January 11, 2024

Ms. Leigh Barr
New Mexico Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
LeighP.Barr@emnrd.nm.gov

Re: 2024 Facility-Wide Groundwater Monitoring Work Plan, HF Sinclair Navajo Refining LLC, Lovington, New Mexico, GW-014.

Dear Ms. Barr:

Please find attached the *2024 Facility-Wide Groundwater Monitoring Work Plan* (2024 FWGMWP) for the HF Sinclair Navajo Refining LLC (HFSNR) facility (Refinery) located in Lovington, New Mexico. The 2024 FWGMWP details the facility-wide groundwater monitoring program to be implemented at the Refinery under Groundwater Discharge Permit GW-014. The 2024 FWGMWP includes a modified facility-wide groundwater monitoring well network and proposes a modification to the monitoring schedule and laboratory analyses at select wells.

If you should have any questions or comments regarding this 2024 FWGMWP, please contact me at (575) 746-5399 or Mike Holder at (575) 308-1115.

Sincerely,

Case Hinkins
Environmental Manager
HF Sinclair Navajo Refining LLC

cc: HF Sinclair: M. Holder, T. Alba
TRC: J. Speer, A. Eljuri, C. Smith

2024 Facility-Wide Groundwater Monitoring Work Plan

HF Sinclair Navajo Refining LLC
GW-014
Lovington, New Mexico

Prepared For:
HF Sinclair Navajo Refining LLC

January 2024

Prepared By:
TRC Environmental Corporation
Austin, Texas

2024 Facility-Wide Groundwater Monitoring Work Plan

HF Sinclair Navajo Refining LLC
GW-014
Lovington, New Mexico

Prepared for:

HF Sinclair Navajo Refining LLC
Artesia, New Mexico

Prepared by:

505 East Huntland Drive, Suite 250
Austin, Texas 78752

TRC Project No. 535328

January 2024

Project Manager
Audrey Eljuri

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Julie Speer

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

COC	Chemical of Concern
°C	Degrees Celsius
DO	Dissolved Oxygen
DRO	Diesel Range Organics
FWGMWP	Facility-Wide Groundwater Monitoring Work Plan
GRO	Gasoline Range Organics
HEP	Holly Energy Partners – Operating, L.P.
HFSNR	HF Sinclair Navajo Refining LLC
IDW	Investigative-Derived Waste
LNAPL	Light Non-Aqueous Phase Liquid
mg/L	miligrams per liter
NMAC	New Mexico Administrative Code
NMOSE	New Mexico Office of the State Engineer
NTUs	Nephelometric turbidity units
OCD	New Mexico Oil Conservation Division
ORP	Oxidation-Reduction Potential
P&A	Plug and Abandon
QA/QC	Quality Assurance/Quality Control
SVOCs	Semi-Volatile Organic Compounds
TDS	Total Dissolved Solids
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbons
TRC	TRC Environmental Corporation
US EPA	Unites States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WQCC	New Mexico Water Quality Control Commission

1.0 INTRODUCTION

On behalf of HF Sinclair Navajo Refining LLC (HFSNR), TRC Environmental Corporation (TRC) prepared this *2024 Facility-Wide Groundwater Monitoring Work Plan* (2024 FWGMWP) detailing the facility-wide groundwater monitoring program to be implemented at the HFSNR Lovington Refinery (Refinery) located at 7406 South Main Street in Lovington, New Mexico. The 2024 FWGMWP was developed in accordance with Groundwater Discharge Permit GW-014 issued by the New Mexico Oil Conservation Division (OCD) (OCD, 2022). The Refinery was previously regulated by the OCD under Abatement Plan AP-110 until November 16, 2022, when the OCD issued a new Groundwater Discharge Permit GW-014 (the Permit).

The facility-wide groundwater monitoring program at the Refinery consists of semi-annual groundwater gauging of wells, semi-annual or annual groundwater sampling of monitoring wells, quarterly sampling of Refinery water supply wells, and annual reporting. The current facility-wide groundwater monitoring program is detailed in the November 2017 *Revised FWGMWP* (TRC, 2017) that was approved by the OCD on February 1, 2018. Subsequent changes to the monitoring program were detailed in a letter from OCD on July 19, 2022. The following changes to the groundwater monitoring program are proposed in this 2024 FWGMWP:

- Remove dry monitoring wells MW-21 and MW-27 from the groundwater monitoring program.
- Remove alkalinity from the monitoring program.
- Modify the monitoring frequency of select chemicals of concern (COCs) from semi-annual to annual at wells MW-1, MW-2, MW-3, MW-6, MW-8, MW-11R, MW-12R2, MW-13R, MW-17R, and MW-29.

1.1 Refinery Description

The Refinery is located approximately five miles south of Lovington in Lea County, New Mexico. The Refinery started operation in 1974 (Southern Union) and HFSNR became operator of the Refinery in early 1989. The Refinery is located on leased property owned by the City of Lovington. The property is located within the Permian oil field and surrounded by grazing land, oilfield production that started in approximately the 1940s, and produced water disposal wells. There are active and plugged oil wells and saltwater disposal wells within and surrounding the Refinery. The Refinery consists of refining operations, as well as Holly Energy Partners – Operating, L.P. (HEP) pipeline and receiving stations. A Refinery vicinity map is provided as Figure 1 and a Refinery site plan is provided as Figure 2.

1.2 Field Sampling Plan Contents

This 2024 FWGMWP describes the procedures to be followed during routine groundwater monitoring activities, including well gauging, groundwater sampling, investigation-derived waste (IDW) management, and equipment decontamination. Analytical requirements, data collection rationale, and quality assurance/quality control (QA/QC) requirements for routine groundwater monitoring are also detailed in this 2024 FWGMWP.

2.0 MONITORING PROGRAM SUMMARY

The groundwater monitoring program consists of semi-annual gauging of all monitoring and recovery wells, semi-annual or annual groundwater sampling of select monitoring wells, quarterly sampling of the HFSNR Refinery water supply wells, and annual reporting. The objectives of the monitoring program are to (1) determine and monitor groundwater flow direction and gradient, (2) monitor the nature and extent of dissolved-phase COCs in groundwater, and (3) monitor the presence and extent of light non-aqueous phase liquids (LNAPL). Figure 2 presents the location of the monitoring, recovery, 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 April and October of each calendar year. The more comprehensive monitoring event (i.e., the annual event) will be conducted in October. Quarterly sampling of the three Refinery water supply wells will be conducted in January, April, July, and October of each calendar year. The schedule may be modified if the Refinery turnaround schedule interferes with the groundwater monitoring schedule. 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 LNAPL (if present), depth to water, and total depth (if scheduled for sampling and no LNAPL is present in the well). Dedicated equipment (tubing and pumps), if applicable, will remain in the well during gauging to minimize disturbance to the water column. All synoptic well gauging will be completed within one day, if feasible. 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) Standards for groundwater (20.6.2.3103 New Mexico Administrative Code [NMAC]), COC concentration trends, and well location relative to the Refinery boundaries and Refinery water supply wells. Select groundwater samples will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total mercury, dissolved metals, anions, total petroleum hydrocarbons (TPH) gasoline range organics (GRO) and TPH diesel range organics (DRO), and/or total dissolved solids (TDS). The required sample analytical parameters and sampling frequency for each well are summarized in Table 1.

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, on an electronic tablet, and/or associated field sampling forms. Each page of the logbook and field sampling forms will be signed or initialed 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 or specific conductivity, 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. Each inspection will include:

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

- Inspection of the protective casing and well casing for deterioration or damage
- Inspection of the presence or absence and condition of the padlock and expandable well cap (J-plug)
- 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. The wells to be gauged are presented in Table 1 and well locations are depicted on Figure 2. 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 on a paper or electronic tablet field gauging form. The oil/water interface probe will be decontaminated before use and between wells following the procedures outlined in Section 3.7.

3.3.1 Fluid Level Gauging Procedures

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

- The probe will be lowered into the well slowly until the probe alarm sounds or light illuminates, then the tape will be raised and lowered again slowly until the alarm is again audible or the light again illuminates. The depth to fluid on the tape will be recorded to within 0.01 feet. To ensure accuracy, the measurement will be repeated.
- Well identification, date, time, depth to water, depth to LNAPL (if applicable), and other pertinent observations will be recorded on the field gauging form.

3.3.2 Total Depth Gauging

Total well depth is measured to detect the amount of silt accumulation in a well. This measurement will be collected on at least an annual basis 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 or purge forms.

3.4 Groundwater Sampling

Groundwater will be purged and sampled from Refinery monitoring wells using United States Environmental Protection Agency (US EPA) low flow/low stress methods (EPA, 1996 and Puls and Barcelona, 1996). Groundwater will be purged and sampled from HFSNR Refinery water supply wells using standard procedures described below. Data collected during the purging and sampling of each well will be recorded on a paper or electronic tablet groundwater sampling form.

Groundwater will be purged and sampled from monitoring wells using a dedicated pneumatic bladder pump. The monitoring well locations are depicted in Figure 2. Each dedicated pump will be adjusted as necessary so that the pump intake is at the approximate middle of the water column within the screened interval of the well. The tubing and pump safety line will be secured at the top of the well casing to ensure the pump intake remains at the same elevation during purging and sampling. A decontaminated oil/water interface probe will be lowered into the monitoring well to monitor the depth to water during the purging process.

Groundwater will be purged and sampled from the three Refinery water supply wells by attaching a decontaminated or dedicated hose barb to the available spigot. The spigot is 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 prior to sample collection for a sufficient amount of time to remove any stagnant water from the well casing and surface piping.

A multi-parameter meter 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 or specific conductivity, 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 an electronic tablet or associated field sampling forms. 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 or specific conductivity within 3 percent
- DO within 0.3 milligrams per liter (mg/L) or three consecutive readings below 0.5 mg/L
- ORP within 10 percent
- Turbidity within 10 percent nephelometric turbidity units (NTUs) or three readings below 5 NTUs

If the well goes dry during purging, a sample will be collected as soon after the water level 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, TPH GRO and DRO, SVOCs, dissolved metals, total mercury, anions, and TDS. The groundwater samples will be submitted for laboratory analysis following the schedule in Table 1.

Samples submitted for total mercury analysis will either be filtered in the field or in the laboratory using a new 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 new 0.45-micron filter. The filtering method (i.e., laboratory or field) will affect the type of preservative and handling methods. Filtering methods will be documented on the paper or electronic field form, field logbook, and chain-of-custody. The laboratory sample analyses and frequency are presented in Table 1.

3.4.1 Modifications to Program and Schedule

Historical groundwater analytical data and groundwater elevations were evaluated to support the proposed groundwater monitoring program and schedule presented in Table 1. The following changes to the existing monitoring program and schedule are proposed based on the rational discussed below:

1. Remove laboratory analysis of alkalinity from the monitoring program as this water quality parameter is not a COC nor is it necessary for monitoring the nature and extent

of dissolved-phase COCs in groundwater. There is no WQCC Standard for alkalinity. The field parameter pH will continue to be measured and recorded when purging the wells. Alkalinity was previously analyzed at the following 13 wells semi-annually: MW-11R, MW-12R, MW-15, MW-17R, MW-19, MW-28, MW-30 through MW-33, WW-North, WW-South, and WW-East.

2. Remove interior wells MW-21 and MW-27 from the groundwater monitoring program because these wells are constructed too shallow for the current groundwater regime (i.e., dry wells) and are not critical to determine and monitor the groundwater flow direction and gradient or monitor the nature and extent of dissolved-phase COCs in groundwater. These wells have been dry since at least March 2023.

    a. Monitoring well MW-21 was previously sampled annually for SVOCs and TPH, which have been stable or not detected since 2013. No SVOCs have exceeded WQCC Standards in this well, and there is no WQCC Standard for TPH. It is located within the southern portion of the Refinery and is not near or immediately downgradient of any Refinery infrastructure from which a release could occur.

    b. Monitoring well MW-27 was previously sampled semi-annually for VOCs and annually for SVOCs, which were never detected above WQCC Standards in this well. Target VOCs (benzene, ethylbenzene, toluene, total xylenes, naphthalene, and chloroform) and target SVOCs (1-methylnapthalane, 2-methylnapthalene, naphthalene, and total phenols) were either not detected in this well or detected at an estimated concentration below WQCC Standards. This well is located in a bermed tank area within the central portion of the Refinery; however, its location does not allow for monitoring the potential release of any tank contents to groundwater as it is located over 200 feet cross-gradient of the nearest tanks (Tanks 1209B, 1215, and 1214). Monitoring wells MW-8, MW-11R, and MW-13R provide adequate coverage to monitor for COCs in groundwater beneath these tanks and downgradient of the process area and are proposed to be analyzed at least annually for VOCs and/or SVOCs (among other analytes).

3. Reduce the sample frequency for the following well and analyte pairs from semi-annual to annual based on the rationale provided:

    a. MW-1 (VOCs, metals, and anions): No COCs have exceeded WQCC Standards in this well since at least 2017, and concentrations of target VOCs, metals, and anions are stable to decreasing over time.

b. MW-2 (VOCs and SVOCs): No VOCs or SVOCs have exceeded WQCC Standards in this well, except for one isolated exceedance of total phenols in April 2018 which was likely attributed to measurement contributions from inadequate decontamination of field equipment. Target VOCs and SVOCs have not been detected in this well over the last seven semi-annual monitoring events, except for chloroform, which was detected at estimated J-flagged concentrations three orders of magnitude below the WQCC Standard.

c. MW-3 (Anions): No anions have exceeded WQCC Standards in this well since 2014, and anion concentrations are stable to decreasing over time.

d. MW-6 (VOCs): No VOCs have exceeded WQCC Standards in this well. Further, target VOCs have not been detected in this well since 2011, except for chloroform, which was detected at estimated J-flagged concentrations three orders of magnitude below the WQCC Standard.

e. MW-8 (VOCs): Target VOCs have not been detected in this well since monitoring began in 2009, except for chloroform which was detected at estimated J-flagged concentrations three orders of magnitude below the WQCC Standard.

f. MW-11R (metals): Dissolved metals and total mercury have not been detected above WQCC Standards in this well since it was installed in 2016. Metal concentrations are overall stable in this well despite occasional fluctuations.

g. MW-12R2 (metals, anions, and TDS): Metals, anions, and TDS have not been detected above WQCC Standards in this well since it was installed in 2020, or in the two former wells (MW-12 and MW-12R) except an isolated exceedance of chromium in MW-12R in August 2014. Concentrations of metals, anions, and TDS are overall stable in this well except for zinc which increased over the three most recent sampling events but remains two orders of magnitude below the WQCC Standard.

h. MW-13R (VOCs and metals): Target VOCs have not been detected in this well since 2019, except for chloroform, which was detected at estimated J-flagged concentrations three orders of magnitude below the WQCC Standard. There was an isolated J-flagged detection of benzene at a concentration two orders of magnitude below the WQCC Standard in October 2022, but benzene was not detected in the field duplicate collected from this well. Dissolved metals and total mercury have not been detected above WQCC Standards in this well since 2019. Manganese exceeded the WQCC Standard in this well and the former well

MW-13 during some of the sampling events conducted between 2010 and 2018, but manganese concentrations have remained an order of magnitude below the WQCC Standard since 2019. Metal concentrations are overall stable in this well despite occasional fluctuations.

i. MW-17R (VOCs, SVOCs, metals, anions, and TDS): No COCs have exceeded WQCC Standards in this well since 2014. Target VOCs and SVOCs have not been detected in this well, except for total phenols, which was detected at estimated J-flagged concentrations below the WQCC Standard. There was an isolated naphthalene (Method 8270 as SVOC) detection below the WQCC Standard in April 2018, but naphthalene was not detected by Method 8260 (VOC) during this same event. Metal concentrations are overall stable in this well despite occasional fluctuations. Anion and TDS concentrations are stable to decreasing over time.

j. MW-29 (VOCs): No target VOCs have been detected in this well, except for chloroform, which was detected at estimated J-flagged concentrations at least two orders of magnitude below the WQCC Standard.

4. Include a provision to replace separate analyses of nitrite and nitrate with combined nitrate/nitrite analysis for comparison to the nitrate WQCC Standard if nitrite is not detected in a well for four consecutive sampling events. The rationale for this provision is that combined nitrate/nitrite results are representative of nitrate concentrations because nitrite is not present at measurable concentrations. This provision will be applied only to wells that meet the criteria, and will remove the 48-hour hold time required for separate nitrate and nitrite analyses, which is difficult to meet considering the remote location of the Refinery and common shipping or laboratory delays that are not in the Refinery's control.

3.5 Handling of Samples for Laboratory Analysis

Neoprene or nitrile gloves will be worn during sample collection and while handling sample containers. New disposable gloves will be used to collect each sample. 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 degrees Celsius (°C). The sample labels will include the Permittee name (HFSNR), site name (Lovington Refinery), unique sample identification, 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 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. At a minimum, all samples will be submitted to the laboratory within 48 hours after collection. 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-milliliter vials of reagent water provided by the laboratory that were stored in the sample cooler at all times.

Laboratory QA/QC samples will be performed according to test methodologies specified for each analytical method. The laboratory QA/QC samples may include reagent or method blanks, surrogates, matrix spike/matrix spike duplicates, blank spike/blank spike duplicates and/or laboratory duplicates, as appropriate for each method. The laboratory QA/QC samples will be run at the frequency specified by each method.

3.7 Decontamination

The interface probe and other non-dedicated equipment coming into contact with groundwater will be decontaminated by the following procedures:

1. LNAPL, if present, will be removed with an absorbent pad.
2. Any solids will be removed to the degree possible with a brush and tap or distilled water.
3. Equipment will be washed with a brush, laboratory-grade non-phosphate detergent (e.g., Liquinox, Alconox), and potable tap water. Excess soap will be allowed to drain off the equipment when finished.

4. Equipment will be double rinsed with distilled water.

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

3.8 Investigation Derived Waste Management

The IDW (e.g., purge water, decontamination water) generated during monitoring activities will be collected and disposed of at the 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.

3.9 Monitoring Well Replacements

Groundwater elevations measured across the Refinery have consistently decreased since facility-wide groundwater monitoring began in 2009. As an example, groundwater elevations measured in monitoring well MW-6 declined 15.87 feet from June 2009 to October 2022. The reduction in groundwater levels is likely caused by (1) limited recharge due to low rainfall levels and (2) regional groundwater pumping including active pumping from three on-site Refinery water supply wells and City of Lovington water supply wells located northwest and west (i.e., upgradient) of the Refinery.

The screened interval depth of some existing wells may become too shallow for optimal monitoring of the current groundwater elevation. If a well goes dry, HFSNR will propose to either replace the well or plug and abandon (P&A) it without replacement to OCD for approval. The recommendation to either replace or P&A the well will be based on the following criteria:

- Location relative to the Refinery boundaries, Refinery infrastructure from which a release could possibly occur (e.g., tanks, piping, etc.), groundwater COC exceedance zone, and other wells;
- The current or historical presence of groundwater COCs at concentrations above WQCC Standards in the well;
- Groundwater COC concentrations trends in the well over time; and
- Whether the well provides a critical point required to determine groundwater potentiometric surface and flow direction.

HFSNR will present recommendations for well replacements or abandonments to OCD in the *Annual Facility-Wide Groundwater Monitoring Report* or by email. No wells will be P&A'd

without written OCD approval. Wells will be P&A'd under a *Well Plugging Plan of Operations* approved by the New Mexico Office of the State Engineer (NMOSE).

Monitoring wells MW-28 and MW-29 have been dry since October 2022, and are proposed to be replaced with deeper wells (MW-28R and MW-29R). The new wells will be gauged and sampled consistent with the program and schedule noted for wells MW-28 and MW-29 in Table 1.

4.0 ANNUAL FACILITY-WIDE GROUNDWATER MONITORING REPORT

Semi-annual and quarterly groundwater monitoring activities and results from each calendar year will be documented in an *Annual Facility-Wide Groundwater Monitoring Report* in accordance with GW-014. The *Annual Facility-Wide Groundwater Monitoring Report* will include the following:

- Site background summary;
- Summary of groundwater monitoring and remediation activities conducted during the reporting period;
- Data tables summarizing groundwater and LNAPL gauging data and analytical results collected during the reporting period;
- Maps depicting the groundwater potentiometric surface and groundwater COC concentrations that exceeded WQCC Standards for each semi-annual monitoring event of the reporting period.
- Plots of groundwater elevations and groundwater COC concentrations over time;
- Copies of laboratory analytical reports;
- QA/QC evaluation of the laboratory analytical results;
- A summary section demonstrating compliance with GW-014 during the reporting period, including:
    - A summary of all major Refinery activities or events;
    - A summary of leaks, spills, and releases and corrective actions taken, including a summary of fluids detected in any leak detection system;
    - A summary of all waste and wastewater disposed of, sold, or treated on site;
    - Closure of any UIC Class V wells; 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 via OCD's E-Permitting System.

5.0 SCHEDULE

The groundwater monitoring program is conducted on a quarterly basis for the Refinery water supply wells and on a semi-annual basis for the monitoring and recovery wells. The first quarter and third quarter water supply well monitoring events occur during January and July, respectively. Typically, the first semi-annual event (second quarter) will occur in March or April of each calendar year and the second semi-annual event (fourth quarter) will occur in September or October of each calendar year.

The wells that are sampled on an annual basis will be sampled during the second semi-annual event of each calendar year. HFSNR will notify the OCD prior to the initiation of each semi-annual sampling event. The Annual Facility-Wide Groundwater Monitoring Report will be submitted to OCD no later than April 15 of the calendar year following sample collection.

6.0 REFERENCES

EPA, 1996. *Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells*. Revised September 19, 2017.

20.6.2.3103 NMAC. Environmental Protection, Water Quality, Ground and Surface Water Protection, Standards for Ground Water of 10,000 mg/L TDS Concentration or Less. February 18, 1977, as amended through December 21, 2018.

OCD, 2022. *Discharge Permit GW-014 for HollyFrontier Navajo Refining LLC, Lovington Refinery*. November 16, 2022.

Puls and Barcelona, 1996. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures.* EPA/540/S-95/504. April 1996.

TRC, 2017. *Revised Facility-Wide Groundwater Monitoring Work Plan.* November 16, 2017.

FIGURES

Plot Date: 3/8/2023, 13:21:55 PM by MHORN -- LAYOUT: ANSI B (11"x17")
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Coordinate System: NAD 1983 2011 StatePlane New Mexico East FIPS 3001 Ft US (Foot US)
Map Rotation: 0

TRC - GIS

LEGEND

W LW - CITY OF LOVINGTON WATER WELL
RAIL
FENCE

SOURCE: BASEMAP: WORLD IMAGERY - ESRI, VIVID MAXAR; 4/21/2022.

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FEET
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N

TRC
505 East Huntland Drive
Suite #250
Austin, TX 78752
Phone: 512.329.6080

PROJECT:
HF SINCLAIR NAVAJO REFINING LLC
GW-014, LOVINGTON REFINERY, LOVINGTON, NM

TITLE:
REFINERY VICINITY MAP

DRAWN BY:	S. RAY
CHECKED BY:	A. ELJURI
APPROVED BY:	J. SPEER
DATE:	MARCH 2023
PROJ. NO.:	527021
FILE:	527021_1.mxd

FIGURE 1

Plot Date: 3/8/2023, 13:47:38 PM by MHORN -- LAYOUT: ANSI B (11"x17")
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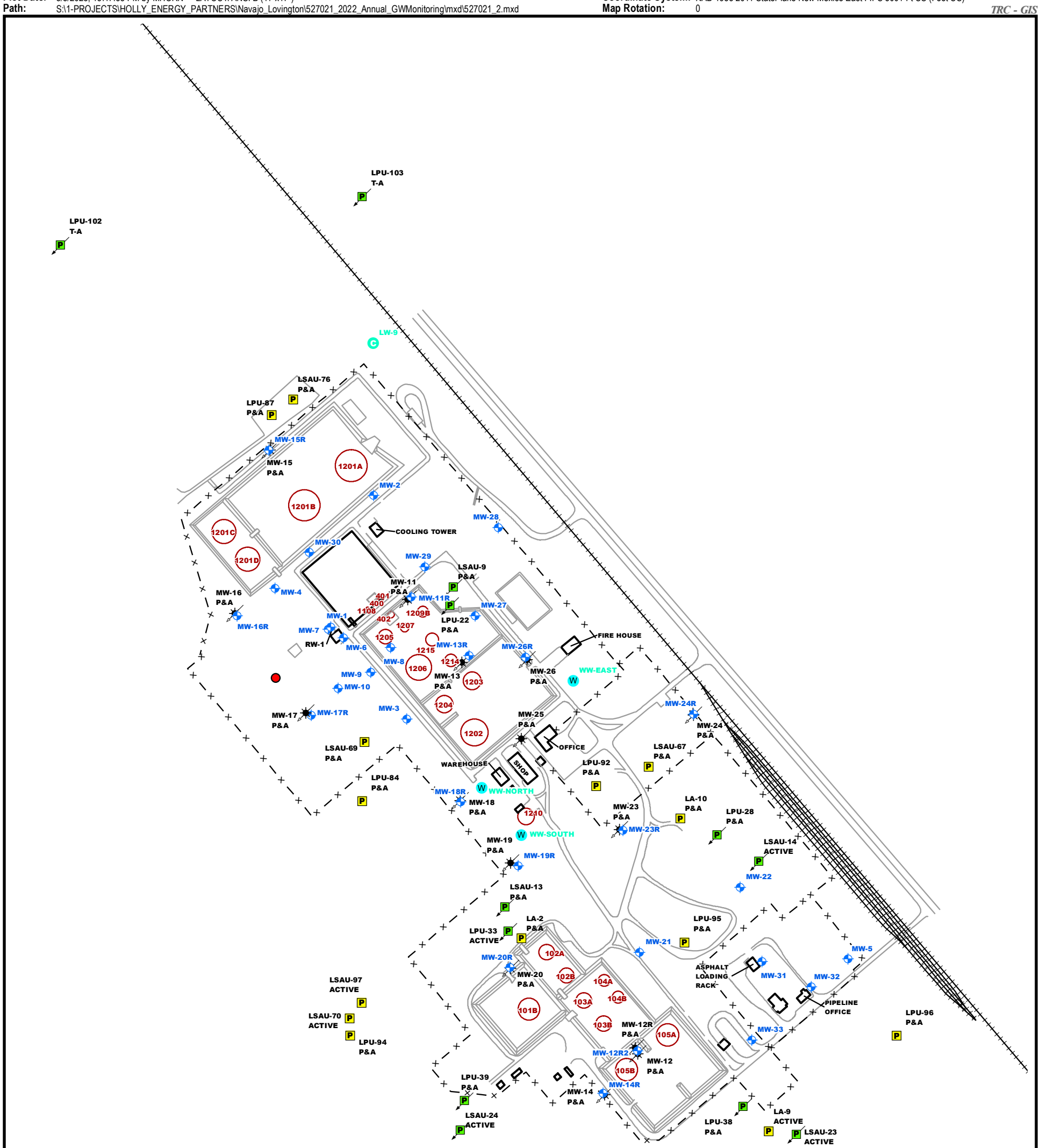
Coordinate System: NAD 1983 2011 StatePlane New Mexico East FIPS 3001 Ft US (Foot US)
Map Rotation: 0

TRC - GIS



LEGEND

- MONITORING WELL
- MONITORING WELL - PLUGGED AND ABANDONED (P&A)
- OIL PRODUCTION WELL
- OIL PRODUCTION WELL CONVERTED TO INJECTION WELL
- RECOVERY WELL
- WATER WELL
- CITY OF LOVINGTON WATER WELL
- FLARE
- RAIL
- FENCE
- BUILDINGS
- TANKS

0 250 500 FEET
1 " = 500 '
1:6,000

N

TRC
505 East Huntland Drive
Suite #250
Austin, TX 78752
Phone: 512.329.6080

PROJECT:
HF SINCLAIR NAVAJO REFINING LLC
GW-014, LOVINGTON REFINERY, LOVINGTON, NM

TITLE:
REFINERY SITE PLAN

DRAWN BY:	S. RAY
CHECKED BY:	A. ELJURI
APPROVED BY:	J. SPEER
DATE:	MARCH 2023
PROJ. NO.:	527021
FILE:	527021_2.mxd

FIGURE 2

TABLE

Table 1. 2024 Facility-Wide Groundwater Monitoring Program and Schedule

HF Sinclair Navajo Refining LLC - Lovington Refinery, Lovington, New Mexico

Well ID	Well Type	Well Location Relative to Refinery Boundary	Well Construction [a]		Historic LNAPL? [b]	Gauging Frequency	Analytical Suite and Frequency [c,d]						
			Well Diameter (inch)	Approximate Screen Interval Elevation (feet below ground surface)			VOCs	SVOCs	TPH DRO and GRO	Metals		Anions [e]	Total Dissolved Solids
										Total Mercury	Dissolved Metals		
MW-1	Monitoring	Interior	2	99-129		SA	A	-	-	A	A	A	A
MW-2	Monitoring	Perimeter	2	97-127		SA	A	A	-	A	A	A	A
MW-3	Monitoring	Interior	2	98-128		SA	-	-	-	-	-	A	-
MW-4	Monitoring	Interior	2	98-128		SA	A	A	-	A	A	A	A
MW-5	Monitoring	Perimeter	2	85-115		SA	A	A	A	A	A	A	A
MW-6	Monitoring	Interior	2	100-130		SA	A	A	-	SA	SA	SA	A
MW-7	Monitoring	Interior	2	100-130		SA							
MW-8	Monitoring	Interior	2	99-129		SA	A	-	-	A	A	SA	SA
MW-9	Monitoring	Interior	2	99-129		SA	-	-	-	-	-	A	-
MW-10	Monitoring	Interior	2	98-128		SA	-	-	-	-	-	A	-
MW-11R	Monitoring	Interior	2	110-130		SA	SA	SA	-	A	A	A	A
MW-12R2	Monitoring	Perimeter	2	104-124		SA	SA	SA	-	A	A	A	A
MW-13R	Monitoring	Interior	2	115-135		SA	A	A	-	A	A	SA	SA
MW-14R	Monitoring	Perimeter	2	110-130		SA	A	A	-	A	A	A	A
MW-15R	Monitoring	Perimeter	2	118-138		SA	A	A	-	SA	SA	SA	SA
MW-16R	Monitoring	Perimeter	2	117-137		SA	A	A	-	A	A	A	A
MW-17R	Monitoring	Perimeter	2	100-120		SA	A	A	-	A	A	A	A
MW-18R	Monitoring	Perimeter	2	113-133		SA	A	A	-	A	A	A	A
MW-19R	Monitoring	Perimeter	2	112-132		SA	A	A	-	A	A	SA	SA
MW-20R	Monitoring	Perimeter	2	106-126		SA	A	A	-	A	A	A	A
MW-22	Monitoring	Perimeter	2	88-108		SA	A	A	A	A	A	A	A
MW-23R	Monitoring	Interior	2	107-127		SA	-	-	-	-	-	A	A
MW-24R	Monitoring	Perimeter	2	116-136		SA	A	A	-	A	A	A	A
MW-26R	Monitoring	Interior	2	117-137		SA	-	-	-	-	-	A	-
MW-28	Monitoring	Perimeter	2	100-120		SA	A	A	-	A	A	SA	A
MW-29	Monitoring	Interior	2	102-122		SA	A	A	-	SA	SA	A	A
MW-30	Monitoring	Interior	2	108-128		SA	SA	SA	-	SA	SA	SA	SA
MW-31	Monitoring	Interior	2	100-120	Y	SA	SA	SA	SA	SA	SA	SA	SA
MW-32	Monitoring	Perimeter	2	96-116		SA	SA	SA	SA	SA	SA	SA	SA
MW-33	Monitoring	Perimeter	2	97-117		SA	SA	SA	SA	SA	SA	SA	SA
RW-1	Recovery	Interior	5	100-130		SA							
WW-North	Water Well	Interior					Q	Q	Q	Q	Q	Q	Q
WW-South	Water Well	Interior					Q	Q	Q	Q	Q	Q	Q
WW-East	Water Well	Interior					Q	Q	Q	Q	Q	Q	Q

Note: Blank cells indicate that information is not available or applicable.

Abbreviations:

A = Annual (March/April event)

SA = Semi-Annual (March/April and September/October events)

Q = Quarterly (January, March/April, July, September/October)

DRO = Diesel Range Organics

GRO = Gasoline Range Organics

TPH = Total Petroleum Hydrocarbons

VOCs = Volatile Organic Compounds

WQCC = New Mexico Water Quality Control Commission

Y = Yes

Footnotes:

[a] Available well construction information provided.

[b] LNAPL was present during previous groundwater monitoring events.

[c] Analytical Suite to include the following:

1. Purge parameters pH, temperature, specific conductivity or conductivity, dissolved oxygen, oxygen-reduction potential, and turbidity will be measured and recorded in the field.
2. TPH DRO by Method 3511/8015.
3. TPH GRO by Method 8015.
4. Volatile organic compounds (VOCs) by Method 8260, to include methyl tert-butyl ether (MTBE) and naphthalene.
5. Semi-volatile organic compounds (SVOCs) by Method 8270.
6. Total mercury by Method 7470. Dissolved metals (Al, As, Ba, Bo, Cd, Cr, Co, Cu, Fe, Pb, Mn, Mo, Ni, Se, Ag, U, Zn) by 6010 or 6020.
7. Anions (Nitrate, Nitrite, Sulfate, Chloride, Fluoride) by Method 300 or 9056.
8. Total Dissolved Solids by Method 2540 C-2011.

[d] Groundwater will be purged and sampled from monitoring wells using a dedicated, stainless steel submersible pump unless insufficient water volume is available then a bailer is used instead. Samples will not be collected from any well with measurable LNAPL.

[e] Replace separate analyses of nitrite and nitrate with combined nitrate/nitrite analysis for comparison to the nitrate WQCC Standard if nitrite is not detected in a well for four consecutive sampling events

"-" indicates parameter not required.

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 303066

CONDITIONS

Operator: HF Sinclair Navajo Refining LLC ATTN: GENERAL COUNSEL Dallas, TX 75201	OGRID: 15694
	Action Number: 303066
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
joel.stone	None	3/12/2024