) Appendix B: C-141 Final Forms are required to close out all initial C-141 Form submittals. In Appendix B it is not clear that OCD will ever receive a final form because of the release response procedure outlined therein. Verification of soil remediation is required in all C-141 Final Form submittals for efficient tracking of all reported releases or discoveries at the facility.
- 2) Due to No. 1 above, OCD hereby requires from now on a remediation plan submittal or equivalent to accompany the initial C-141 Form for OCD approval for every release or discovery that is reported to OCD on an initial C-141 Form at the facility.

Thank you.

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Revised Facility-Wide Groundwater Monitoring Work Plan



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

December 2015

Prepared for:


HOLLYFRONTIER
Navajo Refining Company
Artesia, New Mexico

Prepared by:


TRC Environmental Corporation
Austin, Texas

Revised Facility-Wide Groundwater Monitoring Work Plan

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

Prepared for:



The HollyFrontier Companies/Navajo Refining Company
Artesia, New Mexico

Prepared by:



TRC Environmental Corporation
Austin, Texas

TRC Project No. 196364

December 2015

Principal Lead

A handwritten signature in blue ink, appearing to read 'Bill', written over a horizontal line.

Technical Lead

A handwritten signature in blue ink, appearing to read 'Julie Speer', written over a horizontal line.

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1.0 INTRODUCTION

The purpose of this *Revised Facility-Wide Groundwater Monitoring Work Plan* (Revised 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 Revised 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. The initial FWGWMWP was submitted to the New Mexico Oil Conservation Division (OCD) on July 31, 2013. The OCD provided comments to the July 2014 FWGWMWP in a letter dated May 16, 2014. NRC provided a response to OCD's May 2014 comments in a letter dated June 20, 2014. OCD provided a response to NRC's June 2014 letter in a letter dated June 26, 2014. This Revised FWGWMWP addresses OCD's May and June 2014 comments.

A site location map is provided in Figure 1-1. The proposed modified sampling schedule can be found in Table 2-1. 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 thirteen wells and no sampling for two wells.
- The sampling frequency of the three on-Site NRC water supply wells is proposed to be increased from semi-annual to quarterly.
- pH, and specific conductivity are proposed to be removed from the monitoring program as laboratory analytes.
- The number of laboratory analytes (beyond pH and specific conductivity) is proposed to be reduced for one or both events for 26 monitor and recovery wells.

1.1 Site Background

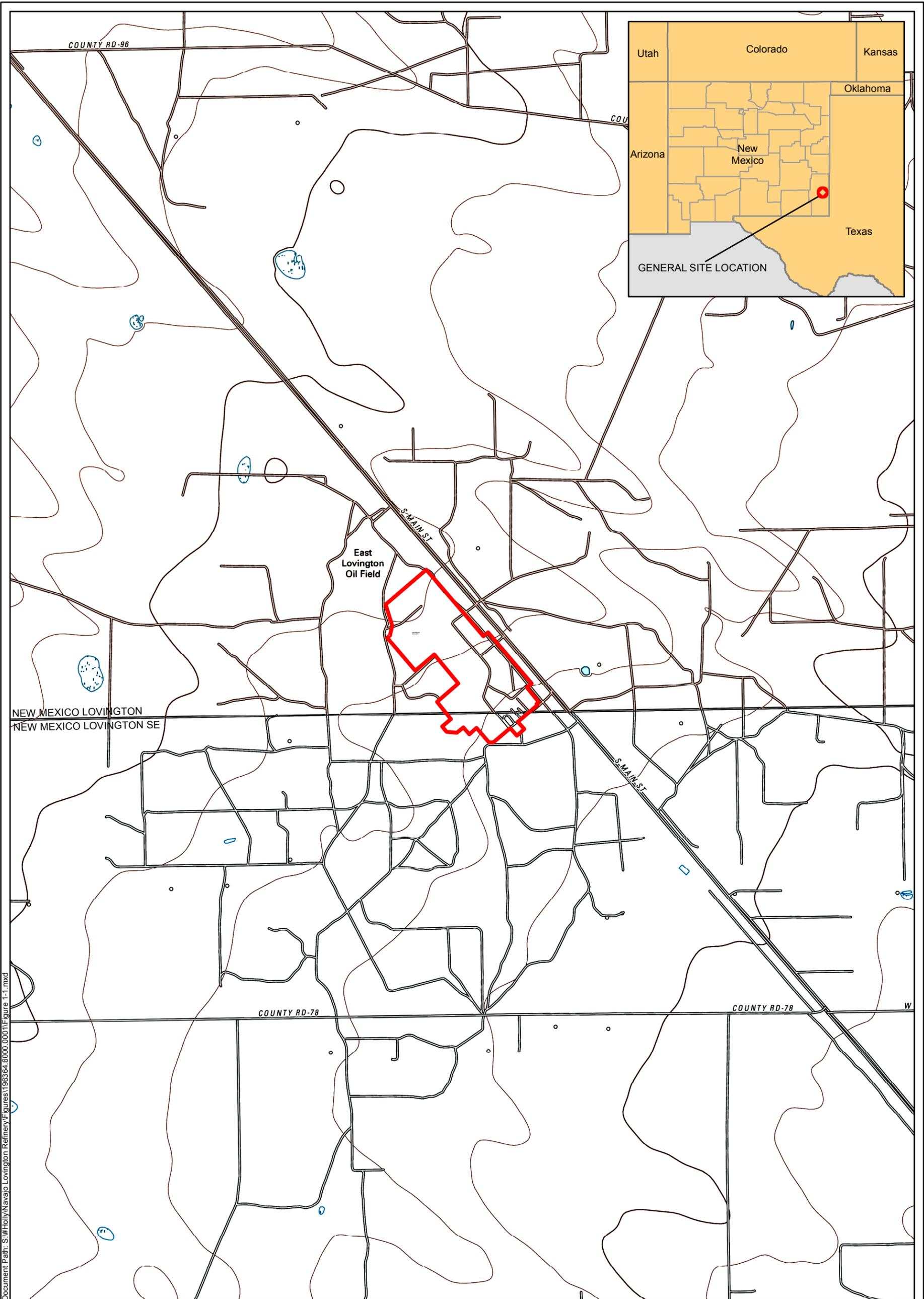
The NRC Lea Refinery is located approximately five miles south of Lovington in Lea County, New Mexico. The facility is operated by NRC and consists of refining operations and includes Holly Energy Partners (HEP) pipeline and receiving stations.

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 OCD, which was rescinded by the OCD on February 9, 2012. The NRC Lea Refinery is currently regulated under Abatement Plan permit AP-110.

1.2 Field Sampling Plan Contents

This Revised 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.

Figure 1-1. Site Location Map



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

LEGEND

 SITE

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



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, quarterly sampling of the on-Site NRC 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. Quarterly sampling of the three on-Site NRC water supply wells will be conducted in February, May, August, and November of each calendar year. OCD will be notified of the monitoring schedule prior to each monitoring event.

2.2 Gauging Requirements

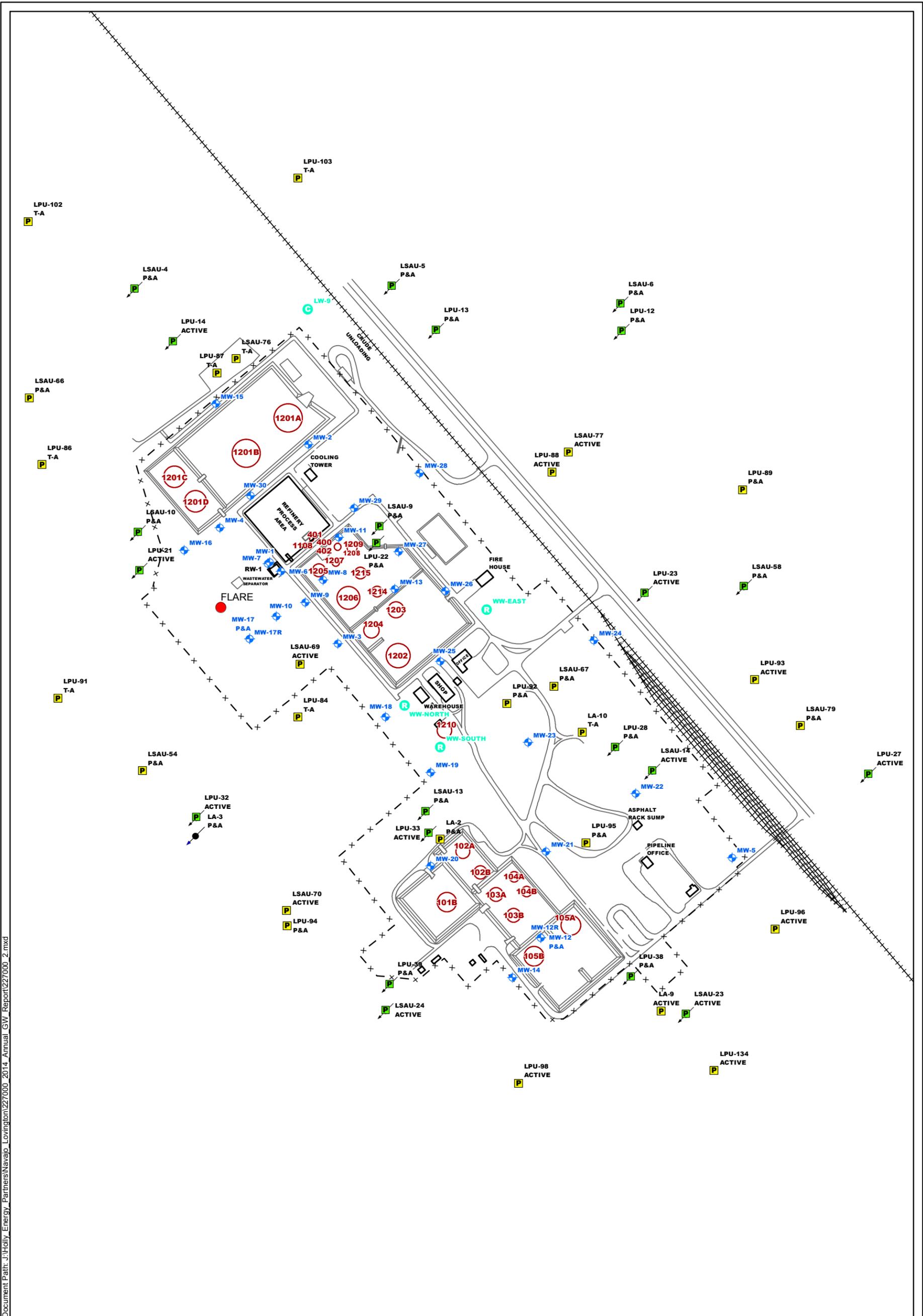
Synoptic fluid level gauging will be completed semi-annually at all monitoring and recovery wells. Wells will be gauged for depth to light non-aqueous phase liquids (LNAPL) (if present), depth to water, and total depth (if scheduled for sampling and no LNAPL is present). Dedicated tubing will remain 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.

Figure 2-1. Refinery Site Plan

Document Path: J:\Holly Energy Partners\Navajo Lovington\227000_2014 Annual GW Report\227000_2.mxd



LEGEND

	INJECTION WELL		WATER WELL
	MONITORING WELL		FLARE
	OIL PRODUCTION WELL		RAIL
	OIL PRODUCTION-CONVERTED TO INJECTION WELL		FENCE
	RECOVERY WELL		BUILDINGS
	REFINERY WATER SUPPLY WELL		TANKS
	CITY OF LOVINGTON WATER SUPPLY WELL		

N

0 250 500 1,000
FEET

REFINERY SITE PLAN

NAVAJO REFINING COMPANY
LEA REFINERY LOVINGTON, NM

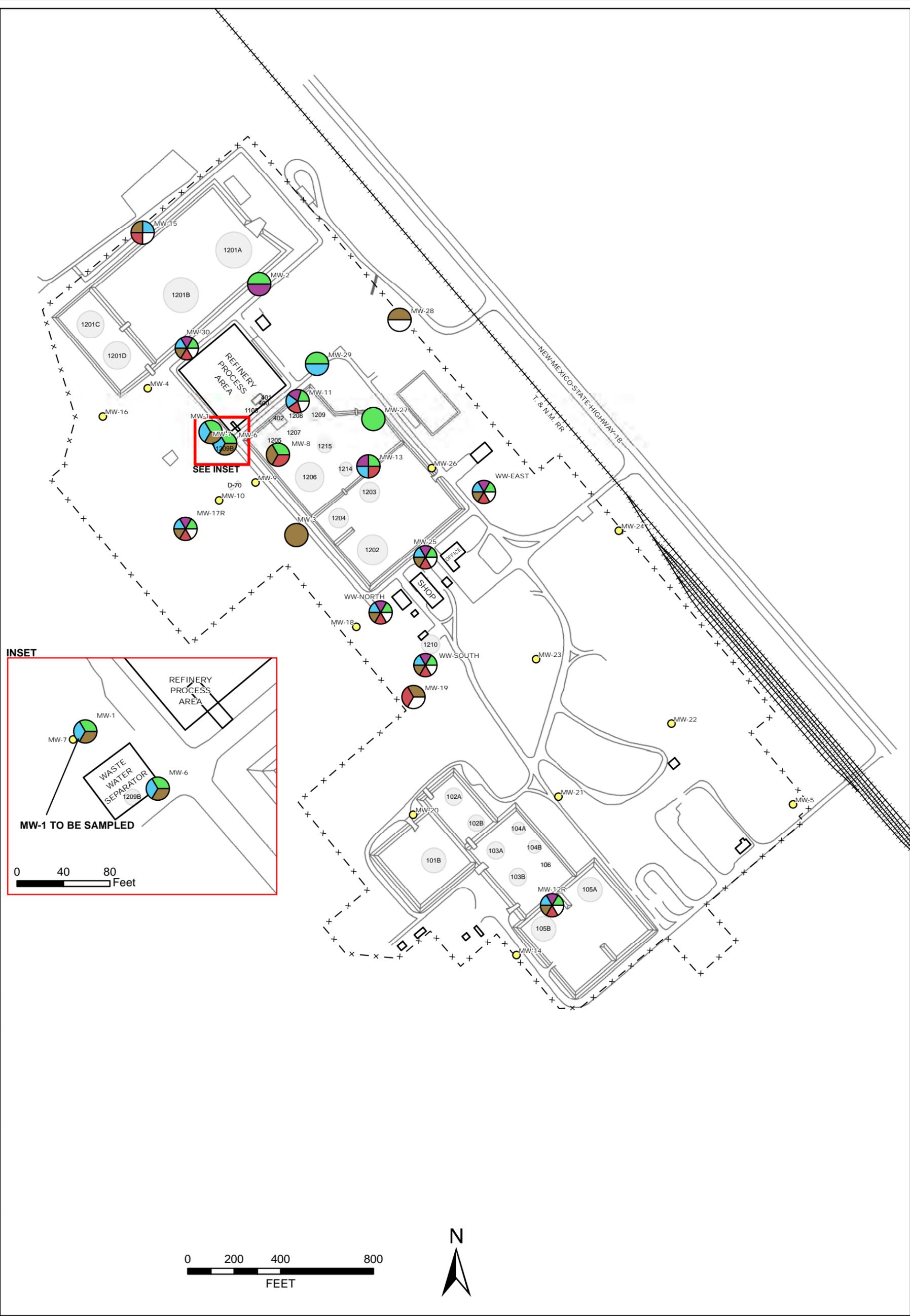
PROJECT NO: 227000	MXD: 227000_2
AUTHOR: MFL	DATE: 2/12/2015

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

FIGURE
2-1

Figure 2-2. February Sampling Plan

Document Path: J:\Holly_Energy_Partners\Navajo_Lovington\196364.0000_Sampling_Plan\Figure 2-2.mxd



	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
	ANALYSIS OF TOTAL ALKALINITY BY SM2320B
	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: MFL	DATE: 7/28/2015
	505 EAST HUNTLAND DRIVE SUITE 250 AUSTIN, TEXAS 78752 (512) 329-6080
	FIGURE 2-2

Figure 2-3. August Sampling Plan

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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
	ANALYSIS OF TOTAL ALKALINITY BY SM2320B
	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: MFL	DATE: 7/28/2015
	505 EAST HUNTLAND DRIVE SUITE 250 AUSTIN, TEXAS 78752 (512) 329-6080
	FIGURE 2-3

Table 2-1. Proposed Groundwater Monitoring Plan

**TABLE 2-1. GROUNDWATER SAMPLING PLAN SUMMARY
Lea Refinery - Lovington, New Mexico**

Monitor Well Number	Proposed Sampling Frequency		Well Location Relative to Site Boundary	Sampling Reduction Rationale
	February Event	August Event		
MW-1	A, C, D	A, C, D, E	Interior	VOC, SVOC, anion, and TDS stable to decreasing; no historical VOC or SVOC exceedances
MW-2	A, 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, F	Perimeter	All COCs stable to decreasing; no historical COC exceedances
MW-6	A, 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	A, 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	---	D	Interior	All COCs stable to decreasing; no historical COC exceedances
MW-11	A, B, C, E, F	A, B, C, D, E, F	Interior	Anions and TDS stable to decreasing
MW-12R	A, B, C, D, E, F	A, B, C, D, E, F	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, F	A, B, C, D, E, F	Perimeter	Upgradient boundary well; VOCs, SVOCs, anions, & 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-17R	A, B, C, D, E, F	A, B, C, D, E, F	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, F	A, B, C, D, E, F	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 exceedances
MW-24	---	A, B, C, D, E, F	Perimeter	All COCs stable to decreasing; no historical VOC, SVOC, metal, and TDS exceedances
MW-25	A, B, C, D, E, F	A, B, C, D, E, F	Interior	VOCs, SVOCs, metals, and TDS stable to decreasing; no historical VOC or SVOC exceedances
MW-26	---	D	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, F	A, B, C, D, E, F	Perimeter	All COCs stable to decreasing; no historical VOC, SVOC, metal, and TDS exceedances
MW-29	A, C	A, B, C, D, E	Interior	All COCs stable to decreasing; no historical VOC and SVOC exceedances
MW-30	A, B, C, D, E, F	A, B, C, D, E, F	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)
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.

Water supply wells North Well, South Well, and East Well will be sampled on a quarterly basis for the same constituents shown in Table 2-1.

All wells to be sampled will also be field-screened using a water quality meter for temperature, specific conductivity, pH, oxidation reduction potential, dissolved oxygen, and turbidity.

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

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 from Site monitoring wells using United States Environmental Protection Agency (US EPA) low flow/low stress methods. Groundwater will be purged and sampled from on-Site NRC water supply wells using standard procedures described below. Data collected during the purging and sampling of each well will be recorded on the Groundwater Sampling Form located in Appendix A.

Groundwater will be purged and sampled from monitoring wells using a stainless steel submersible pump. 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. An oil/water interface probe will be lowered into the monitoring well after the pump is properly suspended and used to record the depth to water.

Groundwater samples will be purged and sampled from the three on-Site NRC water supply wells by attaching by attaching a decontaminated or dedicated hose barb to the available spigot. The spigot will be located at a point before the water supply is introduced into any storage tanks or treatment units. The groundwater will be purged from the spigot for a minimum of ten minutes prior to sample collection to remove any stagnant water from the well casing and surface piping.

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. The water quality parameters and depth to water (in monitoring wells only) 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 \pm 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 either be filtered in the field or in the laboratory using a 10-micron filter if the turbidity is greater than 10 NTUs. Samples submitted for dissolved metals analysis will either be filtered in the field or in the laboratory using a 0.45-micron filter. The filtering method (i.e., laboratory or field) will affect the type of preservative and handling methods as shown in Table 3-2. Filtering methods will be documented on the Groundwater Sampling Form, field logbook, and chain-of-custody.

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 sampling event or throughout the week as appropriate. 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 4°C; HCl	14 days	ESC
SVOCs	SW8270	Two 1-L glass ambers	Cool to 4°C	7 days	
Metals	SW7470	One -mL poly	If field-filtered: Cool to 4°C; HNO ₃ ; Filter sample in field with 10 micron filter if turbidity >10 NTUs	6 months	
			If lab-filtered: Cool to 4°C; Laboratory will filter sample with 10 micron filter if turbidity >10 NTUs		
Dissolved Metals	SW6020	One 250-mL poly	If field-filtered: Cool to 4°C; HNO ₃ ; Filter sample in field with 0.45 micron filter	6 months	
			If lab-filtered: Cool to 4°C; Laboratory will filter sample with 0.45 micron filter		
Chloride	E 300	One 1-L poly	Cool to 4°C	28 days	
Fluoride					
Sulfate					
TDS	M2540C			7 days	
Nitrate/Nitrite	E 300	One 250-mL poly	Cool to 4°C; H ₂ SO ₄	28 days	

ESC Lab Sciences, 12065 Lebanon Road, Mt. Juliet, TN 37122

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;
- 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 April 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.*

NMED, 2014. *Risk Assessment Guidance for Site Investigations and Remediation.*

NM OCD, 1993. *Guidelines for Remediation of Leaks, Spills, and Releases.*

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

19.15.29 NMAC. Natural Resources and Wildlife, Oil and Gas, Release Notification.

19.15.30 NMAC. Natural Resources and Wildlife, Oil and Gas, Remediation.

20.6.2 NMAC Environmental Protection, Water Quality, Ground and Surface Water Protection.

APPENDIX A

TRC FIELD FORMS

FLUID GAUGING FORM

	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			

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 New Mexico Oil Conservation Division (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 (i.e., abatement) and notification.
- Perform immediate recovery of release (i.e., cleanup).
- 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 Water Quality Control Commission (WQCC) Human Health Standards (WQCC Standards) with an applied dilution factor (DF) of 20 (i.e., 20x DF).
- If soil COC concentrations are below RALs and/or WQCC Standards with 20x DF, 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 WQCC Standards with 20x DF, additional responses may be required.

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

B1. INITIAL RELEASE RESPONSE AND NOTIFICATION

Initial release abatement/cleanup activities will be conducted immediately upon discovery of a release. 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 19.15.29 *Release Notification*. 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 damage to property or the environment – 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.

B2. INITIAL INSPECTION AND EXCAVATION

Following the release and any initial recovery (i.e., abatement/cleanup), 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.

B3. 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 initial 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 WQCC Standards with a 20x DF.
- 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 B-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.

B4. DEVELOPMENT OF RALS AND WQCC STANDARDS WITH 20X DF

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 115 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 B-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 B-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 COCs other than BTEX and TPH are analyzed, the COC concentrations will be compared to their respective WQCC Standard with a 20x DF.

If confirmation soil sample analytical results indicate that COC concentrations are below RALs and/or WQCC Standards with a 20x DF 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 WQCC Standards with a 20x DF, 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.

B5. ADDITIONAL ASSESSMENT

Additional assessment may be warranted after initial spill abatement measures have been completed and the initial C-141 Form has been submitted 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.

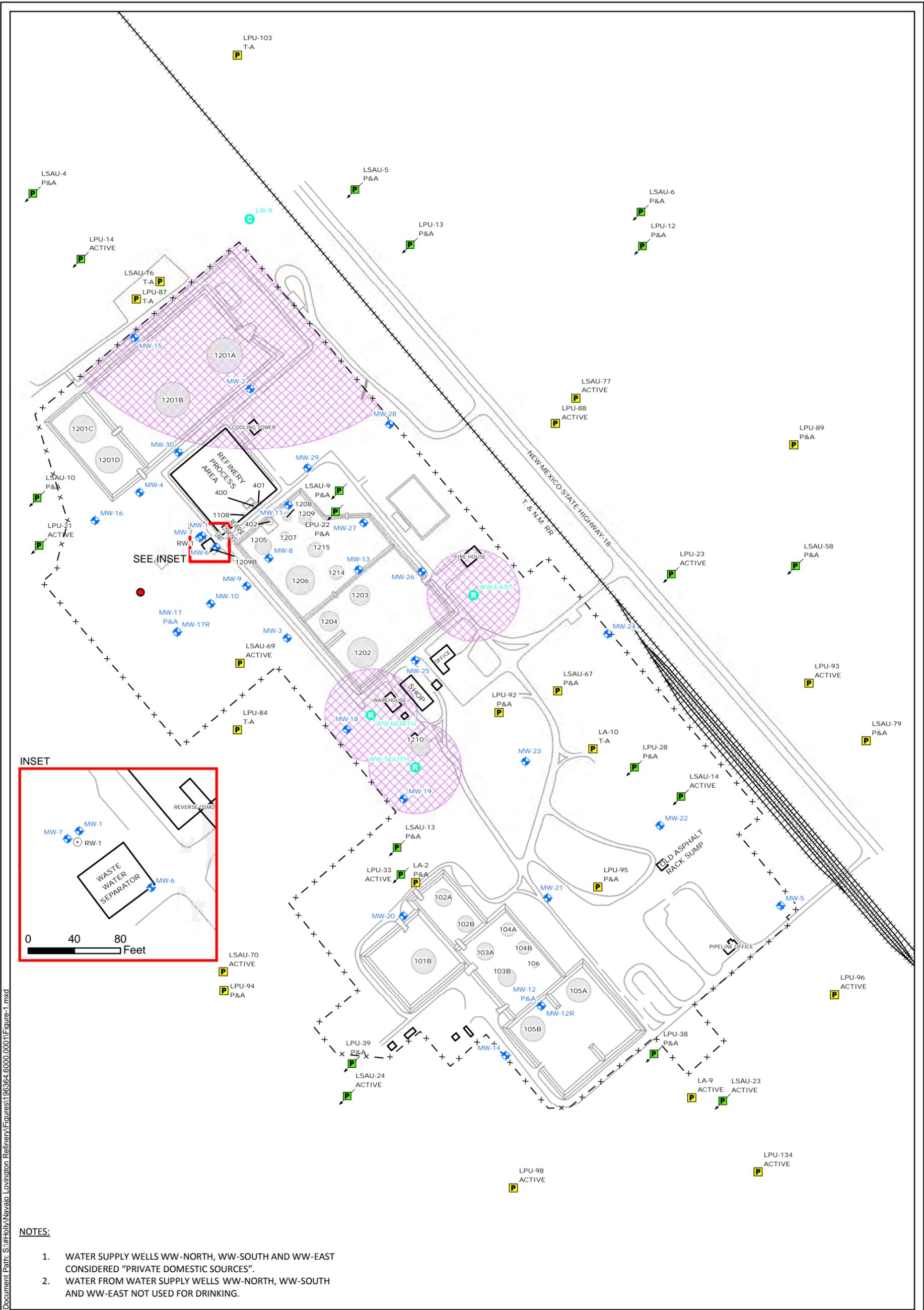
Assessment will be conducted in accordance with the OCD's aforementioned *Guidelines for Remediation of Leaks, Spills and Releases* to complete source area characterization and determine what, if any, additional response may be required.

Groundwater sampling may be warranted if the vertical extent of soil COC concentrations above RALs and/or WQCC Standards with a 20x DF is not delineated. Table B-1 identifies the groundwater COCs to be analyzed based on the substance released.

An evaluation of potential risk and development of Site-specific soil screening levels (SSLs) may also be performed in accordance with the NMED's *Risk Assessment Guidance for Site Investigations and Remediation* dated December 2014, should the OCD approve of such an approach.

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 B-1



- 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

	INJECTION WELL		BUILDINGS
	MONITORING WELL		TANKS
	OIL PRODUCTION WELL		WELLHEAD PROTECTION AREAS
	OIL PRODUCTION-CONVERTED TO INJECTION WELL		RAIL
	RECOVERY WELL		FENCE
	REFINERY WATER SUPPLY WELL		
	CITY OF LOVINGTON WATER SUPPLY WELL		
	FLARE		

0 200 400 800
FEET

WELLHEAD PROTECTION PLAN

NAVAJO REFINING COMPANY
LEA REFINERY LOVINGTON, NM

PROJECT NO: 196364.6000.0001	MXD: Figure-1
AUTHOR: KVILLATORO	DATE: 7/28/2015

505 EAST HUNTLAND DRIVE SUITE 250 AUSTIN, TEXAS 78752 (512) 329-6080	FIGURE B-1
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Document Path: S:\HollyNavajo Lovington Refinery\Figures\196364.6000.0001\Figure-1.mxd

Table B-1

Table B-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 B-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

Form C-141
Revised August 8, 2011

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

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? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom?	
By Whom?	Date and Hour	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input type="checkbox"/> 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:		<u>OIL CONSERVATION DIVISION</u>	
		Approved by Environmental Specialist:	
Printed Name:		Approval Date:	Expiration Date:
Title:		Conditions of Approval:	
E-mail Address:		Attached <input type="checkbox"/>	
Date:	Phone:		

* Attach Additional Sheets If Necessary

Attachment B-2

Release Response Guidance Procedural Check List

Attachment B-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.