



HollyFrontier Navajo Refining LLC
501 East Main, Artesia, New Mexico 88210
Tel: 575-748-3311
hollyfrontier.com

June 15, 2021

Ms. Teresa McDill
New Mexico Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
TeresaL.McDill@state.nm.us

**Re: Submittal of the 2020 Annual Discharge Report and the 2020 Annual
Groundwater Monitoring Report for the HollyFrontier Navajo Refining LLC,
Artesia Refinery, Discharge Permit GW-028**

Dear Ms. McDill:

Please find attached electronic copies of the *2020 Annual Discharge Report* and the *2020 Annual Groundwater Monitoring Report*, which fulfill requirements of Section 2.E of Discharge Permit GW-028. If you should have any questions or comments regarding this report, please feel free to contact me at (575) 746-5487 or Jason Leik at (214) 970-8902.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Kawika Tupou'.

Kawika Tupou
Environmental Manager
HollyFrontier Navajo Refining LLC

cc: OCD: C. Chavez, G. Wade
HFC: J. Leik
TRC: J. Speer, D. Helbert, C. Smith



2020 Annual Groundwater Monitoring Report

February 2021

HollyFrontier Navajo Refining LLC
Artesia Refinery
NMD048918817 and DP GW-028

Prepared For:

HollyFrontier Navajo Refining LLC
501 E Main Street,
Artesia, NM 88210



2020 Annual Groundwater Monitoring Report

NMD048918817 and DP GW-028

**HollyFrontier Navajo Refining LLC
Artesia Refinery
Artesia, New Mexico**

Prepared for:



Prepared by:

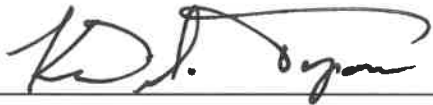


February 2021

TRC Lead Julie Speer
Julie Speer, Project Manager

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Kawika Tupou

Environmental Manager, HollyFrontier Navajo Refining LLC



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Acronyms and Abbreviations

Notation	Description
1,1,2-TCA	1,1,2-trichloroethane
1,2,4-TMB	1,2,4-Trimethylbenzene
1,3,5-TMB	1,3,5-Trimethylbenzene
cis-1,2,-DCE	cis-1,2,-Dichloroethene
CGWSL	Critical Groundwater Screening Level
COC(s)	Constituent(s) of Concern
DO	Dissolved Oxygen
DRO	Diesel Range Organics
EDB	Ethylene Dibromide, 1,2-dibromoethane
EP(s)	Evaporation Pond(s)
FWGMWP	Facility- Wide Groundwater Monitoring Workplan
GRO	Gasoline Range Organics
HMI	Hydrologic Monitoring, LLC
HWB	Hazardous Waste Bureau
HFNR	HollyFrontier Navajo Refining LLC
MCL	Maximum Contaminant Level
mg/L	Milligrams per liter
MTBE	Methyl Tert-Butyl Ether
NCL	North Colony Landfarm
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NWS	National Weather Service
O&M	Operation and Maintenance
OCD	New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division
ORP	Oxidation-Reduction Potential
PCC Permit	Post-Closure Care Permit
PSH	Phase-Separated Hydrocarbons
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RO	Reverse Osmosis



Notation	Description
SVOCs	Semi-Volatile Organic Compounds
SWMU	Solid Waste Management Units
TCE	Trichloroethene
TDS	Total Dissolved Solids
TEL	Tetra Ethyl Lead
TMD	Three Mile Ditch
TPH	Total Petroleum Hydrocarbons
TRC	TRC Environmental Corporation
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds



Executive Summary

This *2020 Annual Groundwater Monitoring Report* documents groundwater monitoring and recovery activities conducted at the HollyFrontier Navajo Refining LLC (HFNR) Artesia Refinery (refinery) located at 501 East Main Street in Artesia, New Mexico. The refinery is subject to a Post-Closure Care Permit (PCC Permit) issued by the New Mexico Environment Department (NMED) in October 2003 and later modified in December 2010; as well as Discharge Permit GW-028 issued by New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD) on May 25, 2017. Both the PCC Permit and Discharge Permit require HFNR to conduct facility-wide groundwater monitoring to evaluate the presence, nature, and extent of groundwater impacts; and to remediate impacted groundwater. This report provides the results of all groundwater monitoring and remedial activities that were conducted to satisfy both the NMED PCC Permit and the OCD Discharge Permit.

The groundwater monitoring program consists of semiannual well gauging and groundwater sampling in accordance with the *2019 Facility-Wide Groundwater Monitoring Work Plan* (2019 FWGMWP) that was submitted to the NMED and OCD in June 2019 and approved on February 17, 2020. Additional sampling was conducted in 2020 in accordance with the December 28, 2018, submittal letter of the "*SWMU / AOC Group 3 Additional Corrective Action Investigation Report – Revision 2*" (SWMU/AOC Group 3 Rev 2 transmittal letter) and NMED's subsequent response letter dated March 22, 2019. Remedial activities consist of recovery of phase-separated hydrocarbons (PSH) and impacted groundwater. The groundwater monitoring and remediation program covers the following refinery areas:

- The closed Tetra Ethyl Lead (TEL) Impoundment
- The closed North Colony Landfarm (NCL)
- The inactive Evaporation Ponds (EPs)
- Three Mile Ditch (TMD)
- The impacted vadose zone located beneath the refinery in the following other areas: Field East of Refinery, North Refinery, South Refinery, Reverse Osmosis (RO) Reject Fields, Cross-gradient of Refinery, and Up-gradient of Refinery

The 2020 groundwater monitoring results indicate physical and chemical groundwater conditions are generally consistent with historical data. Groundwater predominantly flows to the east beneath the refinery towards the Pecos River, and to the southeast beneath the EPs. Measurable PSH was present in wells located at or near the EPs, Field East of Refinery, North Refinery, NCL, South Refinery, and TEL areas in 2020, with a maximum measured thickness of 6.26 feet during the first semiannual event and 5.51 feet during the second semiannual event. The presence and distribution of PSH in 2020 was generally consistent with historical data and measured PSH thicknesses are overall stable to decreasing over time despite fluctuations inversely related to groundwater elevations. Groundwater elevations have generally decreased since 2017, with historical minimums observed in many wells with PSH during October 2020. The following constituents of concern (COCs) were detected in groundwater at concentrations in



exceedance of critical groundwater screening levels (CGWSLs): total petroleum hydrocarbons (TPH) diesel range organics (DRO); select volatile organic compounds (VOCs) including target COCs benzene, toluene, ethylbenzene, xylenes, methyl tert-butyl ether (MTBE), and naphthalene; select semi-volatile organic compounds (SVOCs); select total metals including target COC arsenic; and water quality parameters chloride, fluoride, sulfate, total dissolved solids (TDS), and nitrate/nitrite. COC concentrations in groundwater are generally stable to decreasing over time despite occasional fluctuations. Certain wells that previously exhibited increasing concentration trends have exhibited stable concentration trends over the most recent sampling events.

PSH and impacted groundwater were continually recovered at the refinery from an automated system of recovery trenches and recovery wells throughout 2020. An estimated 4,375,556 gallons of groundwater and an estimated 224,098 gallons of PSH were recovered through operation of the automated recovery system in 2020. An additional 102 gallons of PSH was manually recovered from wells not connected to the automated system by bailing or pumping on a periodic basis.



1.0 Introduction

On behalf of HollyFrontier Navajo Refining LLC (HFNR), TRC Environmental Corporation (TRC) prepared this 2020 Annual Groundwater Monitoring Report (report) to summarize the results of groundwater monitoring and recovery activities conducted in 2020 at the Navajo Artesia Refinery (refinery) located at 501 East Main Street in Artesia, New Mexico. The location of the refinery is shown on Figure 1. The refinery has been in operation since the 1920s and processes crude oil into asphalt, fuel oil, gasoline, diesel, jet fuel, and liquefied petroleum gas.

The refinery is regulated under the Resource Conservation and Recovery Act (RCRA). In October 2003, the Secretary of the New Mexico Environment Department (NMED) issued a Post-Closure Care Permit (PCC Permit) to HFNR for the Artesia Refinery Facility (United States Environmental Protection Agency [US EPA] ID number NMD048918817). The PCC Permit was modified and reissued in December 2010 (NMED 2010). The PCC Permit authorizes and requires HFNR (the Permittee) to conduct post-closure care at the closed tetra ethyl lead (TEL) surface impoundment and the North Colony Landfarm (NCL) and to take appropriate actions to achieve RCRA closure of the inactive Evaporation Ponds (EPs). These areas and the locations of all existing monitoring and recovery wells are shown on Figure 2.

The PCC Permit requires HFNR to maintain a groundwater monitoring program to evaluate the effectiveness of the corrective action program for groundwater and to meet the requirements of New Mexico Administrative Code (NMAC) 20.4.1.500 (incorporating 40 Code of Federal Regulations Part 264, Subpart F) during the post-closure care period. The PCC Permit also requires HFNR to recover phase-separated hydrocarbon (PSH), where present, from the shallow groundwater.

The refinery is also regulated by the New Mexico Energy, Minerals and Natural Resources Department – Oil Conservation Division (OCD). The OCD issued a renewal to Discharge Permit GW-028 (OCD 2017a) on May 25, 2017 and modifications on June 29, 2017 (OCD 2017b), October 25, 2018 (OCD 2018a), and December 14, 2018 (OCD 2018b). Among other requirements, the Discharge Permit requires semiannual facility-wide groundwater monitoring and submittal of an annual report summarizing the groundwater monitoring and remediation conducted throughout each year.

This report provides the results of all groundwater monitoring and remedial activities that were conducted during 2020 to satisfy both the NMED PCC Permit and the OCD Discharge Permit. The format of this report follows specifications in Appendix E.4 of the PCC Permit.

Groundwater monitoring activities conducted in 2020 consisted of semiannual well gauging and groundwater sampling. The semiannual monitoring events were performed in accordance with the (1) 2019 Facility-Wide Groundwater Monitoring Work Plan (2019 FWGMWP; TRC 2019) that was submitted to the NMED and OCD in June 2019 and approved by the NMED on February 17, 2020 (NMED 2020a) and (2) the December 28, 2018, submittal letter of the "SWMU / AOC Group 3 Additional Corrective Action Investigation Report – Revision 2 (SWMU/AOC Group 3 Rev 2 transmittal letter; HFNR 2018) and NMED's subsequent response letter dated March 22, 2019 (NMED 2019a). Remedial activities conducted in 2020 consisted of recovery of PSH and impacted groundwater and periodic gauging of recovery wells. The



groundwater monitoring and remediation activities were performed in the following refinery areas of interest:

- The closed TEL Impoundment
- The closed NCL
- The inactive EPs
- Three Mile Ditch (TMD)
- The impacted vadose zone located beneath the refinery in the following other areas:
 - Field East of Refinery
 - North Refinery
 - South Refinery
 - Reverse Osmosis (RO) Reject Fields (North and South)
 - Cross-gradient of Refinery
 - Up-gradient of Refinery



2.0 Scope of Services

Groundwater monitoring, remedial, and other associated activities performed in 2020 are summarized in this section. The first semiannual groundwater monitoring event was conducted from June 16 to June 18, 2020. The second semiannual groundwater sampling event was conducted from October 6 to October 7, 2020. Routine remedial activities were conducted throughout 2020.

The first semiannual groundwater monitoring event was originally scheduled for the week of April 13, 2020, but was postponed due to the public health emergency and travel restrictions associated with the coronavirus disease of 2019 (COVID-19) pandemic. The event was rescheduled for the week of June 15, 2020. Appropriate notifications were made to the NMED regarding the rescheduling of activities.

2.1 Monitoring Well Installation, Maintenance, and Repairs

Eight monitoring wells (MW-53R, MW-62R, MW-137A, MW-138A, MW-145, MW-146, MW-147, and MW-148) were installed in September 2020, as detailed below. These wells were gauged and sampled (if less than 0.03 feet of PSH measured in well) during the second 2020 semiannual event and will be added to the facility-wide groundwater monitoring program in the 2021 annual update to the FWGMWP in June 2021. Boring logs and well construction details for each well are provided as Appendix A.

- MW-53R was installed on September 23, 2020 along the US Highway 285 right of way, up-gradient of the NCL. MW-53R was installed in the shallow saturated zone as a replacement for MW-53, which was likely destroyed during road construction activities. The replacement well was completed consistent with the former well. MW-53 could not be located to plug and abandon.
- MW-62R, MW-137A, and MW-138A were installed on September 1 to 4, 2020 in the north central portion of the refinery in the North Refinery Area at locations adjacent to existing wells MW-62, MW-137, and MW-138, respectively. The wells were installed in the shallow saturated zone in accordance with the *Nested Well Installation Work Plan for SWMU / AOC Group 3* (Wood 2019) dated December 30, 2019, NMED's subsequent approval with modifications letter dated April 6, 2020 (NMED 2020b), and the subsequent response to NMED comments letter dated June 25, 2020 (HFNR 2020). Well installation and development activities will be documented in a forthcoming report. MW-137A and MW-138A were not sampled during the second 2020 semiannual event due to the presence of PSH at a thickness greater than 0.03 feet.
- MW-145 through MW-148 were installed on September 22 to 24, 2020, down-gradient of the refinery, in the Field East of Refinery. The wells were installed in the shallow saturated zone in accordance with the scope of work that was submitted to the NMED and the OCD in an email on May 21, 2019 (HFNR 2019), and approved with modifications by NMED and OCD in emails on May 29, 2019 (NMED 2019b; OCD



2019). Well installation, development, and sampling activities are documented in the February 2021 *Downgradient Groundwater Investigation Report* (TRC 2021).

The following well maintenance was performed in 2020:

- Locking J-plugs and locks were replaced on various monitoring wells as required throughout 2020.
- PSH absorbent socks were installed and maintained in various wells including MW-64, MW-65, MW-85, MW-86, MW-99, NCL-34A, KWB-4, KWB-7, KWB-8, KWB-11B, RW-17A, RW-17G, and TEL-3.

2.2 Phase-Separated Hydrocarbon and Water Level Measurements

Synoptic fluid gauging was conducted by Hydrologic Monitoring, LLC (HMI) at the beginning of each semiannual monitoring event in accordance with the 2019 FWGMWP. Wells were gauged to determine the groundwater elevation, flow direction, and gradient, the presence or absence of PSH, and apparent PSH thickness. A decontaminated oil-water interface probe was used to measure depth to PSH (if present), depth to water, and total depth in the monitoring and recovery wells. All measurements were recorded to the nearest 0.01-foot from the surveyed datum marking on each well casing. If the survey datum mark was not visible, measurements were obtained from the northern side of each well riser. Measurements were recorded on the field data sheets for each event.

The first semiannual gauging event was conducted on June 15 to 16, 2020. All wells were gauged within 48 hours in accordance with the 2019 FWGMWP. No rainfall was recorded at the refinery, or at a National Weather Service (NWS) gauging station located approximately 6 miles south of the refinery during the days on which gauging occurred. A total of 0.28 inches of rainfall was recorded at the NWS gauging station during the month of June 2020. Rainfall of 0.02 inches was recorded on June 12, 2020, three days before gauging activities; the remainder occurred after completion of gauging and sampling activities. A copy of the NWS data for June 2020 is provided in Appendix B.

The second semiannual gauging event was conducted on October 6, 2020. All wells were gauged within 48 hours in accordance with the 2019 FWGMWP. No rainfall was recorded at the refinery or the NWS gauging station during the days on which gauging occurred. A total of 0.05 inches of rainfall was recorded at the NWS gauging station during the month of October 2020, all of which occurred after completion of gauging and sampling activities. A copy of the NWS data for October 2020 is provided in Appendix B.

Results of the 2020 semiannual gauging events are summarized in Table 1. Potentiometric surface maps of the shallow saturated zone and valley fill zone are provided as Figures 4 through 7. PSH thickness maps are provided as Figures 8 and 9.

2.3 Groundwater Sample Collection and Handling

Semiannual groundwater sampling was conducted by HMI in accordance with the 2019 FWGMWP. No sample was collected from a well containing PSH with a measured thickness



greater than or equal to ($\geq$) 0.03 feet in accordance with the 2019 FWGMWP. The following wells were not sampled during each 2020 semiannual event due to the presence of PSH at thicknesses ≥ 0.03 feet:

- First semiannual event: MW-48, MW-58, MW-65, MW-67, MW-85, MW-92, MW-94, MW-97, MW-107, MW-112, MW-127, MW-128, MW-129, MW-132, MW-133, MW-137, MW-138, KWB-2R, KWB-4, KWB-5, KWB-6, KWB-8, KWB-10R, RW-1, RW-2, RW-5R, RW-6, RW-8, RW-13R, RW-14R, RW-15C, RW-19, RW-20A, RW-20B, RW-22, and TEL-3; and
- Second semiannual event: MW-48, MW-58, MW-65, MW-67, MW-85, MW-91, MW-92, MW-94, MW-99, MW-111, MW-112, MW-127, MW-128, MW-131, MW-132, MW-133, MW-137, MW-137A, MW-138, MW-138A, NCL-34A, KWB-2R, KWB-4, KWB-5, KWB-6, KWB-10R, TEL-1, and TEL-2.

Groundwater was purged and sampled from monitoring and recovery wells with a peristaltic pump and dedicated tubing or a dedicated bladder pump using low-flow methods in accordance with the NMED Hazardous Waste Bureau (HWB) Position Paper "Use of Low-Flow and Other Non-Traditional Sampling Techniques for Compliance Groundwater Monitoring" (NMED 2001). Groundwater was purged and sampled from water supply wells by attaching a decontaminated or dedicated hose barb to the available spigot. The spigot was located at a point before the water supply is introduced into any storage tanks or treatment units. The method by which each well was purged and sampled is provided in Table 2.

A multi-parameter water quality meter with flow-through cell and hand-held turbidity meter were used during the purging process of monitoring and recovery wells to monitor for field water quality parameters (pH, temperature, specific conductance, oxidation-reduction potential [ORP], dissolved oxygen [DO], and turbidity) and demonstrate stabilization. Water quality parameters were recorded approximately every three minutes during purging on a groundwater sampling form. The water quality parameters, depth to water (in non-supply wells only), and a qualitative description of the water quality (e.g., turbidity, sheen, odor) were also recorded during the purging process. Copies of the groundwater sampling forms are provided in Appendix B.

Water supply wells were purged and sampled from a sampling point (i.e., tap or spigot) located at or near the well head or pump house and before the water supply is introduced into any storage tank or treatment unit. The wells were purged at the sample point to remove any standing water from the well casing and surface piping. Grab readings of geochemical parameters including pH, temperature, conductivity, ORP, dissolved oxygen, and turbidity were also collected during the purging process.

The purging process was considered complete and groundwater sampling commenced when at least four of the purge parameters had stabilized. The specified stabilization criteria was ± 0.2 standard unit for pH, ± 0.2 degree Celsius for temperature, ± 0.2 milligrams per liter (mg/L) for DO, ± 0.02 Siemen per meter for specific conductance, and ± 20 millivolts for ORP. The final stabilized water quality parameters measured at each well are summarized in Table 2. In addition, other observations of relative water quality (color and odor) are included in Table 2.



Groundwater samples were collected directly from the dedicated tubing or water supply well sampling point into laboratory-provided sample containers. Care was taken to not overflow the containers and potentially remove preservatives from pre-preserved containers. Samples that were to be analyzed for dissolved metals were field-filtered by attaching a disposable 0.45 micron filter to the tubing and directing the flow through the filter into the sample container.

Sample labels were placed on each container and included the well name, sample name, date and time, sampler's initials, and analytical method(s) to be performed. Glass sample containers were placed in padded packing sleeves to prevent breakage. All samples were placed on wet ice in a shipping container. All groundwater samples collected during the 2020 semiannual events were submitted to Pace Analytical National Center for Testing & Innovation in Mount Juliet, Tennessee under appropriate chain-of-custody documentation for laboratory analyses specified in the 2019 FWGMWP. Shipping containers were sent overnight to the laboratory via Federal Express. Copies of the chain-of-custody forms are included in Appendix C with the analytical data reports.

2.4 Equipment Decontamination Procedures

The oil-water interface probes used to gauge the PSH and water levels were the only equipment that was placed within multiple wells. This equipment was decontaminated between uses at each well to prevent cross-contamination between wells. The probe and the attached measuring tape were washed in a mixture of water and non-phosphate detergent (Alconox™). The equipment was then rinsed with water. Distilled water purchased from a local store was used for washing and rinsing the equipment.

The flow-through cell and probes of the water quality meters used for low-flow purging was also decontaminated between uses at each well. Decontamination of this equipment included submersing the flow-through cell in a mixture of water and non-phosphate detergent (Alconox™), washing the cell with a soft brush, submersing the probe end of the meters in the soapy water mixture, and brushing the end of the probe with a soft brush. The equipment was then rinsed with distilled water purchased from a local store.

Dedicated tubing was used for sample collection from each well; therefore, decontamination of sample collection tubing was not required. The dedicated tubing was left in the well between sampling events, with the upper portion coiled to ensure that the lower portion did not remain in the water column. At the beginning of each sampling event, the tubing was inspected and replaced if staining or mold was observed.

2.5 Investigation-Derived Waste

All purge water and decontamination liquids were temporarily contained. The liquids were disposed daily in the refinery process wastewater system upstream of the oil/water separator. The volumes of purge water collected at each well were recorded on the HMI groundwater sampling forms and copies of these forms are provided in Appendix B.



Solid wastes generated during sampling activities included disposable gloves, paper towels, plastic bags, and tubing. All solid waste was contained in plastic bags and placed in the refinery trash receptacles for later disposal.

2.6 Exceptions to Groundwater Monitoring Work Plan

The following exceptions to the 2019 FWGMWP occurred during the first semiannual monitoring event conducted from June 16 to June 18, 2020:

- The sampling event occurred in June 2020 instead of April 2020 due to the public health emergency and travel restrictions associated with the coronavirus disease of 2019 (COVID-19) pandemic.
- Wells KWB-3AR and KWB-9 were not gauged or sampled, and well RA-1227 was not sampled because access was denied by the landowner. The landowner has not granted HFNR access to these wells since 2011, but HFNR continues to pursue access.
- Well RW-11 was not sampled because it was dry.
- Well MW-53 was not gauged or sampled because it could not be located (likely destroyed during road construction/landscaping activities).

The following exception to the 2019 FWGMWP occurred during the second semiannual monitoring event conducted from October 6 to October 7, 2020:

- Wells KWB-3AR was not gauged or sampled and KWB-9 was not gauged because access was denied by the landowner. The landowner has not granted HFNR access to these wells since 2011.
- Replacement well MW-53R was gauged and sampled instead of MW-53.
- Well RW-20A was not gauged because a pump installed in the well prevented measurement.
- Well MW-97 was not gauged or sampled because it could not be located due to construction in the area.



3.0 Regulatory Criteria

Regulatory standards or screening levels used to evaluate the data collected for the groundwater monitoring program are based on the presumption that the shallow groundwater might be used as a source of drinking water. Use of these screening levels are conservative because the shallow groundwater is not a documented source of drinking water. The Critical Groundwater Screening Level (CGWSL) used for each constituent of concern (COC) is the lower value of either the New Mexico Water Quality Control Commission (WQCC) standard from 20.6.2.3103 NMAC (last updated in December 2018) or the Maximum Contaminant Level (MCL) from the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) (USEPA 2020). For COCs where neither a WQCC standard or MCL exists, the CGWSL is the NMED Groundwater Screening Level listed in the NMED Risk Assessment Guidance for Investigations and Remediation updated in February 2019 and revised in June 2019 (NMED 2019c). If no NMED Groundwater Screening Level value is available, then the CGWSL is the USEPA Tap Water RSL value (USEPA 2020).

Available regulatory screening levels and the applicable CGWSL for each COC is presented in Table 3. The CGWSL for each COC is also provided for comparison in the analytical data summary tables, as discussed later in this report.

The 2020 TPH diesel range organics (DRO) groundwater data, in all areas except the EPs, was screened against the groundwater screening level for "unknown oil" included in Table 6-4 of the 2019 guidance document (NMED 2019c). The 2020 TPH DRO groundwater data for the EPs was screened against the groundwater screening level for "Diesel #2/New Crankcase Oil" in Table 6-4 of the 2019 NMED guidance document, consistent with the approved investigation report for the EPs (Arcadis 2015a). The 2020 TPH gasoline range organics (GRO) groundwater data was screened against the screening value for "gasoline," established in 2019, on Table 6-4 of the 2019 NMED guidance document (NMED 2019c).

An evaluation of background (or baseline) groundwater quality was conducted between July 2014 and June 2015 for the purpose of determining the concentrations of COCs that may be present hydraulically up- and cross-gradient of refinery operations. The evaluation was performed according to an approved work plan (Arcadis 2014) and a report summarizing the evaluation was submitted to NMED and OCD in September 2015 (Arcadis 2015b). The background groundwater investigation included statistical evaluation of COCs and calculation of upper tolerance limits, where a statistically valid set of data was available. HFNR requested to use the background groundwater evaluation to develop alternative screening standards for specific COCs where the background data set demonstrates that the COCs are present above the WQCC standards or MCLs. Alternative standards development is pending further discussion and approval from OCD and NMED and so they are not included in this report. However, it should be noted that concentrations of manganese, chloride, fluoride, sulfate, nitrate/nitrite, and TDS that exceed the screening levels using the WQCC standards or USEPA MCLs may not exceed up-gradient concentrations.



4.0 Monitoring Results

Results of the 2020 semiannual groundwater monitoring events are summarized in this section.

4.1 Groundwater Gauging Results

Well gauging was conducted from June 15 and 16, 2020, and on October 6, 2020. Depth to water measurements, depth to PSH (if present) measurements, and groundwater elevations are presented in Table 1. For wells with PSH present, the groundwater elevation was corrected for the presence of PSH (with a specific gravity of 0.8). Groundwater potentiometric surface maps based on the 2020 semiannual gauging results for the shallow saturated zone and the valley fill zone are presented in Figures 4 through 7.

The 2020 gauging results indicate groundwater predominantly flows eastward beneath the refinery towards the Pecos River, with localized variations in both the shallow saturated zone and the valley fill zone. The groundwater flow direction beneath the EPs is generally to the southeast. The 2020 gauging results are consistent with historical results. Groundwater mounding was observed around wells MW-114 and MW-115 during both semiannual gauging events, despite cessation of discharge of RO reject water to the RO Reject Fields in January 2019. Localized groundwater sinks were observed around various recovery wells during both semiannual gauging events due to active groundwater pumping at those recovery wells.

4.2 Phase-Separated Hydrocarbons

The presence of PSH and measured apparent in-well PSH thicknesses are shown on Figures 8 and 9 for the 2020 first and second semiannual events, respectively. Consistent with previous results, PSH is present in four general areas at the refinery: isolated wells in the north portion of the refinery (North Refinery Area, NCL, and the TEL Surface Impoundment), isolated wells in the southwestern portion of the refinery (South Refinery Area), in a segmented area across multiple wells in the southeastern portion of the refinery (South Refinery Area) extending east through the field owned by HFNR east of the refinery (Field East of Refinery) and Bolton Road, and one isolated area on the western end of the EPs near the former discharge point into Pond 1.

Plots presenting apparent in-well PSH thicknesses and groundwater elevations over time for wells that have historically contained measurable PSH are provided in Appendix D. PSH thicknesses across all areas of interest are generally stable to declining over time. PSH thicknesses generally appear to be inversely affected by fluctuations in groundwater elevations and any recent increases in PSH thicknesses are attributed to reductions in groundwater elevations. Groundwater elevations generally decreased across the facility over the last eight sampling events (April 2017, October 2017, April 2018, October 2018, April 2019, October 2019, June 2020, and October 2020). Groundwater elevation in many wells was measured at a historical minimum in 2020. The reduction in groundwater elevations from 2017 through 2020 is consistent with the occurrence of drought conditions across New Mexico during this time. Apparent in-well PSH thickness fluctuates with the water table because it relates to the



hydrogeologic conditions and characteristics of the PSH and soil and is therefore a poor indicator of PSH mobility and recoverability.

The presence of PSH within each area of interest is discussed in the following subsections. PSH recovery activities and results are provided in Section 6.0.

4.2.1 North Colony Landfarm – PSH Gauging Results

PSH was detected in NCL well NCL-34A in October 2020 at an estimated thickness of greater than 4.25 feet – the PSH thickness could not be measured because groundwater was not measured above the total depth of the well. PSH was last measured in NCL-34A from March 2011 through March 2013 (at a historical maximum of 5.87 feet in September 2011). PSH presence and thickness in this well directly correlates with reductions in the groundwater elevation observed during these times. The October 2020 groundwater elevation (i.e., below the well total depth) is the historical minimum observed in this well.

4.2.2 Tetra Ethyl Lead Surface Impoundment – PSH Gauging Results

PSH was measured in well TEL-3 at a thickness of 0.06 feet in June 2020. In October 2020, PSH was measured in wells TEL-1 and TEL-2 at thicknesses of 0.66 and 0.38 feet, respectively. PSH was last measured in TEL-1 in 2010. PSH has intermittently been present in TEL-2 since 2007 and TEL-3 since 2008. PSH presence in these wells correlates with reductions in groundwater elevations during those corresponding monitoring periods. The PSH thicknesses measured in TEL-1, TEL-2, and TEL-3 in 2020 are historical maximums and groundwater elevations have decreased over 11 feet in these wells since at least April 2017 to historical minimums in October 2020.

4.2.3 Evaporation Ponds – PSH Gauging Results

PSH was measured in EP well MW-85 at thicknesses of 0.13 feet in June 2020 and 0.57 feet in October 2020. PSH was historically present in EP well MW-86 but was not measured in MW-86 during either 2020 semiannual event. These wells are located near the original discharge point in EP 1 (Pond 1). PSH thicknesses in MW-85 have overall decreased since 2012, despite PSH thickness fluctuations between the gauging events attributable to fluctuations in groundwater elevations.

4.2.4 Three Mile Ditch – PSH Gauging Results

No measurable PSH was present in any wells along the TMD during either 2020 semiannual event.

4.2.5 North Refinery Area – PSH Gauging Results

PSH was measured in wells MW-67, MW-92, MW-94, MW-97, MW-137, MW-138, RW-1, RW-2, and RW-8 in June 2020 at thicknesses ranging from 0.05 feet in MW-67 to 3.87 feet in MW-94. In October 2020, PSH was measured in MW-67, MW-91, MW-92, MW-93, MW-94, MW-137, MW-137A, MW-138, MW-138A, RW-1, RW-2, RW-7, and RW-8 at thicknesses ranging from



0.04 feet in MW-91 and MW-93, to 5.51 feet in MW-94. PSH thicknesses have generally decreased over time in these wells, except in wells MW-92, MW-93, MW-137, and MW-138 RW-1, and RW-8, which reached historical maximums in 2020. These increased thicknesses are attributed to decreasing groundwater elevations and are not indicative of a new release or PSH migration, as follows:

- PSH thicknesses in wells MW-92, MW-137, and MW-138 increased over each monitoring event conducted since April 2019 to historical maximums of 3.01 feet, 1.56 feet, and 3.07 feet, respectively, in October 2020. Groundwater elevations measured in these wells decreased 6.15 feet, 9.52 feet, and 8.67 feet, respectively, from historical maximums in October 2015 to October 2020.
- PSH was detected for the first time at a measurable thickness (0.04 feet) in MW-93 in October 2020. The presence of measurable PSH in MW-93 in October 2020 is attributed to decreasing groundwater elevations and is not indicative of a new release or PSH migration. Groundwater elevations measured at this well decreased 6.94 feet from a historical maximum in October 2015 to October 2020.
- PSH thicknesses in wells RW-1 and RW-8 increased in 2020 to historical maximums in June 2020 and October 2020, respectively. PSH was detected at a historical maximum of 0.71 feet in RW-1 in June 2020 and 3.55 feet in RW-8 in October 2020. Groundwater elevations measured at these wells decreased 9.78 feet and 10.54 feet, respectively, from historical maximums in October 2015 to October 2020. Active pumping in these wells also contributed to the observed decreases in groundwater elevation and increases in apparent thickness in these wells.

PSH and groundwater are routinely removed from this plume by automated pumping from RW-1R, RW-2R, RW-7R, and/or RW-8R. Measurable volumes of PSH (as measured by the automated recovery system) were recovered from all these recovery wells (see Section 6.0 and Table 5 for details). The recovered PSH is pumped to Tank 49 within the refinery and then to crude tanks for processing.

4.2.6 South Refinery Area – PSH Gauging Results

PSH was measured in wells KWB-2R, KWB-4, KWB-5, KWB-6, MW-48, MW-64, MW-65, MW-107, RW-5R, RW-6, RW-15C, and RW-19 in June 2020 at thicknesses ranging from 0.01 feet in MW-64 to 2.56 feet in KWB-6. In October 2020, PSH was measured in wells KWB-2R, KWB-4, KWB-5, KWB-6, MW-48, MW-65, MW-99, MW-107, RW-5R, RW-6, RW-15C, and RW-19 at thicknesses ranging from 0.04 feet at RW-15C to 3.74 feet at RW-6.

PSH thicknesses have generally decreased over time in most of these wells, except for recent increases in wells KWB-4, KWB-5, KWB-6, MW-99, MW-107, and RW-6. These increased thicknesses are attributed to recent reductions in groundwater elevations or the combined influence of the active recovery system and are not indicative of a new release or PSH migration, as follows:



- PSH thicknesses in KWB-4, KWB-5, and KWB-6 have overall increased during monitoring events conducted since April 2017, April 2019, and April 2018, respectively. The PSH thicknesses measured in these wells in 2020 are less than the historical maximums. The recent increase in PSH thicknesses in these wells is attributed to reductions in groundwater over the same time.
- Measurable PSH was detected in MW-99 in October 2020 for the first time since March 2014. The October 2020 PSH measurement was a historical maximum of 1.06 feet. Groundwater elevations in MW-99 decreased 6.76 feet from a historical maximum in October 2015 to a historical minimum in October 2020.
- PSH was detected for the first time in MW-107 at a measurable thickness of 1.92 feet in June 2020, and again at a thickness of 1.33 in October 2020. The presence of measurable PSH in MW-107 in 2020 is attributed to decreasing groundwater elevations and is not indicative of a new release or PSH migration. Groundwater elevations in this well have decreased significantly from a historical maximum in October 2015 to a historical minimum in October 2020, as shown in the PSH thickness plots provided in Appendix D. Groundwater elevations decreased 8.02 feet from October 2015 to June 2020; and 8.83 feet from October 2015 to October 2020.
- PSH thicknesses in recovery well RW-6 have overall increased since April 2019, with measured thicknesses of 2.52 feet and 3.74 feet in June 2020 and October 2020, respectively. The 2020 PSH thicknesses were less than the historical maximum of 3.83 feet measured in October 2019. Groundwater elevations in RW-6 have decreased 5.57 feet between a historical maximum in October 2016 to October 2020. The groundwater elevation measured in June 2020 was a historical minimum, but this measurement was likely affected by pumping in the well prior to the gauging event.

PSH and groundwater is routinely removed from this plume by automated pumping from RW-4R, RW-5R, RW-6R, RW-15 (RW-15 recovery trench wells A, B, D, and/or E), and/or RW-19. Measurable volumes of PSH (as measured by the automated recovery system) were recovered from recovery wells RW-5R and RW-6R in 2020 (see Section 6.0 and Table 5 for details). The recovered PSH is pumped to Tank 49 within the refinery and then to crude tanks for processing.

4.2.7 Field East of Refinery – PSH Gauging Results

PSH was measured in wells KWB-8, KWB-10R, MW-58, MW-112, MW-127, MW-128, MW-129, MW-132, MW-133, RW-13R, RW-14R, RW-20A, RW-20B, and RW-22 in June 2020, with thicknesses ranging from 0.09 feet in KWB-8 to 6.26 feet in RW-14R. In October 2020, PSH was measured in wells KWB-10R, MW-58, MW-111, MW-112, MW-127, MW-128, MW-129, MW-131, MW-132, MW-133, RW-13R, RW-14R, RW-20B, and RW-22. PSH was likely present in RW-20A in October 2020, but fluid levels in this recovery well could not be measured because they were below the recovery pump within this recovery well. PSH thicknesses in October 2020 ranged from 0.11 feet in RW-13R to 2.99 feet in KWB-10R.

PSH thicknesses have generally decreased over time in most of these wells, except for recent increases in wells KWB-10R, MW-58, MW-111, MW-127, MW-128, MW-129, MW-131, and RW-



22. These increases are attributed to recent reductions in groundwater elevations or the combined influence of the active recovery system, and are not indicative of a new release or PSH migration, as follows:

- PSH thicknesses have increased during each monitoring event conducted since October 2018 in well KWB-10R, April 2019 in wells MW-127 and MW-128, and October 2019 in wells MW-58 and MW-129. The October 2020 PSH measurements in these wells are historical maximums: 2.99 feet in KWB-10R, 0.95 feet in MW-58, 1.92 feet in MW-127, 2.14 feet in MW-128, and 1.09 feet in MW-129. Groundwater elevations in these wells have decreased between 5.37 feet in MW-129 and 9.43 feet in MW-127 from historical maximums in November 2014 to historical minimums in October 2020.
- PSH was detected for the first time in MW-111 at a measurable thickness (0.25 feet) in October 2020. The presence of measurable PSH in MW-111 in October 2020 is attributed to decreasing groundwater elevations and is not indicative of a new release or PSH migration. Groundwater elevations measured at this well decreased 7.55 feet from a historical maximum in November 2014 to the historical minimum in October 2020.
- PSH thicknesses in MW-131 increased to a historical maximum of 1.63 feet in October 2020. Groundwater elevations in MW-131 decreased 7.32 feet from a historical maximum in November 2014 to a historical minimum in October 2020.
- PSH thicknesses increased in recovery well RW-22 to a historical maximum of 5.69 feet in June 2020 but decreased to 0.88 feet in October 2020. Groundwater elevations and PSH thicknesses in this well have historically fluctuated between gauging events and is affected by recovery system pumping. Despite seasonal fluctuations, groundwater elevations in RW-22 have decreased 8.35 feet from a historical maximum in November 2014 to October 2020.

PSH thicknesses fluctuate in the wells with active PSH recovery and wells located nearby. PSH and groundwater is routinely removed from this plume by automated pumping from RW-12R, RW-13R, RW-14R, RW-20, and/or RW-22. Measurable volumes of PSH (as measured by the automated recovery system) were recovered from wells RW-13R, RW-14R, and RW-22 in 2020. The recovered PSH is pumped to Tank 49 within the refinery and then to crude tanks for processing.

4.2.8 Cross-Gradient and Up-Gradient Areas – PSH Gauging Results

No measurable PSH was present in any wells located up-gradient or cross-gradient of the refinery during either 2020 semiannual event. The up-gradient wells are only gauged on an annual basis.

4.2.9 RO Reject Fields – PSH Gauging Results

No measurable PSH was present in any wells located within the North or South RO Reject Fields during either 2020 semiannual event.



5.0 Chemical Analytical Data

The chemical laboratory analyses and results of groundwater samples collected at the refinery in 2020 are summarized in this section.

5.1 Sample Laboratory Analyses

Groundwater samples collected during the 2020 semiannual sampling events were submitted for laboratory analysis of one or more of the following COCs by the associated analytical methods in accordance with the 2019 FWGMWP:

- TPH DRO by Method 8015 Modified
- TPH GRO by Method 8015 Modified
- Volatile organic compounds (VOCs) by Method 8260
- Metals by Methods 6010/6020 or 7470 (arsenic, barium, chromium, iron, lead, manganese, and selenium in all wells that were analyzed for metals; boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium were additionally analyzed in select wells)
 - Total metals were analyzed during both the first and second semiannual events
 - Dissolved metals were analyzed during the first semiannual event (for the same list of metals as the total metal list)
- Cyanide by Method 4500
- Major cations and anions by Methods 6020 or 300 (calcium, chloride, fluoride, potassium, sodium, and sulfate)
- Nitrates/nitrites (as nitrogen) by Method 300
- Total dissolved solids (TDS) by Method 2540

The specific analytical suite for each groundwater sample was in accordance with Table 1 of the approved 2019 FWGMWP. Laboratory analytical reports are provided in Appendix C.

In accordance with the SWMU/AOC Group 3 Rev 2 transmittal letter dated December 28, 2018, and NMED's subsequent response letter dated March 22, 2019, groundwater samples collected from select wells in the vicinity of solid waste management units (SWMUs) 20 and 22 (North Refinery wells) were analyzed for semi-volatile organic chemicals (SVOCs) by EPA Method 8270. One well (KWB-6) with historical detections of 1,2-dichloroethane was scheduled be analyzed for EDB by EPA Method 8011; however, PSH at a thickness ≥ 0.03 feet was measured in this well during both 2020 semiannual events and no groundwater samples were collected.



5.2 Data Validation

Laboratory analytical results were reviewed and validated following the guidelines of the PCC Permit. The data validation and a discussion of any data quality exceptions are provided in Appendix E. Data qualifier flags were added to the data based on the data validation results and are summarized in tabulated form in Appendix C.

Although some data quality exceptions were noted, the analytical results are generally usable for the intended purpose.

5.3 Laboratory Analytical Results

Laboratory analytical results of all wells sampled in 2020, and during at least the three previous sampling events, are summarized in Tables 4A through 4D, as follows:

- Table 4A – GRO, DRO, and select VOCs (VOCs detected above the CGWSL in more than one well in 2020)
- Table 4B – Total Metals
- Table 4C – Water quality parameters (TDS, nitrate/nitrite, major cations, major anions) and Cyanide
- Table 4D – SVOCs (detected in at least one well in either 2019 or 2020)

Analytical results of the 2020 monitoring events and the three prior sampling events are included in the tables as required by the PCC Permit. The timeframe required to provide data for the three prior sampling events varies by well because wells are sampled semiannually, annually, or biennially. Wells that are sampled on a biennial basis are sampled during odd calendar years and therefore were not sampled during April 2020. For consistency of the timeframe summarized in the analytical results tables, no data prior to 2013 is included for the wells that are sampled biennially or were not sampled during this timeframe for whatever reason (e.g., PSH present at a thickness ≥ 0.03 feet, lack of well access, etc.). Analytical results in Tables 4A through 4D are organized by the major area of interest in which each well is located. The applicable CGWSL is provided at the top of each data table and exceedances of the CGWSL are highlighted in yellow. Analytical results of all detected COCs are summarized in tables organized by well in numeric order that are included in Appendix C.

Plots of historical concentrations of target COCs are provided in Appendix D for wells with historical exceedances of CGWSLs. These plots are organized by well within major areas of interest and include concentration plots for the following target COCs: GRO, DRO, benzene, ethylbenzene, toluene, total xylenes, methyl tert-butyl ether (MTBE), naphthalene, and arsenic.

Figures 10 through 19 present the extent of the CGWSL exceedance areas of the following target COCs for both the first and second semiannual 2020 sampling events: DRO, arsenic, benzene, naphthalene, and MTBE.



Figures 20 through 29 depict the extent of CGWSL exceedance areas of the following water quality parameters for both the first and second semiannual 2020 events in accordance with the Discharge Permit requirements: chloride, fluoride, sulfate, nitrate/nitrite, and TDS.

The 2020 analytical results in each major area of interest are summarized in the following subsections.

5.3.1 North Colony Landfarm – Analytical Results

Groundwater monitoring is ongoing beneath and near the closed NCL. Groundwater samples were collected from the NCL wells listed below during the 2020 semiannual sampling events:

- First Semiannual Event (12 wells): MW-18, MW-45, MW-54A, MW-55, MW-56, MW-108, NCL-31, NCL-32, NCL-33, NCL-34A, NCL-44, and NCL-49.
- Second Semiannual Event (10 wells): MW-45, MW-53R, MW-54A, MW-55, MW-108, NCL-31, NCL-32, NCL-33, NCL-44, and NCL-49.

Groundwater samples collected from these NCL area wells were analyzed for DRO, VOCs, the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium), and water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite). In addition, the groundwater sample collected from MW-55 was analyzed for GRO and groundwater samples from MW-18, MW-45, and MW-55 were analyzed for cyanide and the expanded total metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium).

Analytical results of groundwater samples collected from wells located in and near the NCL in 2020 indicate COCs are present in groundwater above their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics and Gasoline Range Organics, NCL

In 2020, groundwater samples were collected from wells located in and near the NCL for analysis of TPH DRO and GRO. TPH results that exceeded their respective CGWSL in NCL wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
NCL	<i>First Semiannual Event (June 2020)</i>				
	TPH-DRO	0.0858	12	12	7.21 (NCL-33)
	TPH-GRO	0.0101	1	1	0.140 (MW-55)
	<i>Second Semiannual Event (October 2020)</i>				
	TPH-DRO	0.0858	10	9	8.54 (NCL-33)
	TPH-GRO	0.0101	1	1	0.635 (MW-55)



As summarized above and highlighted in Table 4A, DRO and GRO were detected in exceedance of their respective CGWSLs in NCL area wells sampled during both 2020 semiannual events.

As shown in the COC concentration plots included in Appendix D, DRO concentrations in NCL wells MW-18, MW-45, MW-53, MW-54A, MW-56, MW-108, NCL-31, NCL-32, NCL-33, NCL-34A, and NCL-44 have overall increased since 2011, but have exhibited a stable to decreasing trend over at least the four most recent sampling events. DRO concentrations in these wells will be reviewed again in 2021.

DRO concentrations at well MW-55 overall increased since 2011 but were stable from October 2018 through June 2020. DRO concentrations at MW-55 increased from 0.95 mg/L in June 2020 to 1.34 mg/L in October 2020, which is the historical maximum for this well. DRO concentrations in this well will be reviewed again in 2021.

GRO concentrations in MW-55 have exhibited an overall increasing trend since April 2017, with a historical maximum concentration of 0.635 mg/L reported in October 2020. GRO concentrations in this well will be reviewed again in 2021.

Volatile Organic Compounds, NCL

In 2020, groundwater samples were collected from wells located in and near the NCL for analysis of VOCs. VOC results that exceeded their respective CGWSL in NCL wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
NCL	<i>First Semiannual Event (June 2020)</i>				
	Benzene	0.00500	12	2	1.10 (NCL-34A)
	MTBE	0.100	12	1	0.228 (MW-55)
	<i>Second Semiannual Event (October 2020)</i>				
	Benzene	0.00500	10	1	0.100 (MW-108)
	MTBE	0.100	10	1	0.299 (MW-55)

As summarized above and highlighted in Table 4A, benzene and MTBE were detected in exceedance of their respective CGWSLs in NCL area wells during at least one 2020 sampling event. No other VOC was detected above its respective CGWSL during either semiannual event.

The 2020 VOC results in groundwater beneath and near the NCL were generally consistent with historical results, with exceptions listed below. As shown in the COC concentration plots included in Appendix D, concentrations of target VOCs in wells located in and near the NCL are overall stable to declining, except MTBE in wells MW-45 and MW-55 as discussed below. MTBE concentrations in these wells will be reviewed again in 2021.

- MTBE concentrations in MW-45 have exhibited an increasing trend since April 2016 but remain well below the CGWSL of 0.100 mg/L. MTBE concentrations in MW-45 increased to 0.0124 mg/L in October 2020, which is the historical maximum for this well.



- MTBE concentrations in MW-55 have exhibited an increasing trend since April 2015 and have exceeded the CGWSL since the second 2019 semiannual event. MTBE concentrations increased from 0.106 mg/L in October 2019 to 0.228 mg/L in June 2020 to 0.299 mg/L, which is the historical maximum for this well.

Wells MW-45 and MW-55 are located approximately 1,480 feet and 550 feet, respectively, down-gradient of the NCL. MTBE concentrations in wells located in the immediate vicinity of the NCL remain stable and below the CGWSL, including wells NCL-33 and NCL-34A which are located on the down-gradient boundary of the NCL. Therefore, the presence of MTBE in wells MW-45 and MW-55 is not associated with the NCL.

Total Metals, NCL

Groundwater samples were collected from wells located in and near the NCL for analysis of the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium). In addition, groundwater samples collected from wells MW-18, MW-45, and MW-55 were analyzed for the expanded total metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium). Total metal results that exceeded their respective CGWSL in NCL wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
NCL	<i>First Semiannual Event (June 2020)</i>				
	Arsenic	0.0100	12	2	0.0305 (NCL-44)
	Boron	0.750	3	2	2.52 (MW-18)
	Iron	1.00	12	4	3.52 (NCL-33)
	Manganese	0.200	12	6	2.24 (NCL-31)
	Uranium	0.0300	3	2	0.0549 (MW-55)
	<i>Second Semiannual Event (October 2020)</i>				
	Arsenic	0.0100	10	2	0.0211 (NCL-44)
	Iron	1.00	10	2	4.03 (NCL-33)
	Manganese	0.200	10	6	2.15 (NCL-31)
	Uranium	0.0300	2	1	0.0364 (MW-55)

As summarized above and highlighted in Table 4B, arsenic, boron, iron, manganese, and uranium were detected in exceedance of their respective CGWSLs in NCL wells during at least one 2020 sampling event. No other total metal was detected above its respective CGWSL during either semiannual event.

The total metal results in groundwater beneath and near the NCL were generally consistent with or less than historical results, except uranium in MW-18. Uranium concentrations in MW-18 increased from 0.0283 mg/L in April 2019 to 0.0451 mg/L in June 2020. Uranium has fluctuated above and below the CGWSL of 0.0300 mg/L in this well over time. Concentrations of target COC arsenic in wells located in and near the NCL are overall stable to declining, as shown in the COC concentration plots included in Appendix D.



Cyanide, NCL

Groundwater samples collected from wells MW-18 during the first 2020 semiannual event and MW-45 and MW-55 during both 2020 semiannual events were analyzed for cyanide. Cyanide was detected above the method detection limit, at a J-flagged (estimated concentration) of 0.00225 J mg/L, in well MW-45 in June 2020, but the concentration was below the method detection limit in October 2020. Cyanide was not detected above the above the CGWSL of 0.200 mg/L in groundwater samples collected from any NCL well during the June 2020 or October 2020 sampling events.

Water Quality Parameters, NCL

In 2020, groundwater samples were collected from wells located in and near the NCL for analysis of water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite [as nitrogen]).

No CGWSLs are applicable for calcium, potassium, or sodium. Chloride, fluoride, nitrate/nitrite, sulfate, and TDS were detected at concentrations in exceedance of their respective CGWSLs in groundwater samples from various wells in and near the NCL, as highlighted in Table 4C. The reported concentrations of these constituents generally exhibit an overall stable trend across the NCL, with some seasonal fluctuations between the first and second semiannual events. Nitrate/nitrite concentrations in NCL-49 have increased over the four most recent sampling events from 3.59 mg/L in October 2018 to 10.1 mg/L in October 2020, which is slightly above the CGWSL of 10.0 mg/L. Nitrate/nitrite concentrations in this well will be reviewed again in 2021.

5.3.2 Tetra Ethyl Lead Surface Impoundment – Analytical Results

Groundwater monitoring beneath the closed TEL surface impoundment is ongoing. Groundwater samples were collected from the following wells during 2020 semiannual events:

- First Semiannual Event (4 wells): MW-49, TEL-1, TEL-2, and TEL-4
- Second Semiannual Event (3 wells): MW-49, TEL-3, and TEL-4.

Groundwater samples collected from these TEL area wells were analyzed for GRO, DRO, VOCs, the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium), and water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite). In addition, groundwater samples collected from MW-49 were analyzed for the expanded total metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium) and cyanide.

Analytical results of groundwater samples collected from TEL wells in 2020 indicate COCs are present in groundwater above their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.



Total Petroleum Hydrocarbons – Diesel Range Organics and Gasoline Range Organics, TEL

In 2020, groundwater samples were collected from wells located in and near the TEL for analysis of TPH DRO and GRO. TPH results that exceeded their respective CGWSL in TEL wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
TEL	<i>First Semiannual Event (June 2020)</i>				
	TPH-DRO	0.0858	4	4	8.16 (TEL-2)
	TPH-GRO	0.0101	4	4	5.45 (MW-49)
	<i>Second Semiannual Event (October 2020)</i>				
	TPH-DRO	0.0858	3	3	6.36 (TEL-3)
	TPH-GRO	0.0101	3	3	5.05 (MW-49)

As summarized above and highlighted in Table 4A, DRO and GRO were detected in exceedance of their respective CGWSLs in all TEL area wells sampled during both 2020 semiannual events.

DRO and GRO concentrations in all TEL area wells have exhibited a stable trend over at least the four most recent sampling events with occasional fluctuations, as shown in the COC concentration plots included in Appendix D.

Volatile Organic Compounds, TEL

In 2020, groundwater samples were collected from wells located in and near the TEL for analysis of VOCs. VOC results that exceeded their respective CGWSL in TEL wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
TEL	<i>First Semiannual Event (June 2020)</i>				
	Benzene	0.00500	4	3	0.600 (MW-49)
	1,2,4-TMB	0.0560	4	1	0.115 (MW-49)
	MTBE	0.100	4	1	0.148 (MW-49)
	<i>Second Semiannual Event (October 2020)</i>				
	Benzene	0.00500	3	2	0.404 (MW-49)
	1,2,4-TMB	0.0560	3	2	0.0763 (MW-49)
	MTBE	0.100	3	1	0.196 (MW-49)

As summarized above and highlighted in Table 4A, benzene, 1,2,4-trimethylbenzene (1,2,4-TMB), and MTBE were detected in exceedance of their respective CGWSLs in TEL wells during both 2020 sampling events. No other VOC was detected above its respective CGWSL during either semiannual event.



The 2020 VOC results of groundwater in TEL area wells were consistent with historical results. As shown in the COC concentration plots included in Appendix D, concentrations of target VOCs in TEL area wells exhibited stable trends over time despite occasional fluctuations, with the following exceptions:

- MTBE concentrations have overall increased in MW-49 since 2013 after declining between 2009 and 2013. MTBE in this well appeared to be stabilizing between April 2009 and June 2020 (ranging from 0.138 mg/L to 0.160 mg/L) at levels similar to the 2013 maximum (0.160 mg/L), but increased slightly to a historical maximum of 0.196 mg/L in October 2020. MTBE concentrations in MW-49 will be reviewed again in 2021.
- Total xylenes concentrations in TEL-3 increased from 0.0142 mg/L in October 2019 to 0.0505 mg/L in October 2020, which is the historical maximum in this well. However, concentrations in this well remain below the total xylenes CGWSL of 0.620 mg/L. Total xylenes concentrations in this well have fluctuated over time and will be review again in 2021.

Total Metals, TEL

Groundwater samples were collected from wells located in and near the TEL for analysis of the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium). In addition, groundwater sample collected from MW-49 were analyzed for the expanded total metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium). Total metal results that exceeded their respective CGWSL in TEL wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
TEL	<i>First Semiannual Event (June 2020)</i>				
	Arsenic	0.0100	4	1	0.0120 (TEL-1)
	Chromium	0.0500	4	1	0.125 (TEL-4)
	Manganese	0.200	4	1	1.19 (TEL-4 FD)
	<i>Second Semiannual Event (October 2020)</i>				
	Chromium	0.0500	3	1	0.106 (TEL-4)
	Manganese	0.200	3	2	1.24 V (TEL-4)

FD: Field Duplicate

V: The sample concentration is too high to evaluate accurate spike recoveries.

As summarized above and highlighted in Table 4B, chromium, and manganese were detected in exceedance of their respective CGWSLs in TEL wells during both 2020 sampling events. Arsenic was detected above its CGWSL in one TEL well during the first 2020 semiannual sampling event. No other total metal was detected above its respective CGWSL during either semiannual event.

The 2020 total metal results in TEL wells were generally consistent with historical results. Groundwater concentrations of target COC arsenic in TEL area wells are overall stable to declining, despite occasional fluctuations, as shown in the COC concentration plots included in Appendix D. Arsenic concentrations in TEL-1 overall increased since 2015, but concentrations



remain below historical maximum concentrations for this well, and concentrations have been stable over the six most recent sampling events.

Cyanide, TEL

Groundwater samples collected from MW-49 during both 2020 semiannual events were analyzed for cyanide. In October 2020, cyanide was detected below the CGWSL of 0.200 mg/L, at an estimated concentration of 0.0121 J mg/L, for the first time since at least April 2018. Concentrations of cyanide will be reviewed again in 2021.

Water Quality Parameters, TEL

Chloride, fluoride, sulfate, and TDS were detected at concentrations in exceedance of their respective CGWSLs in groundwater samples from various TEL area wells, as highlighted in Table 4C. The reported concentrations of these constituents in 2020 were overall consistent with historical results. Nitrate/nitrite was not detected above the CGWSL in any TEL area well, which is consistent with historical results. No CGWSLs are applicable for calcium, potassium, or sodium. Analytical results of these analytes in all TEL area wells were consistent with historical results.

5.3.3 Evaporation Ponds Analytical – Results

Groundwater monitoring is ongoing beneath the inactive EPs. Analytical results of groundwater samples collected from EP wells in 2020 indicate COCs are present in groundwater above their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics and Gasoline Range Organics, EPs

In 2020, groundwater samples were collected from the following EP wells during each semiannual event for analysis of DRO and GRO, unless noted otherwise:

- First Semiannual Event (42 wells): MW-1R (DRO only), MW-2A, MW-3, MW-4A, MW-5A, MW-6A, MW-7A, MW-10, MW-11A, MW-15, MW-18A (DRO only), MW-22A, MW-70, MW-72, MW-73, MW-74, MW-75, MW-76, MW-77, MW-78, MW-79, MW-80, MW-81, MW-82, MW-83, MW-84, MW-86, MW-87, MW-88, MW-120, MW-121, MW-122, MW-123, MW-124, OCD-1R, OCD-2A, OCD-3, OCD-4, OCD-5, OCD-6, OCD-7AR, and OCD-8A.
- Second Semiannual Event (31 wells): MW-2A, MW-3, MW-4A, MW-5A, MW-7A, MW-10, MW-18A (DRO only), MW-22A, MW-70, MW-74, MW-75, MW-76, MW-79, MW-83, MW-84, MW-86, MW-87, MW-88, MW-120, MW-121, MW-122, MW-123, MW-124, OCD-1R, OCD-2A, OCD-3, OCD-4, OCD-5, OCD-6, OCD-7AR, and OCD-8A.



TPH results that exceeded their respective CGWSL in EP wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
Evaporation Ponds	<i>First Semiannual Event (June 2020)</i>				
	TPH-GRO	0.0101	40	28	2.88 J (MW-77)
	TPH-DRO-EP	0.0167	42	33	93.9 (MW-86)
	<i>Second Semiannual Event (October 2020)</i>				
	TPH-GRO	0.0101	30	23	4.06 JB (MW-3)
	TPH-DRO-EP	0.0167	31	31	80.2 (MW-86)

J: Indicates an estimated value

B: Analyte was also detected in the associated method blank.

As summarized above and highlighted in Table 4A, DRO and GRO were detected in exceedance of their respective CGWSLs in EP wells sampled during both 2020 semiannual events.

As shown in the COC concentration plots included in Appendix D, DRO and GRO concentrations in EP wells are overall stable over time despite occasional fluctuations, with the following exceptions:

- DRO concentrations in EP wells MW-3, MW-4A, MW-5B, MW-5C, MW-6A, MW-6B, MW-18A, MW-18B, MW-22B, MW-73 through MW-78, MW-80 through MW-84, OCD-7AR, and OCD-8A have exhibited an overall increasing trend since approximately 2011. However, DRO concentrations have exhibited a stable to decreasing trend over the four to twelve most recent sampling events in these wells. DRO concentrations in these wells will be reviewed again in 2021.
- DRO and GRO concentrations have been overall increasing in OCD-5 since October 2016. GRO concentrations increased from 0.912 mg/L in October 2019 to 1.09 mg/L in June 2020, which is the historical maximum for this well. GRO decreased in October 2020 to 0.724 mg/L. DRO has exhibited a stable trend over the three most recent sampling events. DRO and GRO concentrations in OCD-5 will be reviewed again in 2021.
- GRO concentrations increased from April 2019 to June 2020 in wells EP wells MW-77, MW-81, and MW-82. However, the June 2020 concentrations remain below the historical maximum for each well except for MW-77, which increased to a historical maximum of 2.88 J mg/L.

Apparent GRO concentration increases shown on the COC concentration plots included in Appendix D for EP wells MW-78, MW-84, MW-86, and MW-122 in 2020 are attributed to elevated detection limits. GRO was not detected in these wells in 2020 above the plotted elevated detection limits of 1.57 mg/L (MW-78 and MW-122), 6.28 mg/L (MW-86) and 3.14 mg/L (MW-84).



Volatile Organic Compounds, EPs

In 2020, groundwater samples collected from the following EP wells during each semiannual event were analyzed for VOCs:

- First Semiannual Event (42 wells): MW-1R, MW-2A, MW-3, MW-4A, MW-5A, MW-6A, MW-7A, MW-10, MW-11A, MW-15, MW-18A, MW-22A, MW-70, MW-72, MW-73, MW-74, MW-75, MW-76, MW-77, MW-78, MW-79, MW-80, MW-81, MW-82, MW-83, MW-84, MW-86, MW-87, MW-88, MW-120, MW-121, MW-122, MW-123, MW-124, OCD-1R, OCD-2A, OCD-3, OCD-4, OCD-5, OCD-6, OCD-7AR, and OCD-8A.
- Second Semiannual Event (31 wells): MW-2A, MW-3, MW-4A, MW-5A, MW-7A, MW-10, MW-18A, MW-22A, MW-70, MW-74, MW-75, MW-76, MW-79, MW-83, MW-84, MW-86, MW-87, MW-88, MW-120, MW-121, MW-122, MW-123, MW-124, OCD-1R, OCD-2A, OCD-3, OCD-4, OCD-5, OCD-6, OCD-7AR, and OCD-8A.

VOC results that exceeded their respective CGWSL in EP wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
Evaporation Ponds	<i>First Semiannual Event (June 2020)</i>				
	Benzene	0.00500	42	1	0.0242 (MW-86)
	Methylene chloride	0.00500	42	2	0.018 J (MW-3)
	TCE	0.00500	42	1	0.022 (MW-6A)
	<i>First Semiannual Event (October 2020)</i>				
	Benzene	0.00500	31	1	0.0313 (MW-86)

J: Indicates an estimated value

As summarized above and highlighted in Table 4A, benzene and trichloroethene (TCE) were detected in exceedance of their respective CGWSLs in an EP well during at least one 2020 sampling event. Additionally, methylene chloride was detected in two EP wells (MW-3 and MW-6A) at estimated concentrations above the CGWSL in June 2020, but the results are not considered confirmed exceedances as methylene chloride is a common laboratory contaminant and it was not detected in the field duplicate collected from MW-3. The methylene chloride results are summarized and highlighted in Appendix C. No other VOC was detected above its respective CGWSL during either semiannual event.

The 2020 analytical results of VOCs in groundwater samples collected from EP wells were generally consistent with historical results with exceptions listed below. As shown in the COC concentration plots included in Appendix D, concentrations of target VOCs in EP wells are stable to declining over time, with the following exceptions:

- Well MW-86 was not sampled between April 2008 and October 2019 due to the presence of PSH at a thickness ≥ 0.03 feet. Benzene was detected in MW-86 at 0.0242 mg/L in June 2020 and 0.0313 mg/L in October 2020, which are the first exceedances of benzene above the CGWSL in any EP well since at least October 2018. However, this well was sampled once after installation in March 2007 and benzene exceeded the



CGWSL at a concentration of 0.022 mg/L. Benzene concentrations in this well will be reviewed again in 2021.

- TCE was detected in MW-6A in June 2020 at a concentration of 0.0217 mg/L. This is the first detection of TCE in this well since at least April 2017. TCE concentrations in this well will be reviewed again in 2021.

Total Metals, EPs

In 2020, groundwater samples were collected from the following EP wells during each semiannual event for analysis of the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium):

- First Semiannual Event (42 wells): MW-1R, MW-2A, MW-3, MW-4A, MW-5A, MW-6A, MW-7A, MW-10, MW-11A, MW-15, MW-18A, MW-22A, MW-70, MW-72, MW-73, MW-74, MW-75, MW-76, MW-77, MW-78, MW-79, MW-80, MW-81, MW-82, MW-83, MW-84, MW-86, MW-87, MW-88, MW-120, MW-121, MW-122, MW-123, MW-124, OCD-1R, OCD-2A, OCD-3, OCD-4, OCD-5, OCD-6, OCD-7AR, and OCD-8A.
- Second Semiannual Event (31 wells): MW-2A, MW-3, MW-4A, MW-5A, MW-7A, MW-10, MW-18A, MW-22A, MW-70, MW-74, MW-75, MW-76, MW-79, MW-83, MW-84, MW-86, MW-87, MW-88, MW-120, MW-121, MW-122, MW-123, MW-124, OCD-1R, OCD-2A, OCD-3, OCD-4, OCD-5, OCD-6, OCD-7AR, and OCD-8A.

In addition, groundwater samples collected from wells MW-18A, MW-86, and OCD-8A were analyzed for the expanded total metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium). Total metal results that exceeded their respective CGWSL in EP wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
Evaporation Ponds	First Semiannual Event (June 2020)				
	Arsenic	0.0100	42	23	0.270 (MW-75)
	Boron	0.750	3	2	1.88 (MW-18A)
	Chromium	0.0500	42	2	0.126 (MW-78)
	Iron	1.00	42	29	9.81 (OCD-7AR)
	Manganese	0.200	42	41	4.60 (MW-79)
	Selenium	0.0500	42	1	0.151 (MW-74)
	Second Semiannual Event (October 2020)				
	Arsenic	0.0100	31	18	0.320 (MW-75)
	Boron	0.750	3	2	1.98 (MW-18A)
	Iron	1.00	31	20	10.4 (OCD-7AR)
	Manganese	0.200	31	29	4.98 (MW79)

As summarized above and highlighted in Table 4B, arsenic, boron, chromium, iron, manganese, and selenium were detected in exceedance of their respective CGWSLs in EP wells during at



least one 2020 sampling event. No other total metal was detected above its respective CGWSL during either semiannual event.

The 2020 analytical results of total metals in groundwater samples collected from EP wells were generally consistent with historical results, with the following exceptions:

- Arsenic concentrations in MW-7A increased from 0.0178 mg/L in June 2020 to 0.0373 mg/L in October 2020, which is below the historical maximum for this well. Arsenic concentrations in this well have fluctuated occasionally over time and will be reviewed again in 2021.
- Arsenic concentrations in MW-78 increased from 0.00686 mg/L in April 2019 to 0.0237 mg/L in October 2020, which is below the historical maximum for this well. Arsenic concentrations in this well have fluctuated occasionally over time and will be reviewed again in 2021.
- Arsenic concentrations in MW-84 increased over the four most recent sampling events from 0.0809 mg/L in April 2019 to 0.187 mg/L in October 2020, which is the historical maximum for this well. Arsenic concentrations in this well have fluctuated occasionally over time and will be reviewed again in 2021.
- Iron concentrations have fluctuated up to two orders of magnitude in many EP wells over time. Iron concentrations in EP wells during the 2020 semiannual sampling events were generally consistent with historical results except in MW-18A, MW-78, MW-82, and OCD-1R. Iron concentrations in these wells increased during the June 2020 semiannual event to the first CGWSL exceedance since at least April 2018. Concentrations in both wells decreased to below the CGWSL in October 2020.

Concentrations of target COC arsenic in EP wells are overall stable despite occasional fluctuations, except in wells discussed above, as shown in the COC concentration plots included in Appendix D.

Cyanide, EPs

Groundwater samples collected from EP wells MW-18A, MW-86, and OCD-8A during both 2020 semiannual events were analyzed for cyanide. Cyanide was detected below the CGWSL in well MW-86 during the October 2020 sampling event at an estimated concentration of 0.00261 J mg/L. Cyanide was not detected above the method detection limit or the CGWSL in groundwater samples collected from any other EP wells during either semiannual event.

Water Quality Parameters, EPs

In 2020, groundwater samples were collected from the following EP wells during each semiannual event for analysis of water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite [as nitrogen]):

- First Semiannual Event (42 wells): MW-1R, MW-2A, MW-3, MW-4A, MW-5A, MW-6A, MW-7A, MW-10, MW-11A, MW-15, MW-18A, MW-22A, MW-70, MW-72, MW-73, MW-



74, MW-75, MW-76, MW-77, MW-78, MW-79, MW-80, MW-81, MW-82, MW-83, MW-84, MW-86, MW-87, MW-88, MW-120, MW-121, MW-122, MW-123, MW-124, OCD-1R, OCD-2A, OCD-3, OCD-4, OCD-5, OCD-6, OCD-7AR, and OCD-8A.

- Second Semiannual Event (26 wells): MW-2A, MW-3, MW-4A, MW-5A, MW-7A, MW-10, MW-11A, MW-18A, MW-22A, MW-74, MW-75, MW-76, MW-79, MW-83, MW-84, MW-86, MW-120, MW-121, MW-122, MW-123, MW-124, OCD-1R, OCD-5, OCD-6, OCD-7AR, and OCD-8A.

No CGWSLs are applicable for calcium, potassium, or sodium. Chloride, fluoride, nitrate/nitrite, sulfate, and TDS were detected at concentrations in exceedance of their respective CGWSLs in groundwater samples from various EP wells, as highlighted in Table 4C. The reported concentrations of these constituents in 2020 were overall consistent with historical results.

5.3.4 Three Mile Ditch – Analytical Results

Groundwater monitoring is ongoing along the inactive TMD. Analytical results of groundwater samples collected from TMD wells in 2020 indicate COCs are present in groundwater above their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics and Gasoline Range Organics, TMD

In 2020, groundwater samples were collected from the following TMD wells during each semiannual event for analysis of DRO:

- First Semiannual Event (11 wells): MW-8, MW-16, MW-20, MW-21, MW-25, MW-26, MW-27, MW-46R, MW-68, MW-71, and MW-89.
- Second Semiannual Event (2 wells): MW-21 and MW-46R.

In addition, groundwater samples collected from wells MW-8 and MW-21 were analyzed for GRO. TPH results that exceeded their respective CGWSL in TMD wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
TMD	<i>First Semiannual Event (June 2020)</i>				
	TPH-DRO	0.0858	11	3	0.218 (MW-89)
	TPH-GRO	0.0101	2	2	0.300 (MW-8)
	<i>Second Semiannual Event (October 2020)</i>				
	TPH-DRO	0.0858	2	2	0.163 (MW-21)
	TPH-GRO	0.0101	1	1	0.492 (MW-21)

As summarized above and highlighted in Table 4A, DRO and GRO were detected in exceedance of their respective CGWSLs in TMD wells sampled in at least one 2020 semiannual event.



As shown in the COC concentration plots included in Appendix D, DRO concentrations have exhibited an overall increasing trend since 2013 in TMD wells MW-8, MW-16, MW-20, MW-21, MW-25, MW-26, MW-27, MW-68, and MW-89. However, the DRO concentrations in these wells have exhibited a stable to decreasing trend over at least the five most recent sampling events. DRO concentrations in these wells will be reviewed again in 2021.

As shown in the COC concentration plots included in Appendix D, GRO concentrations have exhibited an overall increasing trend since 2014 in TMD wells MW-8 and MW-21. Reported GRO concentrations in 2020 increased in well MW-8 from 0.127 mg/L in April 2019 to 0.300 mg/L in June 2020 but remain below the historical maximum of 0.585 mg/L observed in April 2017. GRO concentrations increased in well MW-21 from 0.229 mg/L in October 2019 to 0.284 mg/L in June 2020 to 0.492 mg/L in October 2020, which is the historical maximum for this well. GRO concentrations in both these wells will be reviewed again in 2021.

Volatile Organic Compounds, TMD

In 2020, groundwater samples collected from the following TMD wells during each semiannual event were analyzed for VOCs:

- First Semiannual Event (12 wells): MW-8, MW-16, MW-20, MW-21, MW-25, MW-26, MW-27, MW-46R, MW-68, MW-71, MW-89, and NP-1.
- Second Semiannual Event (3 wells): MW-21, MW-46R, and NP-1.

VOC results that exceeded their respective CGWSL in TMD wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
TMD	<i>First Semiannual Event (June 2020)</i>				
	MTBE	0.100	12	3	0.216 (NP-1)
	<i>Second Semiannual Event (October 2020)</i>				
	MTBE	0.100	3	2	0.243 (MW-21)

As summarized above and highlighted in Table 4A, MTBE was detected in exceedance of its CGWSL in TMD wells during both 2020 sampling events. No other VOC was detected above its respective CGWSL during either semiannual event.

The 2020 VOC results for groundwater samples collected from TMD wells were generally consistent with historical results. As shown in the COC concentration plots included in Appendix D, concentrations of target VOCs in TMD wells are overall stable, except for MTBE in wells MW-8, MW-21, and NP-1, which are discussed below:

- MTBE concentrations in MW-8 increased over the five most recent sampling events and exceeded the CGWSL for the first time in June 2020 at a concentration of 0.149 mg/L, which is the historical maximum for this well.



- MTBE concentrations in MW-21 have exhibited an overall increasing trend since October 2013 and exceeded the CGWSL during both 2020 semiannual sampling events. Concentrations decreased slightly from 0.217 mg/L in October 2019 to 0.128 mg/L in June 2020 but increased to 0.243 mg/L in October 2020, which is the historical maximum for this well.
- MTBE concentrations in NP-1 have overall increased since November 2014 but have exhibited a stable to decreasing trend since 2017 despite seasonal fluctuations.

MTBE concentrations in these wells will be reviewed again in 2021.

Total Metals, TMD

In 2020, groundwater samples were collected from the following TMD wells during each semiannual event for analysis of the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium):

- First Semiannual Event (11 wells): MW-8, MW-16, MW-20, MW-21, MW-25, MW-26, MW-27, MW-46R, MW-68, MW-71, and MW-89.
- Second Semiannual Event (2 wells): MW-21 and MW-46R.

In addition, the groundwater sample collected from TMD well MW-71 during the first 2020 semiannual event was analyzed for the expanded total metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium). Total metal results that exceeded their respective CGWSL in TMD wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
TMD	<i>First Semiannual Event (June 2020)</i>				
	Manganese	0.200	11	5	0.906 (MW-25)
	Selenium	0.0500	11	2	0.0626 (MW-8)
	Uranium	0.0300	1	1	0.0698 (MW-71)

As summarized above and highlighted in Table 4B, manganese, selenium and uranium were detected in exceedance of their respective CGWSLs in TMD wells during the first 2020 sampling event. Total metals were not detected above the CGWSL during the second 2020 sampling event. No other total metal was detected above its respective CGWSL during either semiannual event.

The 2020 analytical results of total metals in groundwater samples collected from TMD wells were generally consistent with historical results, with the following exceptions:

- Selenium concentrations in TMD wells MW-8, MW-27, and MW-68 have increased over the four most recent sampling events conducted from April 2019 through June 2020. Selenium concentrations remain below the CGWSL in MW-27 and MW-68. Selenium exceeded the CGWSL in June 2020 for the first time since at least April 2017, at a concentration of 0.0626 mg/L.



- Selenium concentrations in MW-21 were detected above the CGWSL in June 2020 for the first time since at least April 2018, at a concentration of 0.0521 mg/L, which is the historical maximum for this well since at least April 2018. Selenium concentrations decreased in October 2020 to 0.0429 mg/L, which is below the CGWSL.

Concentrations of target COC arsenic in TMD wells are overall stable, as shown in the COC concentration plots included in Appendix D.

Cyanide, TMD

Cyanide was not detected above the method detection limit or the CGWSL in the groundwater sample collected from TMD well MW-71 during the first 2020 semiannual event.

Water Quality Parameters, TMD

In 2020, groundwater samples were collected from the following TMD wells during each semiannual event for analysis of water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite [as nitrogen]):

- First Semiannual Event (12 wells): MW-8, MW-16, MW-20, MW-21, MW-25, MW-26, MW-27, MW-46R, MW-68, MW-71, MW-89, and NP-1.
- Second Semiannual Event (2 wells): MW-21 and MW-46R.

No CGWSLs are applicable for calcium, potassium, or sodium. Chloride, fluoride, nitrate/nitrite, sulfate, and TDS were detected at concentrations in exceedance of their respective CGWSLs in groundwater samples from TMD wells, as highlighted in Table 4C. The reported concentrations of these constituents in 2020 were consistent with historical results, with the following exceptions:

- Chloride concentrations in MW-8 increased over the four most recent sampling events from 334 mg/L in April 2017 to 599 mg/L in June 2020.
- Chloride concentrations in MW-68 exceeded the CGWSL in June 2020 for the first time since at least April 2017. Chloride concentrations increased from 145 mg/L in April 2019 to 354 mg/L in June 2020.

5.3.5 North Refinery Area – Analytical Results

Groundwater monitoring is ongoing in the northern portion of the active refinery (i.e., North Refinery Area). Groundwater samples were collected from the following North Refinery Area wells listed below during the 2020 semiannual sampling events:

- First Semiannual Event (22 wells): MW-23, MW-29, MW-39, MW-40, MW-41, MW-42, MW-43, MW-59, MW-60, MW-61, MW-62, MW-90, MW-91, MW-93, MW-95, MW-96, MW-98, RW-7, RW-9, RW-10, RW-16B, and RW-17A.
- Second Semiannual Event (11 wells): MW-23, MW-29, MW-39, MW-43, MW-60, MW-61, MW-62, MW-62R, MW-90, MW-96, and MW-98.



Groundwater samples collected from these North Refinery Area wells were analyzed for DRO, GRO (except for RW-16B), VOCs, the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium), and water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite). In addition, groundwater samples collected from wells MW-43 and MW-60 were analyzed for cyanide and the expanded total metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium).

Analytical results of groundwater samples collected from wells located within the North Refinery Area in 2020 indicate COCs are present in groundwater above their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics and Gasoline Range Organics, North Refinery Area

In 2020, groundwater samples were collected from North Refinery Area wells for analysis of TPH DRO and GRO. TPH results that exceeded their respective CGWSL in North Refinery Area wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
North Refinery	<i>First Semiannual Event (June 2020)</i>				
	TPH-DRO	0.0858	22	22	13.0 (MW-23)
	TPH-GRO	0.0101	21	21	36.2 (MW-91)
	<i>Second Semiannual Event (October 2020)</i>				
	TPH-DRO	0.0858	11	11	17.9 (MW-23)
	TPH-GRO	0.0101	11	11	71.6 (MW-96)

As summarized above and highlighted in Table 4A, DRO and GRO were detected in exceedance of their respective CGWSLs in all North Refinery Area wells sampled during both 2020 semiannual events.

As shown in the COC concentration plots included in Appendix D, DRO concentrations in North Refinery Area wells MW-29, MW-41, MW-59, MW-67, MW-91, MW-92, MW-95, MW-96, RW-7, RW-9, RW-10, RW-16 and RW-17 have exhibited an overall increasing trend since approximately 2010-2014. However, the DRO concentrations have exhibited a stable to decreasing trend over at least the six most recent sampling events in all of these wells except MW-29, MW-41, MW-59, RW-7, and RW-16. DRO concentrations in MW-29, MW-41, RW-7, and RW-16 in 2020 were less than historical maximum concentrations. DRO concentrations increased to a historical maximum of 2.97 mg/L in well MW-59 during the first 2020 semiannual event (this well is only sampled on an annual basis). DRO concentrations in the remaining North Refinery Area wells were overall stable over time.

GRO analytical results in groundwater samples collected from North Refinery Area wells in 2020 were generally consistent with historical results except in well MW-59, MW-91, MW-95, and MW-96, as follows:



- GRO concentrations in MW-59 increased from 0.0605 mg/L in April 2019 to 0.302 mg/L in June 2020, which is the historical maximum for this well.
- GRO concentrations in MW-91 increased from 13.8 mg/L in April 2019 to 34.8 B mg/L in October 2019 to 36.2 mg/L in June 2020, which is the historical maximum for this well.
- GRO concentrations in MW-96 increased from 25.7 mg/L in October 2019 to 30.4 mg/L in June 2020 to 71.6 mg/L in October 2020, which is the historical maximum for this well.

GRO concentrations in these wells will be reviewed again in 2021. As shown in the COC concentration plots included in Appendix D, GRO concentrations in all other North Refinery Area wells are overall stable over time with occasional fluctuations.

Volatile Organic Compounds, North Refinery Area

In 2020, groundwater samples were collected from North Refinery Area wells for analysis of VOCs. VOC results that exceeded their respective CGWSL in North Refinery Area wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
North Refinery	<i>First Semiannual Event (June 2020)</i>				
	Benzene	0.00500	22	10	4.12 (MW-91)
	Toluene	1.00	22	1	6.95 (MW-91)
	Ethylbenzene	0.700	22	2	1.85 (MW-91)
	o-Xylene	0.193	22	1	0.649 (MW-91)
	Total Xylenes	0.620	22	3	2.50 (MW-91)
	MTBE	0.100	22	1	37.6 (MW-96)
	Naphthalene	0.0300	22	6	0.255 (MW-98)
	1,2,4-TMB	0.0560	22	6	0.646 (MW-98)
	1,3,5-TMB	0.0600	22	3	0.110 (MW-98)
	<i>Second Semiannual Event (October 2020)</i>				
	Benzene	0.00500	11	7	9.06 (MW-43)
	Ethylbenzene	0.700	11	1	0.788 (MW-98)
	Total Xylenes	0.620	11	4	1.88 (MW-98)
	MTBE	0.100	11	1	40.5 (MW-96)
	Naphthalene	0.0300	11	6	0.207 (MW-98)
	1,2,4-TMB	0.0560	11	5	0.371 (MW-98)
	1,3,5-TMB	0.0600	11	2	0.0820 (MW-98)

As summarized above and highlighted in Table 4A, benzene, toluene, ethylbenzene, o-xylene, total xylenes, MTBE, naphthalene, 1,2,4-TMB, and 1,3,5-trimethylbenzene (1,3,5-TMB) were detected in exceedance of their respective CGWSLs in North Refinery Area wells during at least one 2020 semiannual sampling event. No other VOC was detected above its respective CGWSL during either semiannual event.

The 2020 VOC results in groundwater samples collected from North Refinery Area wells were generally consistent with historical results with exceptions listed below. As shown in the COC



concentration plots included in Appendix D, concentrations of target VOCs in North Refinery Area wells have exhibited an overall stable trend over time despite occasional fluctuations, with the following exceptions:

- Benzene and MTBE concentrations in MW-41 increased over the three to four most recent sampling events but remain below their respective historical maximums in this well. Benzene increased from not detected above the method detection limit in April 2018 to 0.00758 mg/L in April 2019 to 0.0173 mg/L in June 2020. MTBE increased from 0.00380 mg/L in April 2017 to 0.0254 mg/L in June 2020.
- Benzene, ethylbenzene, toluene, MTBE, and naphthalene concentrations have overall increased in MW-43 since 2012. However, concentrations of these target VOCs have exhibited a stable to decreasing trend since October 2015. Benzene, ethylbenzene, toluene, MTBE, and naphthalene concentrations in MW-43 have decreased or remained stable during both semiannual sampling events in 2020.
- MTBE and naphthalene concentrations in MW-59 increased from not detected above the method detection limit in April 2019 to 0.00350 mg/L and 0.00202 J mg/L, respectively, in June 2020. This is the first time these VOCs have been detected above the method detection limit in this well and is the historical maximum concentration; however, both concentrations remain below the CGWSL.
- MTBE concentrations in MW-62 increased over the four most recent sampling events from not detected above the method detection limit of 0.00734 mg/L in April 2019 to 0.0836 mg/L in October 2020, which is the historical maximum in this well. MTBE concentrations have fluctuated over time in this well and remain below the CGWSL.
- Ethylbenzene, toluene, and total xylenes have generally increased in MW-91 over the four most recent sampling events. Ethylbenzene and toluene concentrations during the June 2020 sampling event remain below historical maximum concentrations in this well. The June 2020 total xylenes concentration of 2.50 mg/L is the historic maximum concentration reported in this well. MW-91 was not sampled in October 2020 due to the presence of PSH at a thickness ≥ 0.03 feet.
- Benzene concentrations in MW-93 increased from 0.673 mg/L in April 2019 to 1.21 mg/L in June 2020 but remains below the historical maximum of 2.70 mg/L in April 2009. Benzene is overall stable to decreasing in this well over time.
- MTBE concentrations in RW-9 increased from 0.00439 mg/L in April 2019 to 0.0674 mg/L in June 2020, which is the historic maximum for this well. However, MTBE concentrations remain below the CGWSL.

Total Metals, North Refinery Area

In 2020, groundwater samples were collected from North Refinery Area wells for analysis of total metals. Total metal results that exceeded their respective CGWSL in North Refinery Area wells are summarized in the table below:



Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
North Refinery	<i>First Semiannual Event (June 2020)</i>				
	Arsenic	0.0100	22	5	0.0426 (MW-62)
	Barium	2.00	22	1	9.81 (MW-23)
	Boron	0.750	2	1	0.781 (MW-43)
	Iron	1.00	22	2	2.57 (RW-7)
	Manganese	0.200	22	7	0.857 (MW-41)
	Selenium	0.0500	22	1	0.0922 (RW-16B)
	<i>Second Semiannual Event (October 2020)</i>				
	Arsenic	0.0100	11	3	0.079 (MW-62R)
	Barium	2.00	11	1	12.3 (MW-23)
	Boron	0.750	2	1	0.770 (MW-43)
	Iron	1.00	11	1	2.90 (MW-29)
	Manganese	0.200	11	4	1.09 (MW-62R)

As summarized above and highlighted in Table 4B, arsenic, barium, boron, iron, manganese, and selenium were detected in exceedance of their respective CGWSLs in North Refinery wells during at least one 2020 semiannual sampling event. No other total metal was detected above its respective CGWSL during either semiannual event.

The 2020 analytical results of total metals in groundwater samples collected from North Refinery Area wells were generally consistent with historical results, with the following exceptions:

- Barium concentrations in MW-23 increased from 9.81 mg/L in June 2020 to 12.3 mg/L in October 2020, which is the historical maximum since at least April 2018
- Arsenic concentrations in MW-29 have overall increased since April 2019 but appear to be stabilizing over the last three sampling events. Arsenic concentrations have occasionally fluctuated above and below the CGWSL over time in this well and remain below the historical maximum of 0.0429 mg/L in April 2008.
- Arsenic concentrations in MW-41 increased from 0.00673 mg/L in April 2019 to 0.0107 mg/L in June 2020, which is the first exceedance of the CGWSL since April 2012, but below the historical maximum concentration of 0.0195 mg/L in December 2006.
- Arsenic concentrations in MW-62 have overall increased since October 2018 and have exceeded the CGWSL during the last three sampling events. Arsenic concentrations were reported at 0.0426 mg/L in June 2020 and 0.0451 mg/L in October 2020, which is the historical maximum reported in this well. Arsenic concentrations have occasionally fluctuated above and below the CGWSL in this well over time and will be reviewed again in 2021.
- Arsenic, iron, and manganese concentrations in MW-62R exceeded their respective CGWSLs in October 2020. As this well was installed in September 2020, the October



semiannual event was the first groundwater data collected for this well. Total metals concentrations in this well will be reviewed again in 2021.

- Manganese concentrations in MW-93 in June 2020 exceeded the CGWSL for the first time since April 2017, at a concentration of 0.208 mg/L. This is the historical maximum for this well since at least April 2017.
- Arsenic concentrations in RW-16 increased over the three most recent sampling events from 0.009922 mg/L in April 2018 to 0.0267 mg/L in June 2020, which is the historical maximum for this well. Arsenic concentrations in this well will be reviewed again in 2021. Iron concentrations in RW-16 increased from 0.0160 J mg/L in April 2019 to 1.10 mg/L in June 2020, which is the first CGWSL exceedance in this well since at least April 2017. Iron concentrations have fluctuated above and below the CGWSL across the facility over time.

As shown in the COC concentration plots included in Appendix D, concentrations of target COC arsenic in North Refinery Area wells have fluctuated above and below the CGWSL over time in wells MW-23, MW-29, MW-39, MW-41 through MW-43, MW-60, MW-62, MW-67, MW-90, MW-93, RW-1, RW-2, RW-7, and RW-16. Arsenic concentrations are overall stable to declining, despite occasional fluctuating, with the exceptions noted above.

Cyanide, North Refinery Area

Groundwater samples collected from North Refinery Area wells MW-43 and MW-60, during the 2020 semiannual events were analyzed for cyanide. Cyanide was not detected above the method detection limit of the CGWSL in groundwater samples collected from these wells.

Water Quality Parameters, North Refinery Area

In 2020, groundwater samples were collected from North Refinery Area wells for analysis of water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite [as nitrogen]).

No CGWSLs are applicable for calcium, potassium, or sodium. Nitrate/nitrite did not exceed the CGWSL in any of the North Refinery Area wells during both 2020 semiannual events. Chloride, fluoride, sulfate, and TDS were detected at concentrations in exceedance of their respective CGWSLs in groundwater samples from various North Refinery Area wells, as highlighted in Table 4C. The reported concentrations of these constituents were generally consistent with historical results except sulfate concentrations in MW-95 exceeded the CGWSL for the first time since at least April 2017. Sulfate concentrations increased from 561 mg/L in April 2019 to 682 mg/L in June 2020. Water quality parameter concentrations have fluctuated over time in this well.



5.3.6 South Refinery Area – Analytical Results

Groundwater monitoring is ongoing in the southern portion of the active refinery (i.e., South Refinery Area). Analytical results of groundwater samples collected from wells located within the South Refinery Area in 2020 indicate COCs are present in groundwater above their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics and Gasoline Range Organics, South Refinery Area

Groundwater samples were collected from the following South Refinery Area wells during each 2020 semiannual event for analysis of DRO and GRO, unless noted otherwise:

- First Semiannual Event (16 wells): MW-28, MW-50 (DRO only), MW-52, MW-64, MW-66, MW-99, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-109, MW-110, MW-139, and RW-4 (DRO only).
- Second Semiannual Event (13 wells): MW-28, MW-50 (DRO only), MW-52, MW-64, MW-66, MW-101, MW-102, MW-104, MW-105, MW-106, MW-109, MW-110, and MW-139.

TPH results that exceeded their respective CGWSL in South Refinery Area wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
South Refinery	<i>First Semiannual Event (June 2020)</i>				
	TPH-DRO	0.0858	16	16	14.6 (MW-106)
	TPH-GRO	0.0101	14	13	102 (MW-64)
	<i>Second Semiannual Event (October 2020)</i>				
	TPH-DRO	0.0858	13	13	16.5 (MW-106)
	TPH-GRO	0.0101	12	11	94.8 (MW-64)

As summarized above and highlighted in Table 4A, DRO and GRO were detected in exceedance of their respective CGWSLs in South Refinery Area wells sampled during both 2020 semiannual events.

As shown in the COC concentration plots included in Appendix D, DRO concentrations in South Refinery Area wells MW-28, MW-50, MW-99, MW-101, MW-104, MW-106, and RW-4 have exhibited an overall increasing trend since approximately 2011 with occasional fluctuations. However, DRO concentrations have exhibited a stable to decreasing trend in these wells over at least the five most recent sampling events, in wells other than MW-101. DRO concentrations in MW-101 increased slightly from 4.85 mg/L in June 2020 to 6.07 mg/L in October 2020, which is the historical maximum for this well. DRO concentrations in these wells will be reviewed again in 2021.

As shown in the COC concentration plots included in Appendix D, GRO concentrations in South Refinery Area wells have exhibited a stable trend over time despite occasional fluctuations,



except in MW-48 and MW-101. GRO concentrations in MW-48 exhibited an overall increasing trend between 2014 and 2018 but was stable to decreasing between April 2018 and October 2019. MW-48 was not sampled in 2020 due to the presence of PSH at a thickness ≥ 0.03 feet. GRO concentrations in MW-101 increased from 0.553 mg/L in June 2020 to 5.37 mg/L in October 2020. GRO concentrations in these wells will be reviewed again in 2021.

Volatile Organic Compounds, South Refinery Area

Groundwater samples were collected from the following South Refinery Area wells during each 2020 semiannual event for analysis of VOCs:

- First Semiannual Event (17 wells): MW-28, MW-50, MW-52, MW-64, MW-66, MW-99, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-109, MW-110, MW-139, RA-313, and RW-4.
- Second Semiannual Event (13 wells): MW-28, MW-50, MW-52, MW-64, MW-66, MW-101, MW-102, MW-104, MW-105, MW-106, MW-109, MW-110, and MW-139.

VOC results that exceeded their respective CGWSL in North Refinery Area wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
South Refinery	<i>First Semiannual Event (April 2020)</i>				
	Benzene	0.00500	17	11	27.5 (MW-64)
	Toluene	1.00	17	1	9.93 (MW-64)
	Ethylbenzene	0.700	17	1	1.76 (MW-64)
	o-Xylene	0.193	17	1	1.03 (MW-64)
	Total Xylenes	0.620	17	1	4.29 (MW-64)
	MTBE	0.100	17	5	1.62 (MW-66)
	Naphthalene	0.0300	17	2	0.167 (MW-66)
	1,2,4-TMB	0.0560	17	4	0.453 J (MW-64)
	1,3,5-TMB	0.0600	17	1	0.076 J (MW-64)
	<i>Second Semiannual Event (October 2020)</i>				
	Benzene	0.00500	13	9	27.2 (MW-64)
	Toluene	1.00	13	1	8.09 (MW-64)
	Ethylbenzene	0.700	13	1	1.55 (MW-64)
	o-Xylene	0.193	13	1	0.794 (MW-64)
	Total Xylenes	0.620	13	1	3.1 (MW-64)
	MTBE	0.100	13	5	1.9 (MW-66)
	Naphthalene	0.0300	13	3	0.127 J (MW-102)
	1,2,4-TMB	0.0560	13	4	0.252 (MW-64)

J: Indicates an estimated value

As summarized above and highlighted in Table 4A and Appendix C, benzene, toluene, ethylbenzene, o-xylene, total xylenes, MTBE, naphthalene, 1,2,4-TMB, and 1,3,5-TMB were detected in exceedance of their respective CGWSLs in South Refinery Area wells during at



least one 2020 sampling event. No other VOC was detected above its respective CGWSL during either semiannual event.

The 2020 analytical results of VOCs in groundwater samples collected from South Refinery Area wells were generally consistent with historical results with exceptions listed below.

- Benzene, ethylbenzene, naphthalene, o-xylene, toluene, and total xylenes increased in MW-101 in October 2020. Benzene concentrations increased from 0.000430 J mg/L in October 2019 to 0.00438 mg/L in June 2020 to 2.32 mg/L in October 2020, which is below the historical maximum but the first exceedance of the CGWSL since April 2017. Ethylbenzene increased from not detected above the method detection limit in October 2019 to 0.000302 J mg/L in June 2020 to 0.0180 mg/L in October 2020, which is below the historical maximum and the CGWSL. Naphthalene, o-xylene, toluene, and total xylenes increased from not detected above their respective detection limits in June 2020 to 0.0180 mg/L, 0.0000814 J mg/L, 0.00858 mg/L, and 0.0779 mg/L, respectively, which are each below their respective CGWSLs.
- 1,2,4-TMB and 1,3,5-TMB concentrations in MW-101 increased from not detected above their respective method detection limit in June 2020 to 0.0254 mg/L and 0.00284 mg/L, respectively, in October 2020, which are the first detections of 1,2,4-TMB and 1,3,5-TMB in this well since at least April 2018.
- Ethylbenzene concentrations in MW-105 increased from 0.0282 J mg/L in June 2020 to 0.584 mg/L in October 2020, which is below the historical maximum and CGWSL. Ethylbenzene has fluctuated above and below the CGWSL in this well over time.
- Benzene concentrations increased in MW-106 from 9.39 mg/L in June 2020 to 14.9 mg/L in October 2020, which is slightly below the historical maximum of 15.0 mg/L in September 2009. Benzene concentrations have been generally stable in this well since 2015 and will be reviewed again in 2021.

As shown in the COC concentration plots included in Appendix D, concentrations of target VOCs in South Refinery Area wells have exhibited overall stable trends over time despite occasional fluctuations, with the exceptions listed above.

Total Metals, South Refinery Area

In 2020, groundwater samples were collected from the following South Refinery Area wells during each semiannual event for analysis of the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium):

- First Semiannual Event (16 wells): MW-28, MW-50, MW-52, MW-64, MW-66, MW-99, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-109, MW-110, MW-139, and RW-4.
- Second Semiannual Event (13 wells): MW-28, MW-50, MW-52, MW-64, MW-66, MW-101, MW-102, MW-104, MW-105, MW-106, MW-109, MW-110, and MW-139.



In addition, groundwater samples collected from South Refinery Area wells MW-28, MW-52, and MW-66 were also analyzed for the expanded metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium) during both 2020 semiannual events. Total metals results that exceeded their respective CGWSL in South Refinery Area wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
South Refinery	<i>First Semiannual Event (June 2020)</i>				
	Arsenic	0.0100	16	5	0.0735 (MW-101)
	Barium	1.00	16	3	8.69 (MW-102)
	Boron	0.750	3	2	1.32 (MW-28)
	Iron	1.00	16	1	3.42 (MW-101)
	Manganese	0.200	16	7	1.92 (MW-110)
	<i>Second Semiannual Event (October 2020)</i>				
	Arsenic	0.0100	13	6	0.0386 (MW-110)
	Barium	1.00	13	3	8.81 (MW-102)
	Boron	0.750	3	2	1.32 (MW-28)
	Iron	1.00	13	1	1.75 (MW-101)
	Manganese	0.200	13	6	2.01 (MW-110)

As summarized above and highlighted in Table 4B, arsenic, barium, boron, iron, and manganese were detected in exceedance of their respective CGWSLs in South Refinery Area wells during both 2020 sampling events. No other total metal was detected above its respective CGWSL during either semiannual event.

The 2020 analytical results of total metals in groundwater in South Refinery Area wells were generally consistent with historical results, with the following exceptions:

- Arsenic concentrations in MW-106 increased over the four most recent sampling events from 0.00725 mg/L in April 2019 to 0.0255 mg/L in October 2020, which is the historical maximum for this well. Arsenic concentrations in this well will be reviewed again in 2021.
- Barium concentrations in MW-105 increased from 0.983 mg/L in June 2020 to 8.29 mg/L in October 2020, which is the maximum concentration in this well since at least April 2018. Barium has fluctuated above and below the CGWSL in this well.

Concentrations of target COC arsenic in South Refinery Area wells are overall stable with occasional fluctuations, as shown in the COC concentration plots included in Appendix D. Arsenic concentrations have fluctuated above and below the CGWSL over time in wells KWB-6, MW-28, MW-48, MW-52, MW-65, MW-66, MW-99, MW-104 through MW-107, MW-109, and MW-110.

Cyanide, South Refinery Area

Groundwater samples collected from South Refinery Area wells MW-28, MW-52, and MW-66 were analyzed for cyanide during both 2020 semiannual events. Cyanide was not detected



above the method detection limit or the CGWSL in groundwater samples collected from these wells.

Water Quality Parameters, South Refinery Area

In 2020, groundwater samples were collected from the following South Refinery Area wells during each semiannual event for analysis of water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite [as nitrogen]):

- First Semiannual Event (17 wells): MW-28, MW-50, MW-52, MW-64, MW-66, MW-99, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-109, MW-110, MW-139, RA-313, and RW-4.
- Second Semiannual Event (13 wells): MW-28, MW-50, MW-52, MW-64, MW-66, MW-101, MW-102, MW-104, MW-105, MW-106, MW-109, MW-110, and MW-139.

No CGWSLs are applicable for calcium, potassium, or sodium. Chloride, fluoride, nitrate/nitrite, sulfate, and TDS were detected at concentrations in exceedance of their respective CGWSLs in groundwater samples collected from at least one South Refinery Area well as highlighted in Table 4C. The reported concentrations of these constituents exhibit an overall stable trend with occasional fluctuations across the South Refinery Area, with the following exceptions:

- Nitrate/nitrite concentrations in MW-50 increased from 1.53 mg/L in October 2019 to 74.6 mg/L in June 2020 to 78.5 mg/L in October 2020. The 2020 results were the first exceedances of the CGWSL of 10.0 mg/L since at least April 2018
- Nitrate/nitrite concentrations in MW-52 have overall increased since April 2018 and continue to exceed the CGWSL in 2020; however, concentrations have generally stabilized during the past four semiannual sampling events since April 2019.

5.3.7 Field East of Refinery – Analytical Results

Groundwater monitoring is ongoing in the Field East of Refinery located between the refinery and the EPs. Analytical results of groundwater samples collected from wells located within the Field East of Refinery in 2020 indicate COCs are present in groundwater above their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics and Gasoline Range Organics, Field East of Refinery

Groundwater samples were collected from the following wells located within the Field East of Refinery during each 2020 semiannual event for analysis of DRO and GRO, unless noted otherwise:

- First Semiannual Event (17 wells): KWB-1A (DRO only), KWB-7 (DRO only), KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-130, MW-131, MW-134, MW-135, and RW-12R (DRO only).



- Second Semiannual Event (15 wells): KWB-1A (DRO only), KWB-7 (DRO only), KWB-8 (DRO only), KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-113, MW-125, MW-126A, MW-126B, MW-130, MW-134, and MW-135.

TPH results that exceeded their respective CGWSL Field East of Refinery wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
Field East of Refinery	<i>First Semiannual Event (June 2020)</i>				
	TPH-DRO	0.0858	17	10	7.29 (KWB-7)
	TPH-GRO	0.0101	14	8	8.68 (MW-131)
	<i>Second Semiannual Event (October 2020)</i>				
	TPH-DRO	0.0858	15	11	6.8 (KWB-8)
	TPH-GRO	0.0101	12	8	3.3 (MW-113)

As summarized above and highlighted in Table 4A, DRO and GRO were detected in exceedance of their respective CGWSLs in Field East of Refinery wells sampled during both 2020 semiannual events.

As shown in the COC concentration plots included in Appendix D, DRO analytical results in groundwater samples collected from wells located in the Field East of Refinery in 2020 were overall consistent with historical results, with the following exceptions:

- DRO concentrations in wells KWB-1A, KWB-1C, KWB-7, KWB-11A, MW-58 and MW-125 have overall increased since approximately 2011-2013 with occasional fluctuations. However, DRO concentrations have stabilized in these wells over at least the three most recent sampling events except in KWB-7, KWB-11B, and MW-58. Well MW-58 was not sampled in 2020 due to the presence of PSH at a thickness ≥ 0.03 feet. DRO concentrations in KWB-7 increased to a historical maximum of 7.29 mg/L in June 2020 but decreased to 1.05 mg/L in October 2020, which is consistent with historical results. DRO concentrations in KWB-11B increased from not detected above the method detection limit of 0.0247 mg/L in October 2019 to 0.0514 mg/L in June 2020 to 0.0956 mg/L in October 2020, which is below the historical maximum for this well. DRO concentrations in these wells will be reviewed again in 2021.
- DRO concentrations in KWB-8 increased to 6.8 mg/L in October 2020, which is the historical maximum for this well. However, this well has only been sampled four times since installation and was most previously sampled in October 2017, due to the presence of PSH presence at a thickness ≥ 0.03 feet from April 2018 through June 2020. DRO concentrations in this well will be reviewed again in 2021.

GRO analytical results in groundwater samples collected from wells located in the Field East of Refinery in 2020 were overall consistent with historical results, as shown in the COC concentration plots included in Appendix D, with the following exceptions:

- GRO concentrations in well KWB-11A have overall increased since 2012 but have generally stabilized over the twelve most recent sampling events (i.e., since October



2014). GRO concentrations in June 2020 increased to a historical maximum of 0.444 mg/L but decreased to 0.0992 J mg/L in October 2020.

- GRO concentrations in MW-111 increased from 1.37 mg/L in October 2019 to 3.86 mg/L in June 2020, which is the historical maximum for this well. This well was not sampled in October 2020 due to the presence of PSH at a thickness ≥ 0.03 feet.
- GRO concentrations in wells MW-113 have overall increased since 2015. However, concentrations are stabilizing over the four most recent sampling events despite fluctuations. GRO concentrations decreased from 4.54 mg/L in October 2019 to 1.30 mg/L in June 2020 and increased slightly to 3.30 mg/L in October 2020. DRO concentrations will be reviewed again in 2021.

Volatile Organic Compounds, Field East of Refinery

Groundwater samples were collected from the following wells located in the Field East of Refinery during each 2020 semiannual event for analysis of VOCs:

- First Semiannual Event (20 wells): KWB-1A, KWB-7, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-130, MW-131, MW-134, MW-135, RA-4196, RA-4798, RW-12R, and RW-18A.
- Second Semiannual Event (21 wells): KWB-1A, KWB-7, KWB-8, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-113, MW-125, MW-126A, MW-126B, MW-130, MW-134, MW-135, MW-145, MW-146, MW-147, MW-148, RA-4196, and RA-4798.

VOC results that exceeded their respective CGWSL in Field East of Refinery wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
Field East of Refinery	<i>First Semiannual Event (June 2020)</i>				
	1,2,4-TMB	0.0560	20	2	0.110 (MW-131)
	Benzene	0.00500	20	5	0.907 (MW-131)
	MTBE	0.100	20	2	2.91 (MW-131)
	O-Xylene	0.193	20	1	0.242 (MW-131)
	Total Xylenes	0.620	20	1	0.786 (MW-131)
	<i>Second Semiannual Event (October 2020)</i>				
	1,2,4-TMB	0.0560	21	2	0.833 (KWB-8)
	1,3,5-TMB	0.0600	21	1	0.191 J (KWB-8)
	Benzene	0.00500	21	3	17.8 (KWB-8)
	Ethylbenzene	0.700	21	1	2.89 (KWB-8)
	Naphthalene	0.0300	21	1	0.539 (KWB-8)
	Toluene	1.00	21	1	1.08 (KWB-8)
	Total Xylenes	0.620	21	1	4.19 (KWB-8)

As summarized above and highlighted in Table 4A, benzene, MTBE, naphthalene, o-xylene, toluene, total xylenes, 1,2,4-TMB, and 1,3,5-TMB were detected in exceedance of their



respective CGWSLs in Field East of Refinery wells during at least one 2020 sampling event. No other VOC was detected above its respective CGWSL during either semiannual event.

The 2020 analytical results of VOCs in groundwater samples collected from wells located in the Field East of Refinery were generally consistent with historical results with exceptions listed below. As shown in the COC concentration plots included in Appendix D, concentrations of target VOCs in wells located in the Field East of Refinery have wells have exhibited stable to fluctuating trends over time, with the following exceptions:

- Benzene, naphthalene, toluene, total xylenes, and 1,2,4-TMB concentrations in KWB-7 increased in June 2020 but decreased to concentrations consistent with historical trends in October 2020. June 2020 concentrations of benzene, naphthalene, toluene, and total xylenes were below each respective historical maximum. The 1,2,4-TMB concentration of 0.0876 mg/L in June 2020 was the first exceedance of the CGWSL and maximum in this well since at least October 2017; 1,2,4-TMB decreased to below the CGWSL at 0.00287 mg/L in October 2020. VOC concentrations in this well will be reviewed again in 2021.
- Benzene, ethylbenzene, naphthalene, toluene, total xylenes, 1,2,4-TMB, and 1,3,5-TMB concentrations overall increased in KWB-8 from October 2016 to the following concentrations in October 2020: 17.8 mg/L (benzene), 2.89 mg/L (ethylbenzene), 0.539 J mg/L (naphthalene), 1.08 mg/L (toluene), 4.19 mg/L (total xylenes), 0.833 mg/L (1,2,4-TMB), and 0.191 J mg/L (1,3,5-TMB). . The October 2020 results for these VOCs were the historical maximum for this well except for toluene. However, this well has only been sampled four times since installation and has not been sampled since October 2017 due to the presence of PSH at a thickness ≥ 0.03 feet from April 2018 through June 2020. VOC concentrations in this well will be reviewed again in 2021.
- Benzene concentrations increased in KWB-11B increased from not detected above the method detection limit in June 2020 to 0.00192 mg/L in October 2020, which is below the CGWSL but the first detection above the method detection limit and historical maximum for this well. MTBE concentrations in KWB-11B increased over the four most recent sampling events from 0.000774 J mg/L in April 2019 to 0.00156 mg/L in October 2020, which is two orders of magnitude below the CGWSL but the historical maximum for this well.
- Benzene concentrations increased in RW-12R from 0.0764 mg/L in April 2019 to 0.154 mg/L in June 2020, which is the first exceedance of the CGWSL in this will since 2017 but below the historical maximum for this well.
- Benzene, ethylbenzene, total xylenes, and 1,3,5-TMB concentrations in MW-111 increased over at least the three most recent sampling events conducted from October 2018 to June 2020. Benzene increased over the five most recent sampling events, from 0.0216 J mg/L in April 2018 to 0.439 mg/L in June 2020. Ethylbenzene increased over the four most recent sampling events, from not detected above the method detection limit in October 2018 to 0.0408 mg/L in June 2020. Total xylenes increased over the four most recent sampling events, from not detected above the method detection limit in



October 2018 to 0.0148 J mg/L in June 2020. 1,3,5-TMB increased from not detected above the method detection limit in April 2019 to 0.00436 J mg/L in June 2020. Each is the respective historical maximum concentration for this well. MW-111 was not sampled in October 2020 due to the presence of PSH at a thickness ≥ 0.03 feet. Benzene concentrations in this well will be reviewed again in 2021.

- Benzene, ethylbenzene, toluene, total xylenes, and naphthalene concentrations in MW-113 have overall increased since April 2019. Concentrations of each of these VOCs decreased from October 2019 to June 2020 and increased in October 2020. However, concentrations of these VOCs remain below their respective historical maximums and October 2019 concentrations. VOC concentrations in this well will be reviewed again in 2021.
- MTBE was detected above the method detection limit for the first time in MW-126A in June 2020 and October 2020. MTBE concentrations increased from not detected above a method detection limit in October 2019 to 0.000248 J mg/L in June 2020 to 0.000502 mg/L in October 2020, which is the historical maximum for this well but several orders of magnitude below the CGWSL.
- MTBE concentrations in MW-130 has overall increased over the five most recent sampling events since October 2018. MTBE concentrations increased from 0.000976 J mg/L in October 2018 to 0.00424 mg/L in June 2020, which is the historical maximum in this well, but decreased to 0.00328 mg/L in October 2020. MTBE concentrations remain at least an order of magnitude below the CGWSL.
- Naphthalene, toluene, and total xylenes concentrations in MW-131 have overall increased since October 2016 but remain below their respective historical maximum concentrations reported in April 2014. Concentrations of o-xylenes and 1,2,4-TMB have overall increased in this well since April 2017 but decreased between October 2019 and June 2020. MW-131 was not sampled in October 2020 due to the presence of PSH at a thickness ≥ 0.03 feet.
- Benzene was detected above the method detection limit for the first time in MW-135 in October 2020. Benzene concentrations increased from not detected above the method detection limit in June 2020 to 0.00250 mg/L in October 2020, which is the historical maximum for this well but at least an order of magnitude below the CGWSL.
- MTBE was detected in newly installed wells MW-145 and MW-148 at concentrations of 0.000507 J mg/L and 0.000183 J mg/L, respectively, which are several orders of magnitude below the CGWSL. No other VOC was detected above the method detection limit in these wells.

Total Metals, Field East of Refinery

In 2020, groundwater samples were collected from the following wells located in the Field East of Refinery during each 2020 semiannual event for analysis of the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium):



- First Semiannual Event (18 wells): KWB-1A, KWB-7, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-130, MW-131, MW-134, MW-135, RW-12R, and RW-18A.
- Second Semiannual Event (15 wells): KWB-1A, KWB-7, KWB-8, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-113, MW-125, MW-126A, MW-126B, MW-130, MW-134, and MW-135.

In addition, groundwater samples collected from wells KWB-1A, KWB-7, KWB-11A, KWB-11B, KWB-12A and KWB-12B during both 2020 semiannual events and well KWB-8 during the second 2020 semiannual event were analyzed for the expanded metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium). Total metals results that exceeded their respective CGWSL in Field East of Refinery wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
Field East of Refinery	<i>First Semiannual Event (June 2020)</i>				
	Arsenic	0.0100	18	3	0.0241 (MW-131)
	Barium	2.00	18	1	2.39 (MW-131)
	Chromium	0.0500	18	1	0.0557 (RW-12R)
	Iron	1.00	18	5	9.23 (MW-111)
	Manganese	0.200	18	9	2.57 (KWB-7)
	<i>Second Semiannual Event (October 2020)</i>				
	Arsenic	0.0100	15	1	0.0157 (MW-57)
	Iron	1.00	15	4	6.56 (MW-57)
	Manganese	0.200	15	7	2.15 (KWB-7)

As summarized above and highlighted in Table 4B, arsenic, barium, chromium, iron, and manganese were detected in exceedance of their respective CGWSLs in Field East of Refinery wells during at least one 2020 sampling event. No other total metal was detected above its respective CGWSL during either semiannual event.

The 2020 groundwater analytical results of total metals in wells located in the Field East of Refinery were generally consistent with historical results, with the following exceptions:

- Arsenic, cobalt, chromium, iron, lead, and nickel concentrations in KWB-8 increased in October 2020 to historical maximums for this well since at least October 2016. However, only iron exceeded the CGWSL in this well in October 2020. There is limited historical data for this well due to the historical presence of PSH. Total metals concentrations in this well will be reviewed again in 2021.
- Iron concentrations have fluctuated up to an order of magnitude in Field East of Refinery wells over time. Iron concentrations in 2020 were generally consistent with historical results wells except in MRW-18A. Iron concentrations in well RW-18A increased from 0.0191 mg/L in April 2019 to 3.06 mg/L in June 2020, which is the only CGWSL exceedance in this well since at least April 2017.



As shown in the COC concentration plots included in Appendix D, concentrations of target COC arsenic in wells located in the Field East of Refinery are overall stable, except in KWB-8, as discussed above. Arsenic concentrations have fluctuated above and below the CGWSL over time in wells KWB-7, KWB-11A, MW-57, MW-58, MW-111, MW-127, and MW-135.

Cyanide, Field East of Refinery

Groundwater samples collected from wells KWB-1A, KWB-7, KWB-11A, KWB-11B, KWB-12A and KWB-12B during both 2020 semiannual events and well KWB-8 during the second 2020 semiannual event were analyzed for cyanide. Cyanide was detected in both the parent and duplicate sample collected from well KWB-12B during the October 2020 sampling event at concentrations of 0.00596 mg/L and 0.0565 mg/L, respectively, which are least an order of magnitude below the CGWSL of 0.200 mg/L. Cyanide was not detected above the method detection limit or the CGWSL in groundwater samples collected from any other Field East of Refinery wells during either semiannual event.

Water Quality Parameters, Field East of Refinery

In 2020, groundwater samples were collected from the following wells located in the Field East of Refinery during each semiannual event for analysis of water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite [as nitrogen]):

- First Semiannual Event (20 wells): KWB-1A, KWB-7, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-130, MW-131, MW-134, MW-135, RA-4196, RA-4798, RW-12R, and RW-18A.
- Second Semiannual Event (17 wells): KWB-1A, KWB-7, KWB-8, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-113, MW-125, MW-126A, MW-126B, MW-130, MW-134, MW-135, RA-4196, and RA-4798 .

No CGWSLs are applicable for calcium, potassium, or sodium. Chloride, fluoride, nitrate/nitrite, sulfate, and TDS were detected at concentrations in exceedance of their respective CGWSLs in groundwater samples from at least one well within the Field East of Refinery as highlighted in Table 4C. The reported concentrations of these constituents exhibit an overall stable trend, with some seasonal fluctuations between the first and second historical semiannual events, with the following exceptions:

- Sulfate concentrations increased in KWB-8 from 417 mg/L in October 2017 to 1,660 mg/L in October 2020. However, this well has not been sampled since October 2017 due to the presence of PSH at a thickness ≥ 0.03 feet from April 2018 through June 2020.
- Nitrate/nitrite concentrations in KWB-12B increased from 7.15 mg/L (duplicate sample) in October 2019 to 11.5 mg/L in the parent sample in June 2020 (duplicate sample concentration was 8.27 mg/L). Nitrate/nitrite concentrations in KWB-12B decreased to 6.35 mg/L (parent sample) and 7.25 mg/L (duplicate sample) in October 2020.



5.3.8 Areas Cross-Gradient and Up-Gradient of Refinery – Analytical Results

Groundwater monitoring is ongoing in areas both cross-gradient and up-gradient of the refinery. Cross-gradient wells KWB-13 (located south of the refinery), and RA-3156 (located southeast of the refinery); and up-gradient wells UG-1, UG-2, UG-3R, and UG-4 (all located to the west of the refinery), were sampled during the first 2020 semiannual event. Cross-gradient well MW-136 (located north of the refinery) was sampled during both 2020 semiannual events. Analytical results of groundwater samples collected from cross-gradient and up-gradient wells in 2020 indicate COCs are present in groundwater above their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics and Gasoline Range Organics, Areas Cross-gradient and Up-gradient of Refinery

In 2020, groundwater samples were collected from the following cross-gradient and up-gradient wells during each semiannual event for analysis of DRO and GRO, unless noted otherwise:

- First Semiannual Event (six wells): KWB-13 (DRO only), MW-136, UG-1, UG-2, UG-3R, and UG-4.
- Second Semiannual Event (one well): MW-136.

TPH results that exceeded their respective CGWSL in cross-gradient and up-gradient wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
Cross- & Up-Gradient	First Semiannual Event (June 2020)				
	TPH-GRO	0.0101	5	2*	0.326 V3 (MW-136)
	TPH DRO	0.0858	6	1	0.0924 J (MW-136)
	Second Semiannual Event (October 2020)				
	TPH-GRO	0.0101	1	1	0.0320 J (MW-136)
	TPH DRO	0.0858	1	1	0.0873 JB (MW-136)

* Method detection limit exceeded CGWSL

J: Indicates an estimated value.

B: Analyte was also detected in the associated method blank.

V3: Biased high due to matrix interference

As shown in Table 4A, GRO and DRO were detected at concentrations in exceedance of the CGWSL during both 2020 semiannual events. As shown in the COC concentration plots included in Appendix D, DRO and GRO concentrations in cross-gradient and up-gradient wells are generally stable over time despite occasional fluctuations, with the following exceptions:

- GRO was detected above the method detection limit for the first time in up-gradient well UG-3R in June 2020 at 0.0421 J mg/L, which is above the CGWSL.
- GRO concentrations in cross-gradient well MW-136 increased from not detected above the method detection limit in April 2019 to 0.0731 JB mg/L in October 2019 to 0.326



mg/L in June 2020, which is the historical maximum for this well, and decreased to 0.0320 J mg/L in October 2020. The anomalously high result in June 2020 is likely biased high, as the internal standard exhibited poor recovery due to sample matrix interference.

- DRO concentrations in cross-gradient well MW-136 increased from 0.0254 mg/L in October 2019 to 0.0924 J mg/L in June 2020 and 0.0873 JB mg/L in October 2020. The 2020 results were the first exceedances of the CGWSL since October 2017, but they were less than the historical maximum. The October 2020 result may be attributable to laboratory source contributions as DRO was detected in the associated laboratory method blank.

Volatile Organic Compounds, Areas Cross-Gradient and Up-Gradient of Refinery

In 2020, groundwater samples collected from the following cross-gradient and up-gradient wells during each semiannual event were analyzed for VOCs:

- First Semiannual Event (seven wells): KWB-13, MW-136, RA-3156, UG-1, UG-2, UG-3R, and UG-4.
- Second Semiannual Event (one well): MW-136.

No VOCs were detected above their respective CGWSL during either 2020 semiannual event, as shown in Table 4A. The 2020 VOC results for groundwater samples collected from cross-gradient and up-gradient wells were consistent with historical results, except in cross-gradient wells KWB-13 and MW-136, as follows:

- Benzene and ethylbenzene concentrations in KWB-13 increased from not detected above the method detection limits in April 2019 to 0.000205 J mg/L and 0.00234 J mg/L, respectively, in June 2020. However, the 2020 results were less than the method detection limits during previous events and are at least an order of magnitude below their respective CGWSL.
- MTBE was detected above the method detection limit for the first time in MW-136 in October 2020 at 0.000122 J mg/L, which is several orders of magnitude below the CGWSL.

Total Metals, Areas Cross-Gradient and Up-Gradient of Refinery

In 2020, groundwater samples were collected from the following cross-gradient and up-gradient wells during each semiannual event for analysis of the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium) and the expanded metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium):

- First Semiannual Event (six wells): KWB-13, MW-136, UG-1, UG-2, UG-3R, and UG-4.
- Second Semiannual Event (one well): MW-136



Total metal results that exceeded their respective CGWSL in cross-gradient and up-gradient wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
Cross- & Up-Gradient	<i>First Semiannual Event (June 2020)</i>				
	Boron	0.750	6	1	1.02 (UG-4)
	Iron	1.00	7	1	4.41 (KWB-13)
	Uranium	0.0300	6	3	0.0639 (MW-136)
	<i>Second Semiannual Event (October 2020)</i>				
	Uranium	0.0300	1	1	0.0558 (MW-136)

As summarized above and highlighted in Table 4B, boron, iron, and uranium were detected in exceedance of their respective CGWSLs in cross-gradient and up-gradient wells during at least one 2020 sampling event. No other total metal was detected above its respective CGWSL during either semiannual event.

The 2020 analytical results of total metals in groundwater samples collected from cross-gradient and up-gradient wells were generally consistent with historical results, with the following exceptions:

- Arsenic, barium, cobalt, chromium, iron, lead, manganese, nickel, and vanadium concentrations increased over the four most recent sampling events conducted since April 2017. However, concentrations of all these metals except for iron remain below their respective CGWSL. Iron concentrations have historically exceeded the CGWSL in this well and have fluctuated across the facility.
- Uranium concentrations in UG-1 have increased slightly over the four most recent sampling events from 0.0262 mg/L in April 2017 to 0.0385 mg/L in June 2020. Uranium exceeded the CGWSL of 0.0300 mg/L in April 2019 and June 2020.

Concentrations of target COC arsenic in cross-gradient and up-gradient wells are overall stable despite occasional fluctuations, as shown in the COC concentration plots included in Appendix D.

Cyanide, Areas Cross-Gradient and Up-Gradient of Refinery

Cyanide was not detected above the CGWSL in groundwater samples collected from cross-gradient and up-gradient wells during either 2020 semiannual event.

Water Quality Parameters, Areas Cross-Gradient and Up-Gradient of Refinery

In 2020, groundwater samples were collected from the following cross-gradient and up-gradient wells during each semiannual event for analysis of water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite [as nitrogen]):

- First Semiannual Event (seven wells): KWB-13, MW-136, RA-3156, UG-1, UG-2, UG-3R, and UG-4.



- Second Semiannual Event (one well): MW-136.

No CGWSLs are applicable for calcium, potassium, or sodium. Chloride, fluoride, nitrate/nitrite, sulfate, and TDS were detected at concentrations in exceedance of their respective CGWSLs in cross-gradient and up-gradient wells, as highlighted in Table 4C. The reported concentrations of these constituents in 2020 were consistent with historical results, except nitrate/nitrite in cross-gradient well MW-136. Nitrate/nitrite concentrations in MW-136 increased from 2.38 mg/L in October 2019 to 13.2 mg/L in June 2020 to 14.4 mg/L in October 2020, which is the historical maximum for this well and the first exceedance of the CGWSL since April 2018.

5.3.9 RO Reject Fields – Analytical Results

The reject water from HFNR's RO system was historically discharged to agricultural fields located north of the refinery in accordance with the Discharge Permit, but discharge ceased in January 2019. These areas are referred to as the North and South RO Reject Fields. Groundwater samples were collected from the following six wells during both 2020 semiannual events:

- North RO Reject Field wells: MW-117, MW-118, and MW-119
- South RO Reject Field wells: MW-114, MW-115, and MW-116

Groundwater samples collected from these wells were all analyzed for GRO, DRO, the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium), and water quality parameters (calcium, chloride, fluoride, potassium, sodium, sulfate, TDS, and nitrate/nitrite).

Analytical results of groundwater samples collected from RO Reject Field wells in 2020 indicate COCs are present in groundwater above their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics and Gasoline Range Organics, RO Reject Discharge Fields

In 2020, groundwater samples were collected from wells located in and near the RO Reject Discharge Fields for analysis of TPH DRO and GRO. TPH results that exceeded their respective CGWSL in RO Reject Field wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
North & South RO Reject Fields	<i>First Semiannual Event (June 2020)</i>				
	TPH-DRO	0.0858	6	3	0.436 (MW-114)
	<i>Second Semiannual Event (October 2020)</i>				
	TPH-DRO	0.0858	6	5	0.663 (MW-114)

As summarized above and highlighted in Table 4A, DRO was detected in exceedance its CGWSL in RO Reject Field wells sampled during both 2020 semiannual events.



As shown in the COC concentration plots included in Appendix D, DRO concentrations in RO Reject Field wells increased over at least one 2020 semiannual sampling event, as follows:

- DRO concentrations in North RO Reject Field wells MW-117 and MW-119 increased from not detected above the method detection limit to exceeding the CGWSL in both June and October 2020. DRO concentrations in MW-117 increased from not detected above the method detection limit in October 2019 to 0.109 mg/L in June 2020 and then decreased slightly to 0.0997 JB mg/L in October 2020. The DRO results in MW-117 during the 2020 events were less than the historical maximum. DRO concentrations in MW-119 increased from not detected above the method detection limit in October 2019 to 0.376 mg/L in June 2020, which is the historical maximum concentration for this well. DRO concentrations then decreased slightly to 0.215 B mg/L in October 2020. However, the reported concentrations in MW-117 and MW-119 in October 2020 may be attributable to laboratory contributions as DRO was detected in the associated laboratory method blanks.
- DRO in well North RO Reject well MW-118 increased from not detected above the method detection limit in June 2020 to 0.0817 JB mg/L in October 2020, which is the historical maximum reported for this well. However, the reported increase is likely attributable to laboratory contributions as DRO was detected in the associated laboratory method blank.
- DRO concentrations in South RO Reject Field wells MW-114 and MW-115 increased from not detected above the method detection limit or below the CGWSL to exceeding the CGWSL in both June and October 2020 (MW-114) or October 2020 (MW-115). DRO concentrations in MW-114 increased from 0.0374 J mg/L in October 2019 to 0.436 mg/L in June 2020 to 0.663 mg/L in October 2020, which is the historical maximum for this well. DRO concentrations in MW-115 increased from not detected above the method detection limit in October 2019 to 0.0430 J mg/L in June 2020 to 0.222 B mg/L in October 2020, which is the historical maximum for this well. However, the reported increase in MW-115 in October 2020 is likely attributable to laboratory contributions as DRO was detected in the associated laboratory method blank.
- DRO concentrations in South RO Reject Field well MW-116 continue to fluctuate above and below the CGWSL.

GRO was not detected in any RO Reject Field well above the method detection limit in either 2020 semiannual event.

Volatile Organic Compounds, RO Reject Discharge Fields

VOCs were not detected above their respective CGWSLs in the six RO Reject Field wells sampled during both 2020 semiannual events. The 2020 VOC results in RO Reject Field wells are consistent with historical results, with the following exceptions:

- MTBE was detected for the first time above the method detection limit in June 2020 and October 2020 in North RO Reject Field well MW-117; however, concentrations remain two orders of magnitude below the CGWSL. MTBE concentrations increased from not



detected above the method detection limit in October 2019 to 0.000222 J mg/L in June 2020 to 0.00195 mg/L in October 2020.

- MTBE was detected for the first time above the method detection limit in June 2020 and October 2020 in South RO Reject Field wells MW-114 and MW-115; however, concentrations remain at least one order of magnitude below the CGWSL. In well MW-114, MTBE concentrations increased from not detected above the method detection limit in October 2019 to 0.00475 mg/L in June 2020 to 0.0112 mg/L in October 2020. In well MW-115, MTBE concentrations increased from increased from not detected above the method detection limit in October 2019 to 0.00126 mg/L in June 2020 to 0.00364 mg/L in October 2020.

Total Metals, RO Reject Discharge Fields

Groundwater samples were collected from wells located in the North and South RO Reject Fields for analysis of the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium). Total metal results that exceeded their respective CGWSL in North and South RO Reject Field wells are summarized in the table below:

Area	Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells > CGWSL	Max. Concentration mg/L (Well)
North & South RO Reject Fields	<i>First Semiannual Event (June 2020)</i>				
	Manganese	0.200	6	1	0.980 (MW-114)
	<i>Second Semiannual Event (October 2020)</i>				
	Manganese	0.200	6	1	0.925 (MW-114)

As summarized above and highlighted in Table 4B, manganese was detected in exceedance of its CGWSLs in RO Reject Field wells in one well during both 2020 semiannual events. No other total metal was detected above its respective CGWSL during either semiannual event.

The 2020 analytical results of total metals in groundwater samples collected from RO Reject Field wells were consistent with historical results. Concentrations of target COC arsenic in RO Reject Field wells are overall stable, as shown in the COC concentration plots included in Appendix D.

Cyanide, RO Reject Discharge Fields

Groundwater samples collected from RO Reject Field wells in 2020 were not analyzed for cyanide.

Water Quality Parameters, RO Reject Discharge Fields

Chloride, fluoride, sulfate, and TDS were detected at concentrations in exceedance of their respective CGWSLs in groundwater samples collected from some RO Reject Field wells, as highlighted in Table 4C. The reported concentrations of these constituents in 2020 were generally consistent with historical results. No CGWSLs are applicable for calcium, potassium, or sodium. The 2020 results of these analytes were consistent with historical results.



5.3.10 Semi Volatile Organic Compounds

In accordance with the SWMU/AOC Group 3 Rev 2 transmittal letter dated December 28, 2018, and NMED's subsequent response letter dated March 22, 2019, groundwater samples from select wells in the vicinity of SWMUs 20 and 22 (North Refinery and TEL wells) were analyzed for SVOCs by EPA Method 8270.

The two required rounds of SVOC analysis were scheduled to be completed during the 2019 semiannual events for wells that are sampled semiannually (MW-23, MW-43, MW-61, MW-62, MW-97, MW-137, MW-138, and TEL-4) and during the first semiannual events in 2019 and 2020 for wells that are sampled annually (MW-93, MW-95, RW-2R). Due to the presence of PSH at thicknesses ≥ 0.03 feet, groundwater samples were not collected from the following wells in at least one event in 2019 and were to be collected in 2020 in order to satisfy the required two rounds of SVOC sample collection: MW-97, MW-137, MW-138, and RW-2R. However, PSH was measured at a thickness ≥ 0.03 feet in wells MW-137, MW-138, and RW-2R during both 2020 semiannual events and groundwater samples were not collected for SVOC analysis from these wells. Well MW-97 was not sampled during the first 2020 semiannual event due to the presence of PSH at a thickness ≥ 0.03 feet and could not be located to gauge or sample during the second 2020 semiannual event due to construction in the area.

Groundwater samples were collected from wells listed below near SWMU 20 and SWMU 22 (North Refinery and TEL wells) during the first 2020 semiannual event for analysis of SVOCs.

- First Semiannual Event (two wells): MW-93 and MW-95.

No groundwater samples were collected for SVOC analysis during the second 2020 semiannual event. SVOC results that exceeded their respective CGWLs are summarized below:

Analyte	CGWSL (mg/L)	No. Wells Sampled	No. Wells >CGWSL	Max. Concentration mg/L (Well)
<i>First Semiannual Event (June 2020)</i>				
1-Methylnaphthalene	0.0300	2	1	0.0340 (MW-93)

As summarized above and highlighted in Table 4D, 1-methylnaphthalene was detected in exceedance of its CGWSLs during the first 2020 semiannual sampling event. No other SVOC was detected above its respective CGWSL.

SVOC sampling will be conducted during the April 2021 sampling event from wells MW-97, MW-137, MW-138, and RW-2R if PSH is not present at thicknesses ≥ 0.03 feet. All SVOC results will be evaluated in 2021 and recommendations for any future SVOC analysis will be provided in the 2021 annual update to the FWGMWP in June 2021.

5.3.11 Ethylene Dibromide (EDB)

In accordance with the SWMU/AOC Group 3 Rev 2 transmittal letter dated December 28, 2018, and NMED's subsequent response letter dated March 22, 2019, groundwater samples collected from wells with historical detections of 1,2-dichloroethane were analyzed for EDB by EPA Method 8011 in 2019. EDB was analyzed in groundwater samples collected from nine wells



during one of the 2019 semiannual sampling events and was not detected in any well. Monitoring well KWB-6 had historical detections of 1,2-dichloroethane but was not sampled in 2019 or 2020 due to the presence of PSH at a thickness ≥ 0.03 feet. Groundwater samples collected from well KWB-6 will be analyzed for EDB in 2021.



6.0 Remediation System Monitoring

The PCC Permit and Discharge Permit both require recovery of PSH present in the shallow groundwater within and adjacent to the refinery. PSH and impacted groundwater are continually recovered at the refinery from a system of recovery trenches and recovery wells. Additionally, PSH is manually recovered from wells not connected to the recovery system on a periodic basis. A summary of the recovery system, manual recovery activities, and recovery results are summarized in this section.

6.1 Recovery System

The system described below only includes the recovery wells/trenches that have infrastructure installed. Recovery trenches associated with wells RW-9, RW-10, RW-16, RW-17, and RW-18 have not been observed to contain measurable PSH and thus have never been included in a recovery system. RW-11 and RW-12R have not had any measurable PSH since the upgraded system was installed in 2012.

The recovery system consists of automated pumping of PSH and groundwater from recovery wells using dedicated groundwater and PSH pumps (both types of fluid pumps installed in each well). Pumps are installed, operated, and removed from each well based on PSH thicknesses and observed recovery during operation and maintenance (O&M) activities. The pumps are typically operated automatically, with remote data sensing and recording. Recovered PSH is pumped into centralized holding tanks, then pumped to Tank 49, associated with the wastewater treatment system, which then transfers the product to crude tank(s) (Tank 1225 or 437) for processing within the refinery. Recovered groundwater is pumped to the nearest process wastewater sump and directed to the process wastewater treatment system. Thus, recovered PSH is recycled into the refinery process while groundwater is treated to remove residual hydrocarbons.

O&M of the recovery system was conducted throughout 2020 on an approximate weekly basis. O&M activities included gauging recovery wells RW-1R, RW-2R, RW-4R, RW-5R, RW-6R, RW-7R, RW-8R, RW-12R, RW-13R, RW-14R, RW-15, RW-19, RW-20, and RW-22 in order to assess the effectiveness of the recovery system and to determine in which wells to install and operate PSH and groundwater pumps. Recovery system gauging results measured during 2020 O&M activities are summarized in Appendix F. Measurable PSH was not observed in RW-4R and RW-12R during 2020.

6.2 Manual Recovery

PSH was manually removed by bailing or pumping from wells in the Field East of Refinery and South Refinery areas on a periodic basis in 2020. These wells included KWB-8, KWB-10R, MW-111, MW-112, MW-127, MW-128, MW-131, MW-132, and MW-133 in the Field East of Refinery and KWB-4, KWB-5, KWB-6, and MW-107 in the South Refinery. Gauging and manual recovery results are summarized in Table 6.



Absorbent socks were also installed and replaced throughout 2020 in various area wells including MW-64, MW-65, MW-85, MW-86, MW-99, NCL-34A, KWB-4, KWB-7, KWB-8, KWB-11B, RW-17A, RW-17G, and TEL-3.

6.3 Estimated Volume of Fluids Recovered

Volumes of groundwater and PSH recovered by the recovery system during 2020 are summarized in Table 5 and additional recovery details are provided in Appendix F. An estimated 4,375,556 gallons of groundwater and an estimated 224,098 gallons of PSH were recovered through operation of the automated recovery system in 2020. The majority of recovered PSH during 2020 was from RW-14R (115,839 gallons) and RW-22 (33,299 gallons). Significant volumes of PSH (greater than 5,000 gallons) were also recovered from wells RW-1R, RW-5R, RW-6R, RW-7R, RW-8R, and RW-13R.

Volumes of PSH and groundwater manually recovered during 2020 are summarized in Table 6. An estimated 102 gallons of PSH and 168 gallons of groundwater were manually recovered in 2020. .



7.0 Conclusions

Conclusions based on the results of groundwater monitoring and remedial activities conducted during 2020 and comparison to historical results are discussed below.

Groundwater flow direction was generally consistent with previous monitoring events with flow predominantly east beneath the refinery and southeast beneath the EPs towards the Pecos River. Localized groundwater sinks are occasionally observed around various recovery wells due to active pumping of groundwater. Mounding at the RO reject fields continues despite cessation of discharge of RO reject water to the RO Reject Fields in January 2019.

The presence and distribution of PSH were generally consistent with previous monitoring results, with some fluctuations. PSH thicknesses across all areas of interest are overall stable to declining over time, with the exception in select wells (KWB-10R, MW-112, MW-127, and MW-128, MW-137, MW-138) located in the Field East of Refinery and North Refinery that are attributed to reductions in groundwater elevations. PSH thicknesses are inversely affected by fluctuations in groundwater elevations, which have generally decreased between 2017 and 2020. Historical minimum groundwater elevations were observed in October 2020 in most of the wells where PSH thicknesses increased during 2020.

Concentrations of COCs in groundwater have generally remained stable over time, although increasing trends were noted in select wells in specific areas of interest. The limited number of increasing COC concentration trends observed since approximately 2011-2014 have generally exhibited stabilizing trends over the most recent sampling events. During 2020 and previous years, the following COCs were detected in groundwater at concentrations in exceedance of their respective CGWSL:

- TPH GRO and DRO
- Select VOCs including target COCs benzene, toluene, ethylbenzene, xylenes, MTBE, and naphthalene
- Select total metals including target COC arsenic
- Water quality parameters chloride, fluoride, sulfate, TDS, and nitrate/nitrite

SVOCs were also detected in groundwater at concentrations in exceedance of their respective CGWLS in samples collected from select wells in the vicinity of SWMUs 20 and 22 (North Refinery wells). SVOC analysis was conducted in 2020 in accordance with the SWMU/AOC Group 3 Rev 2 transmittal letter dated December 28, 2018, and NMED's subsequent response letter dated March 22, 2019.

It should be noted that many of the concentrations of inorganic COCs (manganese, chloride, fluoride, nitrate/nitrite, sulfate, and TDS) depicted as "exceedances" in this report may actually be similar to and reflective of background groundwater concentrations, as detailed in the background evaluation that was submitted to NMED and OCD in September 2015 (Arcadis 2015b).



The PSH and groundwater recovery system operated throughout 2020. An estimated 4,375,556 gallons of groundwater and an estimated 224,098 gallons of PSH were recovered through operation of the automated recovery system in 2020.

According to the requirements of the updated PCC Permit, an updated FWGMWP will be submitted in June 2021.



8.0 References

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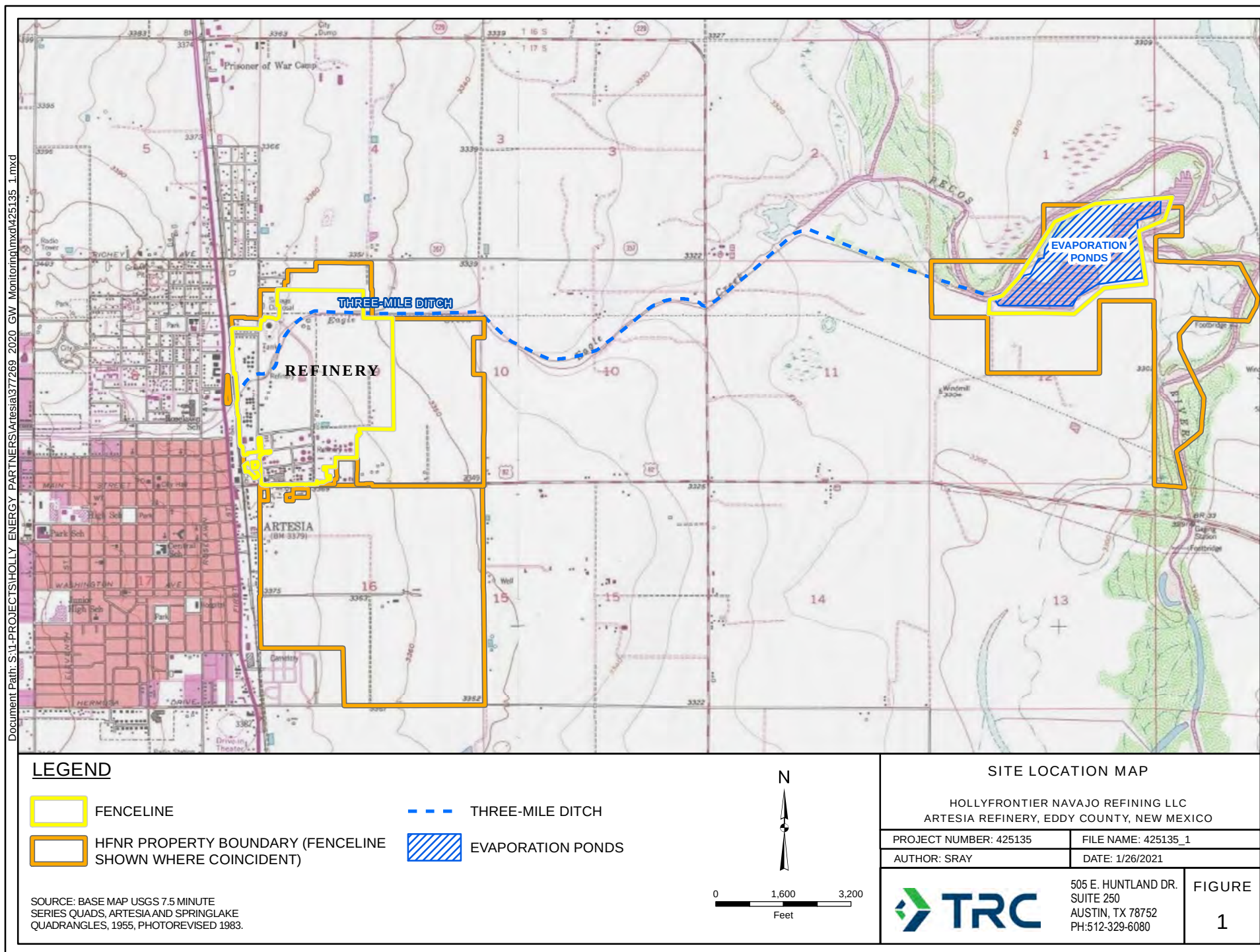
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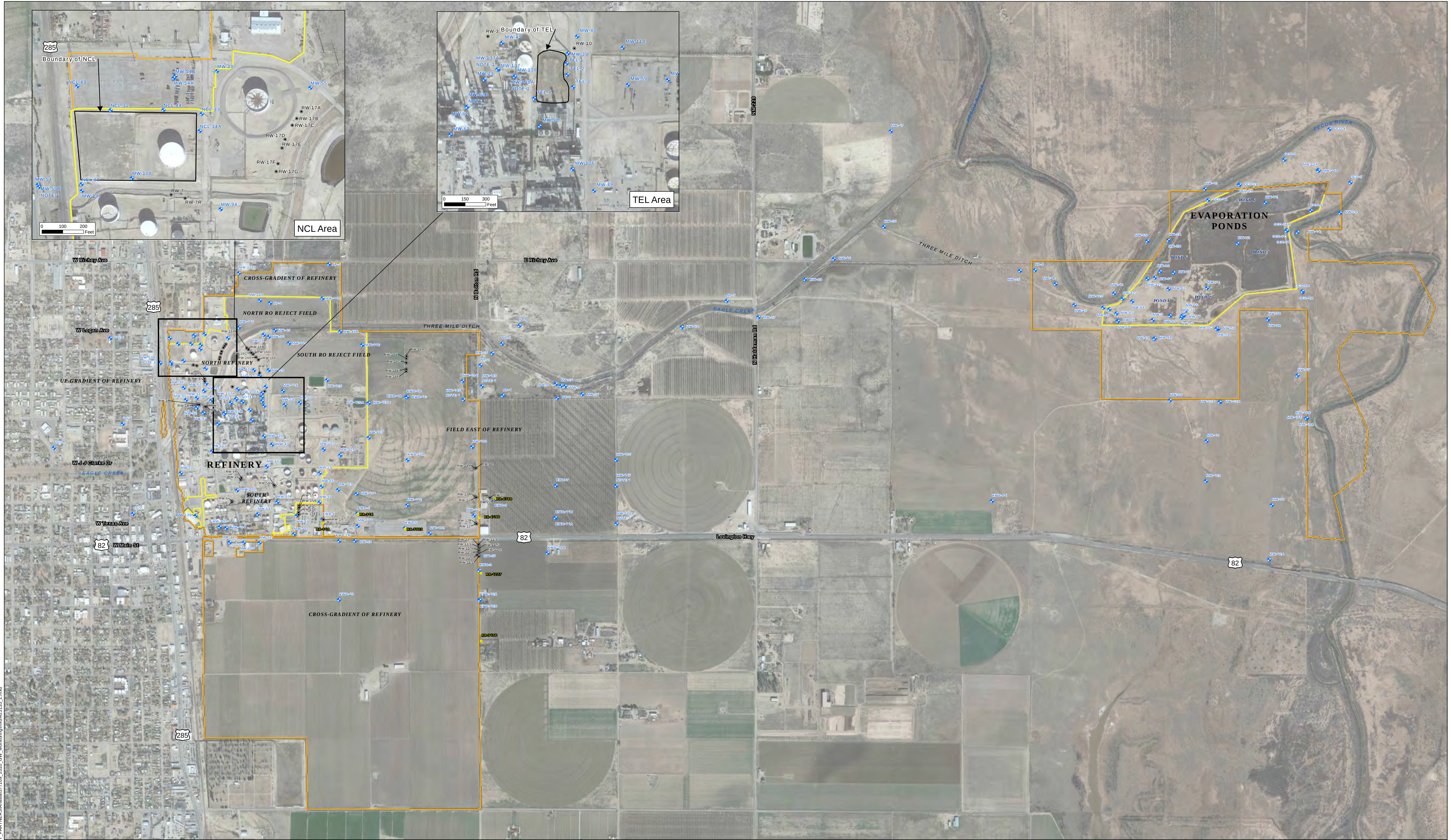
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Figures





LEGEND

IRRIGATION WELL

MONITORING WELL

RECOVERY WELL

FENCELINE

HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

N

W

E

S

0

800

1,600

Feet

1 IN = 800 FT

NOTE:
1. THE FOLLOWING WELLS WERE INSTALLED IN SEPTEMBER 2020:
MW-53R
MW-62R
MW-137A
MW-138A
MW-145
MW-146
MW-147
MW-148

WELL LOCATION MAP

HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHRN

SAVED: 2/3/2021

MXD: 425135_2

TRC

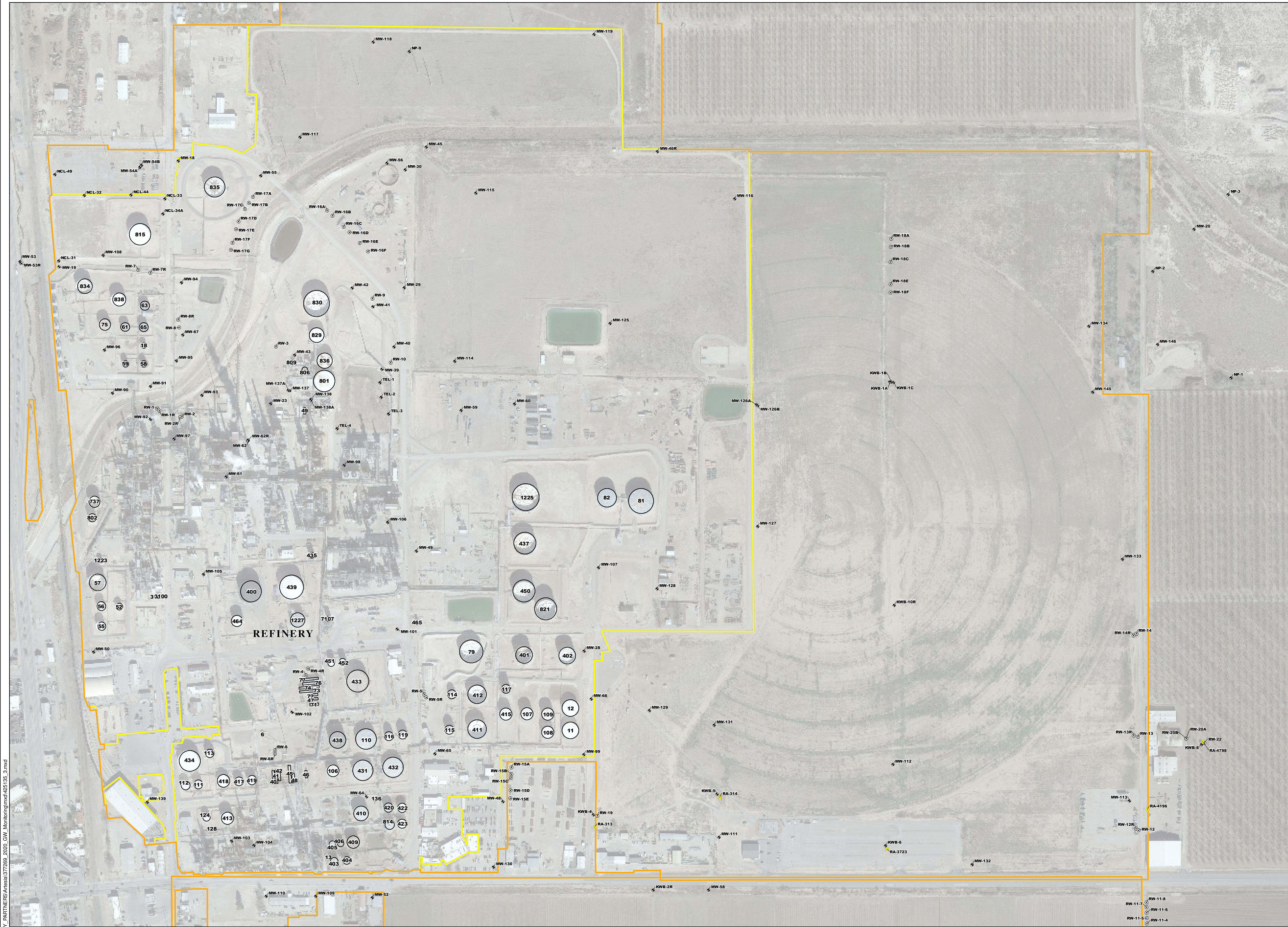
505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH:512-329-6080

FIGURE
2

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AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 12/29/2019.

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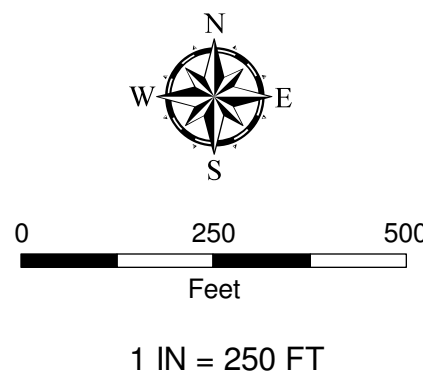


Tank Number	Location in Relation to AOCs & SWMUs	Diameter (ft)	Height / Length (ft)	Capacity (bbl)	Date Constructed	Contents
6	RW-6 between AOC 3 & AOC 4					Out of Service
11	AOC 3	89	29	31,500	B. 1983	Reformate
12	AOC 3	89	29	31,500	B. 1983	Reformate
13	AOC 8	10	20	250	1990	Slop
18	SWMU 17	29	24	2,250	B. 1979	Out of Service
40	Between AOC 3 & AOC 4	9	72	730	B. 1973	Causticw/HC
41	Between AOC 3 & AOC 4	9	72	730	B. 1973	Out of Service
42	Between AOC 3 & AOC 4	9	67	700		Wild Naphtha
45	Between AOC 3 & AOC 4	11	90	1,400		Butane
46	Between AOC 3 & AOC 4	12	47	920		Isobutane
47	West of AOC 3	11	36	700		Out of Service
48	Between AOC 3 & AOC 4	11	36	700		Butane
49	Between AOC 14 & SWMU 24	11				Slop
52	AOC 7					Out of Service
55	AOC 7	45	36	10,800	RBLT 1979	Stripped Sour Water
56	AOC 7	48	36	10,800	B. 1976	Desulfurized Naphtha
57	AOC 7	90	49	55,000	1981	Out of Service
58	SWMU 17	35	30	4,700	B. 1979	Out of Service
59	SWMU 17	35	30	4,700	B. 1979	Light Cycle Oil
61	SWMU 17	50	30	9,700	B. 1987	Light Cycle Oil
63	SWMU 17	51	30	10,000	B. 1987	Carbon Black Oil
65	SWMU 17	50	30	10,380	1999	Carbon Black Oil
71	West of AOC 3	10.5	44	714		Propane
72	West of AOC 3	10.5	44	714		Propane
73	West of AOC 3	10	103	1,525		Propane
74	West of AOC	3	10	103	1,525	Propane
75	SWMU 17	65	32	18,900	2003	Carbon Black Oil
76	West of AOC 3	11	79			Propane
77	West of AOC 3	11	79			Propane
79	AOC 3	125	40	70,000	2008	Reformate
81	AOC 6	108.5	40	60,000	2009	Asphalt/Pitch
82	AOC 6	140	40	100,000	2009	Asphalt/Pitch
106	AOC 3	67	40	22,500	B. 1971	Desalter Water
107	AOC 3	67	40	22,500	B. 1971	Isom Gasoline
108	AOC 3	67	40	22,500	1951	Alkylate
109	AOC 3	67	40	22,500	B. 1971	Alkylate
110	AOC 3	108	35	54,000	1929	Asphalt/Pitch
111	AOC 4	49	30	9,100	B. 1981	Gasoline
112	AOC 4	49	30	9,100	B. 1981	Splitter Bottoms
113	AOC 4	48		10,300		Out of Service
114	AOC 3	38		5,100		N-Butane
115	AOC 3	51		12,300		N-Butane
116	AOC 3	48				Isobutane
117	AOC 3	48	48	15,470	1960	Splitter Bottoms
119	AOC 3	51		12,300		Isobutane
124	AOC 4	40	30	6,700	1955	Gasoline
400	AOC 5	120	48	96,786	1983	Gas Oil
401	AOC 3	90	50	55,000	1982	Isom Gasoline
402	AOC 3	90	50	55,000	1983	Light Cat Naphtha
403	AOC 8	45	36	8,250		Removed
404	AOC 8	45	36	8,250		Removed
405	AOC 8	37	28	4,575		Removed
406	AOC 8	38	28	5,400		Removed
409	AOC 8	67	40	21,450		Removed
410	AOC 8	79	40	30,850	B. 1973	Asphalt/Pitch
411	AOC 3	100	40	52,000	1951	Isom Gasoline
412	AOC 3	100	40	52,000	1951	Splitter Bottoms
413	AOC 4	67	39	22,500	about 1960	Raw Kerosene
415	AOC 3	67	40	25,000	1953	Alkylate
417	AOC 4	50	30	9,300	B. 1981	Gasoline
418	AOC 4	67	33	25,000	B. 1987	Raw Kerosene
419	AOC 4	53	28	10,300	B. 1981	Diesel
420	AOC 8	50	30	8,200	B. 1989	Fuel Oil
422	AOC 8	50	30	8,200	B. 1973	Heavy Light Cycle Oil
423	AOC 8	50	30	8,200	B. 1970	Heavy Light Cycle Oil
431	AOC 3	109	32	45,800	B. 1984	Fuel Oil
432	AOC 3	109	32	45,800	B. 1973	Fuel Oil
433	AOC 3	117	42	72,500	B. 1984	Gas Oil
434	AOC 4	117	42	7,600	1979	Raw Diesel
435	AOC 5	30	40	5,000	Reloc. 1997	Sour Water
437	AOC 6	120	45	80,000	1976/2009	Crude Oil
438	AOC 3	90	48	54,500	1978	Gas Oil
439	AOC 5	130	46	107,900	1978	Naphtha
450	AOC 3	120	40	80,570	1997	Naphtha
451	AOC 3	35	40	6,800	2015	Diesel
452	AOC 3	35	40	6,800	2015	Ethanol
464	AOC 5	60	40	20,000	2016	RO Permeate
465	North of AOC 3					Fresh Water
737	AOC 7	63	40	20,000	2009	Sour Water
801	AOC 9	110	32	54,000	1987	Wastewater
802	AOC 7	45	40	10,000	2002	Sour Water
806	AOC 11	30	7	800		Separator (OOS)
809	West of AOC 11	20	16	850	1954	Treated Wastewater
814	AOC 8	50	32	10,000	2005	Asphalt/Pitch
815	SWMU 6	116	43	90,000	2005	Diesel
821	AOC 3	105	40	65,000	2016	Light Cat Naphtha
829	North of AOC 9	105	40	30,500	2015	Wastewater
830	North of AOC 9	140	40	100,000	2011	Stormwater
834	AOC 1	85	40	40,000	1967	
835	Northeast of SWMU 6	111	40	68,000		Diesel
836	AOC 9	82.5	32	30,460	1998	Wastewater
838	AOC 1	74	40	29,900		Diesel
1223	AOC 7	25	24	2,000	2002	Caustic
1225	AOC 6	150	40	100,000	2009	Crude Oil
1227	AOC 5	77	40	30,000	2009	Asphalt/Pitch
7107	East of AOC 5	25	40	3,300	2015	Treated Wastewater

TANK TABLE NOTES:
AOC = Area of Concern
SWMU = Solid Waste Management Unit
ft = feet
bbl = barrels
B = Before date shown, actual date unknown
RBLT = Rebuilt date shown
w/HC = with hydrocarbon
RO = Reverse Osmosis
OOS = Out of Service

LEGEND

- IRRIGATION WELL
- MONITORING WELL
- RECOVERY WELL
- FENCELINE
- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- TANK



WELL LOCATIONS AND TANK INFORMATION WITHIN REFINERY

2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

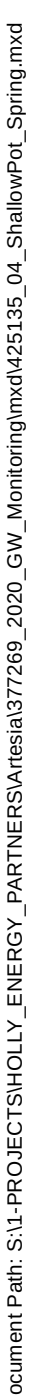
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SAVED: 2/26/2021

MOD: 4/25/2021

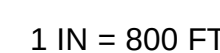
505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH: 512-329-6080

FIGURE 3



 MONITORING WELL
 RECOVERY WELL
 GROUNDWATER FLOW DIRECTION
 SHALLOW SATURATED ZONE POTENTIOMETRIC
 SURFACE CONTOURS - DASHED WHERE INFERRED
 (FEET ABOVE MEAN SEA LEVEL)

3337.25 GROUNDWATER ELEVATION (FEET)



1. GROUNDWATER ELEVATION WAS NOT MEASURED BECAUSE WELL IS NOT IN GAUGING PROGRAM, WELL COULD NOT BE LOCATED, OR WELL WAS DAMAGED.
2. WELL WAS DRY AT TIME OF GAUGING.
3. GROUNDWATER ELEVATION NOT USED IN POTENTIOMETRIC SURFACE CONTOURING.

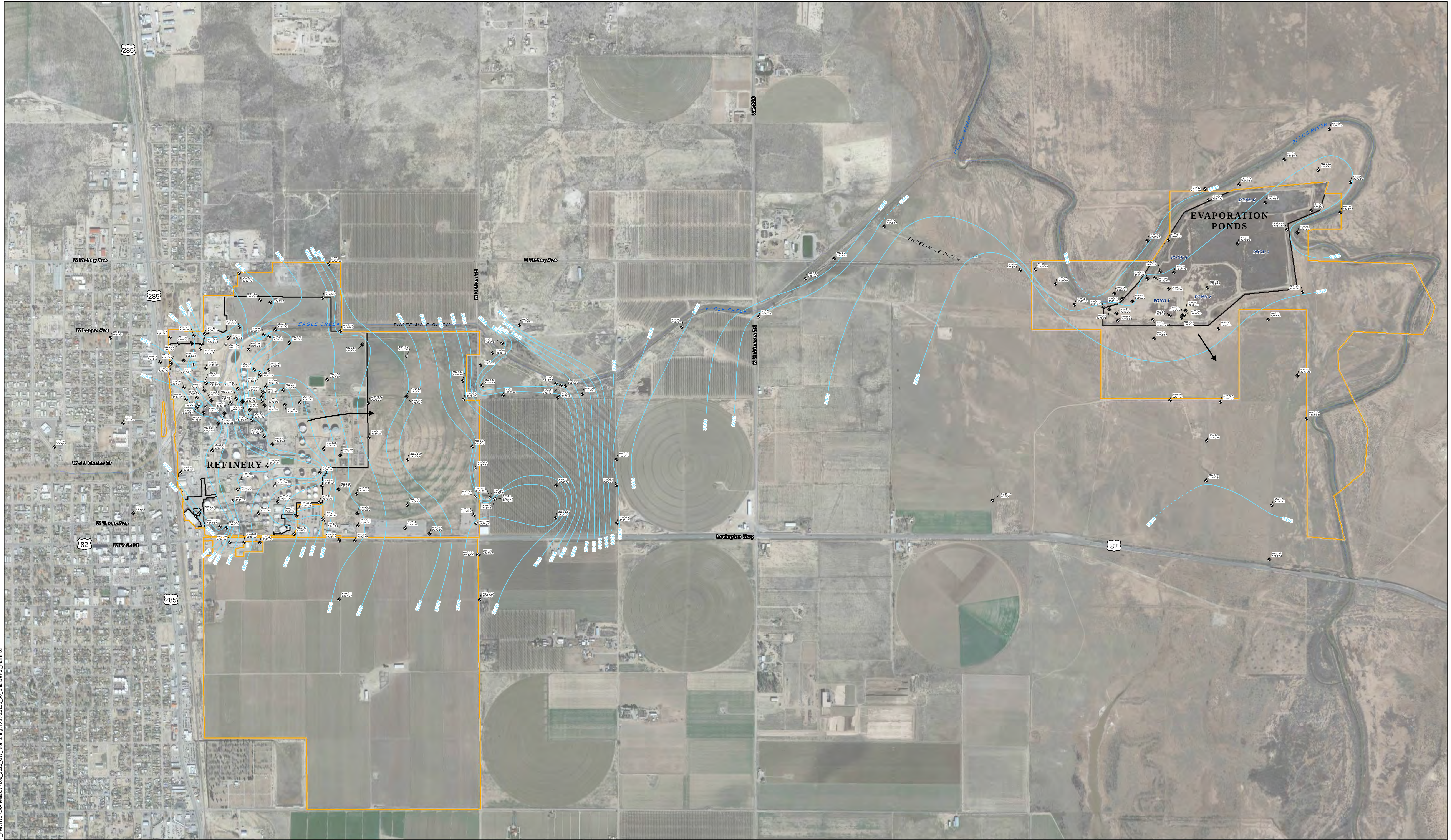


2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

505 E. HUNTLAND DR	FIGURE
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FIGURE
4



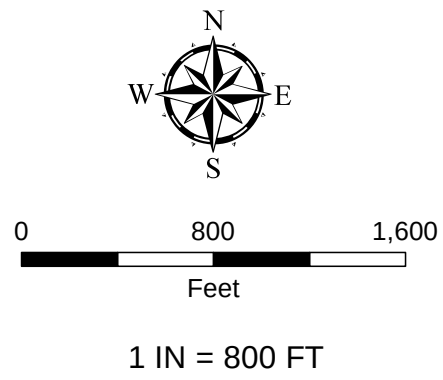


LEGEND

- MONITORING WELL
- RECOVERY WELL
- GROUNDWATER FLOW DIRECTION

SHALLOW SATURATED ZONE POTENTIOMETRIC SURFACE CONTOURS - DASHED WHERE INFERRED (FEET ABOVE MEAN SEA LEVEL)

- GROUNDWATER ELEVATION DEPRESSED LOCALLY DUE TO RECOVERY PUMP
- FENCELINE
- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- GROUNDWATER ELEVATION (FEET)



NOTE:

1. GROUNDWATER ELEVATION WAS NOT MEASURED BECAUSE WELL IS NOT IN GAUGING PROGRAM, WELL COULD NOT BE LOCATED, OR WELL WAS DAMAGED.
2. WELL WAS DRY AT TIME OF GAUGING.
3. GROUNDWATER ELEVATION NOT MEASURED DUE TO PUMP INSTALLED IN WELL.
4. GROUNDWATER ELEVATION NOT AVAILABLE DUE TO PSH IN WELL TO TOTAL DEPTH.
5. GROUNDWATER ELEVATION NOT USED IN POTENTIOMETRIC SURFACE CONTOURING



SHALLOW SATURATED ZONE POTENTIOMETRIC SURFACE MAP 2020 SECOND SEMIANNUAL EVENT

2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

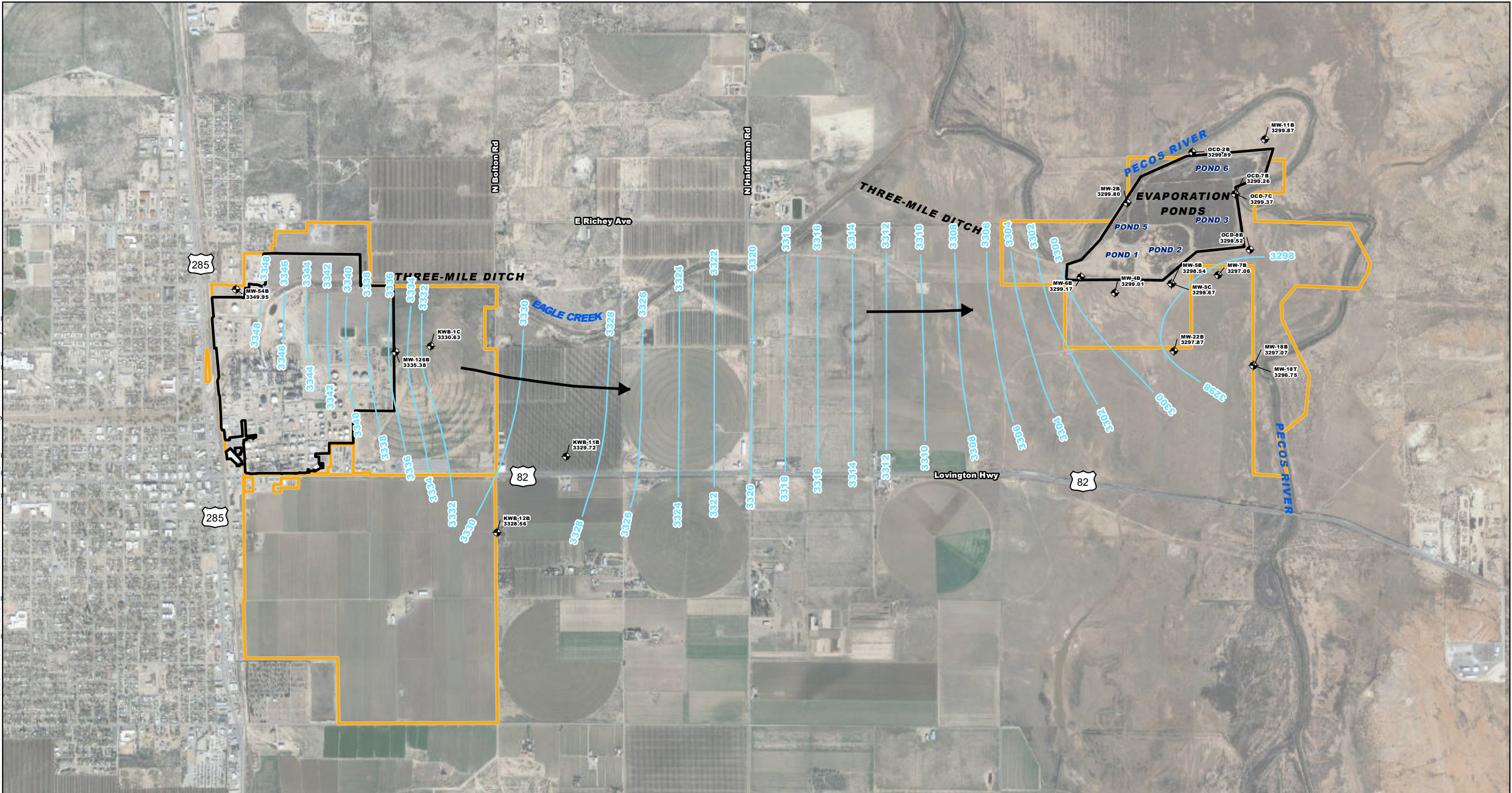
AUTHOR: MHOEN SAVED: 2/4/2021 MOD: 4/25/19_06_ShallowPot_Fall



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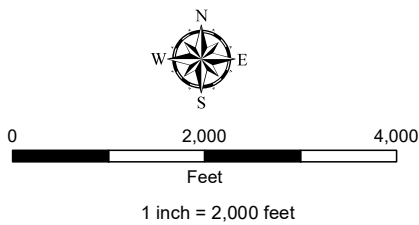
FIGURE
6

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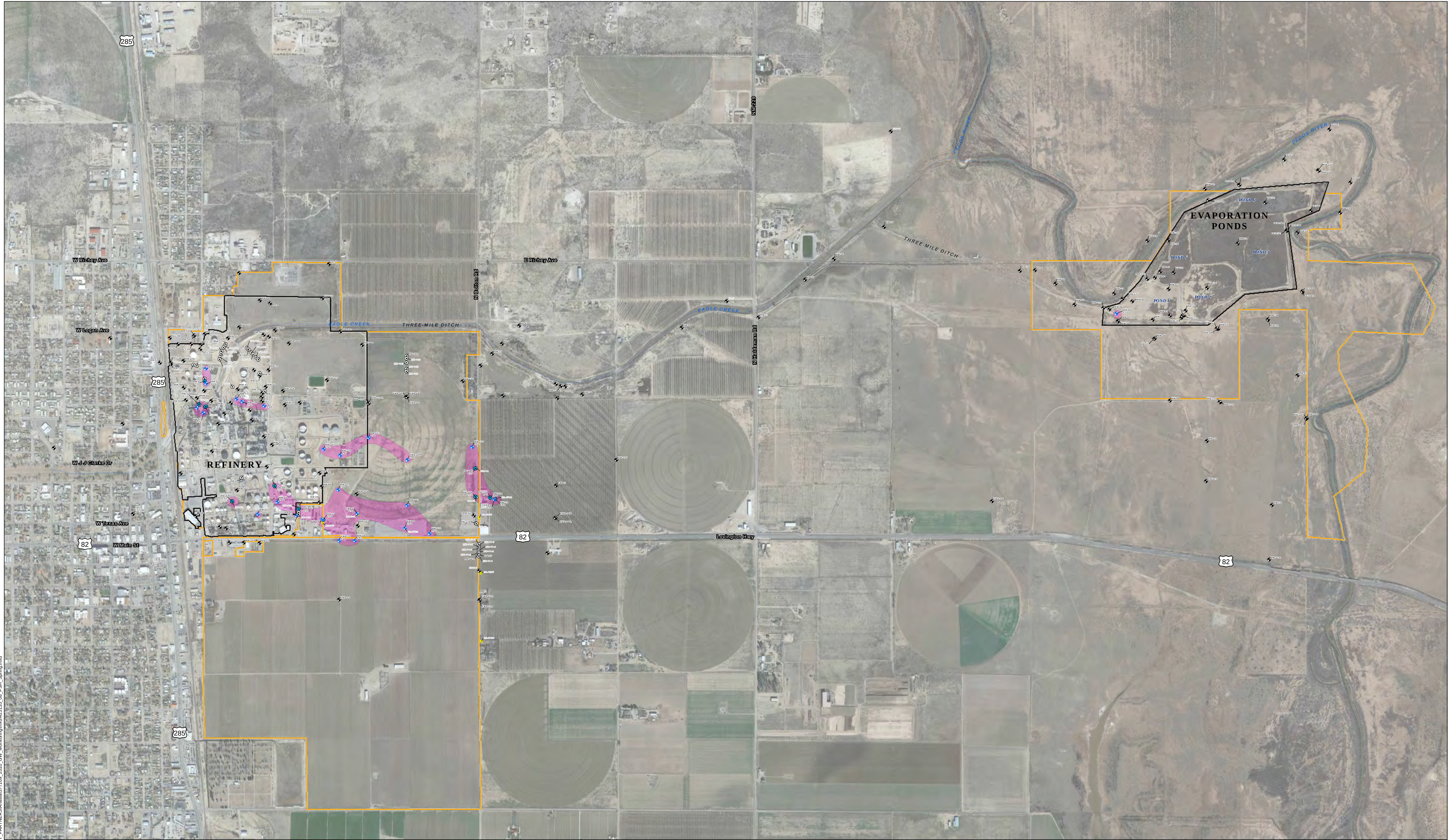
LEGEND

- MONITORING WELL
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- GROUNDWATER FLOW DIRECTION
- 3333.00 GROUNDWATER ELEVATION (FEET)
- VALLEY FILL ZONE POTENTIOMETRIC SURFACE CONTOURS (FEET ABOVE MEAN SEA LEVEL)



AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 12/29/2019.

VALLEY FILL ZONE POTENTIOMETRIC SURFACE MAP 2020 SECOND SEMIANNUAL EVENT		
2020 ANNUAL GROUNDWATER REPORT HOLLYFRONTIER NAVAJO REFINING LLC ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO		
AUTHOR: MHORN	SAVED: 2/5/2021	MXD: 425135_07_ValleyFill_Fall
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Document Path: S:\PROJECTS\HOLLY ENERGY PARTNERS\Artesia\377262_2020_GW_Monitoring\med\425135_08_PSH_Spring.mxd
AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 12/29/2019.

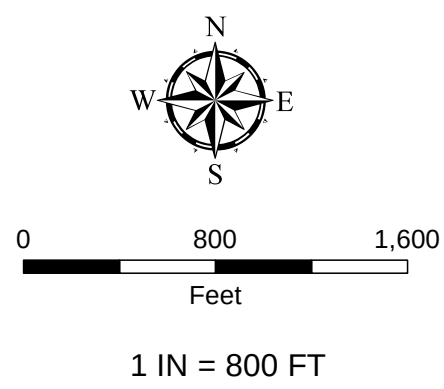
LEGEND

- RECOVERY WELL
- ◆ MONITORING WELL
- IRRIGATION WELL
- FENCELINE
- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

- WELLS WITH PSH
- ◆ MONITORING WELL
 - RECOVERY WELL
 - PSH THICKNESS
 - WELL NOT GAUGED
- PSH THICKNESS IN FEET
- 0.01 - 6.26 FEET
- RW-1
0.71
- RW-15A

NOTE:

1. ALL PHASE-SEPARATED HYDROCARBON (PSH) THICKNESSES PROVIDED IN FEET.



PHASE-SEPARATED HYDROCARBON
THICKNESS MAP
2020 FIRST SEMIANNUAL EVENT
2020 ANNUAL GROUNDWATER REPORT
HOLLY FRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHOEN SAVED: 2/4/2021 MXD: 425135_08_PSH_Spring



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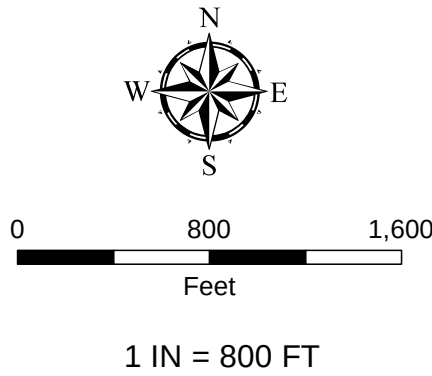
FIGURE
8

○ RECOVERY WELL
 ✦ MONITORING WELL
 ■ IRRIGATION WELL
 [] FENCELINE
 [] HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

WELLS WITH PSH		PSH THICKNESS IN FEET	
	MONITORING WELL		0.01 - 5.51 FEET
	RECOVERY WELL		
MW-85 0.57	PSH THICKNESS		
MW-28	WELL NOT GAUGED		

NOTE:

1. ALL PHASE-SEPARATED HYDROCARBON (PSH) THICKNESSES PROVIDED IN FEET.



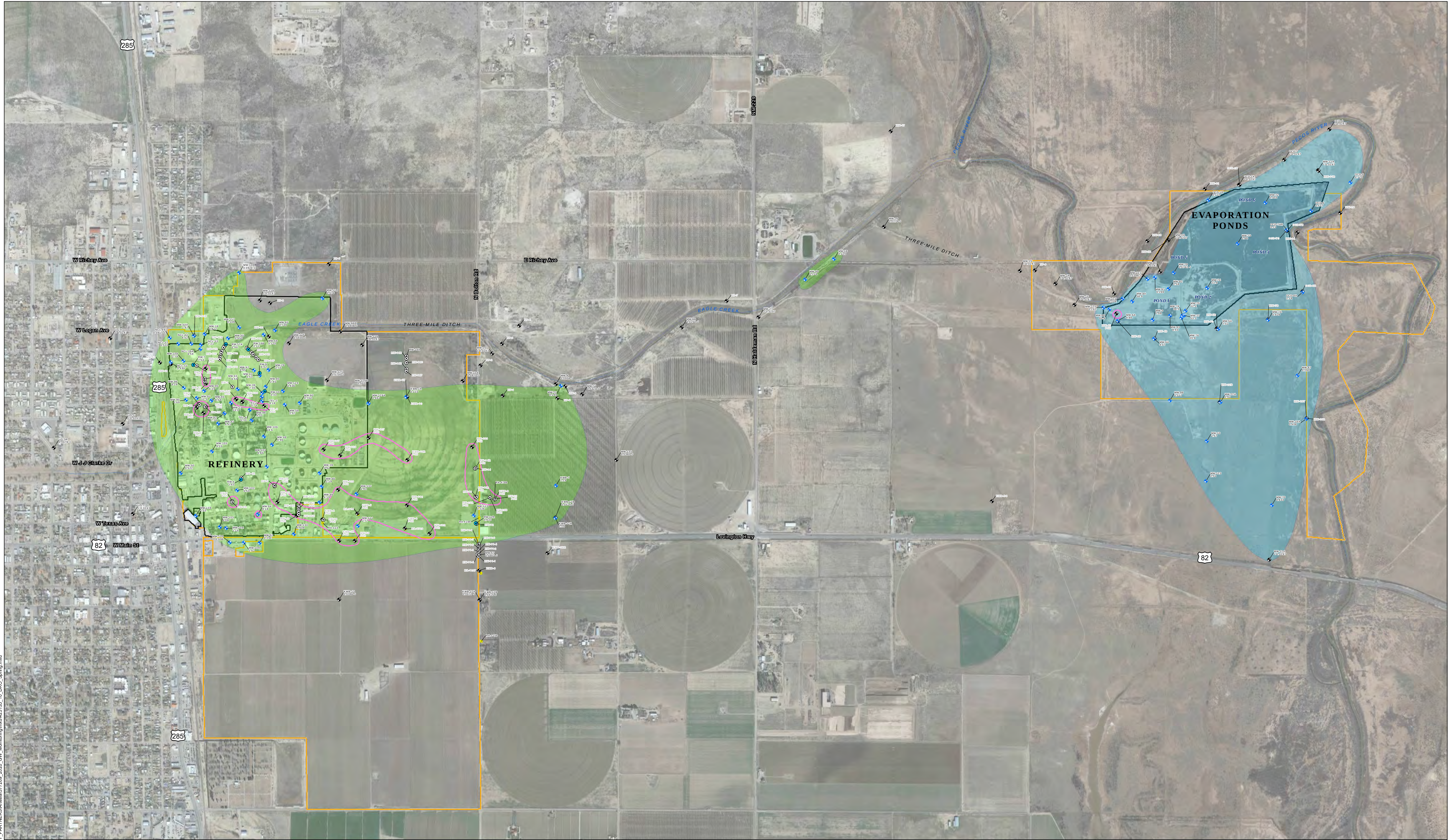
PHASE-SEPARATED HYDROCARBON
THICKNESS MAP
2020 SECOND SEMIANNUAL EVENT

2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHORN SAVED: 2/4/2021 MXD: 425135_09_PSH



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Document Path: S:\PROJECTS\HOLLY ENERGY PARTNERS\Antares\377262_2020_GW_Monitoring\med\25135_10_DRO_Spring.mxd
AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 12/29/2019

LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS

MONITORING WELL

IRRIGATION WELL

RECOVERY WELL EXCEEDS SCREENING LEVELS

RECOVERY WELL

DRO CONCENTRATION
- DRO NOT DETECTED ABOVE METHOD DETECTION LIMIT

WELL NOT SAMPLED

PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)

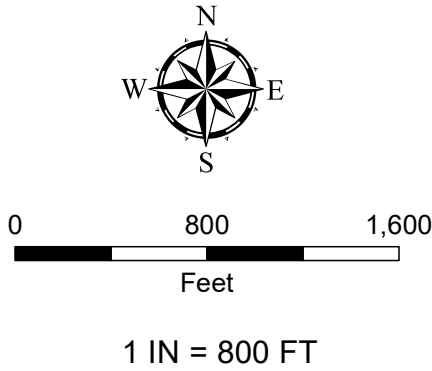
DRO CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 0.0858 mg/L)

DRO CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA, EVAPORATION PONDS (CONCENTRATION > 0.0167 mg/L)

FENCELINE
- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

PHASE-SEPARATED HYDROCARBON (PSH)

- NOTES:
1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
 2. DRO = DIESEL RANGE ORGANICS
 3. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



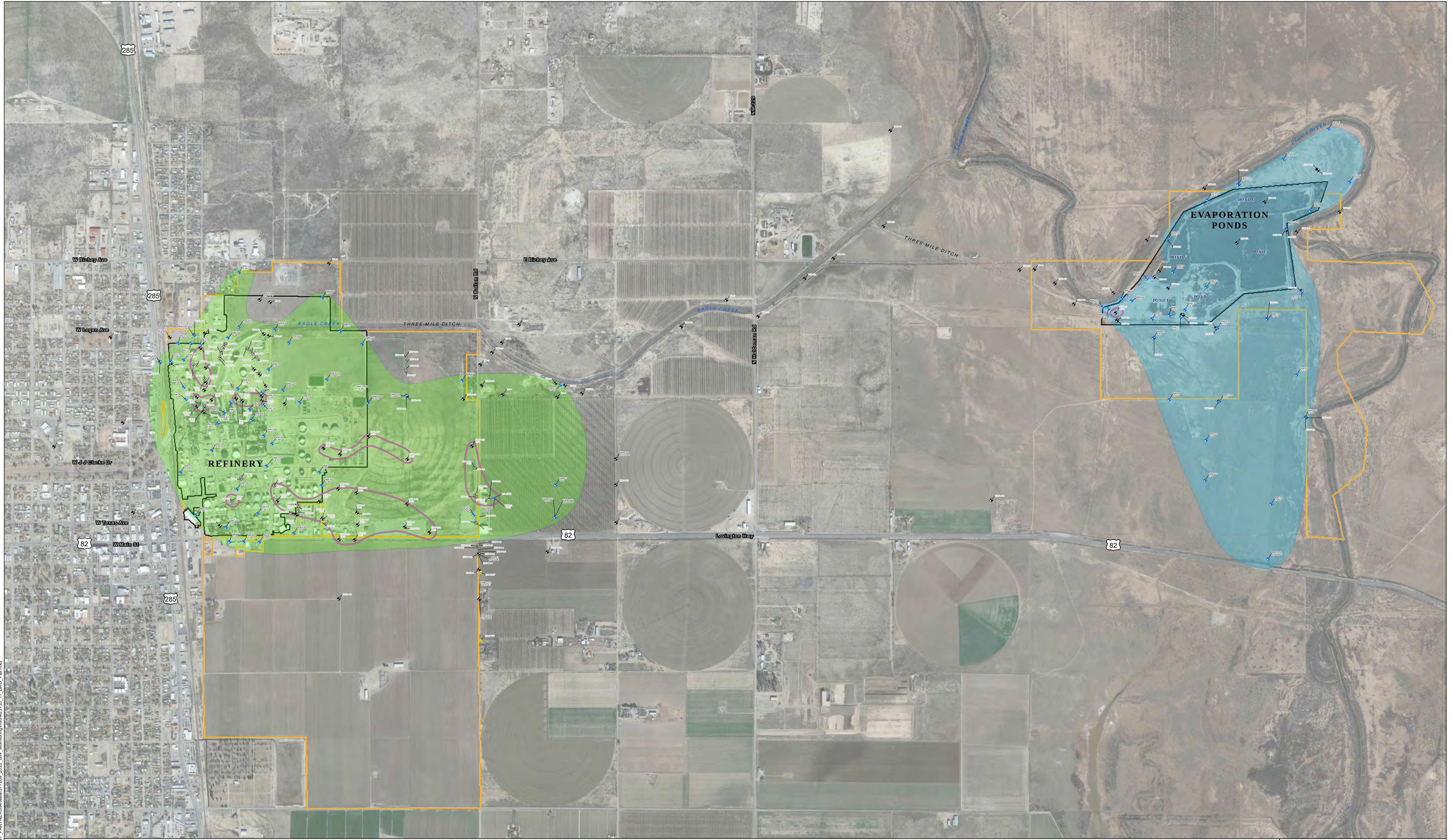
DRO CRITICAL GROUNDWATER
SCREENING LEVEL EXCEEDANCE MAP
2020 FIRST SEMIANNUAL EVENT

2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHOEN	SAVED: 2/4/2021	MXD: 425135_10_DRO_Spring
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FIGURE
10



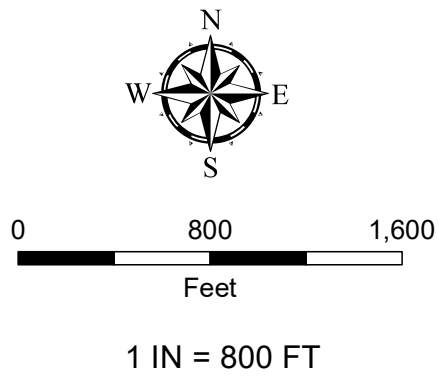
LEGEND

- ◆ MONITORING WELL EXCEEDS SCREENING LEVELS
- ◆ MONITORING WELL
- IRRIGATION WELL
- ⊙ RECOVERY WELL
- 2.21 DRO CONCENTRATION

- <0.0247 DRO NOT DETECTED ABOVE METHOD DETECTION LIMIT
- MW-129 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- 🔗 DRO CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 0.0858 mg/L)
- 🔗 DRO CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA, EVAPORATION PONDS (CONCENTRATION > 0.0167 mg/L)
- ▭ FENCELINE

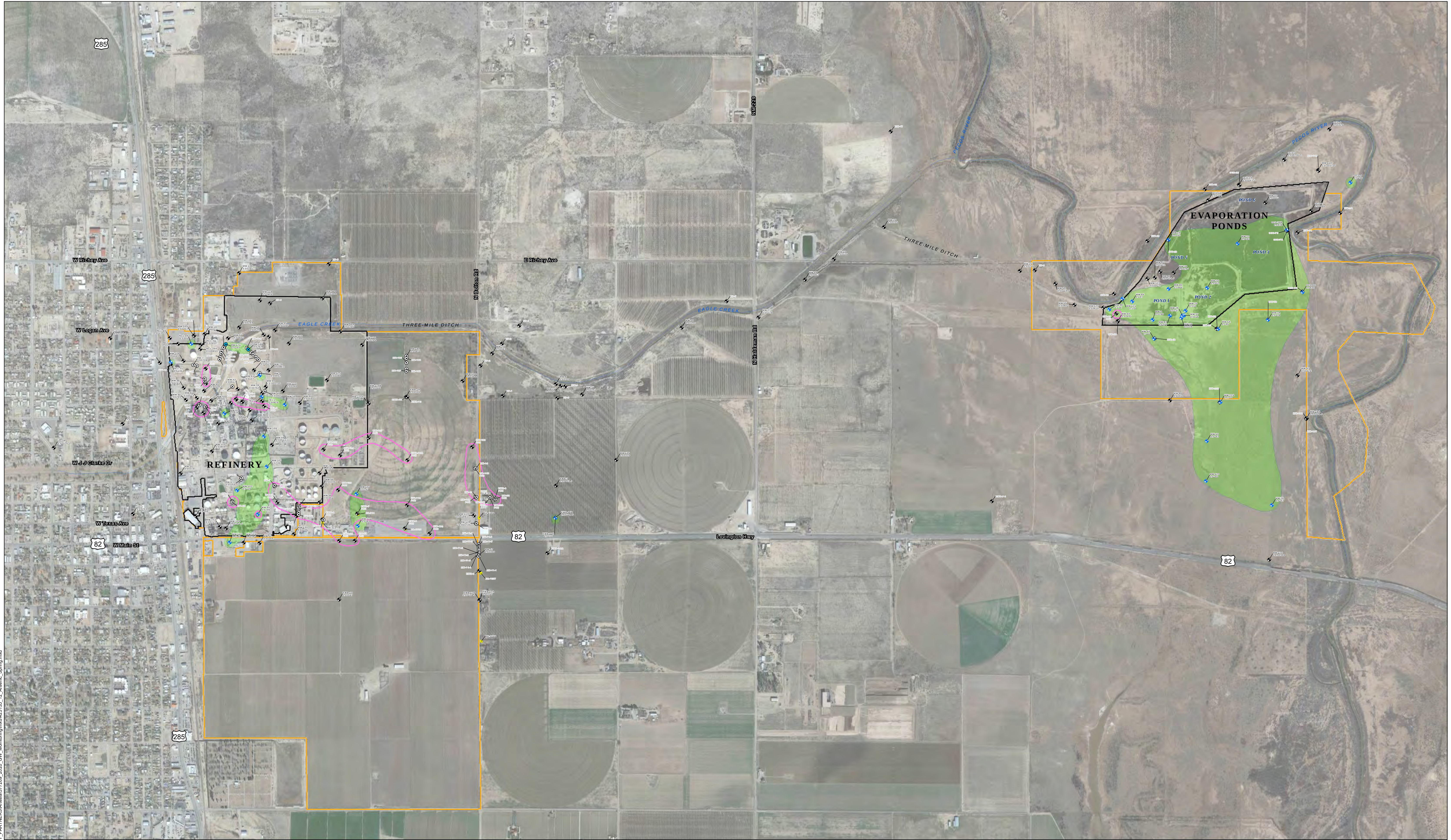
- ▭ HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- 🔗 PHASE-SEPARATED HYDROCARBON (PSH)

- NOTES:
1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
 2. DRO = DIESEL RANGE ORGANICS
 3. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



DRO CRITICAL GROUNDWATER
SCREENING LEVEL EXCEEDANCE MAP
2020 SECOND SEMIANNUAL EVENT
2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHOEN	SAVED: 2/3/2021	MXD: 425135_11_DRO_Fall
TRC	505 E. HUNTLAND DR. SUITE 250 AUSTIN, TX 78752 PH: 512-329-6080	FIGURE 11



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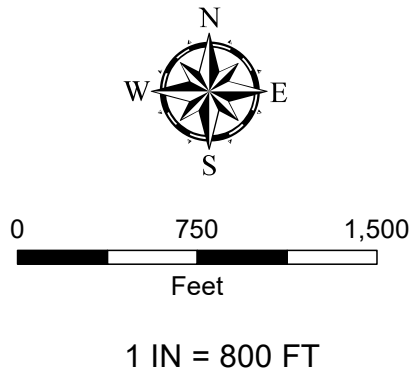
LEGEND

- ♦ MONITORING WELL EXCEEDS SCREENING LEVELS
- ♦ MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL

- 0.0151 ARSENIC CONCENTRATION
- < 0.00368 ARSENIC NOT DETECTED ABOVE METHOD DETECTION LIMIT
- MW-10 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥0.03 FEET THICK)
- ARSENIC CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 0.01 mg/L)
- FENCELINE

- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- PHASE-SEPARATED HYDROCARBON (PSH)

- NOTES:
1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
 2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



ARSENIC CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2020 FIRST SEMIANNUAL EVENT

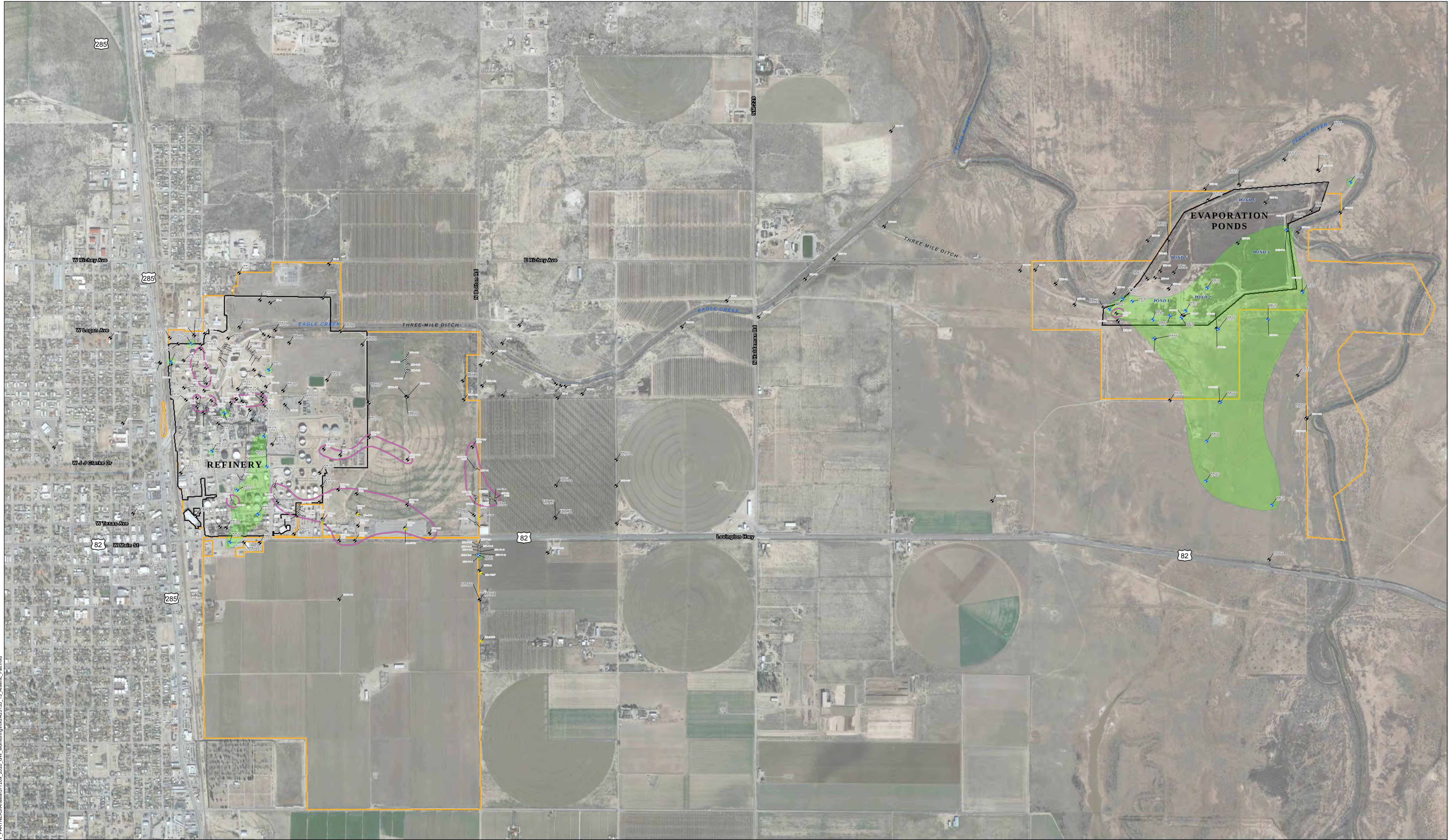
2020 ANNUAL GROUNDWATER REPORT
HOLLY FRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHOEN SAVED: 2/4/2021 MXD: 425135_12_Arsenic_Spring



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FIGURE
12



LEGEND

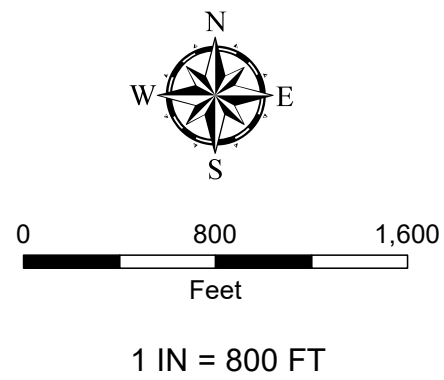
- ♦ MONITORING WELL EXCEEDS SCREENING LEVELS
- ♦ MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL

- 0.0249 ARSENIC CONCENTRATION
- < 0.0368 ARSENIC NOT DETECTED ABOVE METHOD DETECTION LIMIT
- MW-10 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥0.03 FEET THICK)
- ARSENIC CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 0.01 mg/L)
- FENCELINE

- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- PHASE-SEPARATED HYDROCARBON (PSH)

NOTES:

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



ARSENIC CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2020 SECOND SEMIANNUAL EVENT

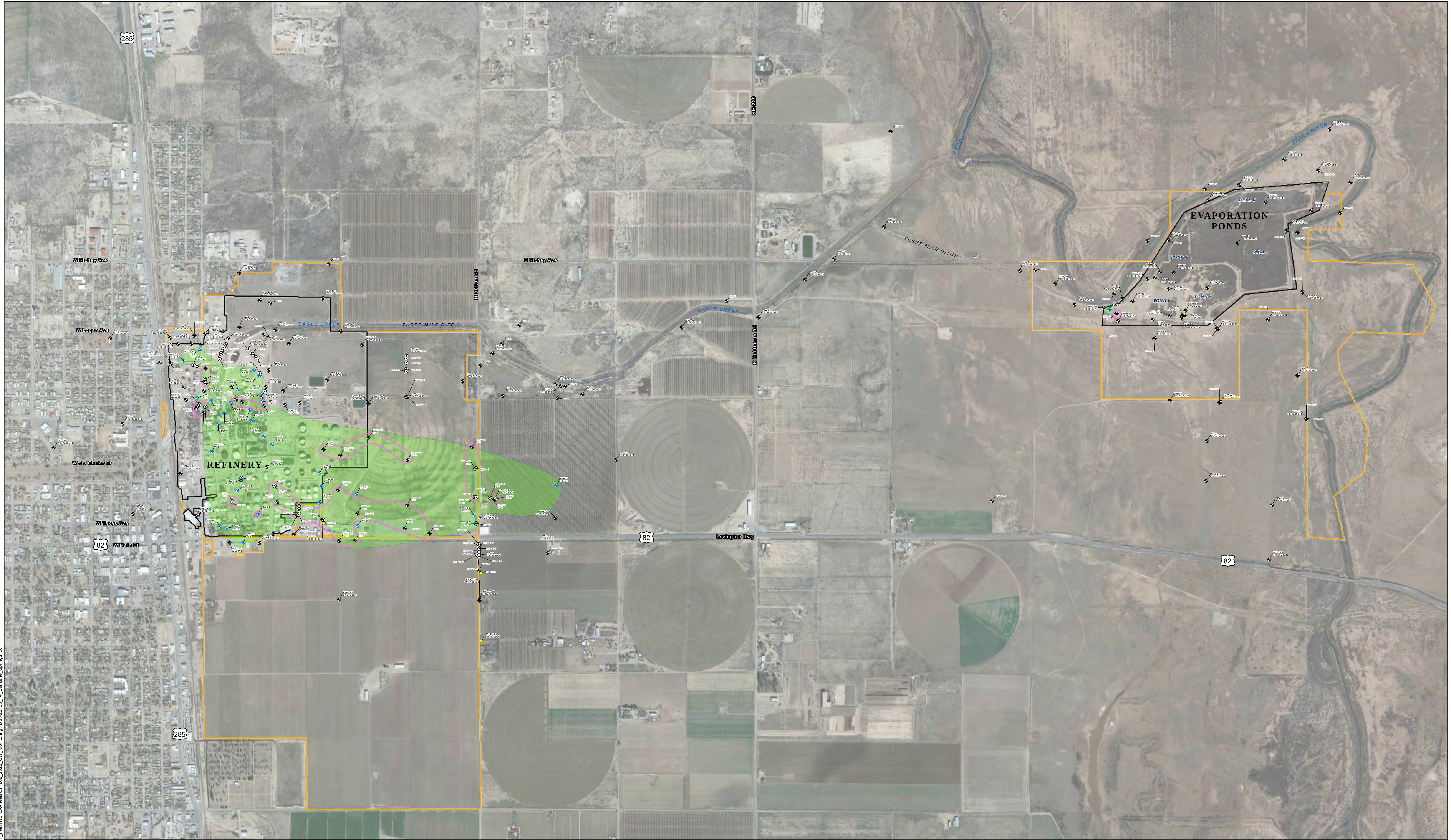
2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
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AUTHOR: MHOEN SAVED: 2/4/2021 MOD: 4/25/13_13_Arsenic_Fall



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FIGURE
13



Document Path: S:\PROJECTS\HOLLY ENERGY PARTNERS\Artesia\377262_2020_GW_Monitoring\mxd\25135_14_Benzene_Spring.mxd

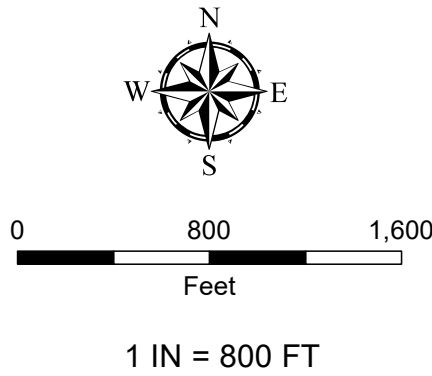
LEGEND

- ♦ MONITORING WELL EXCEEDS SCREENING LEVELS
- ♦ MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL

- 1.59 BENZENE CONCENTRATION
- <0.00331 BENZENE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- MW-19 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- ☒ BENZENE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 0.005 mg/L)
- FENCELINE

- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- ☒ PHASE-SEPARATED HYDROCARBON (PSH)

- NOTES:
1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
 2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



BENZENE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2020 FIRST SEMIANNUAL EVENT

2020 ANNUAL GROUNDWATER REPORT
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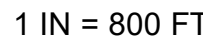
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FIGURE
14

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL

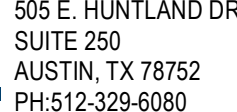
F

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).



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ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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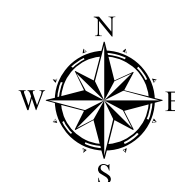
15

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL

MW-2

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).

2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.

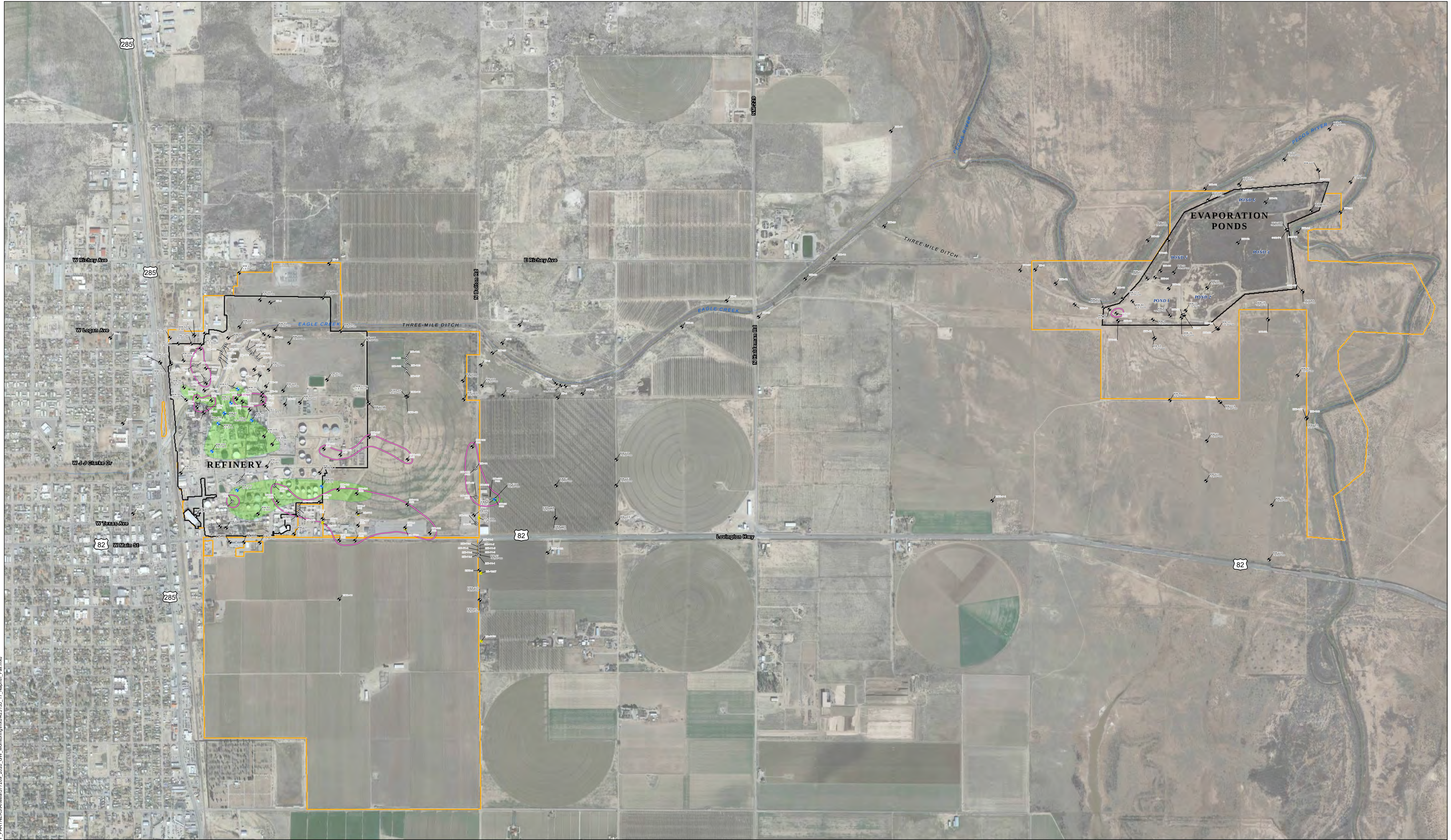


2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHORN	SAVED: 2/4/2021	MXD: 425135_16_Naphth_Spring
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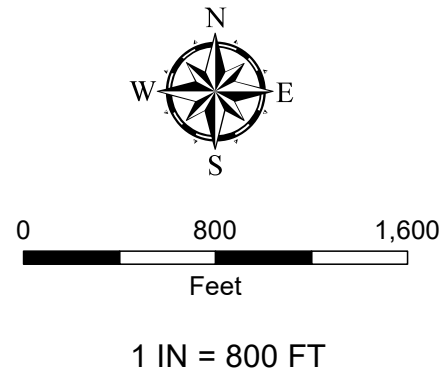
LEGEND

- ♦ MONITORING WELL EXCEEDS SCREENING LEVELS
- ♦ MONITORING WELL
- IRRIGATION WELL
- ⊙ RECOVERY WELL

- 0.136 NAPHTHALENE CONCENTRATION
- < 0.00100 NAPHTHALENE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- KWB-13 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- ☒ NAPHTHALENE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 0.03 mg/L)
- FENCELINE

- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- PHASE-SEPARATED HYDROCARBON (PSH)

- NOTES:
1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
 2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



NAPHTHALENE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2020 SECOND SEMIANNUAL EVENT

2020 ANNUAL GROUNDWATER REPORT
HOLLY FRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHOEN SAVED: 2/4/2021 MOD: 425135_17_Naphth_Fall

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FIGURE 17

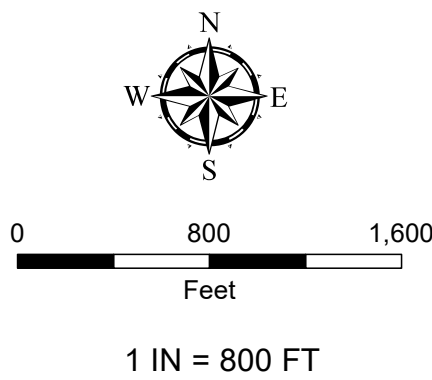
- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL

1.79	MTBE CONCENTRATION
0.000367	MTBE NOT DETECTED ABOVE METHOD DETECTION LIMIT
MTW-19	WELL NOT SAMPLED
PSH	PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
	MTBE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 0.1 mg/L)
	FENCELINE

 HFNR PROPERTY BOUNDARY
(FENCELINE SHOWN WHERE
COINCIDENT)

 PHASE-SEPARATED HYDROCARBON (PSH)

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L)
2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.
3. MTBE = METHYL TERT-BUTYL ETHER



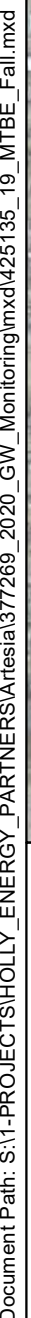
2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHORN	SAVED: 2/4/2021	MXD: 425135_18_MTBE_Sp
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FIGURE
18



1.20 MTBE CONCENTRATION

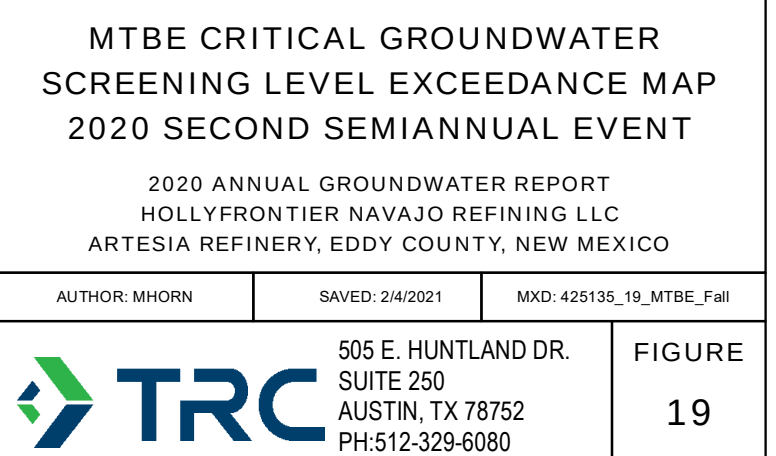
<0.000367 MTBE NOT DETECTED ABOVE METHOD DETECTION LIMIT

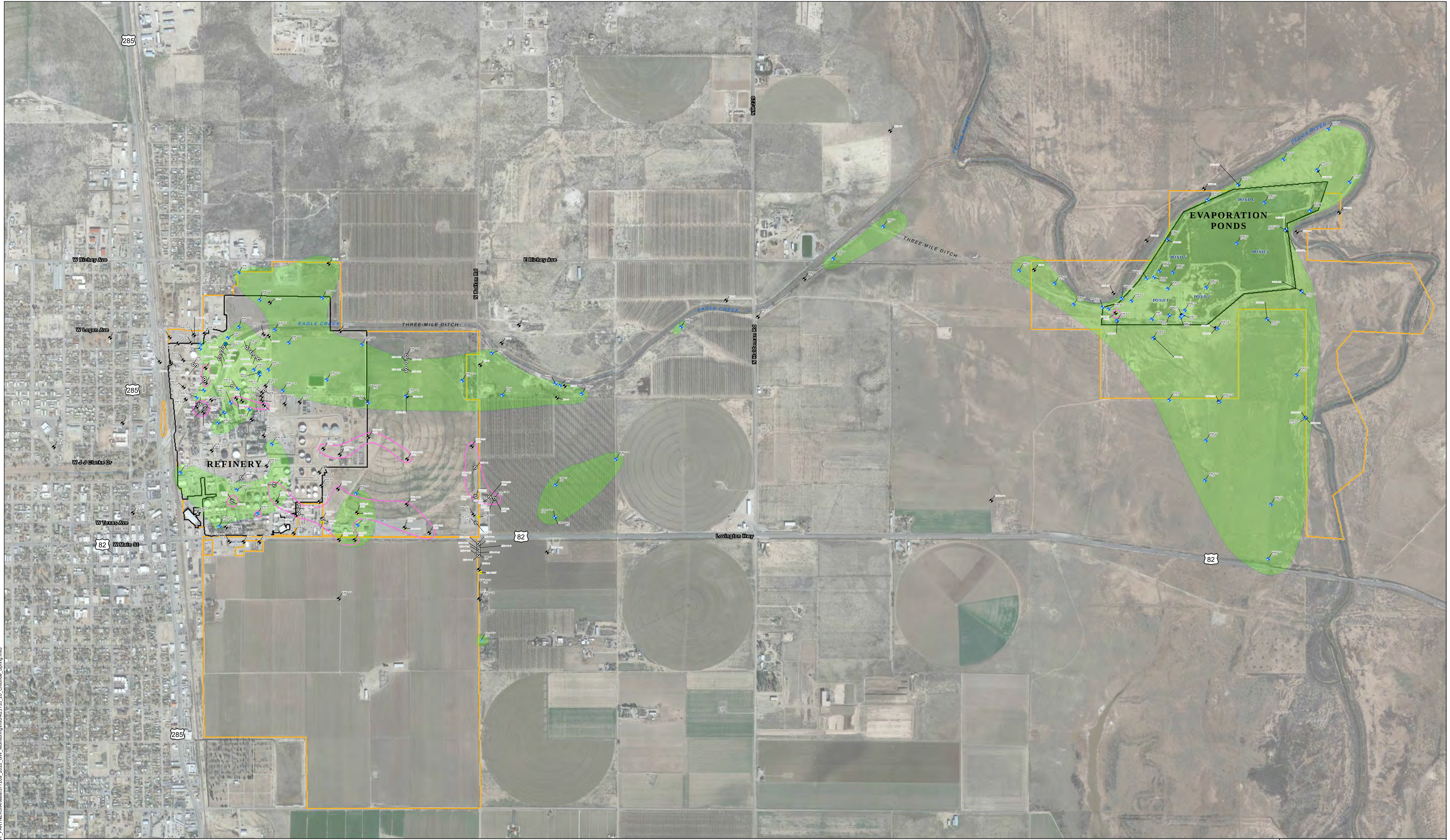
100-103 WELL NOT SAMPLED

PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)

MTBE CRITICAL GROUNDWATER SCREENING LEVEL
EXCEEDANCE AREA (CONCENTRATION > 0.1 mg/L)

FENCELINE





LEGEND

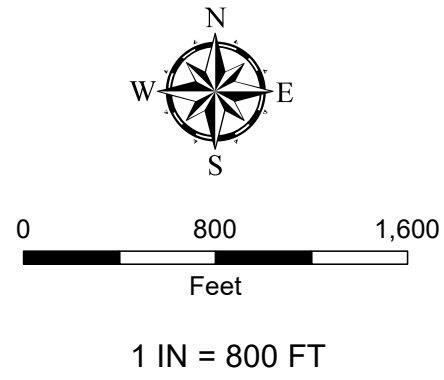
- ♦ MONITORING WELL EXCEEDS SCREENING LEVELS
- ♦ MONITORING WELL
- IRRIGATION WELL EXCEEDS SCREENING LEVELS
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL

- 325 CHLORIDE CONCENTRATION
- MW-19 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- CHLORIDE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 250 mg/L)
- FENCELINE
- HENR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

PSH PHASE-SEPARATED HYDROCARBON (PSH)

NOTES:

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).



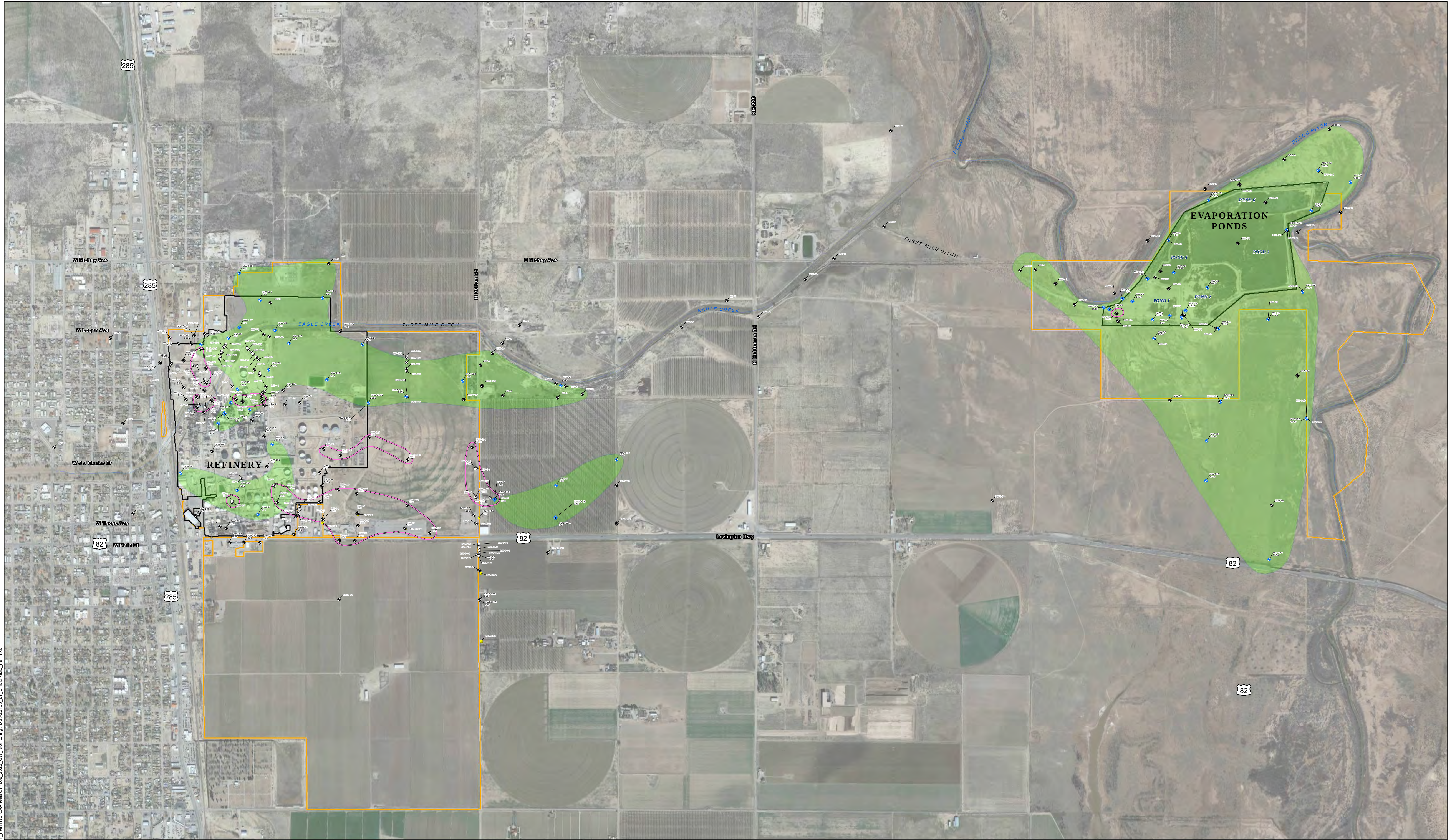
CHLORIDE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2020 FIRST SEMIANNUAL EVENT

2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHOEN SAVED: 2/4/2021 MOD: 4/25/15_20_Chloride_Spring

505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH: 512-329-6080

FIGURE
20



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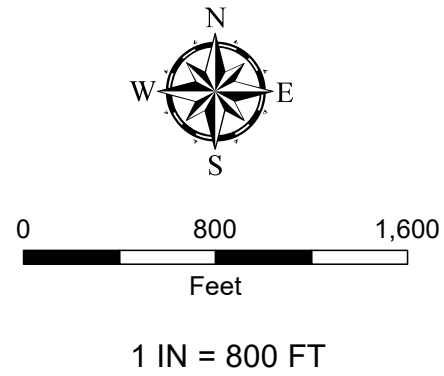
LEGEND

- ◆ MONITORING WELL EXCEEDS SCREENING LEVELS
- ◆ MONITORING WELL
- IRRIGATION WELL
- ⊙ RECOVERY WELL

- 188 CHLORIDE CONCENTRATION
- KWB-13 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- CHLORIDE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 250 mg/L)
- FENCELINE
- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

PHASE-SEPARATED HYDROCARBON (PSH)

NOTES:
1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).



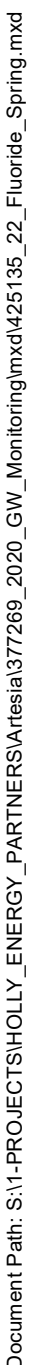
CHLORIDE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2020 SECOND SEMIANNUAL EVENT

2020 ANNUAL GROUNDWATER REPORT
HOLLY FRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

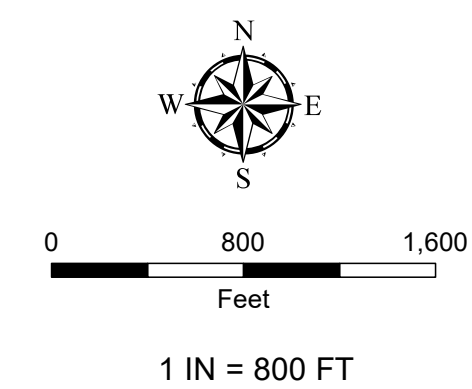
AUTHOR: MHOEN SAVED: 2/3/2021 MXD: 425135_21_CHLORIDE_Fall

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SUITE 250
AUSTIN, TX 78752
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FIGURE
21

 PHASE-SEPARATED HYDROCARBON (PSH)

- NOTES:**
1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).



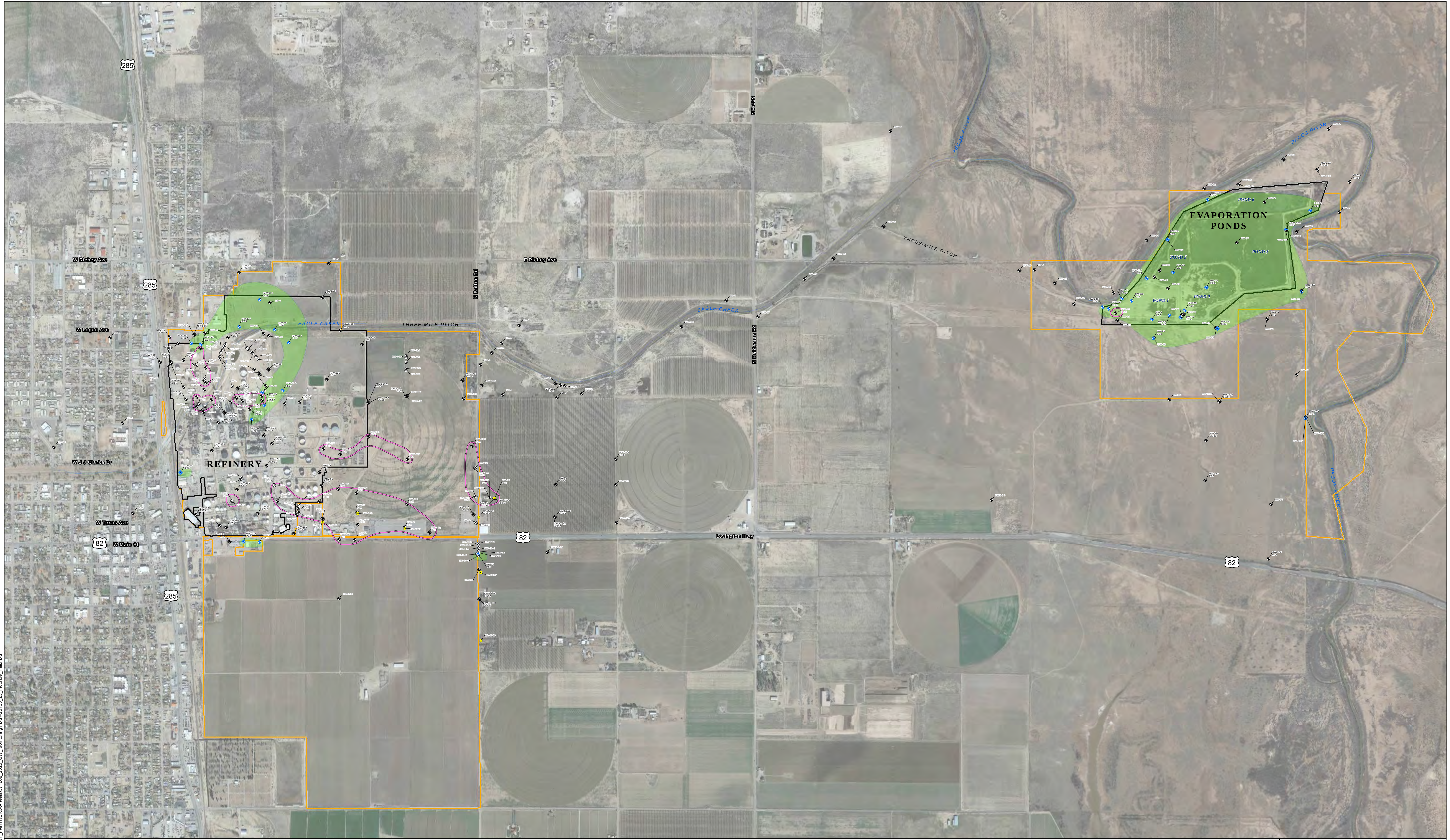
FLUORIDE CRITICAL GROUNDWATER
SCREENING LEVEL EXCEEDANCE MAP
2020 FIRST SEMIANNUAL EVENT

2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHORN	SAVED: 2/4/2021	MXD: 425135, 22_Fluoride_Spring
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505 E. HUNTLAND DR.
ALBUQUERQUE, TX 78752
PH: 512-220-6095

FIGURE
22



Document Path: S:\PROJECTS\HOLLY ENERGY PARTNERS\Artesia\377262_2020_GW_Monitoring\mxd\25135_23_Fluoride_Fall.mxd

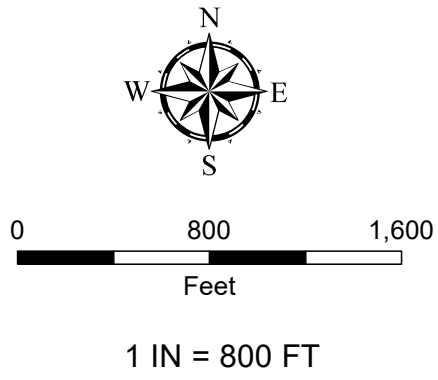
LEGEND

- ♦ MONITORING WELL EXCEEDS SCREENING LEVELS
- ♦ MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL

- 1-79 FLUORIDE CONCENTRATION
- MW-112 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- FLUORIDE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 1.6 mg/L)
- FENCELINE
- HFNr PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

PHASE-SEPARATED HYDROCARBON (PSH)

- NOTES:
1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
 2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



FLUORIDE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2020 SECOND SEMIANNUAL EVENT

2020 ANNUAL GROUNDWATER REPORT
HOLLY FRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHOEN SAVED: 2/3/2021 MXD: 425135_23_Fluoride_Fall



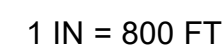
505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH: 512-329-6080

FIGURE
23

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL EXCEEDS SCREENING LEVELS
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL

 PHASE-SEPARATED HYDROCARBON (PSH)

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

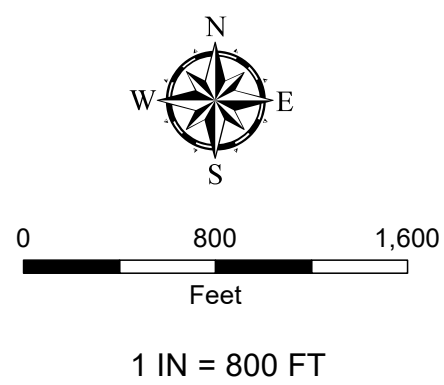


FIGURE 24

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL EXCEEDS SCREENING LEVELS
- IRRIGATION WELL
- RECOVERY WELL

 PHASE-SEPARATED HYDROCARBON (PSH)

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L)
2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHORN	SAVED: 2/3/2021	MXD: 425135_25_Sulfate_F
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SUITE 250
AUSTIN, TX 78752
PH: 512-329-6080

FIGURE
25

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL EXCEEDS SCREENING LEVELS
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL

1340 TOTAL DISSOLVED SOLIDS CONCENTRATION
WELL NOT SAMPLED

MW-19
PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)

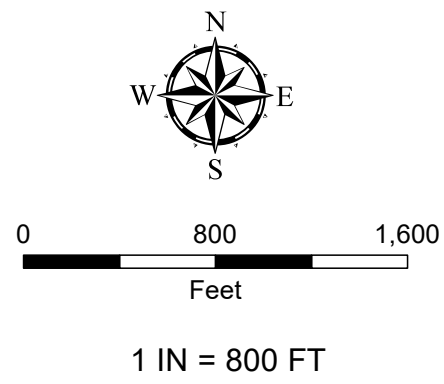
TOTAL DISSOLVED SOLIDS CRITICAL GROUNDWATER SCREENING LEVEL
EXCEEDANCE AREA (CONCENTRATION > 1000 mg/L)

FENCELINE

HFNR PROPERTY BOUNDARY (FENCELINE SHOWN
WHERE COINCIDENT)

 PHASE-SEPARATED HYDROCARBON (PSH)

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).



TOTAL DISSOLVED SOLIDS CRITICAL
GROUNDWATER SCREENING LEVEL
EXCEEDANCE MAP
2020 FIRST SEMIANNUAL EVENT
2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO



505 E. HUNTLAND DR
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PH: 512-329-6080

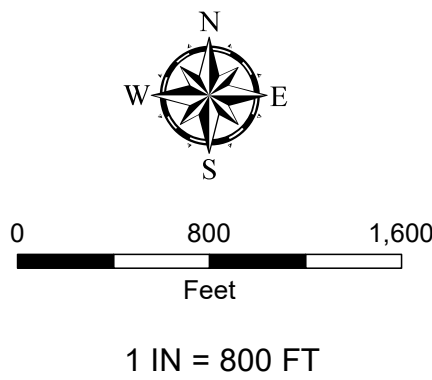
FIGURE 26

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL EXCEEDS SCREENING LEVELS
- IRRIGATION WELL
- RECOVERY WELL

2.10	TOTAL DISSOLVED SOLIDS CONCENTRATION
MSD-103	WELL NOT SAMPLED
PSH	PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
	TOTAL DISSOLVED SOLIDS CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 1000 mg/L)
	FENCELINE
	HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

 PHASE-SEPARATED HYDROCARBON (PSH)

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).

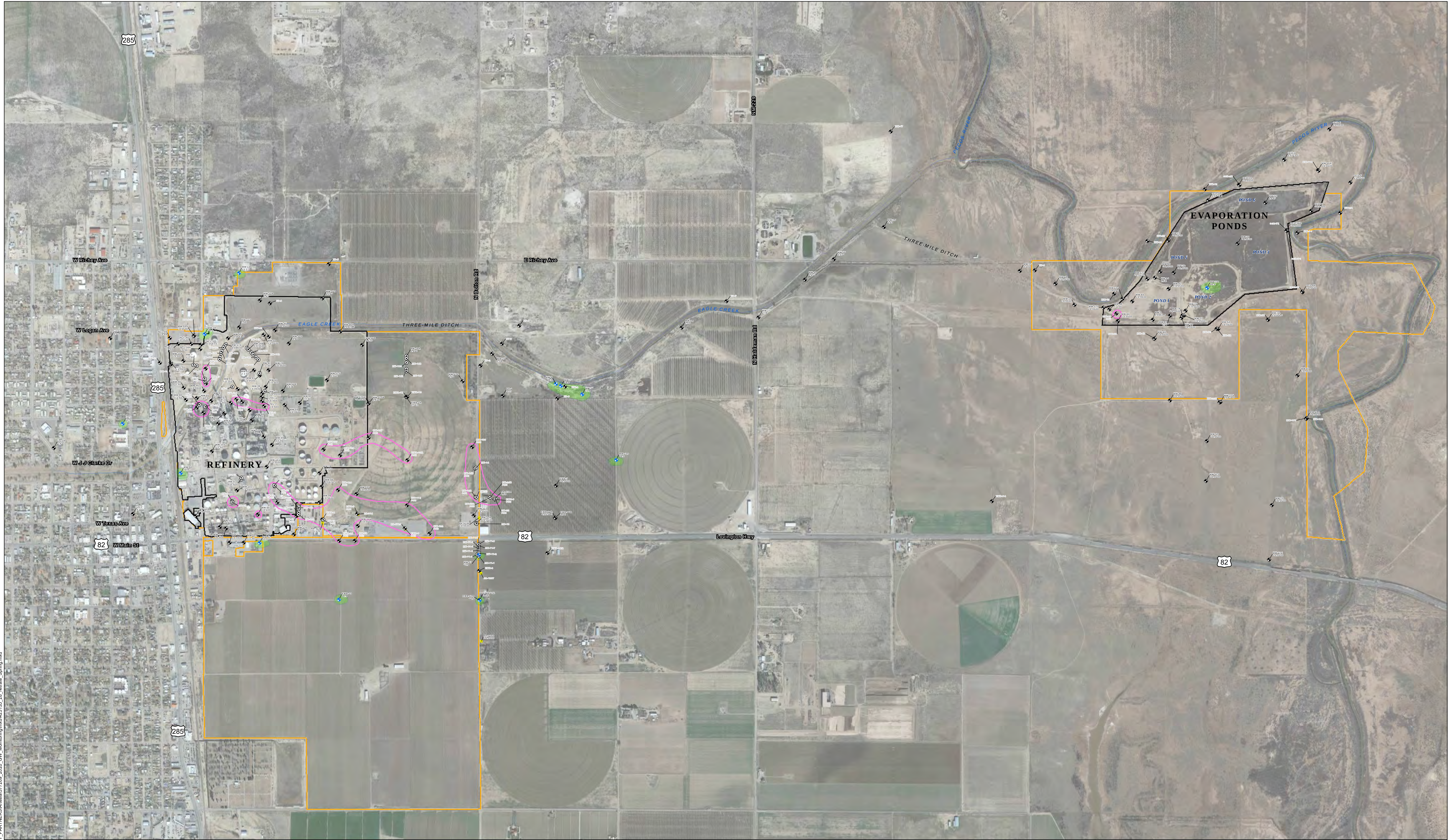


TOTAL DISSOLVED SOLIDS CRITICAL
GROUNDWATER SCREENING LEVEL
EXCEEDANCE MAP
2020 SECOND SEMIANNUAL EVENT
2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO



505 E. HUNTLAND DR
SUITE 250
AUSTIN, TX 78752
PH:512-329-6080

FIGURE
27



LEGEND

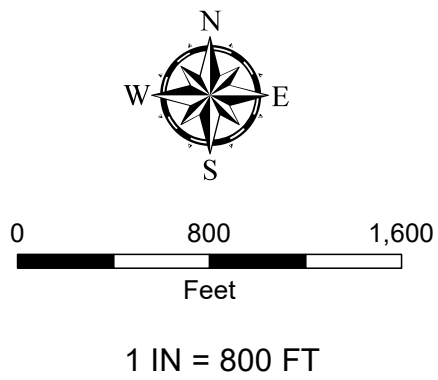
- ◆ MONITORING WELL EXCEEDS SCREENING LEVELS
- ◆ MONITORING WELL
- IRRIGATION WELL
- ⊙ RECOVERY WELL

- 14.0 NITRATE/NITRITE CONCENTRATION
- < 0.197 NITRATE/NITRITE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- MW-19 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- NITRATE/NITRITE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 10 mg/L)
- FENCELINE

- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- PHASE-SEPARATED HYDROCARBON (PSH)

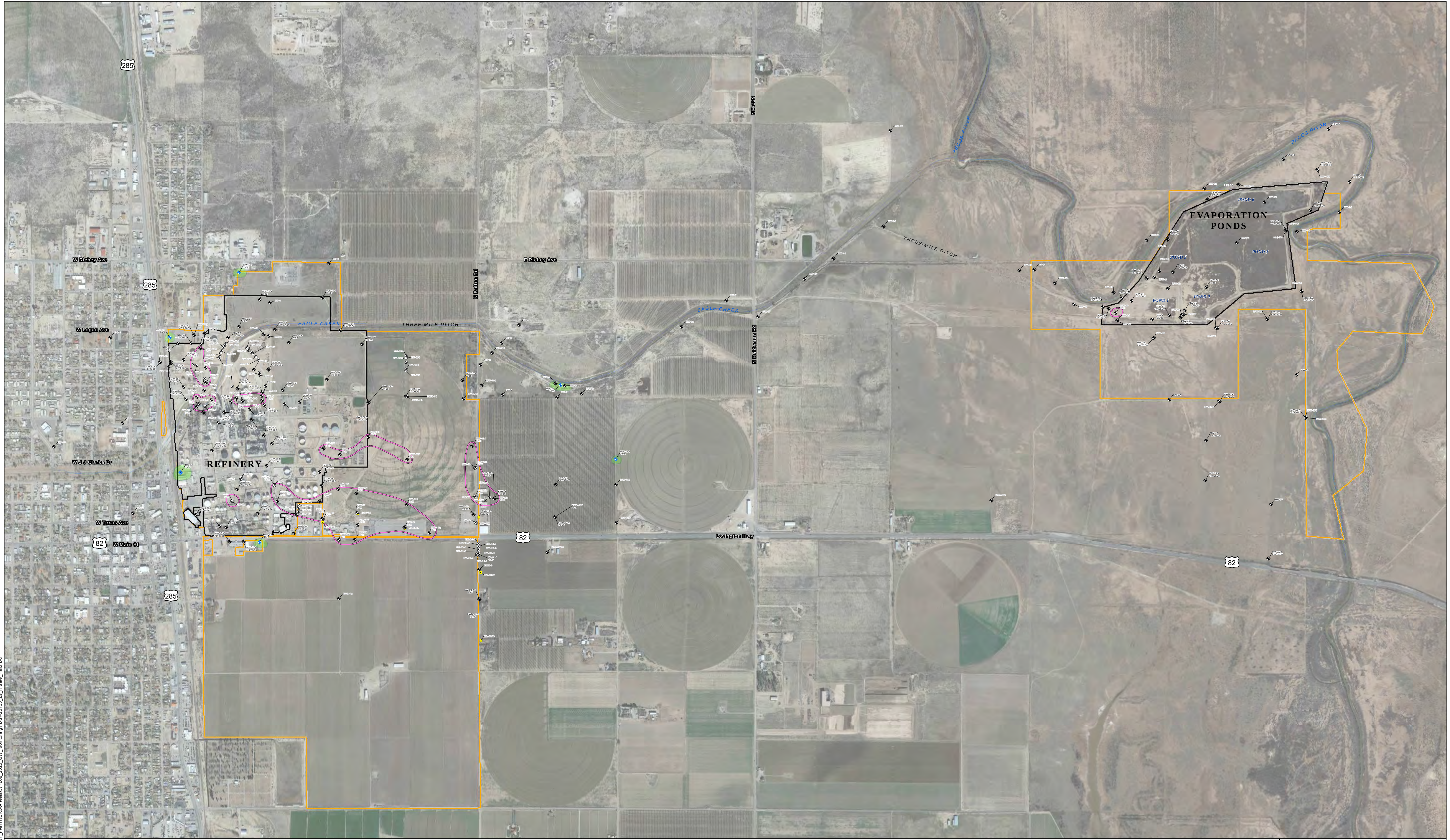
NOTES:

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



NITRATE/NITRITE CRITICAL GROUNDWATER
SCREENING LEVEL EXCEEDANCE MAP
2020 FIRST SEMIANNUAL EVENT
2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHOEN	SAVED: 2/4/2021	MXD: 4/25/15, 28_Nitrate_Spring
505 E. HUNTLAND DR. SUITE 250 AUSTIN, TX 78752 PH: 512-329-6080		FIGURE 28



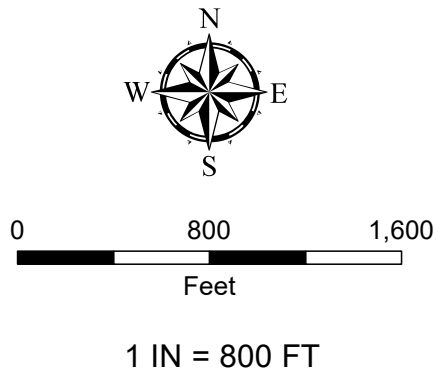
LEGEND

- ◆ MONITORING WELL EXCEEDS SCREENING LEVELS
- ◆ MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL

- 3.99 NITRATE/NITRITE CONCENTRATION
- < 0.394 NITRATE/NITRITE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- MW-103 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- NITRATE/NITRITE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 10 mg/L)
- FENCELINE

- HFNR PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- PHASE-SEPARATED HYDROCARBON (PSH)

- NOTES:
1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
 2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.



NITRATE/NITRITE CRITICAL GROUNDWATER
SCREENING LEVEL EXCEEDANCE MAP
2020 SECOND SEMIANNUAL EVENT

2020 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHOHN

SAVED: 2/3/2021

MOD: 425135_29_Nitrate_Fall

505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH: 512-329-6080

FIGURE
29

Tables

Table 1 - Well Information and Gauging Data

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well ID	Water-Bearing Zone ⁽¹⁾	Northing (ft)	Easting (ft)	Land Surface Elevation (ft amsl)	TOC Elevation (ft amsl)	Top of Screen Elevation (ft amsl)	Screen Interval (ft bgs)	Date Measured	Depth to PSH (ft btoc)	Depth to Water (ft btoc)	Corrected Groundwater Elevation ⁽²⁾ (ft amsl)	PSH Thickness (ft)
Cross-Gradient	KWB-13	Shallow	669077.00	524892.42	3366.02	3365.67	Unknown	Unknown	06/16/20	--	28.42	3,337.25	--
									10/06/20	--	28.00	3,337.67	--
	NP-5	Shallow	675512.24	524698.19	3,346.31	3,349.29	3,336.06	10.25 to 20	06/16/20	--	16.32	3,332.97	--
									10/06/20	--	16.91	3,332.38	--
	MW-136	Shallow	675343.45	522975.40	3,358.62	3,360.83	3,348.62	10 to 25	06/16/20	--	16.69	3,344.14	--
									10/06/20	--	18.40	3,342.43	--
Evaporation Ponds	MW-1R	Shallow	675135.17	538636.78	3,310.49	3,314.20	3,302.49	8 to 23	06/16/20	--	9.04	3,305.16	--
									10/06/20	--	12.51	3,301.69	--
	MW-2A	Shallow	675979.09	540803.91	3,310.55	3,312.97	Unknown	Unknown	06/16/20	--	8.02	3,304.95	--
									10/06/20	--	11.65	3,301.32	--
	MW-2B	Valley Fill	675969.73	540801.44	3,309.94	3,312.49	3,271.44	38.5 to 48	06/16/20	--	9.95	3,302.54	--
									10/06/20	--	12.69	3,299.80	--
	MW-3	Shallow	674443.34	540503.24	3,309.20	3,312.26	Unknown	Unknown	06/16/20	--	10.58	3,301.68	--
									10/06/20	--	13.08	3,299.18	--
	MW-4A	Shallow	674083.00	540529.44	3,308.63	3,312.20	Unknown	Unknown	06/16/20	--	10.82	3,301.38	--
									10/06/20	--	13.23	3,298.97	--
	MW-4B	Valley Fill	674089.71	540541.34	3,308.73	3,312.01	3,248.48	60.25 to 70	06/16/20	--	10.60	3,301.41	--
									10/06/20	--	13.00	3,299.01	--
	MW-5A	Shallow	674272.84	541759.78	3,306.59	3,308.62	Unknown	Unknown	06/16/20	--	8.55	3,300.07	--
									10/06/20	--	10.32	3,298.30	--
	MW-5B	Valley Fill	674272.33	541739.12	3,306.71	3,308.95	3,265.21	41.5 to 50.5	06/16/20	--	8.08	3,300.87	--
									10/06/20	--	10.41	3,298.54	--
	MW-5C	Valley Fill	674279.57	541728.80	3,306.55	3,309.28	3,247.30	59.25 to 68.75	06/16/20	--	8.25	3,301.03	--
									10/06/20	--	10.61	3,298.67	--
	MW-6A	Shallow	674427.07	539833.47	3,310.40	3,313.46	Unknown	Unknown	06/16/20	--	11.64	3,301.82	--
									10/06/20	--	14.28	3,299.18	--
	MW-6B	Valley Fill	674418.57	539834.04	3,310.09	3,313.35	3,270.59	39.5 to 49	06/16/20	--	11.47	3,301.88	--
									10/06/20	--	14.18	3,299.17	--
	MW-7A	Shallow	674447.64	542716.01	3,304.61	3,308.01	Unknown	Unknown	06/16/20	--	8.74	3,299.27	--
									10/06/20	--	10.99	3,297.02	--
	MW-7B	Valley Fill	674455.63	542715.61	3,306.05	3,307.87	3,266.55	39.5 to 49	06/16/20	--	8.52	3,299.35	--
									10/06/20	--	10.81	3,297.06	--
	MW-10	Shallow	672121.15	541540.05	3,304.12	3,304.76	3,304.12	0 to 19.4	06/16/20	--	5.80	3,298.96	--
									10/06/20	--	7.46	3,297.30	--
	MW-11A	Shallow	677317.73	543675.36	3,308.42	3,310.76	3,302.92	5.5 to 20	06/16/20	--	8.18	3,302.58	--
									10/06/20	--	10.93	3,299.83	--

Table 1 - Well Information and Gauging Data

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well ID	Water-Bearing Zone ⁽¹⁾	Northing (ft)	Easting (ft)	Land Surface Elevation (ft amsl)	TOC Elevation (ft amsl)	Top of Screen Elevation (ft amsl)	Screen Interval (ft bgs)	Date Measured	Depth to PSH (ft btoc)	Depth to Water (ft btoc)	Corrected Groundwater Elevation ⁽²⁾ (ft amsl)	PSH Thickness (ft)
Evaporation Ponds	MW-11B	Valley Fill	677305.72	543685.50	3,308.34	3,310.76	3,272.84	35.5 to 45	06/16/20	--	7.98	3,302.78	--
									10/06/20	--	10.89	3,299.87	--
	MW-12	Shallow	676952.63	541505.50	3,310.37	3,312.73	3,303.87	6.5 to 16	06/16/20	--	6.52	3,306.21	--
									10/06/20	--	10.03	3,302.70	--
	MW-13	Shallow	674951.80	539762.62	3,311.95	3,314.24	3,302.45	9.5 to 19	06/16/20	--	9.12	3,305.12	--
									10/06/20	--	12.89	3,301.35	--
	MW-14	Shallow	676122.48	543280.49	3,309.44	3,311.84	3,303.94	5.5 to 20	06/16/20	--	7.28	3,304.56	--
									10/06/20	--	>11.81	--	--
	MW-15	Shallow	674731.39	539003.75	3,310.97	3,313.72	3,301.97	9 to 19	06/16/20	--	9.63	3,304.09	--
									10/06/20	--	13.42	3,300.30	--
	MW-18A	Shallow	672548.16	543447.78	3,306.33	3,308.58	3,296.33	10 to 20	06/16/20	--	8.41	3,300.17	--
									10/06/20	--	11.68	3,296.90	--
	MW-18B	Valley Fill	672557.96	543458.22	3,306.23	3,308.74	3,269.23	37 to 47	06/16/20	--	8.42	3,300.32	--
									10/06/20	--	11.67	3,297.07	--
	MW-18T	Valley Fill	672559.79	543449.75	3,306.30	3,308.55	3,269.30	37 to 47	06/16/20	--	8.53	3,300.02	--
									10/06/20	--	11.80	3,296.75	--
	MW-22A	Shallow	672866.82	541801.63	3,305.24	3,307.62	3,299.74	5.5 to 20.5	06/16/20	--	8.12	3,299.50	--
									10/06/20	--	9.92	3,297.70	--
	MW-22B	Valley Fill	672866.58	541786.97	3,305.08	3,307.63	3,262.78	42.3 to 52	06/16/20	--	7.72	3,299.91	--
									10/06/20	--	9.76	3,297.87	--
	MW-24	Shallow	676498.23	544101.56	3,310.33	3,312.85	3,295.33	15 to 20	06/16/20	--	8.61	3,304.24	--
									10/06/20	--	12.04	3,300.81	--
	MW-69	Shallow	675962.29	540401.29	3,311.40	3,313.86	3,306.40	5 to 20	06/16/20	--	7.79	3,306.07	--
									10/06/20	--	11.61	3,302.25	--
	MW-70	Shallow	670892.66	542787.60	3,303.84	3,306.30	3,298.84	5 to 20	06/16/20	--	8.02	3,298.28	--
									10/06/20	--	10.08	3,296.22	--
	MW-72	Shallow	676691.27	542662.31	3,306.40	3,308.45	3,304.40	2 to 12	06/16/20	--	6.65	3,301.80	--
									10/06/20	--	9.17	3,299.28	--
	MW-73	Shallow	675910.20	542130.56	3,308.02	3,310.18	3,306.02	2 to 17	06/16/20	--	9.15	3,301.03	--
									10/06/20	--	11.92	3,298.26	--
	MW-74	Shallow	675059.14	541546.30	3,307.78	3,310.03	3,305.78	2 to 17	06/16/20	--	8.60	3,301.43	--
									10/06/20	--	11.01	3,299.02	--
	MW-75	Shallow	674622.31	541132.78	3,307.80	3,310.21	3,304.80	3 to 18	06/16/20	--	8.71	3,301.50	--
									10/06/20	--	11.07	3,299.14	--
	MW-76	Shallow	674482.47	541053.83	3,309.70	3,311.84	3,306.70	3 to 18	06/16/20	--	10.31	3,301.53	--
									10/06/20	--	12.77	3,299.07	--

Table 1 - Well Information and Gauging Data
 2020 Annual Groundwater Monitoring Report
 HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New

Area	Well ID	Water-Bearing Zone ⁽¹⁾	Northing (ft)	Easting (ft)	Land Surface Elevation (ft amsl)	TOC Elevation (ft amsl)	Mexico Top of Screen Elevation (ft amsl)	Screen Interval (ft bgs)	Date Measured	Depth to PSH (ft btoc)	Depth to Water (ft btoc)	Corrected Groundwater Elevation ⁽²⁾ (ft amsl)	PSH Thickness (ft)
Evaporation Ponds	MW-77	Shallow	674529.89	541104.86	3,307.97	3,310.07	3,304.97	3 to 18	06/16/20	--	8.60	3,301.47	--
									10/06/20	--	11.01	3,299.06	--
	MW-78	Shallow	674529.23	541073.45	3,307.94	3,310.14	3,305.94	2 to 17	06/16/20	--	8.69	3,301.45	--
									10/06/20	--	11.04	3,299.10	--
	MW-79	Shallow	675349.67	540906.08	3,309.08	3,311.43	3,307.08	2 to 17	06/16/20	--	9.18	3,302.25	--
									10/06/20	--	11.71	3,299.72	--
	MW-80	Shallow	675371.74	540646.46	3,310.27	3,310.79	3,308.27	2 to 17	06/16/20	--	7.39	3,303.40	--
									10/06/20	--	10.44	3,300.35	--
	MW-81	Shallow	675252.80	540544.47	3,310.19	3,312.34	3,308.19	2 to 17	06/16/20	--	9.25	3,303.09	--
									10/06/20	--	12.42	3,299.92	--
	MW-82	Shallow	675035.42	540806.88	3,308.64	3,310.75	3,306.64	2 to 17	06/16/20	--	8.51	3,302.24	--
									10/06/20	--	11.29	3,299.46	--
	MW-83	Shallow	674524.97	540832.80	3,307.93	3,310.19	3,305.93	2 to 17	06/16/20	--	8.56	3,301.63	--
									10/06/20	--	11.01	3,299.18	--
	MW-84	Shallow	674798.43	540109.13	3,309.83	3,311.59	3,307.83	2 to 17	06/16/20	--	9.49	3,302.10	--
									10/06/20	--	10.81	3,300.78	--
	MW-85	Shallow	674566.12	539805.49	3,308.99	3,311.09	3,305.99	3 to 18	06/16/20	8.82	8.95	3,302.24	0.13
									10/06/20	11.71	12.28	3,299.27	0.57
	MW-86	Shallow	674645.96	539671.17	3,308.98	3,311.06	3,306.98	2 to 17	06/16/20	--	8.30	3,302.76	--
									10/06/20	--	11.45	3,299.61	--
	MW-87	Shallow	673379.98	543280.45	3,305.42	3,307.64	3,303.42	2 to 17	06/16/20	--	7.99	3,299.65	--
									10/06/20	--	10.26	3,297.38	--
	MW-88	Shallow	672899.14	540832.09	3,306.43	3,308.68	3,303.43	3 to 18	06/16/20	--	9.00	3,299.68	--
									10/06/20	--	10.71	3,297.97	--
	MW-120	Shallow	674678.95	539555.77	3,310.66	3,313.55	3,300.66	10 to 25	06/16/20	--	10.67	3,302.88	--
									10/06/20	--	14.02	3,299.53	--
	MW-121	Shallow	674851.38	539923.70	3,311.77	3,314.68	3,301.77	10 to 25	06/16/20	--	9.83	3,304.85	--
									10/06/20	--	14.12	3,300.56	--
	MW-122	Shallow	675231.06	540401.60	3,308.78	3,311.69	3,298.78	10 to 20	06/16/20	--	9.36	3,302.33	--
									10/06/20	--	12.02	3,299.67	--
	MW-123	Shallow	671352.15	541523.94	3,302.78	3,303.98	3,292.78	10 to 25	06/16/20	--	6.34	3,297.64	--
									10/06/20	--	7.94	3,296.04	--
	MW-124	Shallow	669844.77	542735.51	3,302.99	3,305.84	3,297.99	5 to 20	06/16/20	--	8.92	3,296.92	--
									10/06/20	--	10.78	3,295.06	--
	OCD-1R	Shallow	676741.31	541568.00	3,310.69	3,314.27	Unknown	Unknown	06/16/20	--	9.50	3,304.77	--
									10/06/20	--	13.03	3,301.24	--

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Evaporation Ponds	OCD-2A	Shallow	677036.12	542157.14	3,310.83	3,314.16	3,302.33	8.5 to 23.5	06/16/20	--	9.16	3,305.00	--
									10/06/20	--	13.26	3,300.90	--
	OCD-2B	Valley Fill	677034.65	542167.57	3,310.66	3,313.07	3,272.16	38.5 to 48	06/16/20	--	10.50	3,302.57	--
									10/06/20	--	13.18	3,299.89	--
	OCD-3	Shallow	677516.31	543024.47	3,310.88	3,314.29	3,304.38	6.5 to 21.5	06/16/20	--	9.78	3,304.51	--
									10/06/20	--	13.68	3,300.61	--
	OCD-4	Shallow	678099.52	543893.55	3,310.10	3,313.70	3,303.60	6.5 to 21.5	06/16/20	--	9.35	3,304.35	--
									10/06/20	--	13.22	3,300.48	--
	OCD-5	Shallow	677081.54	544295.35	3,308.71	3,311.34	Unknown	Unknown	06/16/20	--	7.61	3,303.73	--
									10/06/20	--	11.44	3,299.90	--
	OCD-6	Shallow	676538.82	543540.03	3,307.20	3,311.36	3,299.20	8 to 23	06/16/20	--	7.51	3,303.85	--
									10/06/20	--	11.90	3,299.46	--
	OCD-7AR	Shallow	676169.74	543071.88	3,308.86	3,310.03	3,303.36	5.5 to 19.5	06/16/20	--	6.35	3,303.68	--
									10/06/20	--	11.01	3,299.02	--
	OCD-7B	Valley Fill	676157.36	543081.99	3,307.57	3,310.26	3,264.07	43.5 to 52.5	06/16/20	--	6.96	3,303.30	--
									10/06/20	--	11.00	3,299.26	--
	OCD-7C	Valley Fill	676155.95	543069.21	3,307.74	3,310.10	3,247.49	60.25 to 69.75	06/16/20	--	7.99	3,302.11	--
									10/06/20	--	10.73	3,299.37	--
	OCD-8A	Shallow	674976.41	543376.95	3,306.26	3,308.79	3,303.26	3 to 18	06/16/20	--	8.85	3,299.94	--
									10/06/20	--	10.70	3,298.09	--
	OCD-8B	Valley Fill	674992.24	543375.06	3,306.11	3,309.19	3,262.61	43.5 to 53	06/16/20	--	7.98	3,301.21	--
									10/06/20	--	10.67	3,298.52	--
Field East of Refinery	KWB-1A	Shallow	672969.12	526181.36	3,351.25	3,353.46	3,333.25	18 to 32	06/16/20	--	17.91	3,335.55	--
									10/06/20	--	18.49	3,334.97	--
	KWB-1B	Shallow	672968.90	526191.02	3,351.14	3,352.83	3,333.14	18 to 32	06/16/20	--	19.63	3,333.20	--
									10/06/20	--	20.14	3,332.69	--
	KWB-1C	Valley Fill	672968.22	526202.95	3,351.18	3,351.38	3,320.68	30.5 to 49.5	06/16/20	--	20.24	3,331.14	--
									10/06/20	--	20.75	3,330.63	--
	KWB-7	Shallow	671266.72	529055.47	3,343.00	3,346.16	3,325.00	18 to 32	06/16/20	--	19.71	3,326.45	--
									10/06/20	--	17.75	3,328.41	--
	KWB-8	Shallow	671000.57	527874.87	3,347.90	3,350.41	3,332.90	15 to 34	06/16/20	20.80	20.89	3,329.59	0.09
									10/06/20	--	18.86	3,331.55	--
	KWB-10R	Shallow	671756.34	526206.06	3,351.23	3,350.97	3,342.23	9 to 29	06/16/20	18.56	21.40	3,331.84	2.84
									10/06/20	18.80	21.79	3,331.57	2.99
	KWB-11A	Shallow	670643.67	529043.46	3,346.13	3,348.72	3,316.13	30 to 39.5	06/16/20	--	20.14	3,328.58	--
									10/06/20	--	17.56	3,331.16	--

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Field East of Refinery	KWB-11B	Valley Fill	670653.84	529044.06	3,345.91	3,348.03	3,295.91	50 to 69.5	06/16/20	--	20.88	3,327.15	--
									10/06/20	--	18.31	3,329.72	--
	KWB-12A	Shallow	669074.44	527590.88	3,352.01	3,351.81	3,336.51	15.5 to 24.5	06/16/20	--	23.88	3,327.93	--
									10/06/20	--	23.11	3,328.70	--
	KWB-12B	Valley Fill	669064.18	527590.12	3,351.84	3,351.63	3,326.34	25.5 to 39.5	06/16/20	--	23.73	3,327.90	--
									10/06/20	--	23.07	3,328.56	--
	KWB-P4	Shallow	670970.10	537416.92	3,305.76	3,305.39	Unknown	Unknown	--	--	--	--	--
									--	--	--	--	--
	MW-57	Shallow	669935.59	527579.02	3,350.95	3,350.91	3,340.95	10 to 30	06/16/20	--	21.45	3,329.46	--
									10/06/20	--	21.73	3,329.18	--
	MW-58	Shallow	670207.27	525197.99	3,362.56	3,362.22	3,349.56	13 to 28	06/16/20	23.43	24.05	3,338.67	0.62
									10/06/20	23.76	24.71	3,338.27	0.95
	MW-111	Shallow	670494.22	525254.30	3,362.52	3,365.51	3,337.52	25 to 40	06/16/20	--	27.05	3,338.46	--
									10/06/20	27.39	27.64	3,338.07	0.25
	MW-112	Shallow	670890.64	526198.73	3,355.38	3,358.38	3,330.38	25 to 35	06/16/20	23.15	25.09	3,334.84	1.94
									10/06/20	23.23	25.29	3,334.74	2.06
	MW-113	Shallow	670693.80	527483.95	3,350.06	3,352.93	3,330.06	20 to 35	06/16/20	--	23.02	3,329.91	--
									10/06/20	--	21.49	3,331.44	--
	MW-125	Shallow	673288.01	524663.00	3,355.60	3,358.81	3,340.60	15 to 25	06/16/20	--	19.17	3,339.64	--
									10/06/20	--	20.32	3,338.49	--
	MW-126A	Shallow	672845.69	525458.24	3,353.60	3,356.60	3,334.60	19 to 34	06/16/20	--	20.60	3,336.00	--
									10/06/20	--	21.41	3,335.19	--
	MW-126B	Valley Fill	672843.26	525464.41	3,353.60	3,356.67	3,313.60	40 to 50	06/16/20	--	20.45	3,336.22	--
									10/06/20	--	21.29	3,335.38	--
	MW-127	Shallow	672184.21	525464.20	3,355.50	3,358.39	3,335.50	20 to 50	06/16/20	22.45	24.24	3,335.58	1.79
									10/06/20	22.96	24.88	3,335.05	1.92
	MW-128	Shallow	671846.09	524917.06	3,358.80	3,358.77	3,343.80	15 to 35	06/16/20	18.35	20.26	3,340.04	1.91
									10/06/20	19.06	21.20	3,339.28	2.14
	MW-129	Shallow	671184.95	524876.21	3,363.10	3362.907 ⁽⁴⁾	3,343.10	20 to 50	06/16/20	23.17	24.08	3,339.56	0.91
									10/06/20	23.66	24.75	3,339.03	1.09
	MW-130	Shallow	670331.35	524029.44	3,370.20	3,369.86	3,340.20	30 to 45	06/16/20	--	22.49	3,347.37	--
									10/06/20	--	23.19	3,346.67	--
	MW-131	Shallow	671104.83	525228.77	3,360.40	3,363.49	3,340.40	20 to 50	06/16/20	--	25.85	3,337.64	--
									10/06/20	25.95	27.58	3,337.21	1.63
	MW-132	Shallow	670346.80	526629.79	3,354.30	3,357.12	3,339.30	15 to 40	06/16/20	21.25	23.75	3,335.37	2.50
									10/06/20	21.32	23.80	3,335.30	2.48

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Field East of Refinery	MW-133	Shallow	672005.89	527446.73	3,343.40	3,349.45	3,328.40	15 to 35	06/16/20	19.72	20.18	3,329.64	0.46
									10/06/20	19.40	19.62	3,330.01	0.22
	MW-134	Shallow	673271.80	527263.99	3,343.10	3,346.23	3,323.10	20 to 30	06/16/20	--	19.18	3,327.05	--
									10/06/20	--	19.73	3,326.50	--
	MW-135	Shallow	671758.72	530211.23	3,338.00	3,337.65	3,303.00	35 to 65	06/16/20	--	30.71	3,306.94	--
									10/06/20	--	31.02	3,306.63	--
	RW-12R	Shallow	670542.50	527519.20	3,350.58	3,351.54	3,335.58	15 to 35	06/16/20	--	23.55	3,327.99	--
									10/06/20	--	21.74	3,329.80	--
	RW-13R	Shallow	671049.37	527506.74	3,349.60	3,351.54	3,334.60	15 to 35	06/16/20	22.01	24.21	3,329.09	2.20
									10/06/20	20.02	20.13	3,331.50	0.11
	RW-14R	Shallow	671592.73	527504.45	3,347.39	3,349.37	3,332.39	15 to 35	06/16/20	20.47	26.73	3,327.65	6.26
									10/06/20	21.78	21.97	3,327.55	0.19
	RW-18A	Shallow	673750.19	526188.64	3,349.04	3,350.84	Unknown	Unknown	06/16/20	--	16.94	3,333.90	--
									10/06/20	--	17.60	3,333.24	--
	RW-20A	Shallow	671032.06	527790.95	3,347.75	3,348.44	Unknown	Unknown	06/16/20	17.52	17.63	3,330.90	0.11
									10/06/20	>20.65	>20.65	NM ⁽⁵⁾	>0.00
	RW-20B	Shallow	671032.06	527790.95	3,347.75	3,348.44	Unknown	Unknown	06/16/20	17.53	17.66	3,330.88	0.13
									10/06/20	20.51	20.70	3,327.89	0.19
	RW-22	Shallow	671009.70	527889.44	3,347.17	3,349.21	3,335.67	11.5 to 39	06/16/20	24.64	30.33	3,323.43	5.69
									10/06/20	23.46	24.34	3,325.57	0.88
	MW-145	Shallow	672914.535	527283.916	3,343.94	3347.069	3,334.94	9 to 29	06/16/20	--	--	--	--
									10/06/20	--	20.04	3,327.03	--
	MW-146	Shallow	673173.048	527636.606	3,340.34	3343.093	3,330.34	10 to 30	06/16/20	--	--	--	--
									10/06/20	--	23.30	3,319.79	--
	MW-147	Shallow	671265.079	530212.282	3,339.85	3339.480	3,319.85	20 to 40	06/16/20	--	--	--	--
									10/06/20	--	30.70	3,308.78	--
	MW-148	Shallow	670534.369	530218.563	3,342.79	3342.593	3,322.79	20 to 40	06/16/20	--	--	--	--
									10/06/20	--	34.40	3,308.19	--
North Refinery	MW-23	Shallow	672851.25	522821.05	3,365.09	3,368.38	3,350.09	15 to 20	06/16/20	--	16.24	3,352.14	--
									10/06/20	--	18.31	3,350.07	--
	MW-29	Shallow	673481.15	523544.65	3,359.79	3,360.64	3,350.04	9.75 to 19.25	06/16/20	--	20.76	3,339.88	--
									10/06/20	--	22.19	3,338.45	--
	MW-30	Shallow	674124.92	523550.16	3,359.14	3,361.98	Unknown	Unknown	06/16/20	--	15.90	3,346.08	--
									10/06/20	--	17.71	3,344.27	--
	MW-39	Shallow	673039.50	523422.93	3,357.94	3,358.79	3,343.94	14 to 24	06/16/20	--	15.22	3,343.57	--
									10/06/20	--	16.84	3,341.95	--

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North Refinery	MW-40	Shallow	673161.12	523489.02	3,356.56	3,356.93	Unknown	Unknown	06/16/20	--	13.86	3,343.07	--
									10/06/20	--	15.40	3,341.53	--
	MW-41	Shallow	673379.87	523374.64	3,356.38	3,356.58	3,342.38	14 to 19	06/16/20	--	14.02	3,342.56	--
									10/06/20	--	14.74	3,341.84	--
	MW-42	Shallow	673480.27	523263.53	3,355.64	3,358.44	Unknown	Unknown	06/16/20	--	15.42	3,343.02	--
									10/06/20	--	17.04	3,341.40	--
	MW-43	Shallow	673115.86	522950.40	3,363.38	3,365.49	3,347.88	15.5 to 20.5	06/16/20	--	13.99	3,351.50	--
									10/06/20	--	15.85	3,349.64	--
	MW-59	Shallow	672814.66	523854.12	3,359.44	3,362.43	3,344.44	15 to 30	06/16/20	--	16.62	3,345.81	--
									10/06/20	--	18.11	3,344.32	--
	MW-60	Shallow	672849.58	524143.12	3,359.26	3,361.98	3,344.26	15 to 30	06/16/20	--	17.95	3,344.03	--
									10/06/20	--	19.35	3,342.63	--
	MW-61	Shallow	672453.76	522578.38	3,369.45	3,369.47	3,355.45	14 to 29	06/16/20	--	12.90	3,356.57	--
									10/06/20	--	14.97	3,354.50	--
	MW-62	Shallow	672650.76	522696.50	3,368.35	3,368.81	3,354.35	14 to 29	06/16/20	--	15.50	3,353.31	--
									10/06/20	--	17.56	3,351.25	--
	MW-62R	Shallow	672656.02	522699.19	Unknown	3,368.53	Unknown	5 to 25	06/16/20	--	--	--	--
									10/06/20	--	17.29	3,351.24	--
	MW-67	Shallow	673224.88	522342.43	3,365.59	3,365.45	3,353.59	12 to 27	06/16/20	12.18	12.23	3,353.26	0.05
									10/06/20	14.42	16.28	3,350.66	1.86
	MW-90	Shallow	672909.28	521960.18	3,367.13	3,369.42	3,362.13	5 to 20	06/16/20	--	12.66	3,356.76	--
									10/06/20	--	14.47	3,354.95	--
	MW-91	Shallow	672945.86	522167.26	3,365.72	3,367.73	3,358.72	7 to 22	06/16/20	--	12.78	3,354.95	--
									10/06/20	14.87	14.91	3,352.85	0.04
	MW-92	Shallow	672766.10	522167.26	3,366.75	3,368.72	3,361.75	5 to 20	06/16/20	13.11	13.67	3,355.50	0.56
									10/06/20	14.68	17.69	3,353.44	3.01
	MW-93	Shallow	672897.25	522446.83	3,364.22	3,363.79	3,359.22	5 to 20	06/16/20	--	9.90	3,353.89	--
									10/06/20	11.86	11.90	3,351.92	0.04
	MW-94	Shallow	673510.54	522336.27	3,365.82	3,367.97	3,360.82	5 to 20	06/16/20	14.63	18.50	3,352.57	3.87
									10/06/20	16.94	22.45	3,349.93	5.51
	MW-95	Shallow	673084.72	522308.89	3,366.48	3,368.70	3,359.48	7 to 22	06/16/20	--	14.86	3,353.84	--
									10/06/20	--	17.13	3,351.57	--
	MW-96	Shallow	673143.60	521917.50	3,366.83	3,368.92	3,359.83	7 to 22	06/16/20	--	12.85	3,356.07	--
									10/06/20	--	15.03	3,353.89	--
	MW-97	Shallow	672660.45	522295.96	3,366.38	3,365.92	3,358.38	8 to 23	06/16/20	10.81	14.06	3,354.46	3.25
									10/06/20	NM	NM	--	NM

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HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well ID	Water-Bearing Zone ⁽¹⁾	Northing (ft)	Easting (ft)	Land Surface Elevation (ft amsl)	TOC Elevation (ft amsl)	Top of Screen Elevation (ft amsl)	Screen Interval (ft bgs)	Date Measured	Depth to PSH (ft btoc)	Depth to Water (ft btoc)	Corrected Groundwater Elevation ⁽²⁾ (ft amsl)	PSH Thickness (ft)
North Refinery	MW-98	Shallow	672517.05	523220.39	3,358.96	3,361.36	3,345.96	13 to 23	06/16/20	--	12.88	3,348.48	--
									10/06/20	--	13.54	3,347.82	--
	MW-137	Shallow	672923.48	522924.27	3,363.15	3,364.83	3,353.15	10 to 30	06/16/20	11.38	12.47	3,353.23	1.09
									10/06/20	13.41	14.97	3,351.11	1.56
	MW-137A	Shallow	672872.20	523039.47	Unknown	3,363.45	Unknown	5.5 to 15.5	06/16/20	--	--	--	--
									10/06/20	13.49	14.62	3,349.74	1.13
	MW-138	Shallow	672876.52	523041.05	3,364.73	3,363.24	3,354.73	10 to 25	06/16/20	12.89	15.49	3,349.83	2.60
									10/06/20	14.81	17.88	3,347.82	3.07
	MW-138A	Shallow	672924.49	522916.09	Unknown	3,364.56	Unknown	5.5 to 15.5	06/16/20	--	--	--	--
									10/06/20	14.59	--	--	>0.44
	RW-1	Shallow	672825.27	522204.68	3,365.29	3,367.03	Unknown	Unknown	06/16/20	14.37	15.08	3,352.52	0.71
									10/06/20	17.61	18.21	3,349.30	0.60
	RW-2	Shallow	672781.86	522337.29	3,368.17	3,368.17	Unknown	Unknown	06/16/20	15.02	15.53	3,353.05	0.51
									10/06/20	15.60	16.88	3,352.31	1.28
	RW-7	Shallow	673579.35	522098.94	3,365.03	3,367.09	Unknown	Unknown	06/16/20	--	13.84	3,353.25	--
									10/06/20	18.79	20.95	3,347.87	2.16
	RW-8	Shallow	673266.20	522321.21	3,364.89	3,368.10	Unknown	Unknown	06/16/20	13.62	15.72	3,354.06	2.10
									10/06/20	18.17	21.72	3,349.22	3.55
	RW-9	Shallow	673423.49	523371.16	3,356.30	3,359.51	Unknown	Unknown	06/16/20	--	15.19	3,344.32	--
									10/06/20	--	16.75	3,342.76	--
	RW-10	Shallow	673076.17	523469.29	3,356.12	3,360.61	Unknown	Unknown	06/16/20	--	15.18	3,345.43	--
									10/06/20	--	16.76	3,343.85	--
	RW-16B	Shallow	673876.71	523156.09	3,357.20	3,360.97	Unknown	Unknown	06/16/20	--	17.10	3,343.87	--
									10/06/20	DRY	DRY	--	DRY
	RW-17A	Shallow	673978.33	522723.59	3,362.76	3,364.72	Unknown	Unknown	06/16/20	--	14.54	3,350.18	--
									10/06/20	DRY	DRY	--	DRY
North RO Reject Field	MW-117	Shallow	674301.52	522979.73	3,360.07	3,363.01	3,350.07	10 to 25	06/16/20	--	14.65	3,348.36	--
									10/06/20	--	16.17	3,346.84	--
	MW-118	Shallow	674819.18	523375.94	3,359.62	3,361.95	3,349.62	10 to 25	06/16/20	--	17.76	3,344.19	--
									10/06/20	--	19.35	3,342.60	--
	MW-119	Shallow	674860.11	524575.80	3,353.83	3,356.11	3,343.83	10 to 25	06/16/20	--	16.02	3,340.09	--
									10/06/20	--	17.21	3,338.90	--
NCL	MW-18	Shallow	674172.45	522318.86	3,358.54	3,361.02	3,343.54	15 to 19	06/16/20	--	14.14	3,346.88	--
									10/06/20	--	15.85	3,345.17	--
	MW-19	Shallow	673597.29	521670.75	3,366.00	3,368.00	3,361.00	5 to 19.5	06/16/20	--	12.45	3,355.55	--
									10/06/20	--	14.80	3,353.20	--

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Area	Well ID	Water-Bearing Zone ⁽¹⁾	Northing (ft)	Easting (ft)	Land Surface Elevation (ft amsl)	TOC Elevation (ft amsl)	Top of Screen Elevation (ft amsl)	Screen Interval (ft bgs)	Date Measured	Depth to PSH (ft btoc)	Depth to Water (ft btoc)	Corrected Groundwater Elevation ⁽²⁾ (ft amsl)	PSH Thickness (ft)
NCL	MW-45	Shallow	674247.07	523663.75	3,351.32	3,351.51	3,340.82	10.5 to 15.5	06/16/20	--	11.27	3,340.24	--
									10/06/20	--	13.20	3,338.31	--
	MW-53	Shallow	673626.07	521459.12	3,368.86	3,368.73	3,355.06	13.8 to 23.8	06/16/20	--	-- ⁽³⁾	--	--
									10/06/20	--	-- ⁽³⁾	--	--
	MW-53R	Shallow	673615.989	521463.004	3,368.87	3368.749	3,354.87	14 to 24	06/16/20	--	--	--	--
									10/06/20	--	14.56	3,354.19	--
	MW-54A	Shallow	674138.65	522110.51	3,363.55	3,366.49	3,350.85	12.7 to 27.7	06/16/20	--	14.77	3,351.72	--
									10/06/20	--	16.50	3,349.99	--
	MW-54B	Valley Fill	674148.44	522118.80	3,363.47	3,366.47	3,329.67	33.8 to 43.8	06/16/20	--	14.83	3,351.64	--
									10/06/20	--	16.52	3,349.95	--
	MW-55	Shallow	674091.95	522766.46	3,361.90	3,364.77	3,348.20	13.7 to 23.7	06/16/20	--	15.02	3,349.75	--
									10/06/20	--	16.64	3,348.13	--
	MW-56	Shallow	674160.38	523450.14	3,354.84	3,357.44	3,341.44	13.4 to 23.4	06/16/20	--	16.67	3,340.77	--
									10/06/20	--	18.51	3,338.93	--
	MW-108	Shallow	673659.33	521910.16	3,366.25	3,369.11	3,357.25	9 to 24	06/16/20	--	15.30	3,353.81	--
									10/06/20	--	17.89	3,351.22	--
	NCL-31	Shallow	673629.51	521669.01	3,366.21	3,367.54	3,353.21	13 to 18	06/16/20	--	12.17	3,355.37	--
									10/06/20	--	14.44	3,353.10	--
	NCL-32	Shallow	673984.83	521808.14	3,364.96	3,364.91	3,347.96	17 to 22	06/16/20	--	12.26	3,352.65	--
									10/06/20	--	13.96	3,350.95	--
	NCL-33	Shallow	673967.20	522245.18	3,364.26	3,363.97	3,351.26	13 to 18	06/16/20	--	12.10	3,351.87	--
									10/06/20	--	14.04	3,349.93	--
	NCL-34A	Shallow	673885.52	522235.08	3,364.82	3,365.49	3,348.82	16 to 21	06/16/20	--	13.40	3,352.09	--
									10/06/20	15.01	--	--	>4.25 ⁽⁶⁾
	NCL-44	Shallow	673986.41	522062.11	3,364.01	3,364.45	Unknown	Unknown	06/16/20	--	11.85	3,352.60	--
									10/06/20	--	13.81	3,350.64	--
	NCL-49	Shallow	674099.16	521648.40	3,368.26	3,371.13	3,351.46	16.8 to 17.8	06/16/20	--	18.18	3,352.95	--
									10/06/20	--	19.62	3,351.51	--
South Refinery	KWB-2R	Shallow	670207.24	524897.59	3,364.56	3,364.32	Unknown	Unknown	06/16/20	24.57	24.73	3,339.72	0.16
									10/06/20	25.10	25.29	3,339.18	0.19
	KWB-4	Shallow	670616.38	524572.44	3,368.36	3,370.25	3,348.36	20 to 39	06/16/20	26.39	28.10	3,343.52	1.71
									10/06/20	27.03	28.31	3,342.96	1.28
	KWB-5	Shallow	670729.55	525244.51	3,362.60	3,364.72	3,337.90	24.7 to 38.7	06/16/20	25.72	27.11	3,338.72	1.39
									10/06/20	25.97	28.09	3,338.33	2.12
	KWB-6	Shallow	670449.36	526158.70	3,358.02	3,360.30	3,340.52	17.5 to 36.5	06/16/20	23.89	26.45	3,335.90	2.56
									10/06/20	23.98	26.61	3,335.79	2.63

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Area	Well ID	Water-Bearing Zone ⁽¹⁾	Northing (ft)	Easting (ft)	Land Surface Elevation (ft amsl)	TOC Elevation (ft amsl)	Mexico Top of Screen Elevation (ft amsl)	Screen Interval (ft bgs)	Date Measured	Depth to PSH (ft btoc)	Depth to Water (ft btoc)	Corrected Groundwater Elevation ⁽²⁾ (ft amsl)	PSH Thickness (ft)
South Refinery	MW-28	Shallow	671508.38	524521.56	3,366.79	3,370.27	3,341.79	25 to 30	06/16/20	--	20.18	3,350.09	--
									10/06/20	--	21.03	3,349.24	--
	MW-48	Shallow	670689.39	524080.35	3,363.04	3,362.97	Unknown	Unknown	06/16/20	20.79	20.82	3,342.17	0.03
									10/06/20	21.41	21.49	3,341.54	0.08
	MW-50	Shallow	671502.45	521857.84	3,368.91	3,371.05	Unknown	Unknown	06/16/20	--	14.85	3,356.20	--
									10/06/20	--	15.41	3,355.64	--
	MW-52	Shallow	670165.24	523370.99	3,368.36	3,368.30	Unknown	Unknown	06/16/20	--	20.83	3,347.47	--
									10/06/20	--	21.54	3,346.76	--
	MW-64	Shallow	670716.03	523338.61	3,365.56	3,369.52	3,350.56	15 to 30	06/16/20	20.95	20.96	3,348.57	0.01
									10/06/20	--	21.67	3,347.85	--
	MW-65	Shallow	670949.22	523711.75	3,363.84	3,363.60	3,349.34	14.5 to 29.5	06/16/20	17.84	18.99	3,345.53	1.15
									10/06/20	19.12	19.62	3,344.38	0.50
	MW-66	Shallow	671247.57	524560.06	3,363.66	3,363.46	3,349.06	14.6 to 29.6	06/16/20	--	19.34	3,344.12	--
									10/06/20	--	19.95	3,343.51	--
	MW-99	Shallow	671652.52	524579.74	3,365.11	3,364.51	3,353.11	12 to 27	06/16/20	--	20.07	3,344.44	--
									10/06/20	20.46	21.52	3,343.84	1.06
	MW-101	Shallow	671627.36	523504.79	3,362.98	3366.148 ⁽⁴⁾	3,354.98	8 to 23	06/16/20	--	14.25	3,351.90	--
									10/06/20	--	15.06	3,351.09	--
	MW-102	Shallow	671176.70	522937.01	3,365.51	3,367.64	3,353.51	12 to 27	06/16/20	--	16.65	3,350.99	--
									10/06/20	--	17.00	3,350.64	--
	MW-103	Shallow	670472.55	522607.80	3,370.89	3,372.47	3,363.89	7 to 22	06/16/20	--	17.69	3,354.78	--
									10/06/20	--	18.30	3,354.17	--
	MW-104	Shallow	670450.35	522729.44	3,369.41	3,371.43	3,366.41	3 to 18	06/16/20	--	13.85	3,357.58	--
									10/06/20	--	14.31	3,357.12	--
	MW-105	Shallow	671924.44	522454.93	3,365.20	3,364.99	3,357.20	8 to 18	06/16/20	--	9.69	3,355.30	--
									10/06/20	--	11.18	3,353.81	--
	MW-106	Shallow	672207.14	523454.55	3,359.29	3,358.98	3,359.29	0 to 11	06/16/20	--	10.32	3,348.66	--
									10/06/20	--	11.81	3,347.17	--
	MW-107	Shallow	671961.38	524600.45	3,359.63	3,359.44	3,347.63	12 to 22	06/16/20	16.43	18.35	3,342.63	1.92
									10/06/20	17.35	18.68	3,341.82	1.33
	MW-109	Shallow	670174.25	523065.52	3,368.27	3,368.09	3,353.27	15 to 29.5	06/16/20	--	18.89	3,349.20	--
									10/06/20	--	19.52	3,348.57	--
	MW-110	Shallow	670174.33	522796.69	3,368.46	3,368.03	3,353.46	15 to 29.5	06/16/20	--	15.45	3,352.58	--
									10/06/20	--	16.12	3,351.91	--
	MW-139	Shallow	670687.2	522149.2	3374.32	3374.05	3,364.32	10 to 30	06/16/20	--	13.86	3,360.19	--
									10/06/20	--	14.51	3,359.54	--

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Area	Well ID	Water-Bearing Zone ⁽¹⁾	Northing (ft)	Easting (ft)	Land Surface Elevation (ft amsl)	TOC Elevation (ft amsl)	Top of Screen Elevation (ft amsl)	Screen Interval (ft bgs)	Date Measured	Depth to PSH (ft btoc)	Depth to Water (ft btoc)	Corrected Groundwater Elevation ⁽²⁾ (ft amsl)	PSH Thickness (ft)
South Refinery	RW-4	Shallow	671378.27	523010.47	3,364.41	3,364.86	Unknown	Unknown	06/16/20	--	15.05	3,349.81	--
									10/06/20	--	15.58	3,349.28	--
	RW-5R	Shallow	671258.01	523662.01	3,362.79	3,368.56	3,349.79	13 to 33	06/16/20	22.60	24.32	3,345.62	1.72
									10/06/20	21.04	21.33	3,347.46	0.29
	RW-6	Shallow	670969.39	522843.22	3,366.03	3,368.36	Unknown	Unknown	06/16/20	23.60	26.12	3,344.26	2.52
									10/06/20	17.51	21.25	3,350.10	3.74
	RW-11-0	Shallow	669938.15	527541.66	3,351.48	3,353.95	Unknown	Unknown	06/16/20	DRY	DRY	--	DRY
									10/06/20	DRY	DRY	--	DRY
	RW-15C	Shallow	670820.45	524123.41	3,362.65	3,361.41	Unknown	Unknown	06/16/20	18.71	18.99	3,342.64	0.28
									10/06/20	19.26	19.30	3,342.14	0.04
	RW-19	Shallow	670611.43	524592.99	3,367.09	3,369.11	3,356.09	11 to 46	06/16/20	27.25	27.30	3,341.85	0.05
									10/06/20	27.80	27.89	3,341.29	0.09
South RO Reject Field	MW-114	Shallow	673082.16	523818.86	3,358.62	3,361.68	3,338.62	20 to 35	06/16/20	--	15.98	3,345.70	--
									10/06/20	--	17.38	3,344.30	--
	MW-115	Shallow	673997.34	523932.93	3,356.48	3,359.31	3,346.48	10 to 25	06/16/20	--	16.18	3,343.13	--
									10/06/20	--	17.89	3,341.42	--
	MW-116	Shallow	673966.06	525339.63	3,350.99	3,353.77	3,340.99	10 to 25	06/16/20	--	16.18	3,337.59	--
									10/06/20	--	17.18	3,336.59	--
TEL	MW-49	Shallow	672051.80	523610.79	3,359.73	3,359.63	Unknown	Unknown	06/16/20	--	12.95	3,346.68	--
									10/06/20	--	14.15	3,345.48	--
	TEL-1	Shallow	672966.33	523412.82	3,356.79	3,358.23	3,343.79	13 to 23	06/16/20	--	14.52	3,343.71	--
									10/06/20	16.14	16.80	3,341.96	0.66
	TEL-2	Shallow	672885.90	523419.29	3,356.80	3,359.12	3,343.80	13 to 23	06/16/20	--	15.20	3,343.92	--
									10/06/20	16.87	17.25	3,342.17	0.38
	TEL-3	Shallow	672796.06	523459.33	3,356.43	3,358.33	3,343.43	13 to 23	06/16/20	14.10	14.16	3,344.22	0.06
									10/06/20	--	15.90	3,342.43	--
	TEL-4	Shallow	672715.99	523181.18	3,358.21	3,360.24	3,345.21	13 to 23	06/16/20	--	12.67	3,347.57	--
									10/06/20	--	14.80	3,345.44	--
TMD	MW-8	Shallow	673215.93	529055.18	3,334.81	3,336.42	Unknown	Unknown	06/16/20	--	15.87	3,320.55	--
									10/06/20	--	16.59	3,319.83	--
	MW-9	Shallow	673169.56	529232.03	3,334.50	3,336.20	Unknown	Unknown	06/16/20	--	16.43	3,319.77	--
									10/06/20	--	17.12	3,319.08	--
	MW-16	Shallow	675613.35	534389.17	3,313.50	3,316.12	3,305.00	8.5 to 19	06/16/20	--	9.66	3,306.46	--
									10/06/20	--	10.39	3,305.73	--
	MW-20	Shallow	673800.56	527834.67	3,338.43	3,340.91	3,328.93	9.5 to 23.5	06/16/20	--	17.08	3,323.83	--
									10/06/20	--	18.33	3,322.58	--

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Area	Well ID	Water-Bearing Zone ⁽¹⁾	Northing (ft)	Easting (ft)	Land Surface Elevation (ft amsl)	TOC Elevation (ft amsl)	Top of Screen Elevation (ft amsl)	Screen Interval (ft bgs)	Date Measured	Depth to PSH (ft btoc)	Depth to Water (ft btoc)	Corrected Groundwater Elevation ⁽²⁾ (ft amsl)	PSH Thickness (ft)
TMD	MW-21	Shallow	673180.38	529150.62	3,334.65	3,337.31	3,327.15	7.5 to 22	06/16/20	--	15.21	3,322.10	--
									10/06/20	--	15.76	3,321.55	--
	MW-25	Shallow	675386.30	537955.86	3,310.35	3,312.29	3,294.60	15.75 to 25.25	06/16/20	--	12.82	3,299.47	--
									10/06/20	--	15.96	3,296.33	--
	MW-26	Shallow	676229.18	535348.61	3,312.08	3,314.87	3,296.83	15.25 to 24.25	06/16/20	--	7.76	3,307.11	--
									10/06/20	--	14.00	3,300.87	--
	MW-27	Shallow	674495.64	532942.65	3,319.46	3,320.85	3,301.21	18.25 to 27.75	06/16/20	--	18.93	3,301.92	--
									10/06/20	--	20.42	3,300.43	--
	MW-46R	Shallow	674223.03	524920.28	3,350.41	3,350.11	3,346.91	3.5 to 18.5	06/16/20	--	13.33	3,336.78	--
									10/06/20	--	14.56	3,335.55	--
	MW-68	Shallow	674301.02	531466.90	3,325.81	3,328.21	3,311.06	14.75 to 24.5	06/16/20	--	21.09	3,307.12	--
									10/06/20	--	21.12	3,307.09	--
	MW-71	Shallow	673016.80	529560.41	3,332.99	3,335.29	3,323.24	9.75 to 19.5	06/16/20	--	16.63	3,318.66	--
									10/06/20	--	17.41	3,317.88	--
	MW-89	Shallow	675221.56	533835.00	3,316.38	3,318.32	3,314.38	2 to 17	06/16/20	--	12.62	3,305.70	--
									10/06/20	--	13.08	3,305.24	--
	NP-1	Shallow	672992.73	528035.04	3,339.69	3,342.40	3,330.19	9.5 to 19	06/16/20	--	18.18	3,324.22	--
									10/06/20	--	18.74	3,323.66	--
	NP-2	Shallow	673571.19	527611.64	3,340.58	3,342.77	3,331.08	9.5 to 18.5	06/16/20	--	19.23	3,323.54	--
									10/06/20	--	20.56	3,322.21	--
	NP-3	Shallow	673990.66	528019.54	3,340.40	3,342.93	3,330.90	9.5 to 18.5	06/16/20	--	19.02	3,323.91	--
									10/06/20	--	20.47	3,322.46	--
	NP-4	Shallow	674337.35	528351.85	3,343.24	3,345.73	3,318.74	24.5 to 33.5	06/16/20	--	31.43	3,314.30	--
									10/06/20	--	33.81	3,311.92	--
	NP-6	Shallow	672945.23	529083.91	3,336.31	3,338.05	3,327.56	8.75 to 18.75	06/16/20	--	14.57	3,323.48	--
									10/06/20	--	15.14	3,322.91	--
	NP-8	Shallow	675399.60	538245.49	3,310.53	3,314.67	Unknown	Unknown	06/16/20	--	11.15	3,303.52	--
									10/06/20	--	14.27	3,300.40	--
	NP-9	Shallow	674767.14	523571.69	3,357.86	3,360.62	Unknown	Unknown	06/16/20	--	16.78	3,343.84	--
									10/06/20	--	18.40	3,342.22	--

Table 1 - Well Information and Gauging Data
 2020 Annual Groundwater Monitoring Report
 HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well ID	Water-Bearing Zone ⁽¹⁾	Northing (ft)	Easting (ft)	Land Surface Elevation (ft amsl)	TOC Elevation (ft amsl)	Top of Screen Elevation (ft amsl)	Screen Interval (ft bgs)	Date Measured	Depth to PSH (ft btoc)	Depth to Water (ft btoc)	Corrected Groundwater Elevation ⁽²⁾ (ft amsl)	PSH Thickness (ft)
Up-Gradient	UG-1	Shallow	672453.27	520746.73	3,373.02	3,372.94	3,365.02	8 to 23	06/15/20	--	13.02	3,359.92	--
									10/06/20	--	--	--	--
	UG-2	Shallow	670726.77	520942.36	3,380.30	3,380.41	3,365.30	15 to 30	06/15/20	--	16.81	3,363.60	--
									10/06/20	--	--	--	--
	UG-3R	Shallow	671992.70	519424.77	3,384.62	3,384.08	3,367.62	17 to 37	06/15/20	--	22.37	3,361.71	--
									10/06/20	--	--	--	--
	UG-4	Shallow	674087.85	520541.74	3,377.78	3,377.36	3,358.28	19.5 to 39.5	06/15/20	--	19.58	3,357.78	--
							3,358.28		10/06/20	--	--	--	--

Notes:

⁽¹⁾ Wells screened in the shallow water-bearing zone are typically screened at depths ranging between 5 and 35 ft bgs. The shallow water-bearing zone varies between confined and unconfined conditions. Wells screened in the valley fill zone are typically screened at depths ranging between 35 and 70 ft bgs. The clay lens separating the shallow and valley fill zones is discontinuous in some locations resulting in connectivity between the two zones.

⁽²⁾ Water elevations corrected for PSH, if present, using a specific gravity of 0.8.

⁽³⁾ Well not located.

⁽⁴⁾ Well converted to flush-mount; new survey data from 9/30/2020.

⁽⁵⁾ PSH not measured due to pump interference.

⁽⁶⁾ Only PSH present in well.

Definitions:

ft = feet

-- = not applicable

amsl = above mean sea level

bgs = below ground surface

btoc = below top of casing

NCL = North Colony Landfarm

TEL = Tetra Ethyl Lead Surface Impoundment

unknown = screen interval not readily available

TMD = Three Mile Ditch

PSH = phase separated hydrocarbons

RO = Reverse Osmosis

NM = not measured

TMD = Three Mile Ditch

TOC = Top of Casing

Table 2 - Well Purging and Water Quality Field Measurement Data

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well	Purge Method ⁽¹⁾	Date	Time	Temperature (°C)	Specific Conductivity (umho/cm)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water ⁽²⁾
Cross-Gradient	KWB-13	Bladder	6/16/20	1755	25.3	3,020	0.302	5.4	6.74	-6.5	Cloudy, tan
	RA-3156	Grab	6/17/20	1520	20.7	1,703	0.170	2.3	7.00	-58.4	Cloudy, black
	MW-136	Low Flow	6/17/20	915	21.2	6,280	0.628	1.0	6.95	93.2	Clear
			10/6/20	1220	22.0	5,380	0.538	1.6	6.75	110.6	Clear
Evaporation Ponds	MW-1R	Low Flow	6/17/20	1000	18.2	5,420	0.542	1.5	7.25	-116.9	Clear
	MW-2A	Low Flow	6/17/20	855	20.3	5,040	0.504	1.4	7.44	-124.9	Clear
			10/6/20	1155	23.6	6,400	0.640	1.4	7.23	-20.3	Clear
	MW-3	Low Flow	6/17/20	1140	21.7	6,870	0.687	1.8	7.01	-17.5	Clear
			10/7/20	930	19.5	6,540	0.654	2.0	7.00	-16.5	Clear
	MW-4A	Low Flow	6/16/20	1555	22.5	5,690	0.569	2.0	7.06	-175.2	Clear, black particles
			10/6/20	1200	22.1	6,730	0.673	2.5	7.00	-149.6	Clear, black particles
	MW-5A	Low Flow	6/16/20	1450	22.1	11,790	1.179	1.7	7.08	-117.5	Clear, black particles
			10/6/20	1050	20.4	9,570	1.600	1.6	7.08	-138.1	Clear, orange particles
	MW-6A	Low Flow	6/16/20	1055	21.7	4,380	0.438	1.6	7.57	-139.7	Clear
	MW-7A	Low Flow	6/16/20	1345	21.0	9,870	0.987	1.3	7.23	-113.9	Clear
			10/6/20	940	20.2	8,450	0.845	1.5	7.06	-93.3	Clear
	MW-10	Low Flow	6/17/20	940	20.2	6,800	0.680	2.0	6.91	-111.9	Clear, orange particles
			10/6/20	1445	21.1	6,750	0.675	2.3	6.93	-107.5	Clear, orange particles
	MW-11A	Low Flow	6/17/20	1235	26.7	16,190	1.619	2.2	6.59	-38.5	Clear, orange particles
			10/7/20	915	19.3	25,200	2.520	1.8	6.78	33.0	Clear
	MW-15	Low Flow	6/17/20	1045	19.3	4,270	0.427	1.6	7.34	25.8	Clear
	MW-18A	Low Flow	6/16/20	1630	19.4	15,510	1.551	1.1	7.15	-189.8	Clear
			10/6/20	1230	20.2	18,870	1.887	1.3	7.22	-163.4	Clear
	MW-22A	Low Flow	6/17/20	1025	20.1	16,020	1.602	1.8	6.91	-34.8	Clear
			10/6/20	1340	21.2	14,440	1.444	1.8	6.94	-97.9	Clear
	MW-70	Low Flow	6/16/20	1800	20.5	5,970	0.597	1.9	7.09	-94.8	Clear
			10/6/20	1320	21.2	6,260	0.626	1.0	7.16	-102.4	Clear
	MW-72	Low Flow	6/16/20	1650	20.8	11,370	1.137	1.4	6.96	20.6	Clear
	MW-73	Low Flow	6/16/20	1420	20.4	11,860	1.186	1.3	7.33	-75.7	Clear
	MW-74	Low Flow	6/16/20	1315	20.6	10,430	1.043	1.3	7.19	65.5	Clear
			10/6/20	1435	22.6	10,530	1.053	1.0	7.10	58.0	Clear
	MW-75	Low Flow	6/17/20	1540	21.5	7,340	0.734	1.1	7.24	-166.8	Clear
			10/6/20	1625	20.2	7,060	0.706	1.3	7.18	-153.8	Clear
	MW-76	Low Flow	6/17/20	1325	22.8	7,170	0.717	1.8	6.81	-202.5	Clear
			10/6/20	1720	20.2	7,750	0.775	1.8	6.83	-205.6	Clear
	MW-77	Low Flow	6/17/20	1410	23.1	7,980	0.798	1.8	6.85	-177.4	Clear
	MW-78	Low Flow	6/17/20	1455	21.1	4,410	0.441	1.8	7.04	-65.1	Clear, gold tint

Table 2 - Well Purging and Water Quality Field Measurement Data

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well	Purge Method ⁽¹⁾	Date	Time	Temperature (°C)	Specific Conductivity (umho/cm)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water ⁽²⁾
Evaporation Ponds	MW-79	Low Flow	6/17/20	1155	20.0	9,070	0.907	1.5	7.10	-57.9	Clear
			10/6/20	1030	20.8	8,650	0.865	1.2	7.19	-54.4	Clear
	MW-80	Low Flow	6/17/20	1110	19.3	6,070	0.607	1.4	7.23	13.0	Clear
	MW-81	Low Flow	6/17/20	1025	20.8	5,990	0.599	1.5	7.26	38.3	Clear
	MW-82	Low Flow	6/17/20	1245	22.2	7,280	0.728	1.4	7.36	-150.7	Clear
			6/17/20	1240	22.7	6,540	0.654	1.5	6.81	-49.2	Clear
	MW-83	Low Flow	10/7/20	845	20.6	6,140	0.614	1.7	6.96	-145.9	Clear
			6/17/20	1330	22.1	10,140	1.014	1.4	7.16	-117.6	Clear
	MW-84	Low Flow	10/6/20	1550	24.4	10,100	1.010	1.0	7.13	-134.0	Clear, yellow tint
			10/6/20	1635	23.5	7,570	0.757	1.0	6.91	-355.7	Yellow tint, black particles
	MW-86	Low Flow	6/16/20	1545	21.2	11,570	1.157	1.1	7.19	-50.3	Clear
			10/6/20	1150	20.4	14,670	1.467	1.6	7.13	-73.4	Clear
	MW-87	Low Flow	6/16/20	1725	22.0	7,160	0.716	1.3	7.07	-144.0	Clear, orange particles
			10/6/20	1255	20.6	6,860	0.686	1.5	7.01	-52.3	Clear, orange particles
	MW-88	Low Flow	6/16/20	1145	22.5	7,990	0.799	1.4	7.41	-148.5	Clear
			10/6/20	900	21.1	8,370	0.837	1.2	7.19	-132.6	Clear
	MW-120	Low Flow	6/16/20	1230	21.3	5,640	0.564	1.4	7.47	-33.6	Clear
			10/6/20	940	22.3	5,740	0.574	1.4	7.23	34.9	Clear
	MW-121	Low Flow	6/16/20	1230	21.3	5,640	0.564	1.4	7.47	-33.6	Clear
			10/6/20	940	22.3	5,740	0.574	1.4	7.23	34.9	Clear
	MW-122	Low Flow	6/17/20	940	19.6	8,290	0.829	1.4	7.24	-83.6	Clear, small orange particles
			10/6/20	1115	21.5	5,500	0.550	1.1	7.32	-123.1	Clear
	MW-123	Low Flow	6/17/20	855	19.0	7,250	0.725	1.7	6.91	-121.5	Clear
			10/6/20	1530	20.2	6,430	0.643	1.8	6.91	-145.2	Clear
	MW-124	Low Flow	6/16/20	1710	18.9	10,240	1.024	1.4	7.09	-122.9	Clear, orange particles
			10/6/20	1405	21.2	11,790	1.179	1.4	7.19	-94.2	Clear, orange particles
	OCD-1R	Low Flow	6/17/20	1415	27.3	6,070	0.607	1.3	7.08	-28.5	Clear
			10/7/20	1000	18.4	6,840	0.684	1.5	7.22	14.9	Clear
	OCD-2A	Low Flow	6/17/20	1325	25.3	6,810	0.681	2.1	7.10	-19.5	Clear
			10/7/20	830	17.5	5,650	0.565	2.0	7.26	-124.9	Clear
	OCD-3	Low Flow	6/17/20	1145	26.3	3,810	0.381	2.1	7.35	-11.7	Clear
			10/6/20	1640	20.1	4,050	0.405	1.4	7.52	-12.4	Clear
	OCD-4	Low Flow	6/17/20	1055	25.4	13,120	1.312	2.4	7.12	-19.5	Clear
			10/6/20	1600	20.8	14,950	1.495	1.3	7.26	-85.7	Clear
	OCD-5	Low Flow	6/17/20	1010	24.7	11,660	1.166	2.8	6.96	-77.8	Slightly cloudy, orange tint
			10/6/20	1520	20.4	15,790	1.579	1.3	7.25	-72.6	Clear, orange particles
	OCD-6	Low Flow	6/16/20	1605	19.7	12,910	1.291	1.3	7.07	-78.4	Clear, orange particles
			10/6/20	1250	21.8	15,850	1.585	1.0	7.08	-96.5	Clear

Table 2 - Well Purging and Water Quality Field Measurement Data

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well	Purge Method ⁽¹⁾	Date	Time	Temperature (°C)	Specific Conductivity (umho/cm)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water ⁽²⁾
Evaporation Ponds	OCD-7AR	Low Flow	6/16/20	1510	22.3	12,950	1.295	1.3	7.14	-145.1	Clear
			10/6/20	1330	24.3	13,070	1.307	1.3	7.11	-135.5	Clear
	OCD-8A	Low Flow	6/16/20	1250	21.4	18,540	1.854	1.8	7.01	-146.9	Clear
			10/6/20	840	18.8	17,880	1.788	1.7	6.92	-110.9	Clear
Field East of Refinery	KWB-1A	Low Flow	6/17/20	1000	21.9	6,760	0.676	2.1	6.91	112.2	Clear
			10/6/20	1325	22.1	5,770	0.577	1.0	6.70	128.4	Clear
	KWB-7	Low Flow	10/6/20	1200	23.2	2,369	0.237	1.9	6.89	-194.3	Clear
	KWB-8	Low Flow	10/6/20	1250	21.6	5,198	0.520	0.8	6.89	-308.5	Clear
	KWB-11A	Low Flow	6/16/20	1425	22.3	3,974	0.397	0.7	6.78	-91.3	Clear
			10/6/20	1025	19.4	3,861	0.386	1.0	6.77	14.5	Clear
	KWB-11B	Low Flow	6/16/20	1515	21.7	3,034	0.303	1.1	6.87	-28.7	Clear
			10/6/20	1110	20.1	3,143	0.314	1.1	6.93	120.8	Clear
	KWB-12A	Low Flow	10/6/20	930	19.1	2,460	0.246	3.4	6.34	51.3	Clear
	KWB-12B	Bladder	6/16/20	1355	23.9	2,690	0.269	4.7	6.75	75.7	Clear
			10/6/20	1015	19.4	3,020	0.302	4.1	6.39	112.1	Clear
	MW-57	Bladder	6/16/20	1525	24.1	4,270	0.427	3.4	6.73	99.6	Clear
			10/6/20	1130	20.5	3,220	0.322	3.3	6.48	107.3	Clear
	MW-111	Bladder	6/17/20	1045	25.5	4,270	0.427	1.6	6.62	-103.0	Cloudy, tan
	MW-113	Low Flow	6/17/20	1510	21.2	2,310	0.231	1.6	6.65	-106.4	Clear
			10/7/20	900	20.1	3,620	0.362	1.6	6.64	-150.2	Clear
	MW-125	Low Flow	6/16/20	1055	20.9	4,180	0.418	2.1	6.81	42.8	Clear
			10/7/20	1050	19.7	4,371	0.437	2.1	6.80	61.2	Clear
	MW-126A	Low Flow	6/16/20	1505	23.5	4,650	0.465	1.1	6.92	-140.6	Clear
			10/6/20	1010	21.4	4,570	0.457	1.3	6.63	-77.4	Clear
	MW-126B	Low Flow	6/16/20	1425	22.8	6,030	0.603	1.0	6.87	103.4	Clear
			10/6/20	1050	21.2	5,360	0.536	1.8	6.67	82.5	Clear
	MW-130	Low Flow	6/17/20	1410	23.7	2,420	0.242	1.6	6.67	-32.8	Clear
			10/7/20	855	21.6	3,010	0.301	2.3	6.70	51.2	Clear
	MW-134	Low Flow	6/17/20	1340	23.7	4,200	0.420	1.9	6.88	65.7	Clear
			10/6/20	1630	22.1	6,250	0.625	0.9	6.83	123.5	Clear
	MW-135	Bladder	6/17/20	1420	20.5	5,471	0.547	2.2	6.81	84.6	Clear
			10/7/20	1030	19.7	7,400	0.740	3.6	6.74	46.1	Clear
	MW-145	Low Flow	10/6/20	1130	24.0	4,670	0.467	2.3	6.72	129.7	Clear
	MW-146	Low Flow	10/6/20	1100	24.5	4,740	0.474	2.4	6.81	123.1	Clear
	MW-147	Low Flow	10/6/20	1020	21.3	5,310	0.531	5.3	6.65	152.5	Sl. Cloudy
	MW-148	Low Flow	10/6/20	940	22.3	3,610	0.361	5.9	6.47	159.7	Clear

Table 2 - Well Purging and Water Quality Field Measurement Data

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well	Purge Method ⁽¹⁾	Date	Time	Temperature (°C)	Specific Conductivity (umho/cm)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water ⁽²⁾
Field East of Refinery	RA-4196	Grab	6/17/20	1550	22.6	2,238	0.224	3.2	7.18	-76.8	Clear
			10/6/20	1330	23.7	2,186	0.219	3.1	7.19	-39.8	Clear
	RA-4798	Grab	6/17/20	1605	20.2	2,196	0.220	3.9	7.21	-58.2	Clear
			10/6/20	1315	21.4	2,396	0.240	3.8	7.21	-43.9	Clear
	RW-12R	Low Flow	6/17/20	1535	25.1	2,880	0.288	0.8	6.84	-289.3	Clear
North Refinery	RW-18A	Low Flow	6/16/20	950	22.1	3,630	0.363	2.0	6.95	109.1	Clear
	MW-23	Low Flow	6/17/20	1325	28.1	2,760	0.276	1.1	6.94	-310.6	Clear, yellow tint
			10/6/20	1705	23.2	2,320	0.232	1.1	6.93	-334.4	Clear, yellow tint
	MW-29	Low Flow	6/16/20	1020	23.1	4,270	0.427	1.7	6.88	-325.8	
			10/7/20	925	22.9	3,070	0.307	1.2	7.23	-309.9	Clear
	MW-39	Low Flow	6/16/20	1135	27.3	2,830	0.283	1.5	7.26	-297.3	Clear
			10/6/20	1010	25.2	2,730	0.273	1.6	7.26	-299.1	Clear
	MW-40	Low Flow	6/16/20	925	21.7	2,670	0.267	1.5	6.70	-365.9	Clear, black particles
	MW-41	Low Flow	6/16/20	1040	25.1	5,300	0.530	2.2	6.56	-217.4	Clear
	MW-42	Low Flow	6/17/20	1420	25.2	6,110	0.611	2.4	6.76	-341.8	Clear
	MW-43	Low Flow	6/17/20	1425	29.1	3,190	0.319	1.1	6.72	-346.3	Clear
			10/6/20	1510	26.8	3,120	0.312	1.6	6.75	-382.7	Clear
	MW-59	Low Flow	6/17/20	1015	26.2	2,910	0.291	2.5	6.80	-244.5	Clear
	MW-60	Low Flow	6/17/20	1145	27.7	3,560	0.356	2.9	6.57	-303.0	Clear
			10/7/20	1025	24.0	3,470	0.347	2.0	6.55	-315.6	Clear
	MW-61	Low Flow	6/17/20	1025	26.4	2,980	0.298	1.1	6.64	-367.1	Clear
			10/6/20	1335	27.2	2,310	0.231	1.0	6.87	-354.7	Clear
	MW-62	Low Flow	6/17/20	1220	26.5	2,800	0.280	1.4	6.49	-351.3	Clear
			10/6/20	1535	22.3	2,570	0.257	1.3	6.57	-353.1	Clear
	MW-62R	Low Flow	10/6/20	1620	23.6	2,200	0.220	1.3	6.61	-298.8	Clear, gray tint
	MW-90	Low Flow	6/16/20	1445	23.1	3,730	0.373	1.0	6.71	-376.3	Clear
			10/6/20	1245	23.6	3,540	0.354	1.6	6.65	-370.2	Clear
	MW-91	Low Flow	6/16/20	1400	24.7	3,870	0.387	1.4	6.48	-387.9	Clear, yellow tint
	MW-93	Low Flow	6/17/20	1125	23.9	2,970	0.297	1.0	6.47	-353.0	Clear
	MW-95	Low Flow	6/16/20	1645	24.6	2,860	0.286	0.6	6.73	-317.1	Clear
	MW-96	Low Flow	6/16/20	1530	24.7	2,210	0.221	1.1	6.70	-369.0	Clear
			10/6/20	1450	25.1	2,180	0.218	1.4	6.67	-365.1	Clear
	MW-98	Low Flow	6/16/20	1355	25.5	3,210	0.321	0.8	6.67	-376.6	Clear
			10/6/20	1105	25.6	2,650	0.265	0.8	6.62	-380.0	Clear

Table 2 - Well Purging and Water Quality Field Measurement Data

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well	Purge Method ⁽¹⁾	Date	Time	Temperature (°C)	Specific Conductivity (umho/cm)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water ⁽²⁾
North Refinery	RW-7	Low Flow	6/17/20	1220	25.4	2,410	0.241	1.2	6.64	-368.5	Clear, black tint with black particles, sheen
	RW-9	Low Flow	6/16/20	1235	26.0	3,610	0.361	1.3	6.83	-346.8	Clear
	RW-10	Low Flow	6/16/20	925	22.3	2,520	0.252	0.9	7.10	-326.5	Clear
	RW-16B	Low Flow	6/16/20	940	25.5	4,080	0.408	2.0	6.79	29.2	Clear
	RW-17A	Low Flow	6/17/20	1510	22.3	8,270	0.827	2.9	8.02	-77.5	Clear
North RO Reject Field	MW-117	Low Flow	6/16/20	1115	20.3	3,220	0.322	2.6	6.48	76.1	Clear
			10/6/20	1420	21.2	3,010	0.301	2.5	6.71	55.7	Clear
	MW-118	Low Flow	6/16/20	1020	18.2	3,410	0.341	3.4	6.41	75.9	Clear
			10/6/20	1335	20.4	2,940	0.294	3.8	6.87	58.3	Clear
	MW-119	Low Flow	6/16/20	945	19.7	6,470	0.647	1.4	7.06	105.3	Clear
			10/6/20	920	20.4	5,950	0.595	1.8	6.81	59.8	Clear
NCL	MW-18	Low Flow	6/17/20	1440	24.3	3,280	0.328	1.3	6.74	-242.5	Clear
	MW-45	Low Flow	6/17/20	1520	23.2	4,530	0.453	1.4	6.93	-227.8	Clear
			10/6/20	1610	24.2	2,720	0.272	0.9	7.48	-226.3	Clear
	MW-53R	Low Flow	10/6/20	850	21.7	2,190	0.219	2.9	6.88	71.4	Clear
	MW-54A	Low Flow	6/16/20	955	22.7	2,580	0.258	1.7	6.53	65.0	Clear
			10/6/20	930	21.7	2,590	0.259	1.9	6.50	32.9	Clear
	MW-55	Low Flow	6/16/20	1040	18.8	3,280	0.328	1.9	6.58	72.3	Clear
			10/7/20	825	20.9	2,900	0.290	2.0	6.59	38.8	Clear
	MW-56	Low Flow	6/16/20	1125	22.3	3,850	0.385	1.3	6.70	-156.0	Clear
	MW-108	Low Flow	6/17/20	925	24.8	1,761	0.176	1.3	6.78	-378.9	Clear, yellow tint
			10/6/20	1410	26.7	1,632	0.163	1.4	6.80	-389.6	Clear, yellow tint
	NCL-31	Low Flow	6/17/20	1005	26.1	2,890	0.289	1.3	6.82	-278.6	Clear
			10/6/20	1325	26.0	2,710	0.271	1.2	7.05	-286.1	Clear
	NCL-32	Low Flow	6/17/20	1050	23.0	3,200	0.320	1.1	6.79	-127.7	Clear
			10/7/20	905	20.5	3,150	0.315	1.6	6.78	31.3	Clear
	NCL-33	Low Flow	6/17/20	1355	24.7	4,780	0.478	1.1	6.45	-241.7	Clear, orange particles
			10/7/20	1030	22.8	4,770	0.477	1.6	6.44	-68.4	Clear, orange particles
	NCL-34A	Low Flow	6/17/20	1310	24.6	2,400	0.240	1.4	6.54	-370.1	Clear
	NCL-44	Low Flow	6/17/20	1135	24.3	3,170	0.317	1.9	6.56	-280.4	Clear
			10/7/20	950	20.8	3,050	0.305	1.7	6.61	-207.1	Clear
NCL-49	Low Flow	6/16/20	1045	23.3	3,630	0.363	1.9	6.87	133.7	Clear	
		10/6/20	1010	21.9	3,570	0.357	2.6	6.87	81.7	Clear	
South Refinery	MW-28	Low Flow	6/17/20	1340	24.3	4,480	0.448	1.2	7.22	-318.0	Clear
			10/7/20	1110	23.4	3,100	0.310	1.1	7.32	-197.3	Clear
	MW-50	Low Flow	6/16/20	1235	25.1	7,960	0.796	1.1	6.84	-257.1	Clear
			10/6/20	1125	25.0	8,820	0.882	1.6	6.81	-6.1	Clear

Table 2 - Well Purging and Water Quality Field Measurement Data

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well	Purge Method ⁽¹⁾	Date	Time	Temperature (°C)	Specific Conductivity (umho/cm)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water ⁽²⁾
South Refinery	MW-52	Low Flow	6/17/20	1320	21.2	2,560	0.256	1.4	6.97	-202.4	Clear
			10/7/20	940	20.7	3,190	0.319	1.7	6.84	58.3	Clear
	MW-64	Low Flow	6/16/20	1530	35.9	2,360	0.236	2.4	6.87	-329.0	Clear
			10/6/20	1305	34.6	2,320	0.232	3.6	6.68	-322.3	Clear
	MW-66	Low Flow	6/17/20	1245	25.0	2,730	0.273	1.6	6.82	-170.3	Clear
			10/7/20	925	22.4	1,529	0.153	2.0	6.60	-214.7	Clear
	MW-99	Low Flow	6/17/20	1250	28.0	1,031	0.103	2.4	6.49	-282.2	Clear, light gray tint
	MW-101	Low Flow	6/16/20	1505	26.5	1,641	0.164	2.4	6.87	-209.9	Clear
			10/6/20	900	24.7	1,734	0.173	2.0	6.71	-311.8	Clear
	MW-102	Low Flow	6/16/20	1650	27.6	2,260	0.226	2.2	6.84	-312.4	Clear
			10/6/20	1410	28.5	2,240	0.224	3.1	6.72	-297.2	Clear
	MW-103	Low Flow	6/16/20	1310	33.6	12,040	1.204	1.7	7.03	-324.7	Clear
	MW-104	Low Flow	6/16/20	1415	27.2	1,804	0.180	1.4	6.95	-327.5	Clear
			10/6/20	1210	28.2	1,688	0.169	1.9	6.77	-333.9	Clear
	MW-105	Low Flow	6/17/20	925	24.1	1,736	0.174	1.1	7.15	-354.7	Clear
			10/6/20	1515	27.4	1,254	0.125	0.7	6.75	-362.6	Clear
	MW-106	Low Flow	6/16/20	1625	26.6	2,830	0.283	1.6	6.63	-377.1	Clear
			10/6/20	1200	25.6	3,320	0.332	1.9	6.53	-392.9	Clear
	MW-109	Low Flow	6/17/20	1235	22.6	2,460	0.246	0.8	7.04	-383.5	Clear
			10/7/20	900	24.0	2,690	0.269	1.3	7.23	-355.9	Clear
	MW-110	Low Flow	6/17/20	1150	21.2	1,701	0.170	1.3	7.18	-115.8	Clear
			10/7/20	1000	24.1	1,741	0.174	1.2	7.23	-271.7	Clear
South RO Reject Field	MW-114	Low Flow	6/16/20	1020	21.9	3,307	0.331	1.7	6.68	57.1	Clear
			10/7/20	1000	21.4	3,428	0.343	1.9	6.67	96.3	Clear
	MW-115	Low Flow	6/16/20	920	19.3	4,027	0.403	2.8	6.81	27.5	Clear
			10/7/20	915	19.5	5,048	0.505	2.6	6.80	67.5	Clear
	MW-116	Low Flow	6/16/20	1115	18.7	3,976	0.398	2.6	6.84	-42.2	Clear
			10/7/20	1025	20.2	3,510	0.351	1.9	6.73	-4.6	Clear
TEL	MW-49	Low Flow	6/16/20	1340	27.2	2,740	0.274	1.5	6.59	-373.4	Clear
			10/6/20	1300	25.7	2,870	0.287	2.5	6.55	-371.2	Clear
	TEL-1	Low Flow	6/16/20	1025	24.0	2,550	0.255	0.8	7.19	-279.1	Clear
	TEL-2	Low Flow	6/16/20	1125	25.8	3,290	0.329	0.7	6.92	-354.1	Clear, light sheen
	TEL-3	Low Flow	10/6/20	845	23.4	2,250	0.225	3.0	6.52	-356.8	Clear

Table 2 - Well Purging and Water Quality Field Measurement Data

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well	Purge Method ⁽¹⁾	Date	Time	Temperature (°C)	Specific Conductivity (umho/cm)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water ⁽²⁾
TEL	TEL-4	Low Flow	6/16/20	1255	24.5	3,830	0.383	0.7	6.77	-308.9	Clear
			10/6/20	955	24.2	3,210	0.321	0.8	6.48	-308.1	Clear
TMD	MW-8	Low Flow	6/17/20	1130	23.3	4,720	0.472	2.1	6.94	45.1	Clear
	MW-16	Low Flow	6/17/20	1135	18.5	4,833	0.483	1.3	6.86	84.6	Clear
	MW-20	Low Flow	6/17/20	1235	23.5	3,990	0.399	2.0	6.96	63.1	Clear
	MW-21	Low Flow	6/17/20	1035	23.6	4,950	0.495	1.7	7.00	31.8	Clear
			10/6/20	1545	23.3	7,460	0.746	1.0	6.91	128.9	Clear
	MW-25	Low Flow	6/17/20	910	18.8	3,530	0.353	1.6	7.30	34.4	Clear
	MW-26	Low Flow	6/17/20	1230	18.9	6,290	0.629	0.7	6.96	-22.7	Clear
	MW-27	Low Flow	6/17/20	1325	22.6	1,950	0.195	1.7	6.90	18.0	Clear
	MW-46R	Low Flow	6/17/20	1345	25.3	3,520	0.352	2.4	6.71	24.7	Clear
			10/7/20	940	18.4	3,090	0.309	2.1	6.82	40.5	Clear
	MW-68	Low Flow	6/17/20	940	23.8	2,780	0.278	1.3	6.96	-81.9	Clear
	MW-71	Low Flow	6/17/20	1415	20.4	6,059	0.606	1.5	6.94	-40.4	Clear
Up-Gradient	NP-1	Low Flow	6/17/20	940	22.5	4,090	0.409	2.0	6.67	19.1	Clear
			10/6/20	1415	20.6	4,625	0.463	1.6	6.74	36.3	Clear
	UG-1	Low Flow	6/15/20	1810	26.6	3,190	0.319	4.1	6.97	130.3	Clear
	UG-2	Low Flow	6/15/20	1910	25.4	2,230	0.223	3.2	7.10	124.6	Clear
	UG-3R	Bladder	6/15/20	1630	24.2	2,260	0.226	5.6	6.70	77.0	Clear
	UG-4	Low Flow	6/15/20	1720	25.0	3,670	0.367	2.7	6.75	122.5	Clear

⁽¹⁾ Purge Methods:

Low Flow = peristaltic pump with dedicated tubing, purged until parameters stabilized
Bladder = bladder pump with dedicated tubing, purged until parameters stabilized
Grab = irrigation well sample collected from tap or valve

Definitions:

°C = Degrees Celsius
DO = Dissolved Oxygen
mg/L = milligrams per liter
mV = milliVolts
ORP = oxidation/reduction potential
S/m = Siemens per meter
std units = standard pH units

⁽²⁾ Potential Explanations of Water Quality Observations:

"Odor" likely due to the presence of petroleum hydrocarbons
"Cloudy water" likely due to presence of suspended inorganic particles (silt, clay)
Dark, black, brown, yellow, gold, gray, orange, and "rusty" tints likely due to suspended clay/silt particles or microbial activity
"Particles" of varying color likely due to suspended clay/silt particles
"Orange algae" likely due to microbial activity

Table 3 - Groundwater Screening Levels and Selected Critical Groundwater Screening Levels

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte	WQCC GW Human Health (20.6.2.3103.A)	WQCC GW Domestic (20.6.2.3103.B)	WQCC GW Irrigation (20.6.2.3103.C)	USEPA MCL	NMED Tap Water (Table A-1)	USEPA Tap Water	NMED TPH (Table 6-4)	CGWSL	CGWSL Source
TPH (mg/L)									
TPH - gasoline range organics							1.01E-02	1.01E-02	NMED TPH (Table 6-4)
TPH - diesel range organics							8.58E-02	8.58E-02	NMED TPH (Table 6-4)
TPH - diesel range organics (Evaporation Ponds)							1.67E-02	1.67E-02	NMED TPH (Table 6-4)
VOCs (mg/L)									
1,1,1-Trichloroethane	2.00E-01			2.00E-01				2.00E-01	WQCC GW Human Health (20.6.2.3103.A)
1,1,2,2-Tetrachloroethane	1.00E-02							1.00E-02	WQCC GW Human Health (20.6.2.3103.A)
1,1,2-Trichloroethane	5.00E-03			5.00E-03				5.00E-03	WQCC GW Human Health (20.6.2.3103.A)
1,1-Dichloroethane	2.50E-02							2.50E-02	WQCC GW Human Health (20.6.2.3103.A)
1,1-Dichloroethene	7.00E-03			7.00E-03				7.00E-03	WQCC GW Human Health (20.6.2.3103.A)
1,2-Dibromo-3-chloropropane				2.00E-04				2.00E-04	USEPA MCL
1,2-Dibromoethane (ethylene dibromide)	5.00E-05			5.00E-05				5.00E-05	WQCC GW Human Health (20.6.2.3103.A)
1,2-Dichloroethane	5.00E-03			5.00E-03				5.00E-03	WQCC GW Human Health (20.6.2.3103.A)
1,2-Dichloropropane	5.00E-03			5.00E-03				5.00E-03	WQCC GW Human Health (20.6.2.3103.A)
1,2,4-Trimethylbenzene						5.60E-02		5.60E-02	USEPA Tap Water
1,3,5-Trimethylbenzene						6.00E-02		6.00E-02	USEPA Tap Water
2-Butanone (methyl ethyl ketone)					5.56E+00			5.56E+00	NMED Tap Water (Table A-1)
2-Phenylbutane (sec-butylbenzene)						2.00E+00		2.00E+00	USEPA Tap Water
4-Methyl-2-Pentanone (methyl isobutyl ketone)					1.24E+00			1.24E+00	NMED Tap Water (Table A-1)
Acetone					1.41E+01			1.41E+01	NMED Tap Water (Table A-1)
Benzene	5.00E-03			5.00E-03				5.00E-03	WQCC GW Human Health (20.6.2.3103.A)
Bromodichloromethane				8.00E-02				8.00E-02	USEPA MCL
Bromomethane					7.54E-03			7.54E-03	NMED Tap Water (Table A-1)
Carbon Disulfide					8.10E-01			8.10E-01	NMED Tap Water (Table A-1)
Carbon tetrachloride	5.00E-03			5.00E-03				5.00E-03	WQCC GW Human Health (20.6.2.3103.A)
Chlorobenzene				1.00E-01				1.00E-01	USEPA MCL
Chloroethane (ethyl chloride)					2.09E+01			2.09E+01	NMED Tap Water (Table A-1)
Chloroform	1.00E-01			8.00E-02				8.00E-02	USEPA MCL
Chloromethane					2.03E-02			2.03E-02	NMED Tap Water (Table A-1)
cis-1,2-Dichloroethene	7.00E-02			7.00E-02				7.00E-02	WQCC GW Human Health (20.6.2.3103.A)
cis-1,3-Dichloropropene					4.71E-03			4.71E-03	NMED Tap Water (Table A-1)
Dibromochloromethane				8.00E-02				8.00E-02	USEPA MCL
Dichlorodifluoromethane					1.97E-01			1.97E-01	NMED Tap Water (Table A-1)
Ethylbenzene	7.00E-01			7.00E-01				7.00E-01	WQCC GW Human Health (20.6.2.3103.A)
Isopropylbenzene (cumene)					4.47E-01			4.47E-01	NMED Tap Water (Table A-1)
m-Xylene					1.93E-01			1.93E-01	NMED Tap Water (Table A-1)
Methyl acetate					1.99E+01			1.99E+01	NMED Tap Water (Table A-1)
Methylene chloride (dichloromethane)	5.00E-03			5.00E-03				5.00E-03	WQCC GW Human Health (20.6.2.3103.A)
Methyl tert-butyl ether		1.00E-01						1.00E-01	WQCC GW Domestic (20.6.2.3103.B)
n-Butylbenzene						1.00E+00		1.00E+00	USEPA Tap Water
n-Propylbenzene						6.60E-01		6.60E-01	USEPA Tap Water
Naphthalene	3.00E-02							3.00E-02	WQCC GW Human Health (20.6.2.3103.A)
o-Xylene					1.93E-01			1.93E-01	NMED Tap Water (Table A-1)
Styrene	1.00E-01			1.00E-01				1.00E-01	WQCC GW Human Health (20.6.2.3103.A)
Tetrachloroethene	5.00E-03			5.00E-03				5.00E-03	WQCC GW Human Health (20.6.2.3103.A)
Toluene	1.00E+00			1.00E+00				1.00E+00	WQCC GW Human Health (20.6.2.3103.A)
trans-1,2-Dichloroethene	1.00E-01			1.00E-01				1.00E-01	WQCC GW Human Health (20.6.2.3103.A)
trans-1,3-Dichloropropene					4.71E-03			4.71E-03	NMED Tap Water (Table A-1)
Trichloroethene	5.00E-03			5.00E-03				5.00E-03	WQCC GW Human Health (20.6.2.3103.A)
Trichlorofluoromethane					1.14E+00			1.14E+00	NMED Tap Water (Table A-1)
Vinyl chloride	2.00E-03			2.00E-03				2.00E-03	WQCC GW Human Health (20.6.2.3103.A)
Xylenes	6.20E-01			1.00E+01				6.20E-01	WQCC GW Human Health (20.6.2.3103.A)

Table 3 - Groundwater Screening Levels and Selected Critical Groundwater Screening Level

Table 3 - Groundwater Screening Levels and Selected Critical Groundwater Screening Levels

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte	WQCC GW Human Health (20.6.2.3103.A)	WQCC GW Domestic (20.6.2.3103.B)	WQCC GW Irrigation (20.6.2.3103.C)	USEPA MCL	NMED Tap Water (Table A-1)	USEPA Tap Water	NMED TPH (Table 6-4)	CGWSL	CGWSL Source
Metals (mg/L)									
Aluminum			5.00E+00					5.00E+00	WQCC GW Irrigation (20.6.2.3103.C)
Arsenic	1.00E-02			1.00E-02				1.00E-02	WQCC GW Human Health (20.6.2.3103.A)
Barium	2.00E+00			2.00E+00				2.00E+00	WQCC GW Human Health (20.6.2.3103.A)
Beryllium	4.00E-03			4.00E-03				4.00E-03	WQCC GW Human Health (20.6.2.3103.A)
Boron			7.50E-01					7.50E-01	WQCC GW Irrigation (20.6.2.3103.C)
Cadmium	5.00E-03			5.00E-03				5.00E-03	WQCC GW Human Health (20.6.2.3103.A)
Chromium	5.00E-02			1.00E-01				5.00E-02	WQCC GW Human Health (20.6.2.3103.A)
Cobalt			5.00E-02					5.00E-02	WQCC GW Irrigation (20.6.2.3103.C)
Copper		1.00E+00		1.30E+00				1.00E+00	WQCC GW Domestic (20.6.2.3103.B)
Iron		1.00E+00						1.00E+00	WQCC GW Domestic (20.6.2.3103.B)
Lead	1.50E-02			1.50E-02				1.50E-02	WQCC GW Human Health (20.6.2.3103.A)
Manganese		2.00E-01						2.00E-01	WQCC GW Domestic (20.6.2.3103.B)
Mercury	2.00E-03			2.00E-03				2.00E-03	WQCC GW Human Health (20.6.2.3103.A)
Molybdenum			1.00E+00					1.00E+00	WQCC GW Irrigation (20.6.2.3103.C)
Nickel			2.00E-01					2.00E-01	WQCC GW Irrigation (20.6.2.3103.C)
Selenium	5.00E-02			5.00E-02				5.00E-02	WQCC GW Human Health (20.6.2.3103.A)
Silver	5.00E-02							5.00E-02	WQCC GW Human Health (20.6.2.3103.A)
Vanadium					6.31E-02			6.31E-02	NMED Tap Water (Table A-1)
Water Quality Parameters (mg/L, unless noted otherwise)									
Chloride		2.50E+02						2.50E+02	WQCC GW Domestic (20.6.2.3103.B)
Cyanide	2.00E-01			2.00E-01				2.00E-01	WQCC GW Human Health (20.6.2.3103.A)
Fluoride	1.60E+00			4.00E+00				1.60E+00	WQCC GW Human Health (20.6.2.3103.A)
Nitrate (NO ₃ as N)	1.00E+01			1.00E+01				1.00E+01	WQCC GW Human Health (20.6.2.3103.A)
pH (Std pH units)		6 to 9						6 to 9	WQCC GW Domestic (20.6.2.3103.B)
Sulfate		6.00E+02						6.00E+02	WQCC GW Domestic (20.6.2.3103.B)
Total Dissolved Solids		1.00E+03						1.00E+03	WQCC GW Domestic (20.6.2.3103.B)
SVOCs (mg/L)									
1,1'-Biphenyl					3.71E-02			3.71E-02	NMED Tap Water (Table A-1)
1-Methylnaphthalene	3.00E-02							3.00E-02	WQCC GW Human Health (20.6.2.3103.A)
2,4-Dimethylphenol					3.54E-01			3.54E-01	NMED Tap Water (Table A-1)
2-Methylnaphthalene	3.00E-02							3.00E-02	WQCC GW Human Health (20.6.2.3103.A)
2-Methylphenol								--	--
Acenaphthene					5.35E-01			5.35E-01	NMED Tap Water (Table A-1)
Anthracene					1.72E+00			1.72E+00	NMED Tap Water (Table A-1)
Atrazine	3.00E-03			3.00E-03				3.00E-03	WQCC GW Human Health (20.6.2.3103.A)
Benzo(a)pyrene	2.00E-04			2.00E-04				2.00E-04	WQCC GW Human Health (20.6.2.3103.A)
Benzo(g,h,i)perylene								--	--
Bis(2-ethylhexyl)phthalate				6.00E-03				6.00E-03	USEPA MCL
Butylbenzylphthalate						1.60E-02		1.60E-02	USEPA Tap Water
Carbazole								--	--
Dibenzofuran						7.90E-03		7.90E-03	USEPA Tap Water
Diethyl phthalate					1.48E+01			1.48E+01	NMED Tap Water (Table A-1)
Di-n-butylphthalate					8.85E-01			8.85E-01	NMED Tap Water (Table A-1)
Fluoranthene					8.02E-01			8.02E-01	NMED Tap Water (Table A-1)
Fluorene					2.88E-01			2.88E-01	NMED Tap Water (Table A-1)
Naphthalene	3.00E-02							3.00E-02	WQCC GW Human Health (20.6.2.3103.A)
Phenanthrene					1.70E-01			1.70E-01	NMED Tap Water (Table A-1)
Phenol		5.00E-03			5.76E+00			5.76E+00	NMED Tap Water (Table A-1)
Pyrene					1.17E-01			1.17E-01	NMED Tap Water (Table A-1)

Table 3 - Groundwater Screening Levels and Selected Critical Groundwater Screening Level

Table 3 - Groundwater Screening Levels and Selected Critical Groundwater Screening Levels

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte	WQCC GW Human Health (20.6.2.3103.A)	WQCC GW Domestic (20.6.2.3103.B)	WQCC GW Irrigation (20.6.2.3103.C)	USEPA MCL	NMED Tap Water (Table A-1)	USEPA Tap Water	NMED TPH (Table 6-4)	CGWSL	CGWSL Source
Other Parameters (mg/L, unless noted otherwise)									
Uranium	3.00E-02			3.00E-02				3.00E-02	WQCC GW Human Health (20.6.2.3103.A)
Polychlorinated Biphenyls	5.00E-04			5.00E-04				5.00E-04	WQCC GW Human Health (20.6.2.3103.A)

Definitions and Notes:

Blank cell indicates no standard is available

CGWSL = Critical Groundwater Screening Level

Heirarchy of selecting the CGWSL is as follows:

1. Lowest of either NM WQCC GW Standard (20.6.2.3103) or USEPA MCL.
2. If no NM WQCC GW Standard or USEPA MCL available, NMED Tap Water value.
3. If no NMED Tap Water value, USEPA Tap Water value, if available.
4. NMED TPH screening for "unknown oil" used for TPH-DRO.
5. NMED TPH screening value for "Diesel #2/New Crankase Oil" applied to TPH DRO samples collected from Evaporation Ponds.

NMAC = New Mexico Administrative Code

NMED = New Mexico Environment Department

NMED Tap Water = NMED Risk Assessment Guidance for Site Investigations and Remediation, February 2019, Rev 2 (6/19/19), Table A-1, Tap Water Screening Level

NMED TPH = NMED Risk Assessment Guidance for Site Investigations and Remediation, February 2019, Rev 2 (6/19/19), Table 6-4, TPH Groundwater Screening Levels

mg/L = Milligrams per Liter

pCi/L = PicoCuries per Liter

SVOC = Semivolatile Organic Compound

TPH = Total Petroleum Hydrocarbons

USEPA MCL = United States Environmental Protection Agency Maximum Contaminant Level from "Regional Screening Level (RSL) Summary Table", November 2020

USEPA Tap Water = United States Environmental Protection Agency Tap Water Screening Level from "Regional Screening Level (RSL) Summary Table", November 2020

VOC = Volatile Organic Compound

WQCC = New Mexico Water Quality Control Commission

WQCC GW Domestic = WQCC groundwater standard for domestic exposure, 20.6.2.3103.B NMAC

WQCC GW Human Health = WQCC groundwater standard for human health exposure, 20.6.2.3103.A NMAC

WQCC GW Irrigation = WQCC groundwater standard for irrigation exposure, 20.6.2.3103.C NMAC

Table 4A - Summary of Groundwater Analytical Data - Total Petroleum Hydrocarbons and Volatile Organic Compounds

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				TPH			Volatile Organic Compounds										
				GRO	DRO	DRO - EP	1,2,4-TMB	1,3,5-TMB	Benzene	cis-1,2-DCE	Ethylbenzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
CAS				TPH-GRO	TPH-DRO	TPH-DRO	95-63-6	108-67-8	71-43-2	156-59-2	100-41-4	1634-04-4	91-20-3	95-47-6	108-88-3	1330-20-7	79-01-6
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL				0.0101	0.0858	0.0167	0.0560	0.0600	0.00500	0.0700	0.700	0.100	0.0300	0.193	1.00	0.620	0.00500
CGWSL Source				NMED TPH			USEPA TW	USEPA TW	WQCC HH	WQCC HH	WQCC HH	WQCC Dom	WQCC HH	WQCC TW	WQCC HH	WQCC HH	WQCC HH
Area	Well ID	Date	Dup														
Cross-Gradient	KWB-13	Apr-17			0.0370 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-13	Apr-18			0.0567 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-13	Apr-19			<0.0247		0.00191	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	0.00236 JJ4	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-13	Jun-20			0.0396 J		<0.000322	<0.000104	0.000205 J	<0.000126	0.000234 J	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4
	MW-136	Apr-18		<0.0314	0.0596 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-136	Oct-18		<0.0314	0.0676 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-136	Apr-19		<0.0314	0.0741 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-136	Oct-19		0.0731 JB	0.0254 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-136	Jun-20		0.326 v3	0.0924 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-136	Oct-20		0.0320 J	0.0873 JB		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000122 J	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4
	NP-5	Apr-13			<0.0530		<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	NP-5	Apr-15			0.0387 J		0.000804 J	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	NP-5	Apr-17			<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NP-5	Apr-19			<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RA-3156	Apr-17					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RA-3156	Apr-18					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
RA-3156	Apr-19					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398	
RA-3156	Jun-20					<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190	
Evaporation Ponds	MW-1R	Apr-17			0.0583 J	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398	
	MW-1R	Apr-18			0.0624 J	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	MW-1R	Apr-19			0.0756 J	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	MW-1R	Jun-20			<0.0247	<0.000322	<0.000104 J4	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190	
	MW-2A	Apr-18		<0.0314	0.132	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	MW-2A	Oct-18		<0.0314	0.175	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	MW-2A	Apr-19		<0.0314	0.153	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500 J3	<0.00170	<0.00206	<0.00530	<0.00199	
	MW-2A	Oct-19		0.0798 JB	0.0585 J	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	MW-2A	Jun-20		0.0484 J	<0.0247	<0.000322	<0.000104 J4	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190	
	MW-2A	Oct-20		<0.0314	0.153	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190	
	MW-3	Apr-18		0.245	5.43	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	MW-3	Apr-18	FD	0.237	6.52	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	MW-3	Oct-18		0.289	6.25	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199	
	MW-3	Oct-18	FD	0.381	5.62	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	MW-3	Apr-19		0.0731 J	3.93	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	MW-3	Apr-19	FD	0.192 B	3.77	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367</						

Table 4A - Summary of Groundwater Analytical Data - Total Petroleum Hydrocarbons and Volatile Organic Compounds

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				TPH			Volatile Organic Compounds										
Analyte				GRO	DRO	DRO - EP	1,2,4-TMB	1,3,5-TMB	Benzene	cis-1,2-DCE	Ethylbenzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
CAS				TPH-GRO	TPH-DRO	TPH-DRO	95-63-6	108-67-8	71-43-2	156-59-2	100-41-4	1634-04-4	91-20-3	95-47-6	108-88-3	1330-20-7	79-01-6
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL				0.0101	0.0858	0.0167	0.0560	0.0600	0.00500	0.0700	0.700	0.100	0.0300	0.193	1.00	0.620	0.00500
CGWSL Source				NMED TPH			USEPA TW	USEPA TW	WQCC HH	WQCC HH	WQCC HH	WQCC Dom	WQCC HH	WQCC TW	WQCC HH	WQCC HH	WQCC HH
Area	Well ID	Date	Dup														
Evaporation Ponds	MW-15	Apr-17		0.0940 J		0.251	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000373 J	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-15	Apr-18		0.328		0.479	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000836 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-15	Apr-19		0.136 B		0.475	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000549 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-15	Jun-20		<0.0314		<0.0247	<0.000322	<0.000104 J4	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-18A	Apr-18				0.349	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000589 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-18A	Oct-18				0.329	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000566 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-18A	Apr-19				0.652	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000600 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-18A	Oct-19				0.410	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000793 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-18A	Jun-20				0.408	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000734 J	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-18A	Oct-20				0.373 B	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000678 J	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-18B	Apr-13		0.0995		<0.0520	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	MW-18B	Apr-15		<0.0310		0.280	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-18B	Apr-17		0.0932 J		0.287	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-18B	Apr-19		0.105 B		0.230	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Apr-18		2.50		4.86	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00458	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Apr-18	FD	3.30		5.22	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00580	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Oct-18		3.61		5.13	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	0.00351 J	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-22A	Oct-18	FD	4.46		4.89	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00446	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Apr-19		2.75		4.55	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00438	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Apr-19	FD	3.22		4.41	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00409	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Oct-19		0.599 B		1.54	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000923 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Oct-19	FD	0.612 B		1.54	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00103	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Jun-20		2.73		2.91	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.00242	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-22A	Jun-20	FD	2.10		2.72	0.000411 J	<0.000104 J4	<0.0000941	<0.000126	<0.000137	0.00254	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-22A	Oct-20		1.68		3.45	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.00286	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-22A	Oct-20	FD	2.13		3.13	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.00273	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-22B	Apr-13		1.99		3.00	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	0.00650	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	MW-22B	Apr-15		2.34		5.60	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	0.00634	<0.00100	<0.000340	<0.000780 JJ	<0.00110	<0.000400
	MW-22B	Apr-17		1.76		5.25	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00564	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22B	Apr-19		2.58		4.77	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00582	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-70	Apr-18		1.97		0.749	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-70	Oct-18		2.34		0.666	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-70	Apr-19		1.92		0.688	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-70	Oct-19		1.50		0.861	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-70	Jun-20		1.29		0.833	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000119 J	<0.00100</				

Table 4A - Summary of Groundwater Analytical Data - Total Petroleum Hydrocarbons and Volatile Organic Compounds

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				TPH			Volatile Organic Compounds										
Analyte				GRO	DRO	DRO - EP	1,2,4-TMB	1,3,5-TMB	Benzene	cis-1,2-DCE	Ethylbenzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
CAS				TPH-GRO	TPH-DRO	TPH-DRO	95-63-6	108-67-8	71-43-2	156-59-2	100-41-4	1634-04-4	91-20-3	95-47-6	108-88-3	1330-20-7	79-01-6
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL				0.0101	0.0858	0.0167	0.0560	0.0600	0.00500	0.0700	0.700	0.100	0.0300	0.193	1.00	0.620	0.00500
CGWSL Source				NMED TPH			USEPA TW	USEPA TW	WQCC HH	WQCC HH	WQCC HH	WQCC Dom	WQCC HH	WQCC TW	WQCC HH	WQCC HH	WQCC HH
Area	Well ID	Date	Dup														
Evaporation Ponds	MW-87	Apr-18		<0.0314		0.288	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000710 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-87	Oct-18		0.0326 J		0.222	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000736 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-87	Apr-19		0.0422 JB		0.364	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000622 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-87	Oct-19		0.0950 JB		0.247	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00108	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-87	Jun-20		<0.0314		0.260	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000725 J	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-87	Oct-20		0.0469 JB		0.270 B	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000777 J	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-88	Apr-18		0.0540 J		0.508	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-88	Oct-18		0.0479 J		0.415	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-88	Apr-19		<0.0314		0.359	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-88	Oct-19		0.120 B		0.325	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-88	Jun-20		0.0434 J		0.317	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-88	Oct-20		0.0806 JB		0.405	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-120	Apr-18		0.124		0.540	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-120	Oct-18		0.133		0.664	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-120	Apr-19		0.102		0.554	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500 J3	<0.00170	<0.00206	<0.00530	<0.00199
	MW-120	Oct-19		0.611 B		0.463	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-120	Jun-20		0.0458 J		0.262	<0.00161	<0.000520	<0.000471	<0.000630	<0.000685	<0.000505	<0.00500	<0.000870	<0.00139	<0.000870	0.00169 J
	MW-120	Oct-20		<0.0314		0.402	<0.00161	<0.000520	<0.000471	<0.000630	<0.000685	<0.000505	<0.00500	<0.000870	<0.00139	<0.000870	<0.000950
	MW-121	Apr-18		<0.0314		0.395	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-121	Oct-18		<0.0314		0.473	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-121	Apr-19		<0.0314		0.418	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J3	<0.000341	<0.000412	<0.00106	<0.000398
	MW-121	Oct-19		0.0537 JB		0.310	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	0.000498 JB
	MW-121	Jun-20		<0.0314		0.204	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-121	Oct-20		<0.0314		0.268	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-122	Apr-18		<0.0314		0.211	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-122	Oct-18		<0.0314		0.188	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-122	Apr-19		<0.0314		0.338	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500 J3	<0.00170	<0.00206	<0.00530	<0.00199
	MW-122	Oct-19		0.233 JB		0.111	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-122	Jun-20		<1.57		0.0398 J	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-122	Oct-20		<1.57		0.122	<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-123	Apr-18		1.35		3.09	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00122	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-123	Oct-18		2.04		2.51	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-123	Apr-19		1.63		2.63	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00163	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-123	Oct-19		1.58		2.36	<0.000373	<0.000387	<0.000331								

Table 4A - Summary of Groundwater Analytical Data - Total Petroleum Hydrocarbons and Volatile Organic Compounds

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				TPH			Volatile Organic Compounds											
				GRO	DRO	DRO - EP	1,2,4-TMB	1,3,5-TMB	Benzene	cis-1,2-DCE	Ethylbenzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE	
CAS				TPH-GRO	TPH-DRO	TPH-DRO	95-63-6	108-67-8	71-43-2	156-59-2	100-41-4	1634-04-4	91-20-3	95-47-6	108-88-3	1330-20-7	79-01-6	
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
CGWSL				0.0101	0.0858	0.0167	0.0560	0.0600	0.00500	0.0700	0.700	0.100	0.0300	0.193	1.00	0.620	0.00500	
CGWSL Source				NMED TPH			USEPA TW	USEPA TW	WQCC HH	WQCC HH	WQCC HH	WQCC Dom	WQCC HH	WQCC TW	WQCC HH	WQCC HH	WQCC HH	
Area	Well ID	Date	Dup															
Field East of Refinery	KWB-1C	Apr-13			<0.0440		<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500	
	KWB-1C	Apr-15			0.113		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400	
	KWB-1C	Apr-17			0.140		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	KWB-1C	Apr-19			0.0921 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398	
	KWB-7	Oct-17			1.69		0.0258	<0.000387	0.0363	<0.000260	0.0156	0.00510	0.00350 J	0.00112	<0.000412	0.0143	<0.000398	
	KWB-7	Oct-18			0.444		0.00186	<0.000387	0.0247	<0.000260	0.00178	0.00928	<0.00100	<0.000341	<0.000412	0.00156 J	<0.000398	
	KWB-7	Jun-20			7.29		0.0876	<0.000104	0.0545	<0.000126	0.00936	0.00932	0.00822	0.00226	0.000536 J	0.0413	<0.000190	
	KWB-7	Oct-20			1.05		0.00287	<0.000104	0.00789	<0.000126	0.00262	0.00365	<0.00100	0.000402 J	<0.000278	0.00289 J	<0.000190	
	KWB-8	Oct-16			3.02		0.170 J	<0.0774	11.5	<0.0520	0.828	<0.0734	<0.200 J4	0.150 J	1.48	1.16	<0.0796	
	KWB-8	Apr-17			3.41		0.380	0.0863 J	5.62	<0.0260	1.24	0.129	0.141 J	0.145	0.747	2.07	<0.0398	
	KWB-8	Oct-17			3.30		0.114	0.0225	12.5	<0.000260	0.617	0.134 v3	0.0519	0.0133	0.336	0.795	<0.000398	
	KWB-8	Oct-20			6.80		0.833	0.191 J	17.8	<0.0252	2.89	0.0230 J	0.539 J	0.139 J	1.08	4.19	<0.0380	
	KWB-10R	Apr-17			4.01		0.360	0.0907	4.95	<0.0130	0.505	3.65	0.156 J	0.198	0.0605	0.914	<0.0199	
	KWB-10R	Oct-17			5.18		0.302	0.0759	7.06	<0.000260	0.530	5.41	0.152	0.112 J	0.0588	0.767	<0.000398	
	KWB-10R	Apr-18			3.23		0.214 J	<0.0968	3.06	<0.0650	0.354	2.74	<0.250	0.0922 J	<0.103	0.549 J	<0.0995	
	KWB-10R	Oct-18			3.35		0.215 J	<0.0968	3.81	<0.0650	0.238 J	4.12	<0.250	<0.0852	<0.103	<0.265	<0.0995	
	KWB-11A	Apr-18			0.287	0.398		0.00290	<0.000387	0.000985 J	<0.000260	<0.000384	0.00341	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-11A	Oct-18			0.369	1.20		0.00500	<0.000387	0.00333	<0.000260	<0.000384	0.00290	0.00165 J	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-11A	Apr-19			0.149	0.787		0.000467 J	<0.000387	0.000898 J	<0.000260	<0.000384	0.00371	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-11A	Jun-20			0.444	2.28		0.0486	<0.000104	0.000492 J	<0.000126	0.000576 J	0.00359	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	KWB-11A	Oct-20			0.0992 J	0.376		0.00151	<0.000104	0.00234	<0.000126	<0.000137	0.00307	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	KWB-11B	Apr-18			<0.0314	0.0406 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000498 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-11B	Oct-18			<0.0314	0.0382 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00125	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-11B	Apr-19			<0.0314	0.0418 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000774 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-11B	Oct-19			0.0747 JB	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00103	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-11B	Jun-20			<0.0314	0.0514 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.00140	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	KWB-11B	Oct-20			<0.0314	0.0956 J		<0.000322	<0.000104	0.00192	<0.000126	<0.000137	0.00156	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	KWB-12A	Oct-18			<0.0314	0.132		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-12A	Oct-19			0.0748 JB	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-12A	Jun-20			<0.0314	0.0477 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4
	KWB-12A	Oct-20			0.0364 J	<0.0247		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4
	KWB-12B	Apr-18			<0.0314	0.0354 JB		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-12B	Apr-18	FD		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-12B	Oct-18			<0.0314	0.0425 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-12B	Oct-18	FD		<0.0314	0.0643 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-12B	Apr-19			<0.0314	<0.0247		<0.00										

Table 4A - Summary of Groundwater Analytical Data - Total Petroleum Hydrocarbons and Volatile Organic Compounds

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				TPH			Volatile Organic Compounds										
				GRO	DRO	DRO - EP	1,2,4-TMB	1,3,5-TMB	Benzene	cis-1,2-DCE	Ethylbenzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
CAS				TPH-GRO	TPH-DRO	TPH-DRO	95-63-6	108-67-8	71-43-2	156-59-2	100-41-4	1634-04-4	91-20-3	95-47-6	108-88-3	1330-20-7	79-01-6
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL				0.0101	0.0858	0.0167	0.0560	0.0600	0.00500	0.0700	0.700	0.100	0.0300	0.193	1.00	0.620	0.00500
CGWSL Source				NMED TPH			USEPA TW	USEPA TW	WQCC HH	WQCC HH	WQCC HH	WQCC Dom	WQCC HH	WQCC TW	WQCC HH	WQCC HH	WQCC HH
Area	Well ID	Date	Dup														
Field East of Refinery	MW-130	Apr-18		0.0327 J	0.756 B		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00134	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-130	Oct-18		<0.0314	0.945		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000976 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-130	Apr-19		0.0395 JB	0.648		<0.000373	<0.000387	0.000351 J	<0.000260	<0.000384	0.00131	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-130	Oct-19		0.0828 JB	0.774		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00295	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-130	Jun-20		<0.0314	0.609		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.00424	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-130	Oct-20		<0.0314	0.676		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.00328	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-131	Apr-17		6.81	1.77		0.0137	0.00348	3.09	<0.000260	0.0532	3.99	0.0295	0.0406	0.153	0.114	<0.000398
	MW-131	Oct-17		4.95	1.58		<0.0932	0.00174	1.39	<0.000260	<0.0960	5.25	0.0303	<0.0852	0.0627	<0.265	<0.000398
	MW-131	Oct-19		8.71	1.46		0.167	0.0432	0.796	<0.000260	0.0255	4.95	0.0314	0.312	0.232	0.993	<0.000398
	MW-131	Jun-20		8.68	1.83		0.110	0.0408 J	0.907	<0.00630	0.0171 J	2.91	<0.0500	0.242	0.150	0.786	<0.00950
	MW-133	Nov-14		9.40	2.80		0.280	0.0530 J	0.620	<0.0260	0.300	5.60	<0.100	0.0380 J	0.100 J	0.220 J	<0.0400
	MW-133	Apr-15		11.3	3.10		0.138	<0.0390	0.788	<0.0260	0.199	6.67	<0.100	<0.0340	<0.0780	<0.110	<0.0400
	MW-134	Apr-18		<0.0314	0.0533 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-134	Apr-18	FD	<0.0314	0.0427 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-134	Oct-18		<0.0314	0.0547 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-134	Oct-18	FD	<0.0314	0.0883 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-134	Apr-19		0.0450 JB	0.0911 J		0.000846 J	<0.000387	0.000947 J	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-134	Apr-19	FD	<0.0314	0.0927 J		0.000471 J	<0.000387	0.00279	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-134	Oct-19		0.0965 JB	0.0947 J		0.000835 J	<0.000387	0.000392 J	<0.000260	0.000442 J	<0.000367	0.00326 J	<0.000341	<0.000412	<0.00106	<0.000398
	MW-134	Oct-19	FD	0.0939 JB	0.277		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	0.00248 J	<0.000341	<0.000412	0.00106 J	<0.000398
	MW-134	Jun-20		0.0330 JB	0.0820 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-134	Jun-20	FD	0.0332 J	<0.0247		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-134	Oct-20		<0.0314	0.107 B		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4
	MW-134	Oct-20	FD	<0.0314	0.129		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4
	MW-135	Apr-18		<0.0314	0.0408 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-135	Oct-18		<0.0314	0.0342 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-135	Apr-19		0.0317 JB	0.0521 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-135	Oct-19		0.0796 JB	0.0543 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-135	Jun-20		0.0425 J	0.0380 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-135	Oct-20		<0.0314	0.0723 JB		<0.000322	<0.000104	0.00250	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-145	Oct-20					<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000496 J	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-145	Oct-20	FD				<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000507 J	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-146	Oct-20					<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-147	Oct-20					<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-148	Oct-20					<0.000322	<0.000104									

Table 4A - Summary of Groundwater Analytical Data - Total Petroleum Hydrocarbons and Volatile Organic Compounds

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				TPH			Volatile Organic Compounds											
				GRO	DRO	DRO - EP	1,2,4-TMB	1,3,5-TMB	Benzene	cis-1,2-DCE	Ethylbenzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE	
CAS				TPH-GRO	TPH-DRO	TPH-DRO	95-63-6	108-67-8	71-43-2	156-59-2	100-41-4	1634-04-4	91-20-3	95-47-6	108-88-3	1330-20-7	79-01-6	
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
CGWSL				0.0101	0.0858	0.0167	0.0560	0.0600	0.00500	0.0700	0.700	0.100	0.0300	0.193	1.00	0.620	0.00500	
CGWSL Source				NMED TPH			USEPA TW	USEPA TW	WQCC HH	WQCC HH	WQCC HH	WQCC Dom	WQCC HH	WQCC TW	WQCC HH	WQCC HH	WQCC HH	
Area	Well ID	Date	Dup															
NCL	NCL-32	Apr-18			0.971		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-32	Oct-18			2.11		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-32	Apr-19			1.67		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-32	Oct-19			0.970		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-32	Jun-20			0.533		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100 J4	<0.000174	<0.000278	<0.000174	<0.000190	
	NCL-32	Oct-20			0.800		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190	
	NCL-33	Apr-18			2.44		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-33	Oct-18			4.50		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000618 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-33	Apr-19			7.38		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-33	Oct-19			8.53		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000371 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-33	Jun-20			7.21		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000208 J	<0.00100 J4	<0.000174	<0.000278	<0.000174	<0.000190	
	NCL-33	Oct-20			8.54		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000230 J	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190	
	NCL-34A	Apr-18			5.16		0.0123	<0.00387	1.02	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00412	0.0390	<0.00398	
	NCL-34A	Oct-18			7.41		0.00612 J	<0.00387	1.11	<0.00260	0.00672 J	<0.00367	<0.0100	<0.00341	<0.00412	0.0266 J	<0.00398	
	NCL-34A	Apr-19			6.59		<0.00746	<0.00774	0.479	<0.00520	<0.00768	<0.00734	<0.0200 J3J4	<0.00682	<0.00824	<0.0212	<0.00796	
	NCL-34A	Oct-19			5.90		0.00369 J	0.00207 J	0.562	<0.00130	0.00677	<0.00184	<0.00500	<0.00170	<0.00206	0.0175	<0.00199	
	NCL-34A	Jun-20			6.58		0.0113 J	0.00286 J	1.10	<0.00252	0.00476 J	<0.00202	<0.0200 J4	<0.00348	<0.00556	0.0335 J	<0.00380	
	NCL-44	Apr-18			3.65		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-44	Oct-18			8.38		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-44	Apr-19			7.31		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-44	Oct-19			5.80		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
	NCL-44	Jun-20			4.52		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000383 J	<0.00100 J4	<0.000174	<0.000278	<0.000174	<0.000190	
	NCL-44	Oct-20			5.12		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.000412 J	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4	
	NCL-49	Apr-18				0.0568 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-49	Apr-18	FD			0.0559 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-49	Oct-18				0.0922 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-49	Oct-18	FD			0.0672 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-49	Apr-19				0.0986 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-49	Apr-19	FD			0.0811 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-49	Oct-19				0.153		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-49	Oct-19	FD			0.119		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-49	Jun-20				0.0917 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	NCL-49	Jun-20	FD			0.0640 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	NCL-49	Oct-20				0.0702 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	NCL-49	Oct-20	FD			0.0750 J		<0.0003										

Table 4A - Summary of Groundwater Analytical Data - Total Petroleum Hydrocarbons and Volatile Organic Compounds

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				TPH			Volatile Organic Compounds										
				GRO	DRO	DRO - EP	1,2,4-TMB	1,3,5-TMB	Benzene	cis-1,2-DCE	Ethylbenzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
				TPH-GRO	TPH-DRO	TPH-DRO	95-63-6	108-67-8	71-43-2	156-59-2	100-41-4	1634-04-4	91-20-3	95-47-6	108-88-3	1330-20-7	79-01-6
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
				CGWSL	CGWSL	CGWSL	CGWSL	CGWSL	CGWSL	CGWSL	CGWSL	CGWSL	CGWSL	CGWSL	CGWSL	CGWSL	CGWSL
CGWSL Source				NMED TPH			USEPA TW	USEPA TW	WQCC HH	WQCC HH	WQCC HH	WQCC Dom	WQCC HH	WQCC TW	WQCC HH	WQCC HH	WQCC HH
Area	Well ID	Date	Dup														
North Refinery	MW-90	Apr-18		0.354	3.29		<0.000373	<0.000387	0.000758 J	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-90	Oct-18		0.397 B	5.54		<0.000373	<0.000387	0.00103	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-90	Apr-19		0.0877 J	4.99		<0.000373	<0.000387	0.00125	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-90	Oct-19		0.321 B	2.21		<0.000373	<0.000387	0.00267	<0.000260	0.000557 J	<0.000367	<0.00100	<0.000341	0.000519 J ^{J4}	<0.00106	<0.000398
	MW-90	Jun-20		0.412	3.69		<0.000322	<0.000104	0.00305	<0.000126	0.000290 J	<0.000101	<0.00100	0.000299 J	0.000350 J	0.000299 J	<0.000190
	MW-90	Oct-20		0.498	3.99		<0.000322	<0.000104	0.00334	<0.000126	0.000310 J	<0.000101	<0.00100	0.000349 J	0.000323 J	0.000349 J	<0.000190 J ^{J4}
	MW-91	Apr-18		17.2	8.33		0.214	0.0671 J	2.41	<0.0260	0.258	<0.0367	0.136 J	0.138	1.23	0.697	<0.0398
	MW-91	Oct-18		16.7	11.8		0.182	0.0510 J	2.86	<0.0260	0.210	<0.0367	<0.100	0.164	1.24	0.716	<0.0398
	MW-91	Apr-19		13.8	15.8		0.216	0.0571 J	2.89	0.0926 J	0.481	<0.0367	<0.100	0.187	1.94	0.799	<0.0398
	MW-91	Oct-19		34.8 B	10.8		0.239	0.0675 J	4.07	<0.0260	1.48	<0.0367	<0.100	0.548	7.07 J ^{J4}	2.12	<0.0398
	MW-91	Jun-20		36.2	11.5		0.234	0.0671 J	4.12	<0.0126	1.85	<0.0101	<0.100	0.649	6.95	2.50	<0.0190
	MW-92	Apr-16		5.50	20.4		0.0588	0.0174	2.87	0.0640	0.462	0.113	0.224 J	0.0268	0.0173	0.188	<0.000398
	MW-92	Oct-16		6.05	22.8		0.0308	0.00835 J	2.05	0.0968	0.400	0.134	0.174	0.0151 J	<0.0156	0.110	<0.00796
	MW-93	Apr-17		3.73	7.89		0.148	0.0236 J	0.633	<0.00650	<0.00960	<0.00918	0.0422 J	<0.00852	<0.0103	0.326	<0.00995
	MW-93	Apr-18		3.59	5.05		0.116	0.0260	0.857	0.000281 J	0.00738	<0.000367	0.0256	0.00452	0.00797	0.336	<0.000398
	MW-93	Apr-19		2.82	7.92		0.187	0.0356	0.673	0.000267 J	0.00962	<0.000367	0.0482	0.00409	0.00748	0.303	<0.000398
	MW-93	Jun-20		6.28	8.54		0.111	0.0243	1.21	<0.00252	0.00622 J	<0.00202	0.0519 J	<0.00348	0.0123 J	0.296	<0.00380
	MW-94	Oct-15		6.12	25.6		0.432	0.0857	0.339	<0.00260	0.509	0.798	0.202	0.360	0.553	0.574	<0.00398
	MW-94	Apr-16		7.91	8.69		0.489	0.100	0.417	0.0149 J	0.553	0.621	0.228 J	0.387	0.687	0.615	<0.0199
	MW-94	Oct-16		6.83	9.76		0.458	0.0917	0.297	<0.00130	0.564	2.01	0.128	0.390	0.468	0.592	<0.00199
	MW-94	Apr-17		10.2	9.96		0.398	0.0785	0.284	<0.00650	0.432	0.958	0.174	0.292	0.435	0.460	<0.00995
	MW-95	Apr-17		0.0826 J	6.96		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-95	Apr-18		<0.0314	3.68		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-95	Apr-19		<0.0314	7.34		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-95	Jun-20		0.162 B	6.29		<0.000322	<0.000104	0.000603 J	<0.000126	0.000196 J	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-96	Apr-18		36.5	4.65		<0.0186	<0.0194	<0.0166	<0.0130	<0.0192	29.4	<0.0500	<0.0170	<0.0206	<0.0530	<0.0199
	MW-96	Oct-18		31.3	8.07		<0.373	<0.387	<0.331	<0.260	<0.384	26.7	<1.00	<0.341	<0.412	<1.06	<0.398
	MW-96	Apr-19		17.0	9.67		<0.0186	<0.0194	<0.0166	<0.0130	<0.0192	32.7	<0.0500	<0.0170	<0.0206	<0.0530	<0.0199
	MW-96	Oct-19		25.7 B	6.80		<0.0187	<0.0194	<0.0166	<0.0130	<0.0192	33.3	<0.0500	<0.0170	<0.0206	<0.0530	<0.0199
	MW-96	Jun-20		30.4	8.28		<0.0805	<0.0260	<0.0235	<0.0315	<0.0343	37.6	<0.250	<0.0435	<0.0695	<0.0435	<0.0475
	MW-96	Oct-20		71.6	6.91		<0.0805	<0.0260	0.0424 J	<0.0315	<0.0343	40.5	<0.250	<0.0435	<0.0695	<0.0435	<0.0475 J ^{J4}
	MW-98	Apr-18		25.4	4.78		0.475	0.116	3.17	<0.0130	1.08	<0.0184	0.327	0.0245 J	0.282	1.90	<0.0199
	MW-98	Oct-18		20.9	5.69		0.480	0.103	2.64	<0.0130	1.09	<0.0184	0.257	0.0272 J	0.269	2.16	<0.0199
	MW-98	Apr-19		25.0	5.64		0.618	0.138	2.69	<0.0130	1.18	<0.0184	0.251	0.0314 J	0.284	2.19	<0.0199
	MW-98	Oct-19		19.5 B	6.15		0.453	0.112	1.88	<0.0130	0.870	<0.0184	0.301	0.0266 J	0.246	1.87	<0.0199
	MW-98	Jun-20		16.7	6.31		0.646	0.110	1.74	<0.00630	0.711	<0.00505	0.255	0.0256 J	0.202	2.17	<0.00950 J ^{J4}
	MW-98	Oct-20		22.0	5.31		0.371	0.0820	1.73	<0.00630	0.788	<0.00505	0.207 J	0.0254 J	0.236	1.88	<0.00950 J ^{J4}
	MW-137	Oct-17		33.1	11.3		0.559	0.137 J	12.5	<0.0520	1.53	0.0754 J	0.317 J	0.265	1.54	1.16	<0.0796
	MW-137	Apr-18		26.6	9.60		0.531	0.125 J	9.63	<0.0520	1.86	0.0758 J	0.373 J	0.398	1.83	1.30	<0.0796
	MW-137	Oct-18		32.6	8.76		0.342	<0.0774	10.6	&							

Table 4A - Summary of Groundwater Analytical Data - Total Petroleum Hydrocarbons and Volatile Organic Compounds

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				TPH			Volatile Organic Compounds										
				GRO	DRO	DRO - EP	1,2,4-TMB	1,3,5-TMB	Benzene	cis-1,2-DCE	Ethylbenzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
CAS				TPH-GRO	TPH-DRO	TPH-DRO	95-63-6	108-67-8	71-43-2	156-59-2	100-41-4	1634-04-4	91-20-3	95-47-6	108-88-3	1330-20-7	79-01-6
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL				0.0101	0.0858	0.0167	0.0560	0.0600	0.00500	0.0700	0.700	0.100	0.0300	0.193	1.00	0.620	0.00500
CGWSL Source				NMED TPH			USEPA TW	USEPA TW	WQCC HH	WQCC HH	WQCC HH	WQCC Dom	WQCC HH	WQCC TW	WQCC HH	WQCC HH	WQCC HH
Area	Well ID	Date	Dup														
South Refinery	MW-28	Apr-18		5.55	3.62		0.110	<0.0194	0.959	<0.0130	0.0408 J	0.0977	0.0604 J	<0.0170	0.0316 J	0.144 J	<0.0199
	MW-28	Oct-18		1.30	4.68		0.0165 J	<0.00774	0.356	<0.00520	0.00788 J	0.0425	<0.0200	<0.00682	<0.00824	0.0301 J	<0.00796
	MW-28	Apr-19		5.37	8.80		0.107	<0.0194	1.43	<0.0130	0.0274 J	0.268	0.0736 J	<0.0170	0.0272 J	0.140 J	<0.0199
	MW-28	Oct-19		10.4 B	11.6		0.213	0.0243 J	1.51	<0.0130	0.0375 J	0.692	0.137 J	<0.0170	0.0384 J	0.264	<0.0199
	MW-28	Jun-20		3.94	3.91		0.0527	<0.000520	0.397	<0.000630	0.0201	0.194	0.0157 J	0.00154 J	0.0126	0.0916	<0.000950
	MW-28	Oct-20		1.65	5.28		0.0430	0.00133 J	0.362	<0.000630	0.0136	0.214	0.00638 J	0.00171 J	0.00882	0.0626	<0.000950
	MW-48	Apr-18		45.6	6.50		0.381	<0.0968	14.9	<0.0650	1.36	0.171 J	<0.250	<0.0852	1.02	0.955	<0.0995
	MW-48	Oct-18		21.8	5.56		0.377	<0.0968	7.97	<0.0650	0.479	0.611	<0.250	<0.0852	<0.103	0.358 J	<0.0995
	MW-48	Apr-19		17.7	6.53		0.564	<0.0968	4.87	<0.0650	0.603	0.372	1.20 JJ4	<0.0852	0.152 J	0.498 J	<0.0995
	MW-48	Oct-19		31.9 B	6.48		0.240 J	<0.0967	5.04	<0.0650	0.118 J	0.517	<0.250	<0.0852	0.138 J	0.290 J	<0.0995
	MW-50	Apr-18			0.489		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-50	Oct-18			0.677		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-50	Apr-19			0.632		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-50	Oct-19			0.399		<0.000373	<0.000387	<0.000331	<0.000260	0.000417 J	<0.000367	<0.00100	<0.000341	<0.000412 J4	<0.00106	<0.000398
	MW-50	Jun-20			0.522		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-50	Oct-20			0.526		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4
	MW-52	Apr-18		<0.0314	0.231 B		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-52	Oct-18		<0.0314	0.269		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-52	Apr-19		0.0328 JB	0.146		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-52	Oct-19		0.0776 JB	0.183		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-52	Jun-20		<0.0314	0.294		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-52	Oct-20		<0.0314	0.282		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-64	Apr-18		102	8.37		0.0519	0.0107 J	2.37	<0.00520	0.237	0.0359	0.0238 J	0.122	0.816	0.482	<0.00796
	MW-64	Oct-18		141	7.23		0.620	0.123	38.6	<0.00520	2.47	0.510	0.158	1.06	13.0	4.72	<0.00796
	MW-64	Apr-19		130	9.22		0.592	0.117	33.6	<0.00520	2.46	0.509	0.171	1.49	15.4	5.39	<0.00796
	MW-64	Oct-19		96.0	6.97		0.522	0.102	35.7	<0.00650	2.79	0.502	0.133	1.14	11.2	5.06	<0.00995
	MW-64	Jun-20		102	8.18		0.453 J	0.0760 J	27.5	<0.0630	1.76	0.461 J	<0.500	1.03	9.93	4.29	<0.0950 J4
	MW-64	Oct-20		94.8	6.54		0.252 J	<0.0520	27.2	<0.0630	1.55	0.560	<0.500	0.794	8.09	3.10	<0.0950
	MW-65	Apr-18		15.5	5.05		<0.0373	<0.0387	4.39	<0.0260	0.0528 J	1.73	0.253 J	<0.0341	<0.0412	<0.106	<0.0398
	MW-65	Oct-18		10.4	4.57		<0.0373	<0.0387	2.84	<0.0260	<0.0384	2.38	<0.100	<0.0341	<0.0206	<0.106	<0.0398
	MW-65	Apr-19		16.9	4.86		<0.0373	<0.0387	5.45	<0.0260	0.0628 J	2.35	0.152 J	<0.0341	<0.0412	<0.106	<0.0398
	MW-65	Oct-19		21.4 B	3.59		<0.0373	<0.0387	6.07	<0.0260	0.0565 J	1.82	0.148 J	<0.0341	<0.0412	<0.106	<0.0398
	MW-66	Apr-18		9.68	2.97		<0.00373	<0.00387	2.27	<0.00260	0.00776 J	1.78	0.186	<0.00341	0.00814 J	0.0118 J	<0.00398
	MW-66	Oct-18		6.51	4.31		<0.00373	<0.00387	1.95	<0.00260	0.00686 J	2.05	0.161	<0.00341	0.00704 J	<0.0106	<0.00398
	MW-66	Apr-19		6.03	3.25		<0.00932	<0.00968	0.916	<0.00650	<0.00960	1.36	0.0987 J	<0.00852	<0.0103	<0.0265	<0.00995
	MW-66	Oct-19		7.15 B	2.77		<0.00933	<0.00968	1.24	<0.00650	<0.00960	1.69	0.0758 J	<0.00852	<0.0103	<0.0265	<0.00995
	MW-66	Jun-20		8.44	2.19		0.000705 J	<0.000104	1.18	<0.000126	0.00717	1.62	0.167	0.00239	0.00581	0.0145	<0.000190
	MW-66	Oct-20		4.41	3.36		<0.00322	<0.00104	0.965	<0.00126	0.00643 J	1.90	0.0737	0.00183 J	0.00445 J	0.00787 J	<0.00190
	MW-99	Apr-18		11.9	1.52		0.168	<0.0387									

Table 4A - Summary of Groundwater Analytical Data - Total Petroleum Hydrocarbons and Volatile Organic Compounds

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				TPH			Volatile Organic Compounds										
				GRO	DRO	DRO - EP	1,2,4-TMB	1,3,5-TMB	Benzene	cis-1,2-DCE	Ethylbenzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
CAS				TPH-GRO	TPH-DRO	TPH-DRO	95-63-6	108-67-8	71-43-2	156-59-2	100-41-4	1634-04-4	91-20-3	95-47-6	108-88-3	1330-20-7	79-01-6
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL				0.0101	0.0858	0.0167	0.0560	0.0600	0.00500	0.0700	0.700	0.100	0.0300	0.193	1.00	0.620	0.00500
CGWSL Source				NMED TPH			USEPA TW	USEPA TW	WQCC HH	WQCC HH	WQCC HH	WQCC Dom	WQCC HH	WQCC TW	WQCC HH	WQCC HH	WQCC HH
Area	Well ID	Date	Dup														
South Refinery	RW-4	Apr-17			2.35		<0.00186	<0.00194	0.0294	<0.00130	<0.00192	0.132	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	RW-4	Apr-18			1.02		0.000659 J	<0.000387	0.00821	<0.000260	<0.000384	0.0583	0.00103 J	<0.000341	<0.000412	<0.00106	<0.000398
	RW-4	Apr-19			2.53		0.00105	0.000400 J	0.0854	<0.000260	0.00198	0.0933	0.0266	0.000454 J	0.000772 J	0.00192 J	<0.000398
	RW-4	Jun-20			1.63		0.000958 J	0.000329 J	0.0184	<0.000126	0.00185	0.0727	<0.00100	0.00105	0.00557	0.00375	<0.000190
	RW-5R	Apr-15			6.42		0.298	0.0558	2.92	<0.00260	1.03	2.15	0.174	0.522	2.26	1.91	<0.00400
	RW-5R	Apr-16			7.39		0.437	0.100	3.48	<0.00520	1.20	1.64	0.205	0.570	2.51	2.25	<0.00796
	RW-6	Apr-15			11.4		0.134	0.0280	0.636	<0.00260	0.0476	2.27	0.0602	0.0558	0.0126 J	0.158	<0.00400
	RW-6R	Apr-16			4.20		0.00555	0.00111	0.218	<0.000260	0.00474	2.68	0.00574	0.00275	0.00683	0.00747	<0.000398
	RW-6	Apr-18			3.04		0.0143	0.00259	2.67	<0.000260	0.0838	<0.000367	0.0290	0.0570	0.448	0.150	<0.000398
	RW-6	Apr-19			3.23		0.0110 J	<0.00774	1.18	<0.00520	0.0487	0.792	0.0678 J	0.00804 J	0.0211	0.0304 J	<0.00796
RW-15C	Apr-17			9.74		1.46	0.231	19.1	<0.00650	4.19	4.25	0.383	0.472	0.172	5.39	<0.00995	
RW-15C	Apr-18			9.27		1.06	0.138	21.9	<0.000260	3.93	3.02	<0.500	0.0285	0.111	3.01	<0.000398	
RW-15C	Apr-19			11.7		0.728	0.0476	<0.00331	<0.00260	3.03	3.66	0.173 J4	0.00812 J	0.0871	1.05	<0.00398	
South RO Field	MW-114	Apr-18		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-114	Oct-18		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-114	Apr-19		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-114	Oct-19		0.0705 JB	0.0374 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-114	Jun-20		<0.0314	0.436		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.00475	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-114	Oct-20		<0.0314	0.663		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.0112	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-115	Apr-18		<0.0314	0.0341 JB		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-115	Oct-18		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-115	Apr-19		<0.0314	0.0376 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-115	Oct-19		0.0733 JB	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-115	Jun-20		<0.0314	0.0430 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.00126	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-115	Oct-20		<0.0314	0.222 B		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.00364	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190
	MW-116	Apr-18		<0.0314	0.0353 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-116	Oct-18		<0.0314	0.0468 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-116	Apr-19		0.0383 JB	0.172		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-116	Oct-19		0.118 B	0.123		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412 J4	<0.00106	<0.000398
MW-116	Jun-20		<0.0314	<0.0247		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190	
MW-116	Oct-20		<0.0314	0.127 B		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190	
TEL	MW-49	Apr-18		4.42	4.48		0.0861	0.0151	0.542	<0.00260	0.0135	0.113	0.0159 J	<0.00341	0.00637 J	0.133	<0.00398
	MW-49	Oct-18		2.99	4.24		0.0921	0.0159	0.451	<0.00130	0.0143	0.124	0.00585 JJ4	0.00182 J	0.00918	0.132	<0.00199
	MW-49	Apr-19		4.03	8.93		0.0784	0.0112	0.400	<0.00130	0.0137	0.139	0.0165 J	0.00242 J	0.00550	0.114	<0.00199
	MW-49	Oct-19		5.13 B	6.47		0.0794	0.0155	0.576	<0.00130	0.0175	0.160	0.0132 J	0.00243 J	0.00941	0.122	<0.00199
	MW-49	Jun-20		5.45	4.96		0.115	0.0214	0.600	<0.00252	0.0249	0.148	0.0241 J	<0.00348	0.00895 J	0.179	<0.00380
	MW-49	Oct-20		5.05	5.44		0.0763	0.0154 J	0								

Table 4A - Summary of Groundwater Analytical Data - Total Petroleum Hydrocarbons and Volatile Organic Compounds

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				TPH			Volatile Organic Compounds										
				GRO	DRO	DRO - EP	1,2,4-TMB	1,3,5-TMB	Benzene	cis-1,2-DCE	Ethylbenzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
CAS				TPH-GRO	TPH-DRO	TPH-DRO	95-63-6	108-67-8	71-43-2	156-59-2	100-41-4	1634-04-4	91-20-3	95-47-6	108-88-3	1330-20-7	79-01-6
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL				0.0101	0.0858	0.0167	0.0560	0.0600	0.00500	0.0700	0.700	0.100	0.0300	0.193	1.00	0.620	0.00500
CGWSL Source				NMED TPH			USEPA TW	USEPA TW	WQCC HH	WQCC HH	WQCC HH	WQCC Dom	WQCC HH	WQCC TW	WQCC HH	WQCC HH	WQCC HH
Area	Well ID	Date	Dup														
Three Mile Ditch	MW-71	Apr-17			0.0947 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-71	Apr-18			<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-71	Apr-19			<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-71	Jun-20			0.0323 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.00152	<0.00100 J4	<0.000174	<0.000278	<0.000174	<0.000190
	MW-89	Apr-17			2.15		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-89	Apr-18			0.403		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	0.000421 J	<0.000412	<0.00106	<0.000398
	MW-89	Apr-19			0.611		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-89	Jun-20			0.218		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100 J4	0.000664 J	<0.000278	0.000664 J	<0.000190
	NP-1	Apr-18					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.132	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NP-1	Oct-18					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.547	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NP-1	Apr-19					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0484	<0.00100 J3J4	<0.000341	<0.000412	<0.00106	<0.000398
	NP-1	Oct-19					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.149	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NP-1	Jun-20					<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	0.216	<0.00100 J4	<0.000174	<0.000278	<0.000174	<0.000190
	NP-1	Oct-20					0.000430 J	0.000104 J	<0.0000941	<0.000126	0.000245 J	0.217	<0.00100	<0.000174	<0.000278	0.000456 J	<0.000950
	NP-6	Apr-13					<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
NP-6	Apr-15					<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	0.00878	<0.00100 UJ	<0.000340	<0.000780	<0.00110	<0.000400	
NP-6	Apr-17					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0353	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398	
NP-6	Apr-19					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0729	<0.00100 J3J4	<0.000341	<0.000412	<0.00106	<0.000398	
Upgradient	UG-1	Apr-17		<0.0314	0.0484 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-1	Apr-18		<0.0314	0.0723 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-1	Apr-19		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-1	Jun-20		<0.0314	<0.0247		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4
	UG-2	Apr-17		<0.0314	0.0818 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-2	Apr-18		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-2	Apr-19		<0.0314	0.0647 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-2	Jun-20		<0.0314	<0.0247		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4
	UG-3R	Apr-17		<0.0314	0.0517 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-3R	Apr-18		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-3R	Apr-19		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-3R	Jun-20		0.0421 J	0.0478 J		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4
	UG-4	Apr-17		<0.0314	0.0463 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-4	Apr-18		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	UG-4	Apr-19		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
UG-4	Jun-20		<0.0314	<0.0247		<0.000322	<0.000104	<0.0000941	<0.000126	<0.000137	<0.000101	<0.00100	<0.000174	<0.000278	<0.000174	<0.000190 J4	

Definitions	
X	Reported concentration, X, exceeds the CGWSL.
X	Analyte detected above the detection limit at a concentration equal to X.
<x	Analyte not detected at detection limit equal to x.
<x	Analyte not detected at detection limit equal to x, but x exceeds the CGWSL.
	Blank cell indicates a sample was collected from the well during the indicated sampling event, but the analyte was not analyzed.
---	No applicable CGWSL.

Abbreviations

1,2,4-TMB	1,2,4-Trimethylbenzene
1,3,5-TMB	1,3,5-Trimethylbenzene
CGWSL	Critical Groundwater Screening Level (see Table 3)
CGWSL Source	Source for CGWSL value (see Table 3)
cis-1,2-DCE	cis-1,2-Dichloroethene
DRO	Diesel Range Organics
DRO-EP	Diesel Range Organics data from wells located in the Evaporation Ponds area
Dup	Duplicate sample
FD	Field duplicate sample
GRO	Gasoline Range Organics
mg/L	Milligrams per Liter
MTBE	Methyl Tert-Butyl Ether
NMED TPH	NMED Risk Assessment Guidance for Site Investigations and Remediation, February 2019, Rev 2 (6/19/19), Table 6-4 TPH Groundwater Screening Level
NMED TW	NMED Risk Assessment Guidance for Site Investigations and Remediation, February 2019, Rev 2 (6/19/19), Table A-1 Tap Water Screening Level
TCE	Trichloroethene
TPH	Total Petroleum Hydrocarbons
USEPA TW	United States Environmental Protection Agency Tap Water Screening Level, "Regional Screening Levels (RSL) Summary Table", November 2020
WQCC Dom	NMED Groundwater standard for domestic water supply, 20.6.2.3103.B NMAC
WQCC HH	NMED Groundwater standard for human health exposure, 20.6.2.3103.A NMAC

Lab Footnote

B	Analyte was also detected in the associated method blank.
J	Indicates an estimated value.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
Q	Sample was prepared and/or analyzed past recommended holding time.
V3	Internal standard exhibited poor recovery due to sample matrix interference; analytical result biased high.

Table 4B - Summary of Groundwater Analytical Data - Total Metals
2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Total Metals													
Analyte CAS Units CGWSL				Arsenic 7440-38-2 mg/L 0.0100	Barium 7440-39-3 mg/L 2.00	Boron 7440-42-8 mg/L 0.750	Cadmium 7440-43-9 mg/L 0.00500	Cobalt 7440-48-4 mg/L 0.0500	Chromium 7440-47-3 mg/L 0.0500	Iron 7439-89-6 mg/L 1.00	Lead 7439-92-1 mg/L 0.0150	Manganese 7439-96-5 mg/L 0.200	Mercury 7439-97-6 mg/L 0.00200	Nickel 7440-02-0 mg/L 0.200	Selenium 7782-49-2 mg/L 0.0500	Uranium 7440-61-1 mg/L 0.0300	Vanadium 7440-62-2 mg/L 0.0631
CGWSL Source				WQCC HH	WQCC HH	WQCClrr	WQCC HH	WQCClrr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCClrr	WQCC HH	WQCC HH	NMED TW
Area	Well ID	Date	Dup														
Cross-Gradient	KWB-13	Apr-17		0.00286	0.0229	0.294	<0.000160	0.000487 J	0.00148 J	1.02	0.00107 J	0.0234	<0.0000490	0.00119 J	0.0130	0.0227	0.0213
	KWB-13	Apr-18		0.00395	0.0325	0.343	<0.000160	0.000953 J	0.00437 B	3.01	0.00292	0.0490	0.0000726 JB	0.00296	0.0131	0.0249	0.0261
	KWB-13	Apr-19		0.00485	0.0372	0.376	0.000325 J	0.00113 J	0.00514 B	2.18	0.00472	0.0829	<0.0000490	0.00325	0.0151	0.0250	0.0308
	KWB-13	Jun-20		0.00587	0.0485	0.306	<0.000478	0.00163 J	0.00721	4.41	0.00654	0.113	<0.000100	0.0110	0.0103	0.0260	0.0327
	MW-136	Apr-18		0.00245	0.0104	0.657	<0.000160	<0.000260	0.00403 B	0.0368 JB	<0.000240	0.00375 J	0.0000593 JB	0.00193 J	0.00759	0.0675	0.0163
	MW-136	Oct-18		0.00258 J	0.0115	0.697	<0.000160	<0.000520	<0.00108	0.0379 J	<0.000480	0.00900 JB	0.000168 J	0.00180 J	0.00759	0.0688	0.0176
	MW-136	Apr-19		0.00283	0.0153	0.699	<0.000160	0.000319 J	0.000696 J	0.163	0.000319 J	0.0206	<0.0000490	0.00143 J	0.00503	0.0729	0.0169
	MW-136	Oct-19		0.00256	0.0121	0.663	<0.000160	<0.000260	<0.000540	0.0670 J	0.000261 J	0.0127	0.0000659 JB	0.00108 J	0.00581	0.0599	0.0184
	MW-136	Jun-20		0.00245	0.0147 J	0.571	<0.000478	0.000685 J	<0.00149	0.171	<0.00249	0.0352	<0.000100	0.00183 J	0.00593	0.0639	0.0161
	MW-136	Oct-20		0.00247	0.0123 J	0.556	<0.000478	<0.000477	<0.00149	0.0705 J	<0.00249	0.0123 B	<0.000100	0.00248	0.00553	0.0558	0.0158
	NP-5	Apr-13		<0.0100	<0.0100				<0.0100	<0.400	<0.0100	<0.0100			0.0135		
	NP-5	Apr-15		0.00288	0.0159				0.00109 J	0.437	0.000415 J	0.00318 J			0.0125		
	NP-5	Apr-17		0.00305	0.00938				<0.000540	0.0632 J	<0.000240	0.000586 J			0.0124		
	NP-5	Apr-19		0.00313	0.00844				<0.000540	0.0278 J	0.000709 J	0.000563 J			0.0119		
RA-3156	Apr-17																
RA-3156	Apr-18																
RA-3156	Apr-19																
RA-3156	Jun-20																
Evaporation Ponds	MW-1R	Apr-17		0.00221	0.0258				<0.000540	4.50	<0.000240	2.38			<0.000380		
	MW-1R	Apr-18		0.00180 J	0.0224				<0.000540	3.42	0.000344 J	1.71			0.000380 J		
	MW-1R	Apr-19		0.00176 J	0.0213				<0.000540	2.17	<0.000240	0.995			<0.000380		
	MW-1R	Jun-20		0.00119 J	0.0219				<0.00149	1.87	<0.00249	1.30			<0.000657		
	MW-2A	Apr-18		0.00931	0.0225				0.000609 JB	2.94	<0.000240	1.28			0.00199 J		
	MW-2A	Oct-18		0.00892	0.0314				0.000784 J	0.617	<0.000240	1.24			0.000828 J		
	MW-2A	Apr-19		0.00824	0.0214				0.00139 J	2.14	0.000266 JB	1.03			0.00175 J		
	MW-2A	Oct-19		0.00661	0.0315				<0.000540	0.109	<0.000240	1.10			0.00186 J		
	MW-2A	Jun-20		0.0140	0.0200				<0.00149	2.78	<0.00249	1.74			<0.000657		
	MW-2A	Oct-20		0.00798	0.0148 J				<0.00149	0.700	<0.00249	0.491 V			0.000658 J		
	MW-3	Apr-18		0.0291	0.0143				0.00246	0.472 B	0.000534 J	0.694			0.00605		
	MW-3	Apr-18	FD	0.0281	0.0159				0.00326	0.418	0.000369 JB	0.686			0.00725		
	MW-3	Oct-18		0.0254	0.0151				<0.000540	0.0441 J	0.000448 JB	0.869			0.00889		
	MW-3	Oct-18	FD	0.0279	0.0169				<0.000540	0.0176 J	0.000706 JB	0.983			0.00932		
	MW-3	Apr-19		0.0238	0.0128				0.00140 J	0.0281 J	<0.000240	0.462			0.0143		
	MW-3	Apr-19	FD	0.0224	0.0128				0.00172 J	0.0281 J	0.000432 J	0.491			0.0131		
	MW-3	Oct-19		0.0976	0.0151				0.000655 J	3.73	0.000341 J	1.72			0.00316		
	MW-3	Oct-19	FD	0.101	0.0154				0.000666 J	3.79	0.000337 J	1.73			0.00323		
	MW-3	Jun-20		0.0278	0.0125 J				<0.00149	<0.0489	<0.00249	0.880			0.00995		
	MW-3	Jun-20	FD	0.0299	0.0152 J				<0.00149	<0.0489	<0.00249	0.913			0.0100		
	MW-3	Oct-20		0.0340	0.0142 J				<0.00149	0.0772 J	<0.00249	1.27			0.00722		
	MW-3	Oct-20	FD	0.0343	0.0150 J				<0.00149	0.0500 J	<0.00249	1.38			0.00646		
	MW-4A	Apr-18		0.105	0.0125				0.00444	9.18	0.00119 J	1.93			0.000515 J		
	MW-4A	Oct-18		0.183	0.0122 J				<0.000540	1.34	<0.00120	1.77			0.000579 J		
	MW-4A	Apr-19		0.132	0.0121				0.000785 J	1.67	0.000346 JB	1.82			0.000731 J		
	MW-4A	Oct-19		0.0758	0.0131				0.000785 J	1.88	<0.000240	2.01			<0.000380		
	MW-4A	Jun-20		0.111	0.0125 J				<0.00149	2.55	<0.00249	1.79			<0.000657		
	MW-4A	Oct-20		0.114	0.0133 J				0.00183 J	1.73	<0.00249	1.74			<0.000657		
	MW-4B	Apr-13		0.0371	<0.0250				<0.0250	<1.00	<0.0250	1.30			<0.0250		
	MW-4B	Apr-15		0.101	0.0349				<0.00110	3.60	0.00189 J	8.68			<0.000760		
	MW-4B	Apr-17		0.0371	0.0182				<0.000540	3.42	<0.000240	7.35			<0.000380		
	MW-4B	Apr-19		0.0699	0.0165				0.000725 J	1.54	0.000544 JB	11.1			<0.000380		
	MW-5A	Apr-18		</													

Table 4B - Summary of Groundwater Analytical Data - Total Metals
2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Total Metals													
Analyte CAS Units CGWSL				Arsenic 7440-38-2 mg/L 0.0100	Barium 7440-39-3 mg/L 2.00	Boron 7440-42-8 mg/L 0.750	Cadmium 7440-43-9 mg/L 0.00500	Cobalt 7440-48-4 mg/L 0.0500	Chromium 7440-47-3 mg/L 0.0500	Iron 7439-89-6 mg/L 1.00	Lead 7439-92-1 mg/L 0.0150	Manganese 7439-96-5 mg/L 0.200	Mercury 7439-97-6 mg/L 0.00200	Nickel 7440-02-0 mg/L 0.200	Selenium 7782-49-2 mg/L 0.0500	Uranium 7440-61-1 mg/L 0.0300	Vanadium 7440-62-2 mg/L 0.0631
CGWSL Source				WQCC HH	WQCC HH	WQCCClr	WQCC HH	WQCCClr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCCClr	WQCC HH	WQCC HH	NMED TW
Area	Well ID	Date	Dup														
Evaporation Ponds	MW-15	Apr-17		0.0130	0.0180				<0.000540	0.0239 JB	<0.000240	0.173			0.000518 J		
	MW-15	Apr-18		0.0165	0.0225				0.00926	0.0730 J	0.000357 JB	0.394			0.00128 J		
	MW-15	Apr-19		0.0204	0.0242				<0.000540	0.0520 J	0.000401 J	0.166			0.00101 J		
	MW-15	Jun-20		0.00841	0.0175 J				<0.00149	<0.0489	<0.00249	0.547			<0.000657		
	MW-18A	Apr-18		0.00489	0.0173	2.31	<0.000160	0.00108 J	0.00488	0.148	<0.000240	0.533	<0.0000490	0.00947	0.00120 J	0.0314	0.000459 J
	MW-18A	Oct-18		0.00475	0.0160 J	2.34	<0.000800	0.000525 J	<0.000540	0.436	<0.00120	1.73	0.000145 J	0.00828	<0.000380	0.0243 J	0.000400 J
	MW-18A	Apr-19		0.00549	0.0172	2.14	<0.000160	0.00141 J	<0.000540	0.0468 J	0.000249 J	0.375	<0.0000490	0.0109	0.000716 J	0.0379	0.000813 J
	MW-18A	Oct-19		0.00524	0.0163	2.19	<0.000160	0.000751 J	<0.000540	0.786	0.000355 J	1.73	<0.0000490	0.00798	0.000613 J	0.0271	0.00120 JB
	MW-18A	Jun-20		0.00419 J	<0.0389 JS	1.88	<0.00239	<0.00238	<0.00745	1.65	<0.0124	1.13 O1V	<0.000100	0.00735 J	<0.00328	<0.0377 JS	<0.00493
	MW-18A	Oct-20		0.00468	0.0171 J	1.98	<0.000478	0.00139 J	<0.00149	0.348	<0.00249	1.39	<0.000100	0.00846	<0.000657	0.0226	<0.000986
	MW-18B	Apr-13		<0.0100	0.0126				<0.0100	<0.400	<0.0100	0.572			<0.0100		
	MW-18B	Apr-15		0.0120	0.0125				0.000942 J	0.139	0.000814 J	0.789			<0.000380		
	MW-18B	Apr-17		0.00883	0.0137				<0.000540	0.0793 J	0.00104 J	0.803			<0.000380		
	MW-18B	Apr-19		0.0115	0.0168				<0.000540	0.138	0.000778 J	1.26			<0.000380		
	MW-22A	Apr-18		0.0386	0.0170				0.00141 J	4.16	0.00101 J	6.12			0.000962 J		
	MW-22A	Apr-18	FD	0.0371	0.0165				<0.000540	3.68	<0.000240	6.18			0.000839 J		
	MW-22A	Oct-18		0.0463	0.0156 J				<0.000540	5.81	<0.00120	5.71			0.000677 J		
	MW-22A	Oct-18	FD	0.0496	0.0173				<0.000540	5.73	0.000489 JB	6.14			0.000707 J		
	MW-22A	Apr-19		0.0355	0.0149				0.00184 J	2.29	0.000242 J	5.39			0.00137 J		
	MW-22A	Apr-19	FD	0.0333	0.0152				0.00110 J	2.25	<0.000240	5.54			0.00101 J		
	MW-22A	Oct-19		0.0263	0.0315				<0.000540	0.769	0.000240 J	1.46			0.00842		
	MW-22A	Oct-19	FD	0.0256	0.0318				<0.000540	0.718	0.000294 J	1.46			0.00798		
	MW-22A	Jun-20		0.0299	0.0168 J				<0.00149	2.21	<0.00249	2.94			0.00271		
	MW-22A	Jun-20	FD	0.0311	0.0177 J				<0.00149	1.77	<0.00249	3.10			0.00171 J		
	MW-22A	Oct-20		0.0309	0.0163 J				<0.00149	3.96	<0.00249	3.57			0.00147 J		
	MW-22A	Oct-20	FD	0.0301	0.0165 J				<0.00149	4.02	<0.00249	3.69			0.00132 J		
	MW-22B	Apr-13		0.0343	<0.0250				<0.0250	1.78	<0.0250	3.37			<0.0250		
	MW-22B	Apr-15		0.0389	0.0160 J				<0.00270	2.32	0.00134 J	4.32			<0.00190		
	MW-22B	Apr-17		0.0255	0.0116				<0.000540	1.03	0.000313 J	3.35			0.000603 J		
	MW-22B	Apr-19		0.0316	0.0134				0.00173 J	1.99	<0.000240	4.31			0.000766 J		
	MW-70	Apr-18		0.0508	0.0212				<0.000540	46.3	0.000270 JB	0.425			0.000479 J		
	MW-70	Oct-18		0.0186	0.0161				<0.000540	4.49	0.000490 JB	0.270			<0.000380		
	MW-70	Apr-19		0.0191	0.0173				<0.000540	1.23	0.000601 J	0.508			<0.000380		
	MW-70	Oct-19		0.0177	0.0151				<0.000540	3.92	<0.000240	0.369			<0.000380		
	MW-70	Jun-20		0.0157	0.0156 J				<0.00149	4.07	<0.00249	0.257			<0.000657		
	MW-70	Oct-20		0.0166	0.0171 J				<0.00149	4.50	<0.00249	0.299			<0.000657		
	MW-72	Apr-17		0.0164	0.0213				<0.000540	1.62	<0.000240	3.88			0.00210		
	MW-72	Apr-18		0.0175	0.0155				0.000688 JB	2.04	<0.000240	3.04			0.00173 J		
	MW-72	Apr-19		0.0109	0.0123				0.000785 J	1.21	<0.000240	1.27			0.00232		
	MW-72	Jun-20		0.00851	0.0124 J				<0.00149	1.99	<0.00249	1.91			0.00175 J		
	MW-73	Apr-17		0.0650	0.00734				<0.000540	1.92	<0.000240	0.187			0.00184 J		
	MW-73	Apr-18		0.0614	0.00806				0.00109 JB	0.932	<0.000240	1.84			0.00147 J		
	MW-73	Apr-19		0.0806	0.0106				0.00152 J	0.315	<0.000240	0.0807			0.00616		
	MW-73	Jun-20		0.0493	0.00886 J				0.00186 J	2.78	<0.00249	1.89			0.00195 J		
	MW-74	Apr-18		0.0956	0.0129				0.00199 JB	0.0666 JB	<0.000240	1.22			0.0335		
	MW-74	Oct-18		0.0567	0.0133				<0.000540	0.0233 J	0.000376 J	0.926			0.227		
	MW-74	Apr-19		0.0613	0.0118				0.000701 J	<0.0150	<0.000240	1.59			0.0893		
	MW-74	Oct-19		0.0885	0.0185				0.000980 J	1.09	0.000594 J	1.94			0.0133		
	MW-74	Jun-20		0.0552	0.0160 J				0.00165 J	0.325	<0.00249	1.13			0.151		
	MW-74	Oct-20		0.0779	0.0153 J				<0.00149	0.0779 J	0.00433 J	1.39			0.0354		
	MW-75	Apr-18		0.104	0.0167				0.00325	0.523	0.000500 J	0.877			0.00178 J		
	MW-75	Oct-18		0.312	0.0149				0.000998 J	5.50	0.000372 J	0.884			0.00187 J		
	MW-75	Apr-19		0.11													

Table 4B - Summary of Groundwater Analytical Data - Total Metals
2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Total Metals													
Analyte CAS Units CGWSL				Arsenic 7440-38-2 mg/L 0.0100	Barium 7440-39-3 mg/L 2.00	Boron 7440-42-8 mg/L 0.750	Cadmium 7440-43-9 mg/L 0.00500	Cobalt 7440-48-4 mg/L 0.0500	Chromium 7440-47-3 mg/L 0.0500	Iron 7439-89-6 mg/L 1.00	Lead 7439-92-1 mg/L 0.0150	Manganese 7439-96-5 mg/L 0.200	Mercury 7439-97-6 mg/L 0.00200	Nickel 7440-02-0 mg/L 0.200	Selenium 7782-49-2 mg/L 0.0500	Uranium 7440-61-1 mg/L 0.0300	Vanadium 7440-62-2 mg/L 0.0631
CGWSL Source				WQCC HH	WQCC HH	WQCClrr	WQCC HH	WQCClrr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCClrr	WQCC HH	WQCC HH	NMED TW
Area	Well ID	Date	Dup														
Evaporation Ponds	MW-87	Apr-18		0.00609	0.0145				<0.000540	0.924	0.000262 JB	0.686			0.000502 J		
	MW-87	Oct-18		0.00723	0.0168 J				<0.000540	1.27	<0.00120	1.18			<0.000380		
	MW-87	Apr-19		0.00484	0.0159				<0.000540	0.122	0.000477 J	0.189			<0.000380		
	MW-87	Oct-19		0.00577	0.0176				<0.000540	0.156	0.000308 J	0.808			0.000543 J		
	MW-87	Jun-20		0.00424	0.0145 J				0.00174 J	0.0502 J	<0.0124	2.65			<0.000657		
	MW-87	Oct-20		0.00783	0.0169 J				<0.00149	0.925	<0.00249	1.56 V			<0.000657		
	MW-88	Apr-18		0.00806	0.0112				0.00119 J	0.0352 J	0.000649 J	0.927 V			<0.000380		
	MW-88	Oct-18		0.00660	0.0109				<0.000540	0.0233 J	0.000531 JB	0.881			<0.000380		
	MW-88	Apr-19		0.00713	0.0109				0.00124 J	0.0221 J	<0.000240	0.929			0.000430 J		
	MW-88	Oct-19		0.00643	0.0110				<0.000540	0.0183 J	<0.000240	0.926			<0.000380		
	MW-88	Jun-20		0.00559	0.00971 J				<0.00149	0.0546 J	<0.00249	0.807			<0.000657		
	MW-88	Oct-20		0.00645	0.0106 J				<0.00149	<0.0489	<0.00249	0.898			<0.000657		
	MW-120	Apr-18		0.0117	0.0104				<0.000540	3.78	<0.000240	1.24			0.000466 J		
	MW-120	Oct-18		0.0118	0.0126				<0.000540	4.55 OI	0.000327 J	1.35 OI V			<0.000380		
	MW-120	Apr-19		0.0141	0.0112				<0.000540	5.86	0.000743 JB	1.21			0.000890 J		
	MW-120	Oct-19		0.00935	0.0115				<0.000540	4.05	<0.000240	1.28			0.000828 J		
	MW-120	Jun-20		0.00614	0.00971 J				<0.00149	2.94	<0.00249	0.973			<0.000657		
	MW-120	Oct-20		0.00769	0.0109 J				<0.00149	4.31	<0.00249	1.38			0.000719 J		
	MW-121	Apr-18		0.0373	0.0122				<0.000540	0.519	0.000325 J	2.57			0.00485		
	MW-121	Oct-18		0.0350	0.0123				<0.000540	0.118	0.000425 J	2.03			0.00619		
	MW-121	Apr-19		0.145	0.0122				<0.000540	2.10	0.000348 JB	2.02			0.00529		
	MW-121	Oct-19		0.0387	0.0126				0.000795 J	0.212	<0.000240	1.01			0.00749		
	MW-121	Jun-20		0.131	0.0115 J				<0.00149	2.33	<0.00249	2.29			0.00453		
	MW-121	Oct-20		0.105	0.0134 J				0.00380	1.88	<0.00249	2.51			0.00320		
	MW-122	Apr-18		0.00252	0.0198				0.00136 JB	0.860	<0.000240	0.763			<0.000380		
	MW-122	Oct-18		0.00349	0.0197				<0.000540	3.58	<0.000240	1.08			<0.000380		
	MW-122	Apr-19		0.00196 J	0.0250				0.000767 J	0.833	0.000610 JB	1.14			0.000524 J		
	MW-122	Oct-19		0.00452	0.0213				0.000756 J	5.96	0.000780 J	1.09			<0.000380		
	MW-122	Jun-20		0.00412	0.0194 J				<0.00149	3.11	<0.00249	1.02 V			0.000840 J		
	MW-122	Oct-20		0.00425	0.0223				<0.00149	4.97	<0.00249	1.01			<0.000657		
	MW-123	Apr-18		0.0226	0.0229				<0.000540	0.0493 J	0.000256 J	2.77			<0.000380		
	MW-123	Oct-18		0.0211	0.0249 J				<0.000540	0.0298 J	<0.00120	3.06			<0.000380		
	MW-123	Apr-19		0.0202	0.0235				0.000931 J	0.0411 J	0.000440 J	2.76			0.000559 J		
	MW-123	Oct-19		0.0263	0.0228				<0.000540	0.647	<0.000240	2.43 V			0.000672 J		
	MW-123	Jun-20		0.0185	0.0328				<0.00149	0.0870 J	<0.00249	3.19			<0.000657		
	MW-123	Oct-20		0.0195	0.0317				<0.00149	0.0586 J	<0.00249	3.23			<0.000657		
	MW-124	Apr-18		0.00179 J	0.0203				<0.000540	3.58	<0.000240	0.506			<0.000380		
	MW-124	Oct-18		0.00214	0.0216 OI				<0.000540	4.05	0.000355 JB	0.527			<0.000380		
	MW-124	Apr-19		0.00175 J	0.0207				<0.000540	3.87	<0.000240	0.535			<0.000380		
	MW-124	Oct-19		0.00152 J	0.0194				<0.000540	2.69	<0.000240	0.617			<0.000380		
	MW-124	Jun-20		<0.00368	<0.0389				<0.00745	6.01	<0.0124	0.440			<0.00328		
	MW-124	Oct-20		0.00195 J	0.0214				<0.00149	5.78	<0.00249	0.435			<0.000657		
	OCD-1R	Apr-18		0.00396	0.0155				0.00148 J	0.246	<0.000240	0.306			0.00143 J		
	OCD-1R	Oct-18		0.00423	0.0198 J				0.00104 J	0.679	<0.00120	1.47			0.000628 J		
	OCD-1R	Apr-19		0.00271	0.0172				<0.000540	0.146	0.000336 J	0.214			0.00143 J		
	OCD-1R	Oct-19		0.00398	0.0247				0.000914 J	0.646	0.000264 J	1.75			0.00268		
	OCD-1R	Jun-20		0.00374	0.0202				<0.00149	1.19	<0.00249	2.06			<0.000657		
	OCD-1R	Oct-20		0.00318	0.0176 J				0.00201	0.435	<0.00249	1.03			0.000844 J		
	OCD-2A	Apr-18		0.0112	0.0201				<0.000540	8.58	<0.000240	1.02			0.000730 J		
	OCD-2A	Oct-18		0.00227	0.0266				<0.000540	1.60	0.000247 JB	0.688			<0.000380		
OCD-2A	Apr-19		0.00207	0.0229				0.00138 J	0.860	<0.000240	0.180			<0.000380			
OCD-2A	Oct-19		0.00146 J	0.0232				<0.000540	0.700	0.000258 J	0.408			0.00120 J			
OCD-2A	Jun-20		0.00147 J	0.0206				<0.00149	1.85	<0.00249	1.32			&			

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Analyte Group				Total Metals													
Analyte CAS Units CGWSL				Arsenic 7440-38-2 mg/L 0.0100	Barium 7440-39-3 mg/L 2.00	Boron 7440-42-8 mg/L 0.750	Cadmium 7440-43-9 mg/L 0.00500	Cobalt 7440-48-4 mg/L 0.0500	Chromium 7440-47-3 mg/L 0.0500	Iron 7439-89-6 mg/L 1.00	Lead 7439-92-1 mg/L 0.0150	Manganese 7439-96-5 mg/L 0.200	Mercury 7439-97-6 mg/L 0.00200	Nickel 7440-02-0 mg/L 0.200	Selenium 7782-49-2 mg/L 0.0500	Uranium 7440-61-1 mg/L 0.0300	Vanadium 7440-62-2 mg/L 0.0631
CGWSL Source				WQCC HH	WQCC HH	WQCCClr	WQCC HH	WQCCClr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCCClr	WQCC HH	WQCC HH	NMED TW
Area	Well ID	Date	Dup														
Field East of Refinery	KWB-1C	Apr-13		<0.0100	0.0146				<0.0100	<0.400	<0.0100	<0.0100			<0.0100		
	KWB-1C	Apr-15		0.00338	0.00918				<0.000540	0.0537 J	0.000320 J	0.462			0.000549 J		
	KWB-1C	Apr-17		0.00303	0.00955				<0.000540	<0.0150	<0.000240	0.501			<0.000380		
	KWB-1C	Apr-19		0.00347	0.00925				0.00162 JB	0.0269 J	0.000292 JB	0.482			<0.000380		
	KWB-7	Oct-17		0.00415	0.0915	0.460	<0.000160	0.00247	0.000670 J	1.37	0.000698 J	3.22	<0.0000490	0.00875	0.00100 J	0.00142 J	0.00129 J
	KWB-7	Oct-18		0.000371 J	0.0513	0.491	<0.000160	0.000457 J	0.000570 J	0.432	0.000317 J	2.55	0.000134 J	0.00144 J	<0.000380	0.00120 J	0.00118 JB
	KWB-7	Jun-20		0.00153 J	0.0692	0.418	<0.000478	<0.000477	<0.00149	0.678	0.00545	2.57	<0.000100	0.00133 J	<0.000657	<0.00754	0.00412 J
	KWB-7	Oct-20		<0.00368	0.0528 J	0.439	<0.00239	<0.00238	<0.00745	<0.244	<0.0124	2.15	<0.000100	<0.00476	<0.00328	<0.0377	<0.00493
	KWB-8	Oct-16		0.00109 J	0.139	0.665	<0.000160	<0.000260	0.000710 JB	0.672	0.00387	0.997	<0.0000490 JB	0.00102 JB	0.000475 J	0.000746 J	0.00122 J
	KWB-8	Apr-17		0.00129 J	0.106	0.632	<0.000160	0.000264 J	0.000851 J	1.07	0.00495	1.83	<0.0000490	0.00120 J	<0.000380	<0.000330	0.00157 J
	KWB-8	Oct-17		0.00135 J	0.130	0.769	<0.000160	<0.000260	0.00153 J	0.0804 J	0.00296	0.510	<0.0000490	0.000997 J	0.0463	<0.000330	0.00112 J
	KWB-8	Oct-20		0.00348	0.0706	0.661	<0.000478	0.000490 J	0.00626	1.32	0.00678	0.0432	<0.000100	0.00306	<0.000657	<0.00754	0.00115
	KWB-10R	Apr-17		0.0157	3.82				<0.000540	5.21	0.000971 J	0.157			<0.000380		
	KWB-10R	Oct-17		0.0170	3.85				<0.000540	5.24	0.000996 J	0.163			<0.000380		
	KWB-10R	Apr-18		0.0169	3.91				<0.000540	4.57	0.00320	0.170			<0.000380		
	KWB-10R	Oct-18		0.0164	3.93				<0.00270	4.24	0.00124 J	0.168			<0.00190		
	KWB-11A	Apr-18		0.0112	0.0210	0.460	<0.000160	0.00532	<0.000540	0.595	0.00131 J	0.413	<0.0000490	0.00463	0.00246	0.0140	0.00760
	KWB-11A	Oct-18		0.0487	0.0379	0.423	<0.000160	0.0143	<0.000540	12.6	0.00226	1.98	0.000140 J	0.00485	0.00182 J	0.0119	0.00855
	KWB-11A	Apr-19		0.00966	0.0450	0.444	<0.000160	0.0108	<0.000540	3.95	0.00137 J	1.05	<0.0000490	0.0137	0.000527 J	0.0148	0.00424 J
	KWB-11A	Jun-20		0.0111	0.0329	0.380	<0.000478	0.00371	<0.00149	7.33	0.00307 J	0.570	<0.000100	0.00429	0.00104 J	0.0143 J	0.00286 J
	KWB-11A	Oct-20		0.00403	0.0227	0.387	<0.000478	0.00271	<0.00149	1.05	<0.00249	0.471	<0.000100	0.00413	0.00134 J	0.0118 J	0.00555
	KWB-11B	Apr-18		0.00154 J	0.0130	0.131 J	<0.000160	<0.000260	<0.000540	<0.0150	<0.000240	0.000543 J	0.0000648 JB	0.000350	0.0107	0.0111	0.00826
	KWB-11B	Oct-18		0.00122 J	0.0130	0.128 J	<0.000160	<0.000520	<0.00108	<0.0300	<0.000480	0.00248 JB	0.000180 J	0.00108 J	0.00911	0.0111 J	0.00776 J
	KWB-11B	Apr-19		0.00141 J	0.0137	0.161 JB	<0.000160	<0.000260	0.000800 J	<0.0150	0.000488 J	0.00172 J	<0.0000490	<0.000350	0.00969	0.0117	0.00783
	KWB-11B	Oct-19		0.00141 J	0.0137	0.100 J	<0.000160	<0.000260	0.000769 J	<0.0150	<0.000240	0.00109 J	0.0000867 JB	0.000350	0.00915	0.0108	0.00915
	KWB-11B	Jun-20		0.00119 J	0.0144 J	0.0989 J	<0.000478	<0.000477	<0.00149	<0.0489	<0.00249	0.00213 J	<0.000100	<0.000952	0.00865	0.0125 J	0.00855
	KWB-11B	Oct-20		<0.00368	<0.0389	0.111 J	<0.00239	<0.00238	<0.00745	<0.244	<0.0124	<0.00660	<0.000100	<0.00476	0.00750 J	<0.0377	0.00905 J
	KWB-12A	Oct-18		0.00135 J	0.0138	0.592	<0.000160	<0.000260	0.000549 J	<0.0150	<0.000240	0.000829 J	<0.0000490	0.000350 J	0.00302	0.0234	0.0120
	KWB-12A	Oct-19		0.00156 J	0.0144	0.568	<0.000160	<0.000260	<0.000540	0.0166 JB	0.000468 JB	0.00146 J	0.0000672 JB	0.000797 J	0.00368	0.0235	0.0113
	KWB-12A	Jun-20		0.00217	0.0182 J	0.552	<0.000478	<0.000477	<0.00149	0.195	<0.00249	0.0199	<0.000100	0.00213	0.00292	0.0268	0.0112
	KWB-12A	Oct-20		0.00148 J	0.0188 J	0.535	<0.000478	<0.000477	<0.00149	<0.0489	<0.00249	0.00279 JB	<0.000100	<0.000952	0.00371	0.0267	0.00976
	KWB-12B	Apr-18		0.00155 J	0.00991	0.609	<0.000160	<0.000260	0.00116 J	0.0689 JB	0.000700 JB	0.00277 JB	0.0000606 J	0.000382 J	0.00311 B	0.0301	0.0125
	KWB-12B	Apr-18	FD	0.00174 J	0.0102	0.607	<0.000160	<0.000260	<0.000540	0.0363 J	<0.000240	0.00120 J	<0.0000490	0.000364 J	0.00329	0.0304	0.0125
	KWB-12B	Oct-18		0.00155 J	0.00876	0.602	<0.000160	<0.000260	<0.000540	0.0949 J	<0.000240	0.000451 J	<0.0000490	<0.000350	0.00277	0.0248	0.0112
	KWB-12B	Oct-18	FD	0.00157 J	0.00884	0.585	<0.000160	<0.000260	0.000608 J	<0.0150	<0.000240	0.000456 J	<0.0000490	0.000531 J	0.00294	0.0269	0.0117
	KWB-12B	Apr-19		0.00195 J	0.0128	0.606	<0.000160	<0.000260	0.000875 JB	0.137	0.000534 JB	0.0110	<0.0000490	0.000567 JB	0.00355	0.0299	0.0141
	KWB-12B	Apr-19	FD	0.00186 J	0.0100	0.601	<0.000160	<0.000260	0.000663 J	0.0433 JB	<0.000240	0.00208 J	0.000152 J	0.00230	0.00310	0.0279	0.0121
	KWB-12B	Oct-19		0.00176 J	0.00924	0.580	<0.000160	<0.000260	<0.000540	0.0196 JB	0						

Table 4B - Summary of Groundwater Analytical Data - Total Metals
2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Total Metals													
				Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
				7440-38-2	7440-39-3	7440-42-8	7440-43-9	7440-48-4	7440-47-3	7439-89-6	7439-92-1	7439-96-5	7439-97-6	7440-02-0	7782-49-2	7440-61-1	7440-62-2
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL				0.0100	2.00	0.750	0.00500	0.0500	0.0500	1.00	0.0150	0.200	0.00200	0.200	0.0500	0.0300	0.0631
CGWSL Source				WQCC HH	WQCC HH	WQCClrr	WQCC HH	WQCClrr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCClrr	WQCC HH	WQCC HH	NMED TW
Area	Well ID	Date	Dup														
Field East of Refinery	MW-130	Apr-18		0.00400	0.0179					<0.000540	0.0297 J	<0.000240	0.0937			0.0162	
	MW-130	Oct-18		0.00341	0.0159					<0.000540	0.0289 J	<0.000240	0.0888			0.00722	
	MW-130	Apr-19		0.00385	0.0203					<0.000540	0.0697 J	0.000361 JB	0.101			0.0137	
	MW-130	Oct-19		0.00400	0.0198					0.000858 J	0.346	0.000349 J	0.101			0.00478	
	MW-130	Jun-20		0.00375	0.0168 J					<0.00149	0.0745 J	<0.00249	0.0968			0.00436	
	MW-130	Oct-20		0.00374	0.0173 J					0.00174 J	0.0826 J	<0.00249	0.101			0.00581	
	MW-131	Apr-17		0.0214	2.75					<0.000540	1.29	<0.000240	0.294			<0.000380	
	MW-131	Oct-17		0.0223	1.98					<0.000540	1.56	<0.000240	0.283			<0.000380	
	MW-131	Oct-19		0.0261	1.65					<0.000540	1.55	0.000845 JB	0.293			<0.000380	
	MW-131	Jun-20		0.0241	2.39					<0.00149	1.35	<0.00249	0.294			<0.000657	
	MW-133	Nov-14		0.0190	0.130					0.000600 J	3.50	0.000800 J	0.380			<0.000380	
	MW-133	Apr-15		0.00897	0.157					<0.000540	5.53	0.00145 J	0.312			0.00124 J	
	MW-134	Apr-18		0.00410	0.00963					<0.000540	<0.0150	<0.000240	0.0144			0.00560	
	MW-134	Apr-18	FD	0.00465	0.0100					0.00883 J3J5	0.0683 J	0.000274 J	0.0135			0.00665	
	MW-134	Oct-18		0.00394	0.00921					<0.000540	<0.0150	<0.000240	0.0119			0.00564	
	MW-134	Oct-18	FD	0.00388	0.00989					<0.000540	<0.0150	<0.000240	0.0134			0.00539	
	MW-134	Apr-19		0.00471	0.0122					0.00278 B	0.193	0.000688 JB	0.0792			0.00747	
	MW-134	Apr-19	FD	0.00418	0.0122					0.00108 JB	0.183	0.00115 JB	0.0600			0.00829	
	MW-134	Oct-19		0.00417	0.00988					0.000807 J	0.0171 JB	0.000450 JB	0.0383			0.00818	
	MW-134	Oct-19	FD	0.00409	0.00949					0.00104 J	0.0163 J	<0.000240	0.0303			0.00704	
	MW-134	Jun-20		0.00368	0.00896 J					<0.00149	<0.0489	<0.00249	0.00741			0.00631	
	MW-134	Jun-20	FD	0.00384	0.00932 J					<0.00149	<0.0489	<0.00249	0.00677			0.00602	
	MW-134	Oct-20		0.00362	0.0101 J					<0.00149	0.0916 J	<0.00249	0.0370			0.00592	
	MW-134	Oct-20	FD	0.00356	0.0101 J					<0.00149	0.0671 J	<0.00249	0.0339			0.00527	
	MW-135	Apr-18		0.00348	0.0186					0.00386 B	0.205 B	0.000510 J	0.0114			0.0254	
	MW-135	Oct-18		0.00335 J	0.0422					0.00276 J	0.649	0.000966 J	0.0380			0.0298	
	MW-135	Apr-19		0.00383	0.0199					0.00245 B	0.205	0.000746 JB	0.0188			0.0334	
	MW-135	Oct-19		0.00335	0.00928					0.00140 J	0.221 B	0.00194 JB	0.0277			0.0200	
	MW-135	Jun-20		0.00326	0.0158 J					<0.00149	0.203	<0.00249	0.0119			0.0221	
	MW-135	Oct-20		<0.00368	<0.0389					<0.00745	0.745	<0.0124	0.0315			0.0186	
	MW-145	Oct-20															
	MW-145	Oct-20	FD														
	MW-146	Oct-20															
	MW-147	Oct-20															
	MW-148	Oct-20															
	RA-4196	Apr-18															
	RA-4196	Oct-18															
	RA-4196	Apr-19															
	RA-4196	Oct-19															
	RA-4196	Jun-20															
	RA-4196	Oct-20															
	RA-4798	Apr-18															
	RA-4798	Oct-18															
	RA-4798	Apr-19															
	RA-4798	Oct-19															
	RA-4798	Jun-20															
	RA-4798	Oct-20															
	RW-12R	Apr-17		0.000503 J	0.0409					0.0359	0.241	0.00193 J	0.398			<0.000380	
	RW-12R	Apr-18		0.000291 J	0.0387					0.00973	0.0459 J	0.00104 J	0.718			0.000554 J	
	RW-12R	Apr-19		0.00109 J	0.0354					0.00771 B	0.0800 J	0.00177 JB	1.28			0.000508 J	
	RW-12R	Jun-20		<0.000735	0.0342					0.0557	0.150	<0.00249	1.39			<0.000657	
	RW-13R	Apr-16		0.00922 J	0.0165					<0.00270	0.572	<0.00120	1.26			<0.00190	
	RW-13R	Apr-18		0.000839 J	0.0475					0.00357	0.349	0.000602 J	0.985			0.00161 J	
	RW-18A	Apr-17		0.00331	0.0107					<0.000540	<0.0150	<0.000240	0.000927 J			0.00406	
	RW-18A	Apr-18		0.00278	0.0105					<0.000540	<0.0150	<0.000240	0.00299 J			0.00321	
	RW-18A	Apr-19		0.00293	0.0117					0.00130 JB	0.0191 J	0.000246 JB	0.000480 J			0.00449	
	RW-18A	Jun-20		0.00451	0.0243					0.00223	3.06	0.00276 J	0.0307			0.00475	
	RW-20	Apr-15		0.00375 J	0.527												

Table 4B - Summary of Groundwater Analytical Data - Total Metals
2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Total Metals													
Analyte CAS Units CGWSL				Arsenic 7440-38-2 mg/L 0.0100	Barium 7440-39-3 2.00	Boron 7440-42-8 mg/L 0.750	Cadmium 7440-43-9 mg/L 0.00500	Cobalt 7440-48-4 mg/L 0.0500	Chromium 7440-47-3 mg/L 0.0500	Iron 7439-89-6 mg/L 1.00	Lead 7439-92-1 mg/L 0.0150	Manganese 7439-96-5 mg/L 0.200	Mercury 7439-97-6 mg/L 0.00200	Nickel 7440-02-0 mg/L 0.200	Selenium 7782-49-2 mg/L 0.0500	Uranium 7440-61-1 mg/L 0.0300	Vanadium 7440-62-2 mg/L 0.0631
CGWSL Source				WQCC HH	WQCC HH	WQCClrr	WQCC HH	WQCClrr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCClrr	WQCC HH	WQCC HH	NMED TW
Area	Well ID	Date	Dup														
NCL	NCL-32	Apr-18		0.00443	0.0199				0.000813 J	0.0806 J	0.000723 J	0.926			0.00138 J		
	NCL-32	Oct-18		0.00306	0.0198 B				0.00201	0.339	0.00224 B	1.34			0.00134 J		
	NCL-32	Apr-19		0.00257	0.0172				<0.000540	1.84	0.000470 J	1.14			0.00222		
	NCL-32	Oct-19		0.00213	0.0153				0.000548 J	0.0391 J	0.000373 J	1.50			0.00249		
	NCL-32	Jun-20		0.00203	0.0165 J				<0.00149	<0.0489	<0.00249	1.31			0.00321		
	NCL-32	Oct-20		0.00236	0.0160 J				<0.00149	0.0494 J	<0.00249	1.73			0.00271		
	NCL-33	Apr-18		0.00382	0.0223				<0.000540	1.64	<0.000240	0.117			0.000746 J		
	NCL-33	Oct-18		0.00303	0.0244				<0.000540	2.02	<0.000240	0.119			0.000474 J		
	NCL-33	Apr-19		0.00327	0.0280				<0.000540	1.97	0.000403 J	0.106			0.000405 J		
	NCL-33	Oct-19		0.00457	0.0280				0.000581 J	2.91	0.000470 J	0.157			0.00132 J		
	NCL-33	Jun-20		0.00452	0.0289				<0.00149	3.52	<0.00249	0.194			0.00130 J		
	NCL-33	Oct-20		0.00531	0.0231				<0.00149	4.03	<0.00249	0.188			0.00144 J		
	NCL-34A	Apr-18		0.00175 J	0.452				<0.000540	0.0183 J	0.000440 J	0.0204			0.000485 J		
	NCL-34A	Oct-18		0.000692 J	0.376				<0.000540	<0.0150	<0.000240	0.0191			0.000423 J		
	NCL-34A	Apr-19		0.000663 J ₆	0.966 V				<0.000540	0.0216 J	<0.000240	0.0158 O ₁			0.101 J _{3J6O1}		
	NCL-34A	Oct-19		0.000719 J	0.293				0.000842 J _B	0.0403 J _B	0.000906 J _B	0.0318			0.000403 J		
	NCL-34A	Jun-20		0.000811 J	0.242				<0.00149	<0.0489	<0.00249	0.0416			<0.000657		
	NCL-44	Apr-18		0.0387	0.0230				0.00120 J	1.03	0.000489 J	0.884			<0.000380		
	NCL-44	Oct-18		0.0301	0.0201 B				<0.000540	1.13	0.000618 J _B	0.879			<0.000380		
	NCL-44	Apr-19		0.0245	0.0215				0.000595 J	0.792	0.000443 J	0.879			0.000878 J		
	NCL-44	Oct-19		0.0293	0.0205				<0.000540	1.16	<0.000240	0.912			0.000383 J		
	NCL-44	Jun-20		0.0305	0.0218				<0.00149	1.09	<0.00249	0.842			<0.000657		
	NCL-44	Oct-20		0.0211	0.0201				0.00369	0.641	<0.00249	0.820			<0.000657		
	NCL-49	Apr-18		0.00283	0.0138				0.000688 J _{3J4}	<0.0150	0.000258 J	0.00310 J			0.0111		
	NCL-49	Apr-18	FD	0.00254	0.0136				<0.000540 J _{3J4}	<0.0150	<0.000240	0.00462 J			0.0125		
	NCL-49	Oct-18		0.00156 J	0.0127				<0.000540	<0.0150	<0.000240	0.000358 J			0.00739		
	NCL-49	Oct-18	FD	0.00154 J	0.0115				<0.000540	<0.0150	<0.000240	<0.000250			0.00624		
	NCL-49	Apr-19		0.00148 J	0.0135				0.000545 J	0.0420 J	0.000438 J	0.000612 J _B			0.00606		
	NCL-49	Apr-19	FD	0.00157 J	0.0128				<0.000540	0.128	<0.000240	0.00721			0.00630		
	NCL-49	Oct-19		0.00144 J	0.0136 B				0.00113 J _B	0.0164 J _B	0.000412 J _B	0.000870 J _B			0.00551		
	NCL-49	Oct-19	FD	0.00139 J	0.0133 J				<0.00270	<0.0750	<0.00120	<0.00125 J _{3J5}			0.00652 J		
	NCL-49	Jun-20		0.00135 J	0.0145 J				<0.00149	<0.0489	<0.00249	0.0222			0.00832		
	NCL-49	Jun-20	FD	0.00123 J	0.0126 J				<0.00149	<0.0489	<0.00249	0.00204 J			0.00717		
	NCL-49	Oct-20		0.00141 J	0.0129 J				0.00153 J	<0.0489	<0.00249	<0.00132			0.00873		
	NCL-49	Oct-20	FD	0.00155 J	0.0123 J				<0.00149	<0.0489	<0.00249	<0.00132			0.00920		
North Refinery	MW-23	Apr-18		0.00511	9.72				0.000601 J _B	0.0297 J	0.00227	0.0750			0.000496 J		
	MW-23	Oct-18		0.00455	8.55				<0.000540	0.0527 J	0.00657	0.0630			0.0661		
	MW-23	Apr-19		0.00499	9.47				0.000969 J _B	0.0226 J	0.00230	0.0709			0.00135 J		
	MW-23	Oct-19		0.00587	9.44				<0.000540	0.0573 J	0.0150	0.0696			0.000501 J		
	MW-23	Jun-20		0.00595	9.81 V				<0.00149	0.0693 J	0.00484 J	0.0692			<0.000657		
	MW-23	Oct-20		0.00627	12.3				<0.00149	0.0501 J	0.00712	0.0769			<0.000657		
	MW-29	Apr-18		0.00154 J	0.0192				<0.000540	0.0804 J	0.000379 J	0.483			<0.000380		
	MW-29	Oct-18		0.00209	0.0289				<0.000540	<0.0150	<0.000240	0.341			0.0275		
	MW-29	Apr-19		0.00173 J	0.0169				<0.000540	0.174 B	<0.000240	0.534			<0.000380		
	MW-29	Oct-19		0.0161	0.0171				<0.000540	4.34	<0.000240	0.586			0.000458 J		
	MW-29	Jun-20		0.00842	0.0172 J				<0.00149	0.0632 J	<0.00249	0.258			<0.000657		
	MW-29	Oct-20		0.0170	0.0188 J				<0.00149	0.294	<0.00249	0.233 V			0.000944 J		
	MW-39	Apr-18		0.0110	0.0159				0.00126 J _B	0.0868 J	0.00139 J	0.0181			<0.000380		
	MW-39	Oct-18		0.00800	0.0687				<0.000540	<0.0150	0.000324 J	0.0200			0.0389		
	MW-39	Apr-19		0.00933	0.0590				<0.000540	0.0175 J	0.000354 J	0.0267			0.000668 J		
	MW-39	Oct-19		0.00690	0.0118				<0.000540	<0.0150	<0.000240	0.0282			<0.000380		
	MW-39																

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HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Total Metals																			
Analyte CAS Units CGWSL				Arsenic 7440-38-2 mg/L 0.0100	Barium 7440-39-3 mg/L 2.00	Boron 7440-42-8 mg/L 0.750	Cadmium 7440-43-9 mg/L 0.00500	Cobalt 7440-48-4 mg/L 0.0500	Chromium 7440-47-3 mg/L 0.0500	Iron 7439-89-6 mg/L 1.00	Lead 7439-92-1 mg/L 0.0150	Manganese 7439-96-5 mg/L 0.200	Mercury 7439-97-6 mg/L 0.00200	Nickel 7440-02-0 mg/L 0.200	Selenium 7782-49-2 mg/L 0.0500	Uranium 7440-61-1 mg/L 0.0300	Vanadium 7440-62-2 mg/L 0.0631						
CGWSL Source				WQCC HH	WQCC HH	WQCClrr	WQCC HH	WQCClrr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCClrr	WQCC HH	WQCC HH	NMED TW						
Area	Well ID	Date	Dup																				
North Refinery	MW-90	Apr-18		0.00307	0.0170				<0.000540	J3,J4	0.0329	J	<0.000240	0.0329			0.000532	J					
	MW-90	Oct-18		0.00274	0.0189				<0.000540		0.0894	J	0.000534	JB	0.0916			0.000461	J				
	MW-90	Apr-19		0.00236	0.0155				0.000889	JB	0.0179	J	0.000310	JB	0.0602			0.000671	J				
	MW-90	Oct-19		0.00423	0.0147				<0.000540		1.04		0.000315	JB	0.100			0.0141					
	MW-90	Jun-20		0.00299	B	0.0150	J		<0.00149		0.295		<0.00249		0.0909			<0.000657					
	MW-90	Oct-20		0.00318		0.0163	J		0.00157	J	0.495		<0.00249		0.124			<0.000657					
	MW-91	Apr-18		0.00800	0.0454				<0.000540	J3,J4	0.0370	J	0.00365		0.00264	J		<0.000380					
	MW-91	Oct-18		0.00772	0.0484				0.000738	J	0.0472	J	0.00440	B	0.00539			0.000542	J				
	MW-91	Apr-19		0.00693	0.0460				<0.000540		0.0388	J	0.00412	B	0.00762			0.00460					
	MW-91	Oct-19		0.00392	0.0552				<0.000540		0.0186	J	0.00475		0.00710	B		0.0214					
	MW-91	Jun-20		0.00524	B	0.0561			<0.00149		0.197		0.00610		0.00381	J		<0.000657					
	MW-92	Apr-16		0.00316	J	3.44	01V			<0.00270		0.328	J	<0.00120		0.0363		0.00207	J				
	MW-92	Oct-16		0.00732		2.81				0.00101	JB	0.0744	J	0.00183	J	0.0274		0.00172	J				
	MW-93	Apr-17		0.00456		0.0228				0.00367		0.278		0.00116	J	0.0258		0.00683					
	MW-93	Apr-18		0.00706	0.0304					0.00945		0.145	B	0.00152	JB	0.0325		0.00377	B				
	MW-93	Apr-19		0.00456	0.0394					0.00174	JB	0.110		0.00105	J	0.0615		0.0144					
	MW-93	Jun-20		0.00827	0.0351					0.00257		0.181		<0.00249		0.208		0.00412					
	MW-94	Oct-15		0.0215		1.57				0.00144	J	<0.0150		<0.000240		0.00194	J	0.000935	J				
	MW-94	Apr-16		0.0286		0.353				<0.00270		<0.0750		<0.00120		0.00666	J		<0.00190				
	MW-94	Oct-16		0.0115		0.635				0.00119	JB	0.0159	J	0.000255	J	0.00631		0.000962	J				
	MW-94	Apr-17		0.0170		0.873				0.00141	J	0.134		0.000298	J	0.00382	J	0.00304					
	MW-95	Apr-17		0.00173	J	0.0612				<0.000540		<0.0150		<0.000240		0.0330		0.000407	J				
	MW-95	Apr-18		0.00154	J	0.0691				<0.000540		0.0155	J	<0.000240		0.0556		<0.000380					
	MW-95	Apr-19		0.00141	J	0.0597				<0.000540		<0.0150		0.000528	JB	0.0904		<0.000380					
	MW-95	Jun-20		0.00135	JB	0.0431				<0.00149		0.0879	J	<0.00249		0.156		<0.000657					
	MW-96	Apr-18		0.00321		0.124				0.000908	JJ3,J4	0.0251	J	0.000257	J	0.00146	J	<0.000380					
	MW-96	Oct-18		0.00251		0.111				<0.000540		0.0658	J	0.000673	JB	0.00158	J	<0.000380					
	MW-96	Apr-19		0.00237		0.161				<0.000540		0.0510	J	0.000267	JB	0.00103	JB	0.000465	J				
	MW-96	Oct-19		0.00199	J	0.149				<0.000540		0.0158	J	<0.000240		0.00648	B	0.00423					
	MW-96	Jun-20		0.00241	B	0.176				<0.00149		<0.0489		<0.00249		<0.00132		<0.000657					
	MW-96	Oct-20		0.00207		0.175				<0.00149		<0.0489		<0.00249		<0.00132		<0.000657					
	MW-98	Apr-18		0.00120	J	0.0156				0.000670	JJ3,J4	<0.0150		0.00964		0.0246		0.000402	J				
	MW-98	Oct-18		0.000968	J	0.0182				0.000615	J	0.0174	J	0.00903	JB	0.0210		<0.000380					
	MW-98	Apr-19		0.000810	J	0.0409				<0.000540		<0.0150		0.00796		0.0220		<0.000380					
	MW-98	Oct-19		0.00231		0.0177				0.00153	J	0.0792	J	0.00771		0.0231		0.00508					
	MW-98	Jun-20		0.000895	J	0.0180	J			0.00316		0.0721	J	0.00815		0.0213		<0.000657					
	MW-98	Oct-20		0.000795	J	0.0176	J			<0.00149		<0.0489		0.00690		0.0208		<0.000657					
	MW-137	Oct-17		0.0156	0.0756	1.03	<0.000160	<0.000260		0.00109	J	0.260		0.00338		0.209	<0.0000490	0.0198	0.0393	<0.000330	0.00771		
	MW-137	Apr-18		0.0512	0.0711	0.997	<0.000160	<0.000260		0.00132	J	0.0740	JB	0.00433		0.154	<0.0000490	0.0134	0.00240	B	<0.000330	0.00718	
	MW-137	Oct-18		0.0129	0.0942	0.989	<0.000160	<0.000260		0.000586	J	0.0553	J	0.00318		0.183	<0.0000490	0.0126	0.341	<0.000330	0.00844		
	MW-137	Apr-19		0.0285	0.103	1.02	<0.000160	<0.000260		0.000596	JB	0.0240	J	0.00268		0.157	<0.0000490	0.0133	0.00601	<0.000330	0.00838		
	MW-138	Oct-17		0.00507	0.103	1.11	<0.000160	<0.000260		0.000747	J	0.0334	J	0.000271	J	0.0931	<0.0000490	0.00619	0.00945	<0.000330	0.00195	J	
	MW-138	Apr-18		0.00514	0.124	0.984	<0.000160	<0.000260		0.000785	J	0.160	B	<0.000240		0.103	<0.0000490	0.00977	0.000667	JB	<0.000330	0.00169	J
	MW-138	Oct-18		0.00464	0.108	0.927	<0.000160	<0.000260		<0.000540		0.0235	J	0.000249	J	0.111	<0.0000490	0.00490	0.0973	<0.000330	0.00120	J	
	MW-138	Apr-19		0.00560	0.141	0.951	<0.00																

Table 4B - Summary of Groundwater Analytical Data - Total Metals
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HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Total Metals													
Analyte CAS Units CGWSL				Arsenic 7440-38-2 mg/L 0.0100	Barium 7440-39-3 mg/L 2.00	Boron 7440-42-8 mg/L 0.750	Cadmium 7440-43-9 mg/L 0.00500	Cobalt 7440-48-4 mg/L 0.0500	Chromium 7440-47-3 mg/L 0.0500	Iron 7439-89-6 mg/L 1.00	Lead 7439-92-1 mg/L 0.0150	Manganese 7439-96-5 mg/L 0.200	Mercury 7439-97-6 mg/L 0.00200	Nickel 7440-02-0 mg/L 0.200	Selenium 7782-49-2 mg/L 0.0500	Uranium 7440-61-1 mg/L 0.0300	Vanadium 7440-62-2 mg/L 0.0631
CGWSL Source				WQCC HH	WQCC HH	WQCCClrr	WQCC HH	WQCCClrr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCClrr	WQCC HH	WQCC HH	NMED TW
Area	Well ID	Date	Dup														
South Refinery	MW-28	Apr-18		0.00749	0.0581	1.29	<0.000160	<0.000260	<0.000540	0.156 B	0.0134	0.0370	<0.0000490	0.00415	0.000588 JB	<0.000330	0.00230 J
	MW-28	Oct-18		0.00486 J	0.0652	1.16	<0.000160	<0.00130	<0.00270	0.0971 J	0.00453 J	0.0509	0.000108 J	0.00659 J	<0.00190	<0.00165	0.00111 JB
	MW-28	Apr-19		0.00422	0.0660	1.48	<0.000160	<0.000260	0.00131 JB	0.0910 J	0.00990	0.0749	<0.0000490	0.00465	<0.000380	<0.000330	0.00270 J
	MW-28	Oct-19		0.00396	0.0522	1.53	<0.000160	<0.000260	0.000933 J	0.0502 JB	0.00717	0.0261	0.0000582 JB	0.00275	0.00329	<0.000330	0.00228 J
	MW-28	Jun-20		0.00705	0.0449	1.32	<0.000478	0.000802 J	<0.00149	0.122	0.0117	0.708	<0.000100 J6	0.00624	<0.000657	<0.00754	0.00364 J
	MW-28	Oct-20		0.00538	0.0371	1.32	<0.000478	<0.000477	<0.00149	0.0940 J	0.00540	0.389	<0.000100	0.00504	<0.000657	<0.00754	0.00375 JB
	MW-48	Apr-18		0.00554	1.82				<0.000540	0.105	0.00142 J	0.136			0.247		
	MW-48	Oct-18		0.00561	1.13 V				0.00119 J	0.231	0.00268	0.347			0.00132 J		
	MW-48	Apr-19		0.00395	1.04				0.000613 JB	0.195	0.00297	0.481			0.0405		
	MW-48	Oct-19		0.00646	1.04				0.00117 J	0.234	0.00232	0.604			0.000428 J		
	MW-50	Apr-18		0.00391	0.0130				<0.000540 J3J4	0.323	0.000419 J	0.968			0.00580		
	MW-50	Oct-18		0.00610	0.0137				<0.000540	1.59	0.000401 JB	0.898			0.00178 J		
	MW-50	Apr-19		0.00524	0.0143				0.00128 JB	1.30	0.000664 JB	1.03			0.00425		
	MW-50	Oct-19		0.00517	0.0155				<0.000540	0.773	0.000723 JB	1.02			0.00227		
	MW-50	Jun-20		0.00379 B	0.0113 J				<0.00149	0.226	<0.00249	0.536			0.0309		
	MW-50	Oct-20		0.00301	0.0128 J				<0.00149	0.0795 J	<0.00249	0.450			0.0377		
	MW-52	Apr-18		0.00363	0.0108	0.728	<0.000160	0.000378 J	<0.000540	<0.0150	<0.000240	0.0435	<0.0000490	0.00628	0.00799	0.0105	0.0259
	MW-52	Oct-18		0.00321	0.00897	0.723	<0.000160	0.000271 J	<0.000540	<0.0150	<0.000240	0.0433	<0.0000490	0.00504	0.00221	0.00888 J	0.0232
	MW-52	Apr-19		0.00357	0.0108	0.741	<0.000160	0.000338 J	0.00154 JB	<0.0150	0.000325 JB	0.0594	<0.0000490	0.00635	0.00537	0.0103	0.0262
	MW-52	Oct-19		0.00353	0.0113	0.732	<0.000160	0.000402 J	0.000693 J	<0.0150	0.000510 JB	0.0618	0.0000644 JB	0.00980	0.00628	0.0114	0.0235
	MW-52	Jun-20		0.00344	0.0149 J	0.767	<0.000478	0.000742 J	0.00273	0.252	<0.00249	0.0928	<0.000100	0.0260	0.00612	0.0131 J	0.0247
	MW-52	Oct-20		0.00361	0.0123 J	0.772	<0.000478	0.000636 J	<0.00149	<0.0489	<0.00249	0.0661	<0.000100	0.0304	0.00578	0.0125 J	0.0240
	MW-64	Apr-18		0.0394	2.17				<0.000540	0.179 B	0.00122 J	0.0638			0.000584 J		
	MW-64	Oct-18		0.0291	2.33				<0.00270	0.148 J	<0.00120	0.0644			<0.00190		
	MW-64	Apr-19		0.0266	2.43				<0.000540	0.180	0.000861 JB	0.0831			0.000582 J		
	MW-64	Oct-19		0.0230	2.03				<0.000540	0.487	0.000743 JB	0.0793			<0.000380		
	MW-64	Jun-20		0.0246	2.29				<0.00149	0.349	<0.00249	0.0920			<0.000657		
	MW-64	Oct-20		0.0249	2.15				<0.00149	0.0846 J	<0.00249	0.0742			<0.000657		
	MW-65	Apr-18		0.0108	2.60				<0.000540	2.18	0.000448 J	0.527			<0.000380		
	MW-65	Oct-18		0.00679 J	1.71				<0.00270	0.624	<0.00120	0.431			<0.00190		
	MW-65	Apr-19		0.00832	1.88				<0.000540	0.739	0.000373 JB	0.530			<0.000380		
	MW-65	Oct-19		0.00653	1.58				<0.000540	0.265	0.000311 JB	0.405			<0.000380		
	MW-66	Apr-18		0.00275	2.17	0.309	<0.000160	<0.000260	<0.000540	0.820	0.000939 JB	0.293	<0.0000490	0.00678	0.000509 JB	<0.000330	0.000530 J
	MW-66	Oct-18		0.00258	1.88	0.324	<0.000160	<0.000260	<0.000540	0.833	0.00280	0.278	<0.0000490	0.00661	<0.000380	<0.000330	0.000708 J
	MW-66	Apr-19		0.00257	2.75	0.333	<0.000160	<0.000260	0.00118 JB	1.20	0.00158 J	0.265	<0.0000490	0.00606	<0.000380	<0.000330	0.000996 J
	MW-66	Oct-19		0.00236	1.44	0.206	<0.000160	<0.000260	0.000717 J	0.426 B	0.00104 JB	0.283	0.0000567 JB	0.0131	0.00393	<0.000330	0.00180 J
	MW-66	Jun-20		0.00235	1.99	0.250	<0.000478	<0.000477	<0.00149	0.748	<0.00249	0.306	<0.000100	0.00565	<0.000657	<0.00754	<0.000986
	MW-66	Oct-20		0.00267	1.68	0.229	<0.000478	<0.000477	<0.00149	0.704	<0.00249	0.339	<0.000100	0.00675	<0.000657	<0.00754	0.00212 JB
	MW-99	Apr-18		0.00900	0.311				0.000544 J	0.143 B	0.000673 JB	0.244			<0.000380		
	MW-99	Oct-18		0.00821	0.452				0.000542 J	0.163	0.000718 J	0.224			0.00169 J		
	MW-99	Apr-19		0.00789	0.404				0.00207 B	0.346	0.00319	0.225			0.000538 J		
	MW-99	Oct-19		0.00338	0.200				0.00124 J	0.465 B	0.00301	0.193			0.00451		
	MW-99	Jun-20		0.00301	0.209				0.00275	0.168	<0.00249	0.229			<0.000657		
	MW-101	Apr-18		0.0754	0.0518				<0.000540	2.27	<0.000240	1.21			0.000442 JB		
	MW-101	Oct-18		0.0819	0.0374				<0.000540	2.68	<0.000240						

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Analyte Group				Total Metals													
Analyte CAS Units CGWSL				Arsenic 7440-38-2 mg/L 0.0100	Barium 7440-39-3 mg/L 2.00	Boron 7440-42-8 mg/L 0.750	Cadmium 7440-43-9 mg/L 0.00500	Cobalt 7440-48-4 mg/L 0.0500	Chromium 7440-47-3 mg/L 0.0500	Iron 7439-89-6 mg/L 1.00	Lead 7439-92-1 mg/L 0.0150	Manganese 7439-96-5 mg/L 0.200	Mercury 7439-97-6 mg/L 0.00200	Nickel 7440-02-0 mg/L 0.200	Selenium 7782-49-2 mg/L 0.0500	Uranium 7440-61-1 mg/L 0.0300	Vanadium 7440-62-2 mg/L 0.0631
CGWSL Source				WQCC HH	WQCC HH	WQCClrr	WQCC HH	WQCClrr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCClrr	WQCC HH	WQCC HH	NMED TW
Area	Well ID	Date	Dup														
South Refinery	RW-4	Apr-17		0.00340	0.0732				<0.000540	0.192	0.000419 J	0.0261			<0.000380		
	RW-4	Apr-18		0.00293	0.0671				0.000673 J	0.0270 JB	0.000685 JB	0.0548			0.000499 JB		
	RW-4	Apr-19		0.00271	0.148				0.000959 JB	0.0510 J	0.000725 J	0.0379			0.000455 J		
	RW-4	Jun-20		0.00356	0.0676				<0.00149	0.238	<0.00249	0.133			<0.000657		
	RW-5R	Apr-15		0.00136 J	0.0259				<0.000540	0.0952 J	0.000336 J	0.0177			<0.000380		
	RW-5R	Apr-16		0.00183 J	0.0282				<0.00270	<0.0750	<0.00120	0.0191 J			<0.00190		
	RW-6	Apr-15		0.0332	1.66				<0.000540	13.8	0.000574 J	0.280			<0.000380		
	RW-6R	Apr-16		0.0712	0.480				<0.00270	3.70	<0.00120	0.553			<0.00190		
	RW-6	Apr-18		0.0170	1.94				0.00106 J	1.59	0.000764 JB	0.298			<0.000380		
	RW-6	Apr-19		0.00630	6.89				0.000826 JB	0.173	0.000482 J	0.156			<0.000380		
	RW-15C	Apr-17		0.0274	0.885				<0.000540	0.316	0.0116	0.358			0.000461 JB		
	RW-15C	Apr-18		0.0239	1.19				0.000699 J	0.264	0.000822 J	0.372			0.000836 J		
RW-15C	Apr-19		0.0135	1.70				0.00534 B	0.473	0.00106 JB	0.457			0.00895			
South RO Field	MW-114	Apr-18		0.00226	0.0129				0.00708	0.0871 J	<0.000240	0.900			0.0105		
	MW-114	Oct-18		0.00225	0.0133				<0.000540	<0.0150	<0.000240	0.867			0.00985		
	MW-114	Apr-19		0.00215	0.0150				<0.000540	0.170	0.000421 J	0.961			0.00532		
	MW-114	Oct-19		0.00274	0.0141				<0.000540	<0.0150	<0.000240	1.05			0.00389		
	MW-114	Jun-20		0.00348	0.0145 J				<0.00149	<0.0489	<0.00249	0.980			0.00355		
	MW-114	Oct-20		0.00400	0.0131 J				<0.00149	<0.0489	<0.00249	0.925			0.00293		
	MW-115	Apr-18		0.00333	0.00824				<0.000540	0.0246 J	<0.000240	0.0564			0.00159 J		
	MW-115	Oct-18		0.00298	0.00719				<0.000540	<0.0150	<0.000240	0.0425			0.00413		
	MW-115	Apr-19		0.00395	0.0133				<0.000540	0.189	0.000523 J	0.123			0.00497		
	MW-115	Oct-19		0.00434	0.0136				<0.000540	0.184	0.000400 J	0.146			0.00131 J		
	MW-115	Jun-20		0.00388	0.00892 J				<0.00149	<0.0489	<0.00249	0.115			0.00483		
	MW-115	Oct-20		0.00435	0.0112 J				<0.00149	<0.0489	<0.00249	0.0983			0.00844		
	MW-116	Apr-18		0.00492	0.00839				<0.000540	0.0594 J	<0.000240	0.0226			0.00743		
	MW-116	Oct-18		0.00304	0.00833				<0.000540	<0.0150	<0.000240	0.0211			0.00475		
	MW-116	Apr-19		0.00390	0.0121				0.00124 JB	0.0431 J	<0.000240	0.0234			0.00466		
	MW-116	Oct-19		0.00309	0.00893				0.000765 J	0.0209 J	0.000619 JB	0.00907			0.00768		
	MW-116	Jun-20		0.00294	0.00939 J				<0.00149	0.161	<0.00249	0.0241			0.00730		
	MW-116	Oct-20		0.00300	0.00929 J				<0.00149	0.0902 J	<0.00249	0.0150 B			0.00619		
TEL	MW-49	Apr-18		0.00627	0.0565	0.740	<0.000160	<0.000260	<0.000540	0.321	0.00122 JB	0.197	<0.0000490	0.00655	0.000591 J	<0.000330	0.00110 J
	MW-49	Oct-18		0.00517	0.0506	0.693	<0.000160	<0.000260	<0.000540	0.0585 J	0.000826 J	0.211	<0.0000490	0.00660	0.000519 J	<0.000330	0.000439 J
	MW-49	Apr-19		0.00488	0.0541	0.729	<0.000160	<0.000260	<0.000540	0.0354 JB	0.000752 J	0.209	0.0000959 J	0.00773	<0.000380	<0.000330	0.000224 J
	MW-49	Oct-19		0.00532	0.0486	0.642	<0.000160	<0.000260	<0.000540	0.0155 JB	0.000821 JB	0.169	<0.0000490	0.00660 B	<0.000380	<0.000330	0.000786 J
	MW-49	Jun-20		0.00514	0.0552	0.638	<0.000478	<0.000477	<0.00149	<0.0489	<0.00249	0.147	<0.000100	0.00696	<0.000657	<0.00754	<0.000986
	MW-49	Oct-20		0.00538	0.0500	0.661	<0.000478	<0.000477	<0.00149	0.0526 J	<0.00249	0.220	<0.000100	0.00835	<0.000657	<0.00754	<0.000986
	TEL-1	Apr-18		0.0132	0.0140				0.0103	0.107	<0.000240	0.0532			<0.000380		
	TEL-1	Oct-18		0.0173	0.0171				0.00240	0.0675 J	<0.000240	0.0419			<0.000380		
	TEL-1	Apr-19		0.0142	0.0203				0.00480	0.158	0.000325 J	0.0425			<0.000380		
	TEL-1	Oct-19		0.0136	0.0158				0.00444 B	0.0598 JB	0.000418 JB	0.0365			<0.000380		
	TEL-1	Jun-20		0.0116	0.0152 J				0.00273	0.120	<0.00249	0.0315			<0.000657		
	TEL-2	Apr-18		0.0183	0.221				0.00202	0.0568 J	0.00114 J	0.0154			0.000522 J		
	TEL-2	Oct-18		0.0152	0.101				0.00151 J	0.0287 J	0.000727 J	0.0273			0.000520 J		
	TEL-2	Apr-19		0.0117	0.111				0.00208	0.0688 J	0.00130 J	0.0190			0.00137 J		
	TEL-2	Oct-19		0.0115	0.0914				0.00295 B	0.0484 JB	0.000814 JB	0.0281			0.000498 J		
	TEL-2	Jun-20		0.00826	0.131				0.00193 J	0.0517 J	<0.00249	0.0341			<0.000657		
	TEL-3	Apr-18		0.0109	0.0248				0.334	1.47	0.000726 J	0.0114			<0.000380		
	TEL-3	Apr-19		0.00228	0.0214				0.0851	0.336	0.00111 J	0.0142			0.000982 J		
	TEL-3	Oct-19		0.00161 J	0.0182				0.0248	0.112 B	0.000803 JB	0.0205			&		

Table 4B - Summary of Groundwater Analytical Data - Total Metals
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Total Metals													
				Arsenic 7440-38-2 mg/L CGWSL 0.0100 WQCC HH	Barium 7440-39-3 mg/L 2.00 WQCC HH	Boron 7440-42-8 mg/L 0.750 WQCClrr	Cadmium 7440-43-9 mg/L 0.00500 WQCC HH	Cobalt 7440-48-4 mg/L 0.0500 WQCClrr	Chromium 7440-47-3 mg/L 0.0500 WQCC HH	Iron 7439-89-6 mg/L 1.00 WQCC Dom	Lead 7439-92-1 mg/L 0.0150 WQCC HH	Manganese 7439-96-5 mg/L 0.200 WQCC Dom	Mercury 7439-97-6 mg/L 0.00200 WQCC HH	Nickel 7440-02-0 mg/L 0.200 WQCClrr	Selenium 7782-49-2 mg/L 0.0500 WQCC HH	Uranium 7440-61-1 mg/L 0.0300 WQCC HH	Vanadium 7440-62-2 mg/L 0.0631 NMED TW
Area	Well ID	Date	Dup														
Three Mile Ditch	MW-71	Apr-17		0.00387	0.00845	0.538	<0.000160	<0.000260	<0.000540	<0.0150	<0.000240	0.000841 J	<0.0000490	0.000916 J	0.0324	0.0587	0.0248
	MW-71	Apr-18		0.00500	0.00896	0.673	<0.000160	<0.000260	0.00106 J	<0.0150	<0.000240	0.000412 J	<0.0000490	0.00115 J	0.0321	0.0594	0.0255
	MW-71	Apr-19		0.00315	0.00901	0.670	<0.000160	<0.000260	0.000803 JB	0.0423 JB	<0.000240	0.00260 JB	<0.0000490	0.00130 J	0.0320	0.0654	0.0247
	MW-71	Jun-20		0.00391	0.00943 J	0.622	<0.000478	<0.000477	<0.00149	<0.0489	<0.00249	<0.00132	<0.000100	0.00111 J	0.0332	0.0698	0.0251
	MW-89	Apr-17		0.00657	0.0145				0.00102 J	<0.0150	<0.000240	0.0420			0.0534		
	MW-89	Apr-18		0.0112	0.0136				0.000638 JJ3J4	<0.0150	0.000617 J	0.628			0.00218		
	MW-89	Apr-19		0.00748	0.0140				0.000808 JB	0.0326 JB	0.000744 J	0.439			0.0299		
	MW-89	Jun-20		0.00857	0.0133 J				<0.00149	<0.0489	<0.00249	0.579			0.00476		
	NP-1	Apr-18															
	NP-1	Oct-18															
	NP-1	Apr-19															
	NP-1	Oct-19															
	NP-1	Jun-20															
	NP-1	Oct-20															
	NP-6	Apr-13															
	NP-6	Apr-15															
	NP-6	Apr-17															
	NP-6	Apr-19															
Upgradient	UG-1	Apr-17		0.00106 J	0.0135	0.548	<0.000160	<0.000260	0.000572 J	0.0561 J	<0.000240	0.00689	<0.0000490	0.00145 J	0.0100	0.0262	0.0118
	UG-1	Apr-18		0.00177 JB	0.0122	0.668	<0.000160	0.00130 J	<0.000540	<0.0150	<0.000240	0.000486 J	0.0000552 JB	0.00188 J	0.00692	0.0263	0.0153
	UG-1	Apr-19		0.00158 J	0.0165	0.727	<0.000160	0.000332 J	0.000624 JB	<0.0150	<0.000240	0.00109 J	<0.0000490	0.00226 B	0.0149	0.0353	0.0147
	UG-1	Jun-20		0.00139 J	0.0137 J	0.691	<0.000478	<0.000477	<0.00149	<0.0489	<0.00249	<0.00132	<0.000100	0.000984 J	0.0131	0.0385	0.0133
	UG-2	Apr-17		0.00197 J	0.0154	0.303	<0.000160	<0.000260	<0.000540	0.0172 J	<0.000240	0.0154	<0.0000490	0.00271	0.00572	0.0153	0.0154
	UG-2	Apr-18		0.00236 B	0.0142	0.303	<0.000160	<0.000260	<0.000540	0.0153 J	<0.000240	0.00678	0.0000684 JB	0.00188 J	0.00710	0.0131	0.0176
	UG-2	Apr-19		0.00227	0.0183	0.299	0.000295 J	0.000357 J	0.000732 JB	0.0286 J	0.00107 JB	0.0129	<0.0000490	0.00316 B	0.00766	0.0160	0.0174
	UG-2	Jun-20		0.00253	0.0141 J	0.274	<0.000478	<0.000477	<0.00149	<0.0489	<0.00249	0.00395 J	<0.000100	0.00250	0.00616	0.0161 J	0.0185
	UG-3R	Apr-17		0.00161 J	0.0185	0.256	<0.000160	0.000465 J	<0.000540	0.0316 J	<0.000240	0.00182 J	<0.0000490	0.00225	0.00325	0.0129	0.00961
	UG-3R	Apr-18		0.00202 B	0.0170	0.470	<0.000160	<0.000260	<0.000540	0.0377 J	<0.000240	0.000713 J	<0.0000490	0.00104 J	0.00418	0.0124	0.0111
	UG-3R	Apr-19		0.00164 J	0.0183	0.223	<0.000160	<0.000260	0.000713 JB	<0.0150	<0.000240	0.00132 J	<0.0000490	0.000581 JB	0.00266	0.0160	0.00947
	UG-3R	Jun-20		0.00126 J	0.0205	0.173 J	<0.000478	<0.000477	<0.00149	<0.0489	<0.00249	<0.00132	<0.000100	<0.000952	0.00389	0.0167 J	0.00867
	UG-4	Apr-17		0.00111 J	0.0164	1.06	<0.000160	<0.000260	<0.000540	0.0249 J	<0.000240	0.00935	<0.0000490	0.00143 J	0.0143	0.0361	0.00739
	UG-4	Apr-18		0.00177 JB	0.0158	1.07	<0.000160	<0.000260	<0.000540	0.0330 J	<0.000240	0.00117 J	0.0000571 JB	0.000467 J	0.0202	0.0324	0.00962 B
	UG-4	Apr-19		0.00128 J	0.0171	1.07	<0.000160	<0.000260	<0.000540	0.0596 J	<0.000240	0.00792	<0.0000490	0.000696 JB	0.0167	0.0379	0.00813
UG-4	Jun-20		0.00105 J	0.0164 J	1.02	<0.000478	<0.000477	<0.00149	<0.0489	<0.00249	0.00403 J	<0.000100	0.00177 J	0.00925	0.0357	0.00757	

Definitions	
X	Reported concentration, X, exceeds the CGWSL.
X	Analyte detected above the detection limit at a concentration equal to X.
<x	Analyte not detected at detection limit equal to x.
<x	Analyte not detected at detection limit equal to x, but x exceeds the CGWSL.
	Blank cell indicates a sample was collected from the well during the indicated sampling event, but the analyte was not analyzed.

Abbreviations	
CGWSL	Critical Groundwater Screening Level (see Table 3)
CGWSL Source	Source for CGWSL value (see Table 3)
Dup	Duplicate sample
FD	Field duplicate sample
mg/L	Milligrams per Liter
NMED TW	NMED Risk Assessment Guidance for Site Investigations and Remediation, February 2019, Rev 2 (6/19/19), Table A-1, Tap Water Screening Level
WQCC Dom	NMED Groundwater standard for domestic exposure, 20.6.2.3103.B NMAC
WQCC HH	NMED Groundwater standard for human health exposure, 20.6.2.3103.A NMAC
WQCC Irr	NMED Groundwater standard for irrigation exposure, 20.6.2.3103.C NMAC

Lab Footnote	
B	Analyte was also detected in the associated method blank.
J	Indicates an estimated value.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
O1	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
V	The sample concentration is too high to evaluate accurate spike recoveries.

Table 4C - Summary of Groundwater Analytical Data - Water Quality and Cyanide

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Water Quality Parameters								Cyanide
				Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Cyanide
				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	TDS	NO3NO2	57-12-5
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL				250	1.60			600	1000	10.0	0.200	
CGWSL Source				WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH	WQCC HH	
Area	Well ID	Date	Dup									
Cross-Gradient	KWB-13	Apr-17		526	180	0.803	1.18	200	2390	3600	16.1	<0.00180
	KWB-13	Apr-18		558	136	0.704	1.66	227	2470	3580	15.3	<0.00180
	KWB-13	Apr-19		630	125	0.605	1.69	220	2470	3580	14.0	<0.00180
	KWB-13	Jun-20		598	121	0.791	2.10	169	2430	3710	14.9	<0.00180
	MW-136	Apr-18		666	352	1.61	2.74	147	2640	4270	10.3	<0.00180
	MW-136	Oct-18		689	327	1.82	3.52	148	2610	4250	7.86	0.0359
	MW-136	Apr-19		688	284	1.69	2.83	144	2680	4150	4.12	0.00264
	MW-136	Oct-19		630	280	1.73	2.75	140	2520	4100	2.38	<0.00180
	MW-136	Jun-20		631	300	1.62	2.53	139	2370	4290	13.2	<0.00180
	MW-136	Oct-20		640	290	1.54	2.55	148	2150	4180	14.4	<0.00180
	NP-5	Apr-13		465	413	2.58	<0.400	253	3090	5980	2.33	
	NP-5	Apr-15		448	993	2.13	0.484	209	3030	6060	1.38	
	NP-5	Apr-17		514	444	1.63	0.422	212	3770	4810	2.22	
	NP-5	Apr-19		529	310	2.16	0.320	206	3370	5240	1.06	
Evaporation Ponds	RA-3156	Apr-17		337	568	0.668	2.41	292	1080	2400	0.330	
	RA-3156	Apr-18		341	813	0.470	2.63	444	1020	2580	<0.0197	
	RA-3156	Apr-19		83.5	807	0.751	0.679	87.0	1650	3240	1.50	
	RA-3156	Jun-20		180	280	0.313	2.62	97.8	603	1250	<0.0500	
	MW-1R	Apr-17		763	2880	0.736	5.11	1830	3010	9180	0.402	
	MW-1R	Apr-18		623	2200	0.679	4.56	1520	2740	6900	0.0640	
	MW-1R	Apr-19		407	1160	0.710	3.80	1050	2000	4980	<0.0197	
	MW-1R	Jun-20		540	1430	0.732	4.01	831	2060	3200	<0.0500	
	MW-2A	Apr-18		702	6270	1.35	5.75	4870	5800	18800	0.0470	
	MW-2A	Oct-18		512	4270	1.89	5.36	3110	4430	13300	0.0330	
	MW-2A	Apr-19		652	5600	1.93	5.50	3930	5430	15800	<0.0197	
	MW-2A	Oct-19		585	2180	2.94	4.21	1470	2860	7000	0.171	
	MW-2A	Jun-20		487	879	2.70	3.28	610	1730	3960	<0.0500	
	MW-2A	Oct-20		292	1240	2.96	3.46	908	1860	4770	0.0609	
	MW-3	Apr-18		606	1170	1.90	4.99	916	2420	5030	0.249	
	MW-3	Apr-18	FD	626	1150	1.87	5.03	869	2520	5040	0.212	
	MW-3	Oct-18		591	1110	1.91	5.19	856	2610	4370	0.535	
	MW-3	Oct-18	FD	620	1060	1.67	5.74	832	2440	4820	0.481	
	MW-3	Apr-19		579	1140	1.96	4.89	771	2480	5510	0.156	
	MW-3	Apr-19	FD	603	1230	1.86	4.92	774	2530	5450	0.157	
	MW-3	Oct-19		517	1060	2.38	7.63	840	1680	4290	<0.0197	
	MW-3	Oct-19	FD	540	1190	2.53	7.51	836	1970	4950	<0.0197	
	MW-3	Jun-20		553	1280	2.40	7.64	818	2140	5200	0.0662	
	MW-3	Jun-20	FD	553	1290	2.52	7.54	827	2260	4970	<0.0500	
	MW-3	Oct-20		514	1250	1.97	5.94	822	1980	5250	0.210	
	MW-3	Oct-20	FD	506	939	1.69	5.85	812	1440	5090	0.245	
	MW-4A	Apr-18		428	1350	1.99	5.05	899	1820	4170	0.0240	
	MW-4A	Oct-18		415	1300	1.65	4.58	988	1800	3880	<0.0197	
	MW-4A	Apr-19		418	1450	1.82	5.24	904	1810	4940	<0.0197	
	MW-4A	Oct-19		419	1260	2.01	5.80	855	1380	4700	0.0230	
	MW-4A	Jun-20		403	1440	1.98	4.72	962	1890	4870	<0.0500	
	MW-4A	Oct-20		415	1350	2.31	5.63	921	1640	5000	<0.0500	
	MW-4B	Apr-13		371	928	0.870	3.64	556	1330	3660	<1.00	
	MW-4B	Apr-15		367	1110	0.963	2.32	696	1340	3410	<0.0200	
	MW-4B	Apr-17		360	1330	0.985	2.55	758	1410	3690	<0.0197	
	MW-4B	Apr-19		442	1320	0.775	2.50	703	1430	4370	<0.0197	
	MW-5A	Apr-18		478	3040	2.83	7.82	2890	6030	13700	0.0530	
	MW-5A	Oct-18		415	2800	1.80	7.38	2620	5720	11400	<0.0197	
	MW-5A	Apr-19		511	3620	3.03	6.36	3740	8110	14800	<0.0197	
	MW-5A	Oct-19		494	2760	3.63	6.85	3450	6170	13900	0.138	
MW-5A	Jun-20		286	1810	3.40	5.65	2040	3550	7460	<0.0500		
MW-5A	Oct-20		374	2110	3.84	8.27	2280	4220	9910	<0.0500		
MW-5B	Apr-13		473	1840	2.20	10.8	1600	2950	7500	2.93		
MW-5B	Apr-15		482	1590	1.41	9.01	1580	3510	5980	<0.0200		
MW-5B	Apr-17		420	1560	1.73	9.18	1650	2590	6290	0.0210		
MW-5B	Apr-19		389	1530	1.70	9.69	1490	2660	6370	<0.0197		
MW-5C	Apr-13		420	639	1.20	4.21	446	1580	3620	<1.00		
MW-5C	Apr-15		427	585	0.910	3.97	485	2020	3290	<0.0200		
MW-5C	Apr-17		383	576	0.971	3.90	500	1740	3110	<0.0197		
MW-5C	Apr-19		390	591	0.896	4.11	450	1540	3200	<0.0197		
MW-6A	Apr-17		353	904	1.62	1.38	770	2080	4660	<0.197		
MW-6A	Apr-18		303	763	1.59	1.31	776	1690	3330	0.0800		
MW-6A	Apr-19		340	803	1.38	1.38	696	1700	3520	<0.0197		
MW-6A	Jun-20		290	669	1.55	1.18	670	1670	3640	<0.0500		
MW-6B	Mar-13		530	1370	0.533	4.31	710	1640	4480	<1.00		
MW-6B	Mar-13	FD	478	1420	0.814	4.87	753	1690	4510	<1.00		
MW-6B	Apr-15		568	1740	0.669	5.09	873	2280	4760	<0.0200		
MW-6B	Apr-17		418	1250	0.694	3.97	738	1730	4150	<0.197		
MW-6B	Apr-19		462	1140	0.519	4.45	682	1460	4190	<0.0197		
MW-7A	Apr-18		358	2080	1.40	3.91	1580	2670	5380	0.140		
MW-7A	Apr-18	FD	354	2170	1.41	3.89	1590	2780	5430	0.0580		
MW-7A	Oct-18		343	2070	1.09	3.93	1580	2840	6440	<0.0197		
MW-7A	Oct-18	FD	348	2000	1.10	4.24	1550	2770	6530	<0.0197		
MW-7A	Apr-19		345	2480	1.10	3.95	1560	3610	6920	<0.0197		
MW-7A	Apr-19	FD	373	1990	1.20	4.05	1530	2490	6930	<0.0197		
MW-7A	Oct-19		423	2880	1.46	5.56	2310	3250	9100	3.13		
MW-7A	Oct-19	FD	413	2970	1.27	5.48	2110	3370	9440	2.88		
MW-7A	Jun-20		345	2000	1.20	3.28	1560	2670	6630	<0.0500		
MW-7A	Jun-20	FD	370	1950	1.18	3.54	1550	2600	6580	0.0594		
MW-7A	Oct-20		327	1770	1.42	3.83	1470	2130	6330	<0.0500		
MW-7A	Oct-20	FD	315	1550	1.29	3.71	1550	1870	6260	<0.0500		
MW-7B	Apr-13		545	1030	3.09	6.66	540	1800	4280	<1.00		
MW-7B	Apr-15		556	1060	0.795	6.27	672	2200	4640	<0.0200		
MW-7B	Apr-17		530	1060	0.966	6.71	652	1750	4720	0.0670		
MW-7B	Apr-19		581	1100	0.823	6.70	581	1910	4760	<0.0197		
MW-10	Apr-18		472	1300	0.857	3.75	977	1920	3380	0.0550		
MW-10	Oct-18		454	1300	0.854	3.35	1060	2100	3800	<0.0197		
MW-10	Apr-19											

Table 4C - Summary of Groundwater Analytical Data - Water Quality and Cyanide

2020 Annual Groundwater Monitoring Report
HollyFontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Water Quality Parameters								Cyanide
				Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Cyanide
				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	TDS	NO3NO2	57-12-5
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL				250	1.60			600	1000	10.0	0.200	
CGWSL Source				WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH	WQCC HH	
Area	Well ID	Date	Dup									
Evaporation Ponds	MW-15	Apr-17		285	612	1.58	4.31	447	1100	2640	0.485 J	
	MW-15	Apr-18		477	1040	1.70 J5	5.35	657	1720	3580	0.758	
	MW-15	Apr-19		614	1670	1.44	5.73	667	2770	4720	1.58	
	MW-15	Jun-20		480	1200	0.610	5.52	563	1440	3830	<0.0500	
	MW-18A	Apr-18		683	6680	2.44	42.1	4260	6780	13100	0.0720 J	<0.00180
	MW-18A	Oct-18		674	6810	1.25	42.6	3820	7270	17900	<0.0197	0.00485 J
	MW-18A	Apr-19		756	6360	1.85	46.1	3870	6740	17800	<0.0197	<0.00180
	MW-18A	Oct-19		619	5490	3.14	40.1	3670	5780	16000 J3	<0.0197	<0.00180
	MW-18A	Jun-20		574	5140	2.52	33.6 O1	3030 O1V	5780	15500	<0.0500	<0.00180
	MW-18A	Oct-20		616	4600	2.72	39.3	3380	4820	16800	<0.0500	<0.00180
	MW-18B	Apr-13		592	803	1.10	6.32	474	1870	4060	<1.00	
	MW-18B	Apr-15		581	763	0.931	5.91	460	1840	4410	0.0280 J	
	MW-18B	Apr-17		576	860	0.797	5.91	481	2070	4080	<0.0197	
	MW-18B	Apr-19		807	919	0.727	8.43	506	2030	4690	<0.0197	
	MW-22A	Apr-18		473	1780	0.687	3.67	1290	2270	4860 J3	0.0680 J	
	MW-22A	Apr-18	FD	468	1840	0.738	3.57	1310	2380	4320 J3	0.0660 J	
	MW-22A	Oct-18		444	1650	0.677	3.37	1360	2370	5730	<0.0197	
	MW-22A	Oct-18	FD	473	1650	0.584	3.81	1250	2190	5930 Q	<0.0197	
	MW-22A	Apr-19		426	1650	0.761	3.58	1330	2300	5940	0.0230 J	
	MW-22A	Apr-19	FD	431	1700	0.739	3.38	1190	2230	6040	<0.0197	
	MW-22A	Oct-19		969	5760	0.681	6.27	3060	3450	13300	0.418	
	MW-22A	Oct-19	FD	990	5660	0.293	6.42	2970	3520	13100	0.414	
	MW-22A	Jun-20		575	4500	0.900	4.36	2610	3310	11900	0.0816 JB	
	MW-22A	Jun-20	FD	566	4450	1.02	4.20	2270	3330	11300 J4	<0.0500	
	MW-22A	Oct-20		458	2770	0.821	3.75	1920	2450	7820	0.0711 J	
	MW-22A	Oct-20	FD	453	2290	0.795	3.71 B	2240	2060	8210	<0.0500	
	MW-22B	Apr-13		530	1470	0.619	4.48	932	2240	5460	<1.00	
	MW-22B	Apr-15		477	1400	0.823	4.02 J	1150	2170	5590	<0.0200	
	MW-22B	Apr-17		396	1400	0.771	4.15	1150	2080	5670	0.408 J	
	MW-22B	Apr-19		414	1300	0.818	4.30	985	2170	5480	<0.197	
	MW-70	Apr-18		766	1490	0.694	5.51	825	2720	5810	0.0660 J	
	MW-70	Oct-18										
	MW-70	Apr-19		843	1280	0.623	5.99	760	2320	5770	<0.0197	
	MW-70	Oct-19										
	MW-70	Jun-20		764	1400	0.577	5.22	764	2510	5360 J3	<0.0500	
	MW-70	Oct-20										
	MW-72	Apr-17		670	3460	6.25	9.30	2510	2950	9140	1.56	
	MW-72	Apr-18		707	3540	5.82	8.82	2490	3010	8800	2.99	
	MW-72	Apr-19		645	2880	5.61	7.71	1850	2740	8500	2.67	
	MW-72	Jun-20		627	2830	5.71	6.56	1730	2810	8060	0.645	
	MW-73	Apr-17		571	2390	2.11	2.55	2690	3940	8880	0.313	
	MW-73	Apr-18		589	2350	1.95	2.48	2490	4020	8360	0.348	
	MW-73	Apr-19		600	2590	2.95	2.60	2330	3350	9180	4.66	
	MW-73	Jun-20		561	2540	1.67	2.29	2410	3990	8860	<0.0500	
	MW-74	Apr-18		600	1950	7.01	37.3	2280	3700	7860	6.72	
	MW-74	Oct-18		534	1560	8.06	42.9	2310	4870	9420	171	
	MW-74	Apr-19		582	1400	8.15	36.9	2250	4650	9760	52.2	
	MW-74	Oct-19		542	1490	7.85	33.4	1990	3390	5720	<0.0197	
	MW-74	Jun-20		507	1540	7.75	32.7	2260	4190	7180	48.4	
	MW-74	Oct-20		554	1800	8.34	35.8	2000	3610	8370	7.45	
	MW-75	Apr-18		340	1470	7.64	17.9	1350	2000	4670	1.00 J6	
	MW-75	Oct-18		345	1370	7.35	18.0	1410	2100	5890 J4	<0.0197	
	MW-75	Apr-19		348	1410	7.71	17.4	1420	2010	5790	1.56	
	MW-75	Oct-19		362	1360	6.63	15.9	1320	1940	5320	<0.0197	
	MW-75	Jun-20		366	1470	7.22	16.6	1340	2080	6110	<0.0500	
	MW-75	Oct-20		362	1520	7.66	17.9	1470	2010	5680	<0.0500	
	MW-76	Apr-18		468	1220	2.86	26.5	1200	2300	5240	0.0790 J	
	MW-76	Oct-18		464	1130	2.95	25.6	1130	2420	4130	<0.0197	
	MW-76	Apr-19		439	1090	3.02	24.9	955	2210	5620	<0.0197	
	MW-76	Oct-19		483	1150	3.03	28.8	991	2220	5270	<0.0197	
MW-76	Jun-20		454	1150	2.89	26.2	975	2270	5620	<0.0500		
MW-76	Oct-20		426	1220	3.14	25.7	975	2090	5330	<0.0500		
MW-77	Apr-17		534	393	2.43	67.1	1280	4900	6950	<0.197		
MW-77	Apr-18		521	310	2.56	68.8	1240	3770	7230	0.109		
MW-77	Apr-19		491	335	3.20	66.0	1230	4370	7850	<0.0197		
MW-77	Jun-20		488	428	2.53	64.2	1070	3950	7430	<0.0500		
MW-78	Apr-17		537	98.0	9.91	17.4	366	2640	4290	0.372 J		
MW-78	Apr-18		331	239	15.3	19.2	393	1800	3730	2.70		
MW-78	Apr-19		343	20.4	17.2	13.4	81.7	1580	3150	5.82		
MW-78	Jun-20		584	51.7	13.9	16.6	184	2580	4460	<0.0500		
MW-79	Apr-18		586	1700	6.56	7.90	1130	2240	5390 J3	2.16		
MW-79	Oct-18		679	2020	6.21	7.84	1100	2350	7700	1.44		
MW-79	Apr-19		636	1940	7.01	7.82	1250	2470	6510	2.08		
MW-79	Oct-19		818	2410	4.70	7.08	1160	2320	7470	<0.0197		
MW-79	Jun-20		768	2150	5.09	6.82	1160	2540	7550	<0.0500		
MW-79	Oct-20		726	2180	5.58	7.03	1200	2600	6470	<0.0500		
MW-80	Apr-17		759	2530	3.59	3.53	1230	2640	7920	2.63		
MW-80	Apr-18		506	1190	2.97	7.13	1110	2310	5180 J3	0.461		
MW-80	Apr-19		559	1180	3.03	2.72	768	2260	5120	0.355		
MW-80	Jun-20		620	1210	2.19	2.99	680	1980	4990	<0.0500		
MW-81	Apr-17		560	1370	7.55	9.28	1260	3050	6880	80.5		
MW-81	Apr-18		542	1270	6.69	17.9	1170	2340	5600	19.8		
MW-81	Apr-19		527 O1V	1210	6.81	7.33	969 V	2190	5740	14.7		
MW-81	Jun-20		441	1050	5.73	5.49	908	1990	4750	3.54		
MW-82	Apr-17		347	1500	11.4	8.92	1400	2380	5630	0.0820 J		
MW-82	Apr-18		391	1420	11.4	9.36	1510	2350	5460	0.734		
MW-82	Apr-19		395	1360	11.4	8.60	1300	2250	5730	3.50		
MW-82	Jun-20		422	1430	9.31 J	8.75	1150	2180	5560	<0.0500		
MW-83	Apr-18		309	1360 J3	4.80	28.2	965	2220 P1	4190	0.0680 J		
MW-83	Oct-18		562	221	5.14	48.6	363	4240	4860	0.495		
MW-83	Apr-19		555	69.9	2.81	56.3	236	6770	6470	3.70		
MW-83	Oct-19		536	354	4.14	64.3	370	4520	7520	<0.0197		
MW-83	Jun-20											

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HollyFontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Water Quality Parameters								Cyanide	
				Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Cyanide	
				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	TDS	NO3NO2	57-12-5	
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
CGWSL					250	1.60			600	1000	10.0	0.200	
CGWSL Source					WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH	WQCC HH	
Area	Well ID	Date	Dup										
Evaporation Ponds	MW-87	Apr-18		677	4150	1.48	24.2	2930	4570	11600	0.0610	J	
	MW-87	Oct-18											
	MW-87	Apr-19		723	4460	1.13	24.7	2800	5150	13700	<0.0197		
	MW-87	Oct-19											
	MW-87	Jun-20		596	4070	1.41	20.7	2690	4840	12500	<0.0500		
	MW-87	Oct-20											
	MW-88	Apr-18		421	1650	1.15	3.09	1110	2360	4640	0.0750	J	
	MW-88	Oct-18											
	MW-88	Apr-19		426	1740	1.36	3.28	1280	2700	6650	<0.0197		
	MW-88	Oct-19											
	MW-88	Jun-20		406	1510	0.951	2.83	997	2040	5240	<0.0500		
	MW-88	Oct-20											
	MW-120	Apr-18		556	1760	2.79	6.26	1310	2670	6480	0.0720	J	
	MW-120	Oct-18		583	1670	3.66	2.60	1320	3320	5380	0.168		
	MW-120	Apr-19		571	2220	2.91	2.92	1500	4500	6610	0.150		
	MW-120	Oct-19		562	1390	4.02	2.70	1210	2830	4680	<0.0197	J3	
	MW-120	Jun-20		455	1260	2.90	2.23	992	2530	5500	<0.0500		
	MW-120	Oct-20		608	1540	3.81	2.67	1200	2870	7000	<0.0500		
	MW-121	Apr-18		594	999	4.29	2.88	859	2820	5430	1.15	J6	
	MW-121	Oct-18		579	833	5.05	3.25	716	2820	5800	1.06		
	MW-121	Apr-19		616	963	4.45	3.14	696	2530	5490	0.497		
	MW-121	Oct-19		554	770	5.48	3.41	637	2530	5090	1.11		
	MW-121	Jun-20		560	752	5.05	2.71	613	2790	4890	0.0855	J	
	MW-121	Oct-20		595	690	4.87	3.34	665	2400	5180	<0.0500		
	MW-122	Apr-18		368	1170	3.20	3.73	1050	1980	4830	0.137		
	MW-122	Oct-18		324	845	2.32	3.48	742	1730	3860	<0.0197		
	MW-122	Apr-19		413	1110	2.74	3.91	866	2040	4750	0.0650	J	
	MW-122	Oct-19		340	719	2.10	3.54	617	1260	3660	0.0270	J	
	MW-122	Jun-20		413	1470	2.58	4.03	1080	2450	6070	<0.0500		
	MW-122	Oct-20		353	940	2.54	3.78	737	1590	4220	<0.0500		
	MW-123	Apr-18		513	1570	1.13	5.10	1080	<0.0774	4490	0.0660	J	
	MW-123	Oct-18		519	1390	0.894	3.49	1150	2040	4380	<0.0197		
	MW-123	Apr-19		501	1420	1.16	3.63	961	2180	5600	<0.0197		
	MW-123	Oct-19		690	2030	1.17	4.26	1190	2250	6720	<0.0197		
	MW-123	Jun-20		513	1420	1.04	3.54	984	2140	5380	<0.0500		
	MW-123	Oct-20		524	1390	1.07	3.55	1100	1920	5460	<0.0500		
	MW-124	Apr-18		786	3110	1.02	6.67	1820	3700	8980	<0.0197		
	MW-124	Oct-18		798	3700	0.848	7.16	1730	4440	9520	<0.0197		
	MW-124	Apr-19		867	3120	0.884	6.86	1730	3560	11200	<0.0197		
	MW-124	Oct-19		753	3140	1.12	6.86	1630	3500	9980	<0.0197		
	MW-124	Jun-20		785	3510	1.01	6.50	1700	4500	7780	<0.0500		
	MW-124	Oct-20		758	2490	1.03	6.57	1840	3030	9940	<0.0500		
	OCD-1R	Apr-18		493	1870	3.48	3.79	1740	3100	6760	0.599		
	OCD-1R	Oct-18		514	1610	2.61	3.64	1310	2760	4720	0.206		
	OCD-1R	Apr-19		403	1230	3.09	3.03	977	2250	5000	0.485		
	OCD-1R	Oct-19		600	1820	2.93	4.13	1660	3670	7760	0.243		
	OCD-1R	Jun-20		599	1640	2.60	3.82	986	2350	5850	0.0815	JB	
	OCD-1R	Oct-20		500	1070	2.78	3.50	1070	2020	5560	0.0603	J	
	OCD-2A	Apr-18		530	1160	0.813	4.88	825	1990	4530	0.187		
	OCD-2A	Oct-18											
	OCD-2A	Apr-19		573	1300	0.874	4.73	758	2290	5440	0.185		
	OCD-2A	Oct-19											
	OCD-2A	Jun-20		609	1290	0.853	4.93	755	2240	5020	<0.0500		
	OCD-2A	Oct-20											
	OCD-3	Apr-18		842	2110	0.845	14.7	1070	2750	6220	0.194		
	OCD-3	Oct-18											
OCD-3	Apr-19		347	907	1.15	8.85	688	1610	3850	0.0700	J		
OCD-3	Oct-19												
OCD-3	Jun-20		375	585	1.10	7.17	446	1580	3150	0.0713	JB		
OCD-3	Oct-20												
OCD-4	Apr-18		847	4550	0.759	34.0	2540	3430	9500	0.101			
OCD-4	Oct-18												
OCD-4	Apr-19		818	4400	0.820	32.4	5380	3240	11300	0.0360	JJ6		
OCD-4	Oct-19												
OCD-4	Jun-20		840	5000	0.990	33.5	2580	3300	12700	<0.0500			
OCD-4	Oct-20												
OCD-5	Apr-18		882	5050	0.765	40.7	2990	3440	11300	0.0860	J		
OCD-5	Oct-18		834	5130	0.324	36.0	2690	3570	11200	<0.0197			
OCD-5	Apr-19		843	4840	0.790	38.9	2580	3300	12400	<0.0197			
OCD-5	Oct-19		843	5240	0.628	35.7	3010	3080	11900	<0.0197			
OCD-5	Jun-20		824	4770	0.950	37.3	2660	3490	10700	<0.0500	J4		
OCD-5	Oct-20		850	4120	0.702	35.8	3010	2690	12100	<0.0500			
OCD-6	Apr-18		881	4510	2.15	16.6	2800	2960	10800	1.06			
OCD-6	Oct-18		850	4910	1.98	16.1	2600	3110	14200	<0.0197	J4		
OCD-6	Apr-19		931	4710	2.26	17.0	2820	2760	11400	0.837			
OCD-6	Oct-19		754	3180	2.84	11.3	2050	2950	9760	0.0320	J		
OCD-6	Jun-20		918	4880	2.04	15.0	2710	3160	10800	<0.0500			
OCD-6	Oct-20		922	4850	2.27	15.8	2720	2870	11400	<0.0500			
OCD-7AR	Apr-18		603	2400	2.77	5.90	2790	3830	8960	0.0620	J		
OCD-7AR	Oct-18		612	2460	2.45	6.30	2520	3680	10500	<0.0197	J4		
OCD-7AR	Apr-19		662	2700	2.30	6.31	2600	3950	10300	0.711			
OCD-7AR	Oct-19		602	2680	2.80	6.22	2420	3640	10200	<0.0197			
OCD-7AR	Jun-20		619	2990	2.13	6.10	2520	3990	9740	<0.0500			
OCD-7AR	Oct-20		643	2680	2.75	6.37	2590	3640	10800	<0.0500			
OCD-7B	Mar-13		552	867	1.33	12.2	650	2270	4670	<1.00			
OCD-7B	Apr-15		641	910	0.852	11.9	685	2580	4520	<0.0200			
OCD-7B	Apr-17		564	960	1.05	11.0	629	2100	4540	<0.0197			
OCD-7B	Apr-19		590	874	0.839	11.7	678	2260	4760	<0.0197			
OCD-8A	Apr-18		680	2630	2.87	8.52	2090	3730	9840	0.181		<0.00180	
OCD-8A	Oct-18		664	2750	1.73	9.02	2260	4160	9500	<0.0197		<0.00180	
OCD-8A	Apr-19		683	2690	2.47	8.77	2200	3800	10500	<0.0197		<0.00180	
OCD-8A	Oct-19		1010	12000	2.02	17.4	6590	6010	29600	0.275		<0.00180	
OCD-8A	Jun-20		665	5120	2.01	8.85	3440	4510	12600	<0.0500		<0.00180	
OCD-8A	Oct-20		758	5270	2.36	10.8	3710	4260	15600	<0.0500		<0.00180	
OCD-8B	Apr-13		716	2180	0.980	8.75	1330	2880	7400	<1.00			
OCD-8B	Apr-15		680										

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				Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Cyanide
				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	TDS	NO3NO2	57-12-5
				Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL					250	1.60			600	1000	10.0	0.200
CGWSL Source					WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH	WQCC HH
Area	Well ID	Date	Dup									
Field East of Refinery	KWB-1C	Apr-13		474	380	1.03	5.68	161	2150	4420	1.75	
	KWB-1C	Apr-15		619	1160	25.3	1.23	210	2920	5340	0.180	
	KWB-1C	Apr-17		560	508	1.25	1.36	267	2860	5000	0.0350 JP1	
	KWB-1C	Apr-19		533	317	1.16	1.39	274	2550	4680	0.629	
	KWB-7	Oct-17		345	354	0.599	0.230 J	268	907	3080	<0.0197	<0.00180
	KWB-7	Oct-18		326	360	0.754	0.419 JB	248	1120	2630	<0.0197 J6	<0.00180 P1
	KWB-7	Jun-20		330	458	0.915	<0.534	275	834	2810	<0.0500	<0.00180
	KWB-7	Oct-20		371	330	0.794	<2.67	263	1260	3180	0.0590 J	<0.00180 J6
	KWB-8	Oct-16		251	579	0.467	0.351 J	443	701	3120	0.0380 JB	<0.00900
	KWB-8	Apr-17		237	574	0.623	0.414 J	320	442	2400	0.0510 J	<0.00180
	KWB-8	Oct-17		273	913	0.467	0.411 J	462	417	3270	<0.985	<0.00180
	KWB-8	Oct-20		301	398	0.694	<0.534	546	1660	4440	<1.00	<0.0180
	KWB-10R	Apr-17		134	230	1.57	0.521 J	131	0.475 J	1130	<0.0197	
	KWB-10R	Oct-17		138	186	1.39	0.453 J	123	3.08 J	1080	0.440	
	KWB-10R	Apr-18		138	183	1.35	0.430 J	122	<0.0774	1060	0.0250 J	
	KWB-10R	Oct-18		130	188	1.33	0.836 JB	110	<0.0774	1040	<0.0197	
	KWB-11A	Apr-18		461	849	0.567	0.856 J	335	1060	3570	4.51	<0.00180
	KWB-11A	Oct-18		433	786	0.851	1.17 B	359	1220	3410	0.0410 J	<0.00180
	KWB-11A	Apr-19		453	744	0.626	0.831 J	308	1100	3380	0.679	<0.00180
	KWB-11A	Jun-20		408	676	0.753	0.800 J	319	1180	3180	0.0536 J	<0.00180
	KWB-11A	Oct-20		396	541	0.652	0.676 J	306	1090	2930	0.414	<0.00180
	KWB-11B	Apr-18		497	300	0.418	2.21	91.8	1580	2650	3.32	<0.00180
	KWB-11B	Oct-18		484	314	0.399	2.65 B	86.8	1580	2620	3.33	<0.00180
	KWB-11B	Apr-19		516	342	0.359	2.19	87.2	1500	2560	3.31	<0.00180
	KWB-11B	Oct-19		498	329	0.447 J	2.25	87.0	1540	2620	2.69	<0.00180 J6
	KWB-11B	Jun-20		515	369	0.453	2.24	97.1	1710	2880	3.34	<0.00180
	KWB-11B	Oct-20		509	365	0.395	<2.67	100	1380	3130	3.03	<0.00180
	KWB-12A	Oct-18		475	92.4	0.439	0.696 J	120	1890	2850	9.14	<0.00180
	KWB-12A	Oct-19		480	111	0.597	0.614 JB	122	2210	3270	8.01	<0.00180
	KWB-12A	Jun-20		519	115	0.587	1.46 J	135	2270	3490	7.15	<0.00180
	KWB-12A	Oct-20		541	129	0.537	1.07 JB	133	2020	3520	6.85	<0.00180
	KWB-12B	Apr-18		571	121	0.346	0.699 J	150	2390	3560	7.78	<0.00180
	KWB-12B	Apr-18	FD	581	129	0.377	0.745 J	144	2280	3480	7.88	<0.00180
	KWB-12B	Oct-18		507	104	0.312	0.739 J	128	1330	3340	8.52	<0.00180
	KWB-12B	Oct-18	FD	538	106	0.307	0.653 J	129	1660	3380 J3	8.26	<0.00180
	KWB-12B	Apr-19		606	111	0.327	0.752 J	151	2140	3600	7.48	<0.00180
	KWB-12B	Apr-19	FD	549	110	0.328	0.723 J	134	2080	3580	7.81	<0.00180
	KWB-12B	Oct-19		527	114	0.425	0.575 JB	129	2230	3830 J3	7.10	<0.00180
	KWB-12B	Oct-19	FD	533	113	0.417	0.621 J	134	2280	3620	7.15	<0.00180
	KWB-12B	Jun-20		537	120	0.441	0.673 J	130	2460	3790	11.5	<0.00180
	KWB-12B	Jun-20	FD	525	114	0.343	0.742 J	126	2210	3600	8.27	<0.00180
	KWB-12B	Oct-20		578	130	0.386	0.656 JB	141	2210	3820	6.35	0.00596
	KWB-12B	Oct-20	FD	533	126	0.395	0.642 J	141	2140	3760	7.25	0.0565
	KWB-P4	Apr-13										
	KWB-P4	Apr-15										
	KWB-P4	Apr-17										
	KWB-P4	Apr-19										
	MW-57	Apr-18		506	185	2.22	1.57	315	2430	3660 J3	7.42	
	MW-57	Oct-18		536	159	1.91	1.28	386	2220	4850	25.6	
	MW-57	Apr-19		590	152	1.58	3.30	259	1700	3160	4.05	
	MW-57	Oct-19		638	482	2.91	2.35	429	3160	5720	12.7	
	MW-57	Jun-20		568	131	2.63	1.21 J	388	3190	4840	13.8	
	MW-57	Oct-20		529	135	1.99	2.97	287	2140	4040	4.83	
	MW-58	Oct-17		235	249	1.26	0.553 J	116	13.1	1340	<0.0197	<0.00180
	MW-58	Apr-18		215	207	1.37	0.290 J	98.5	2.59 J	1250	<0.0985	<0.00180
	MW-58	Oct-18		176	151	1.06	1.20	74.3	56.9	1040	<0.394	<0.00180 J3J6
	MW-58	Oct-19		229	294	1.33	2.06	70.3	1.49 JB	1140	<0.0197	<0.00180
	MW-111	Apr-18		242	421	0.830	0.158 J	240	435	1630	<0.0197	
	MW-111	Oct-18		203	412	1.46	0.588 JB	221	331	1810	<0.0197	
	MW-111	Apr-19		340	375	0.957	1.83	209	322	2000	<0.0197	
MW-111	Oct-19		212	429	1.38	0.214 J	239	317	2070	<0.0197		
MW-111	Jun-20		251	409	1.08	1.11 J	206	372	1970	<0.0500		
MW-112	Nov-14		190	230	1.00	0.310 J	190	5.40	1200	<0.0200		
MW-113	Apr-18		318	174	0.515	0.538 J	164	985	2210	0.0350 J		
MW-113	Apr-18	FD	329	191	0.521	0.629 J	160	1070	2150	<0.0197		
MW-113	Oct-18		309 V	177	0.499	0.557 JB	156 V	1060	2010	<0.0197		
MW-113	Oct-18	FD	327	186	0.542	0.555 J	161	895	2050	<0.0197		
MW-113	Apr-19		332	172	0.451	0.746 J	163	997	2440	<0.0197 J6		
MW-113	Apr-19	FD	329 V	178	0.449	0.633 J	160 V	1020	2070	<0.0197		
MW-113	Oct-19		299	211	0.593	0.377 JB	164	1180	2050	<0.0197		
MW-113	Oct-19	FD	306	198	0.611	0.419 J	162	971	2380	<0.0197 J6		
MW-113	Jun-20		317	192	0.519	0.598 J	159	1210	2440	<0.0500		
MW-113	Jun-20	FD	313	184	0.605 J	<0.534	152	958	2460	<0.0500		
MW-113	Oct-20		274	177	0.527	<0.534	158	773	2200	0.199		
MW-113	Oct-20	FD	280	185	0.536	<2.67	177	786	2210	0.128		
MW-125	Apr-18		548 V	337	1.32	1.28	234 V	2680	3900 J3	0.213		
MW-125	Oct-18		534	284	0.995	1.31	211	2300	3910	0.440		
MW-125	Apr-19		549	322	1.25	1.23	206	2860	4290	0.457		
MW-125	Oct-19		517	304	1.20	1.30	216	3040	4480	0.788 J5		
MW-125	Jun-20		543	330	1.19	1.41 J	221	2950	4500	0.212 J5		
MW-125	Oct-20		541	271	1.10	1.42 JB	221	2270	4350	0.0919 J		
MW-126A	Apr-18		383	245	0.881	0.548 J	200	1780	3350	<0.0197		
MW-126A	Oct-18		308	185	0.899	1.72 JB	179	1310	2420	0.0850 J		
MW-126A	Apr-19		382	191	0.757	0.547 JB	138	1350	2540	<0.0197		
MW-126A	Oct-19		325	136	0.937	0.670 J	152	1330	2330	<0.0197 J5		
MW-126A	Jun-20		357	198	0.869	<0.534	152	1590	2680	<0.0500		
MW-126A	Oct-20		396	210	0.706	<0.534	189	1510	3150	<0.0500		
MW-126B	Apr-18		534	266	0.764	2.36	202	2310	3680	0.436		
MW-126B	Oct-18											

Table 4C - Summary of Groundwater Analytical Data - Water Quality and Cyanide

2020 Annual Groundwater Monitoring Report
HollyFontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Water Quality Parameters								Cyanide			
				Calcium 7440-70-2 mg/L	Chloride 16887-00-6 mg/L 250	Fluoride 16984-48-8 mg/L 1.60	Potassium 7440-09-7 mg/L	Sodium 7440-23-5 mg/L	Sulfate 14808-79-8 mg/L 600	TDS TDS mg/L 1000	Nitrate/Nitrite NO3NO2 mg/L 10.0	Cyanide 57-12-5 mg/L 0.200			
CGWSL Source					WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH	WQCC HH			
Area	Well ID	Date	Dup												
Field East of Refinery	MW-130	Apr-18		256	235	0.841	0.644	J	299	999	2230	1.87			
	MW-130	Oct-18		239	237	0.792	0.611	J	273	985	2020	J4	1.97		
	MW-130	Apr-19		269	228	1.81	0.712	J	289	940	2470	J4	1.81		
	MW-130	Oct-19		250	243	0.913	0.789	J	275	1000	2170		0.777		
	MW-130	Jun-20		247	208	0.828	0.656	J	285	972	2390		0.861		
	MW-130	Oct-20		242	188	0.758	0.648	JB	285	882	2430		0.959		
	MW-131	Apr-17		151	285	0.773	0.275	J	153	10.3	1230		<0.197		
	MW-131	Oct-17		149	284	0.807	0.200	J	149	15.5	1290		<0.0197		
	MW-131	Oct-19		145	288	0.845	0.251	J	150	19.7	1210		<0.0197		
	MW-131	Jun-20		153	283	0.865	<0.534		163	24.7	1270		<0.0500		
	MW-133	Nov-14		200	170	1.10	0.460	J	140	140	1300		<0.0200		
	MW-133	Apr-15		163	174	1.19	0.323	J	122	116	1190		<0.200		
	MW-134	Apr-18		555	441	1.11	1.65		270	2790	4480		3.89		
	MW-134	Apr-18	FD	574	V	464	1.08	1.71		271	V	2760	4430	3.85	
	MW-134	Oct-18		514		392	0.956	1.50		243		1950	5090	3.83	
	MW-134	Oct-18	FD	546		405	0.947	1.60		241		2170	5460	1.52	
	MW-134	Apr-19		582		417	1.31	1.89		283		3060	4960	3.42	
	MW-134	Apr-19	FD	563		403	1.31	1.70		263		2840	5250	3.53	
	MW-134	Oct-19		511		396	1.37	1.48		243		3140	4710	2.67	
	MW-134	Oct-19	FD	542		398	1.42	1.54		249		2780	4960	2.55	
	MW-134	Jun-20		515		370	1.16	1.51	J	234	V	2910	4870	1.73	J5
	MW-134	Jun-20	FD	516		363	1.45	J	1.43	J	239	2530	4960	<0.0500	
	MW-134	Oct-20		501		349	1.01	1.67	JB	243		2700	4950	1.37	
	MW-134	Oct-20	FD	503		366	1.32	J	1.64	J	251	2530	4970	1.39	
	MW-135	Apr-18		493		765	1.09	0.904	J	599		2530	5020	32.8	
	MW-135	Oct-18		484		716	0.985	1.15	JB	573		2730	5070	35.9	
	MW-135	Apr-19		608		652	0.954	1.00		667		2780	5780	29.5	
	MW-135	Oct-19		513		547	1.20	0.744	JB	542		2820	5240	13.4	
	MW-135	Jun-20		542		542	1.14	0.801	J	594		2940	5600	16.0	
	MW-135	Oct-20		538		504	1.13	<2.67		621		2970	5460	10.9	
	MW-145	Oct-20													
	MW-145	Oct-20	FD												
	MW-146	Oct-20													
	MW-147	Oct-20													
	MW-148	Oct-20													
	RA-4196	Apr-18		379	131	0.354	2.22	97.9		1290	2070		<0.0197		
	RA-4196	Oct-18		345	119	0.291	1.98	90.5		935	1960		<0.0197		
	RA-4196	Apr-19		370	112	0.309	2.34	90.6		1060	1920		<0.0197		
	RA-4196	Oct-19		363	131	0.299	1.96	89.2		1250	2160		<0.0197		
	RA-4196	Jun-20		365	126	0.324	2.17	90.1		1330	2290		<0.0500		
	RA-4196	Oct-20		382	123	0.348	2.36	98.7		1250	2340		0.842	J6	
	RA-4798	Apr-18		238	V	62.9	0.408	1.98	41.4	783	1340		0.878		
	RA-4798	Oct-18		335		110	0.317	1.97	83.1	1270	2110		1.16		
	RA-4798	Apr-19		257		60.1	0.355	2.16	46.5	726	1340		1.02		
	RA-4798	Oct-19		366		130	0.339	1.91	93.8	1260	1950		1.14		
	RA-4798	Jun-20		449		163	0.321	2.30	117	1620	2820		1.50		
	RA-4798	Oct-20		356		104	0.358	2.36	87.6	1080	2200		1.18		
	RW-12R	Apr-17		392		189	0.623	0.293	J	152	1740	2420	J3	<0.197	
	RW-12R	Apr-18		378		155	0.700	0.220	J	171	1400	2400		<0.0197	
	RW-12R	Apr-19		369	V	154	0.609	0.408	JB	164	V	1180	2450	<0.0394	
	RW-12R	Jun-20		337		143	0.716	<0.534		158	1300	2750		<0.0500	
	RW-13R	Apr-16		202		222	0.691	0.346	J	167	341	1190		0.0460	J
	RW-13R	Apr-18		242		207	0.650	0.378	J	183	525	1700		0.0260	JP1
	RW-18A	Apr-17		504		176	2.51	1.09		141	2870	4400		1.90	
	RW-18A	Apr-18		491		206	1.82	0.832	J	132	2750	3940		0.408	
	RW-18A	Apr-19		549		199	1.94	0.832	J	130	2390	3970		0.286	
	RW-18A	Jun-20		515		211	2.03	0.990	J	120	2490	4280		0.460	
	RW-20	Apr-15		228		256	0.530	<0.180		228	125	1430		<0.200	
	RW-22	Apr-15		184		402	0.860	0.319	J	274	78.4	1680		<0.200	
NCL	MW-18	Apr-17		486	77.5	3.44	13.9	65.0	1970	3420	51.0		<0.00180		
	MW-18	Apr-18		472	154	1.59	3.05	90.2	1820	2580	37.9		<0.00180		
	MW-18	Apr-19		536	86.7	2.04	7.60	76.6	1910	3310	32.6		<0.00180		
	MW-18	Jun-20		421	154	1.61	1.66	J	58.7	1510	2870	18.3		<0.00180	
	MW-45	Apr-18		651	523	1.62	6.27	371	2590	4480	0.0220	J		<0.00180	
	MW-45	Oct-18		624	447	1.36	5.03	372	2680	3840	<0.0197		0.00258	J	
	MW-45	Apr-19		670	462	1.24	7.13	390	2580	4760	0.0470	JJ6		<0.00180	
	MW-45	Oct-19		588	441	1.73	5.54	375	2530	4710	0.0260	J		<0.00180	
	MW-45	Jun-20		574	413	1.54	4.80	339	2490	4480	<0.0500		0.00225	J	
	MW-45	Oct-20		577	429	1.70	4.70	359	2350	4970	<0.0500		<0.00180		
	MW-53	Apr-16		459	346	1.06	1.42	J	161	1340	2890	25.3			
	MW-53	Apr-17		340	222	0.904	1.12		130	1330	2290	15.6			
	MW-53	Apr-18		315	72.9	1.13	1.12	B	118	1250	1860	1.58	J6		
	MW-53	Apr-19		259	59.6	1.30	1.17		88.4	1100	1880	0.290			
	MW-53R	Oct-20		298	66.7	1.11	4.08		69.1	955	1920	<0.0500			
	MW-54A	Apr-18		373	V	186	0.955	0.324	JB	61.7	746	1650	<0.0197		
	MW-54A	Oct-18		359		181	0.898	0.215	J	60.3	821	1810	<0.0197		
	MW-54A	Apr-19		335		185	0.957	0.196	J	54.1	778	1890	<0.0197		
	MW-54A	Oct-19		356		212	1.03	0.292	JB	61.1	833	2060	0.154		
	MW-54A	Jun-20		366		198	0.809	<0.534		55.5	838	2030	<0.0500		
	MW-54A	Oct-20		374		196	0.913	<0.534		60.8	768	1990	<0.0500	J5	
	MW-54B	Apr-13		345		176	<0.500	1.16		48.8	747	2050	<1.00		
	MW-54B	Apr-15		307		166	0.613	0.767	J	48.0	752	1890	J	0.0276	J
	MW-54B	Apr-17		317		127	0.617	1.18		54.5	1040	1840	0.100	J	
	MW-54B	Apr-19		319		140	0.634	0.811	J	50.5	818	1870	0.0410	J	
	MW-55	Apr-18		455		523	1.58	0.838	J	214	1770	3670	1.41		<0.00180
	MW-55	Oct-18		447		412	1.59	1.04		227	1810	3340	2.86		<0.00180

Table 4C - Summary of Groundwater Analytical Data - Water Quality and Cyanide

2020 Annual Groundwater Monitoring Report
HollyFontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Water Quality Parameters							Cyanide
Analyte				Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite
CAS				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	TDS	NO3NO2
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL					250	1.60			600	1000	10.0
CGWSL Source					WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH
Area	Well ID	Date	Dup								
NCL	NCL-32	Apr-18		425	130	1.51	3.41	116	1450	2450	2.72 J6
	NCL-32	Oct-18		447	104 B	1.23	3.24	120	1570	2270	5.11
	NCL-32	Apr-19		442	105	1.26	3.35	116	1480	2730	5.87
	NCL-32	Oct-19		431	98.8	1.28	3.19	114	1840	2880	5.62
	NCL-32	Jun-20		472	90.7	1.36	3.12	107	1730	2940	6.45
	NCL-32	Oct-20		483	90.7	1.27	3.47	118	1640	3040	5.82
	NCL-33	Apr-18		473	486	2.63	5.70	122	870	2180	<0.0197
	NCL-33	Oct-18		454	466	2.47	5.35	128	809	1880	<0.0197
	NCL-33	Apr-19		430	483	2.12	4.92	145	595	1840	0.890
	NCL-33	Oct-19		547	964	2.34	5.54	157	1090	3120	<0.0197
	NCL-33	Jun-20		714	692	2.44	5.60	166	1540	3890	0.0547 J
	NCL-33	Oct-20		688	667	2.64	6.43	178	1340	3960	<0.0500
	NCL-34A	Apr-18		276	323	1.36	1.32	113	85.2	1520	<0.197
	NCL-34A	Oct-18		270	289	1.21 J3J5	1.25	111	117	1710	<0.394
	NCL-34A	Apr-19		251 V	262	1.37	1.11	107 V	42.6	1370	<0.394
	NCL-34A	Oct-19		235	245	1.38	1.15	116	119	1470	0.110
	NCL-34A	Jun-20		283	260	1.31	1.13 J	104	234	1680	<5.00
	NCL-44	Apr-18		361	144	1.88	2.44	129	1280	2200	<0.0197 J3J6
	NCL-44	Oct-18		376	146	1.60	2.33	131	1330	2340	0.0260 JJ6
	NCL-44	Apr-19		371	138	1.48	2.39	131	1230	2640	<0.0197 J6
	NCL-44	Oct-19		356	185	1.67	2.32	131	1430	2740	0.142
	NCL-44	Jun-20		373	141	1.66	2.15	135	1290	2700	<0.0500
	NCL-44	Oct-20		358	126 B	1.63	2.29	142	1170	2730	<0.0500
	NCL-49	Apr-18		522	169	0.640	0.736 JB	145	2070	2560	7.75
	NCL-49	Apr-18	FD	525	171	0.651	0.995 JB	147	2070	3060	7.85
	NCL-49	Oct-18		485	143	0.565 B	0.689 J	130	2050	3370	3.59
	NCL-49	Oct-18	FD	448	144	0.572 B	0.635 J	122	2040	3190	3.59
	NCL-49	Apr-19		438	127	0.658	0.761 J	123	1910	2490	5.63
	NCL-49	Apr-19	FD	450	129	0.653	0.701 J	124	1830	2440	5.66
	NCL-49	Oct-19		474	137	0.740	0.736 J	129 V	1910	3240	6.39
	NCL-49	Oct-19	FD	440	134	0.722	0.642 J	126 V	1970	3390	7.44
	NCL-49	Jun-20		486	128	0.609	0.686 J	133	1910	3350	9.98
	NCL-49	Jun-20	FD	472	128	0.613	0.652 J	135	1920	3350	9.95
	NCL-49	Oct-20		487	135 B	0.606	0.692 JB	135	1830	3380	10.1
	NCL-49	Oct-20	FD	482	135 B	0.600	0.675 JB	133	1820	3430	10.0
North Refinery	MW-23	Apr-18		112	450	1.88	1.47	472	10.9	2080	<0.0197
	MW-23	Oct-18		104	418	1.49	1.41	429	10.8	1830	<0.0197
	MW-23	Apr-19		97.5	444	1.70	1.12	482	18.9	2000	<0.0197
	MW-23	Oct-19		95.6	428	1.59	1.27	410	18.7	2020	<0.0197
	MW-23	Jun-20		96.4	410	1.42	1.10 J	426 V	15.6	1970	<0.500
	MW-23	Oct-20		96.8	408	1.19	1.29 J	459	7.39	1990	<0.0500
	MW-29	Apr-18		501	332	1.29	1.61	298	2120	3910	<0.0197
	MW-29	Oct-18		344	263	0.953	1.08	324	1450	2990	<0.0197
	MW-29	Apr-19		617	331	1.61	1.98	360	2790	5300	<0.0197
	MW-29	Oct-19		519	351	2.05	2.08	357	2810	4180	<0.0197
	MW-29	Jun-20		396	383	1.71	2.03	356	1890	3610	<0.0500
	MW-29	Oct-20		336	418	1.47	1.90 J	333 V	1430	3530	<0.0500
	MW-39	Apr-18		72.9	131	3.57	0.331 J	1090	1130	3020	<0.0197
	MW-39	Oct-18		51.5	95.9	3.62	0.295 J	779	770	2490	<0.0197
	MW-39	Apr-19		52.6	111	4.21	0.164 J	891	1000	2580	<0.0197
	MW-39	Oct-19		45.8	86.8	4.26	0.245 J	771	929	2590	<0.0197
	MW-39	Jun-20		61.8	97.7	3.45	<0.534	721	821	2410	<0.0500
	MW-39	Oct-20		63.8	91.5	3.28	<0.534	655	686	2260	<0.0500
	MW-40	Apr-17		474	156	1.76	1.62	110	1550	3190	<0.197
	MW-40	Apr-18		425	141	1.80	1.41	107	1440	2390	<0.985
	MW-40	Apr-19		450	106	1.52	1.39	107	1400	2600 J3	<0.394
	MW-40	Jun-20		374	88.4	1.88	1.30 J	90.4	1380	2430	<0.500
	MW-41	Apr-17		224	328	0.936	0.415 J	379	1200	2890	<0.197
	MW-41	Apr-18		329	682	0.934	0.571 J	624	1500	4060	<0.0197
	MW-41	Apr-19		238	721	0.884	0.590 J	624	1140	4110	<0.394
	MW-41	Jun-20		282	875	1.00	0.653 J	828	1780	4930	<0.0500
	MW-42	Apr-17		222	406	0.831	0.421 J	462	1100	3410	0.416 JP1
	MW-42	Apr-18		241	372	0.984	0.433 J	445	1180	2990 J3	0.0310 JJ6
	MW-42	Apr-19		233	319	0.780	0.449 J	425	1010	2590	<0.394
	MW-42	Jun-20		246	336	0.851	<0.534	358	1020	3310	<2.50
	MW-43	Apr-18		159	697	1.93	1.11	604	357	3110	<0.985
	MW-43	Oct-18		155	636	1.61	1.01	483	311	2900	<0.985
	MW-43	Apr-19		152	639	1.71	0.923 J	491	444	2610	<0.394
	MW-43	Oct-19		205	662	1.66	0.961 J	406	479	2120	<0.985
	MW-43	Jun-20		141	547	1.36	0.828 J	341	198	2210	<0.250
	MW-43	Oct-20		141	550	1.09	0.896 J	350	102	2150	<0.0500
	MW-59	Apr-17		467	184	1.13	0.519 J	134	1870	3160	<0.197
	MW-59	Apr-18		492	180	1.31	0.507 J	151	1680	2760	<0.0197 J6
	MW-59	Apr-19		475	173	1.10	0.468 J	153	1400	3110	<0.0197
	MW-59	Jun-20		366	201	1.33	<0.534	184	1340	2900	<0.0500
	MW-60	Apr-18		444	221	0.974	0.769 J	233	2080	3850	<0.0197 J6
	MW-60	Apr-18	FD	447	231	0.969	0.746 J	218	1980	3510	<0.0197
	MW-60	Oct-18		432	231	1.00	0.836 J	227	2030	3020	0.0640 JP1
	MW-60	Oct-18	FD	432	230	0.978	0.750 J	223	1730	4100	0.0810 J
	MW-60	Apr-19		448	275 B	1.06	0.766 J	258	2380	3870	<0.985
	MW-60	Apr-19	FD	429	269 B	0.901	0.703 J	250	2300	4060	<0.985
	MW-60	Oct-19		401	250	0.972	0.420 J	191	2200	2930 J3	<0.197
	MW-60	Oct-19	FD	402	273	0.936	0.445 JB	184 V	2040	3320 J3	<0.197
	MW-60	Jun-20		418	206	0.778	<0.534	178	1770	3720	<2.50
	MW-60	Jun-20	FD	424	219	1.18 J	<0.534	176	1660	3790	<0.500
	MW-60	Oct-20		418	202	0.715	<0.534	189	1510	3560	0.203
	MW-60	Oct-20	FD	401	219	1.21 J	<0.534	190	1780	3660	<0.0500
	MW-61	Apr-18		289 V	299	1.55	1.24	293 V	862	2200	<0.394
	MW-61	Oct-18		257	279	1.46	2.99 JB	258	797	2180	<0.985
	MW-61	Apr-19		288	322	1.43	0.885 J	317	725	2320	<0.197
	MW-61	Oct-19		402	412	2.05	2.49	234	885	2690	<0.985
	MW-61	Jun-20		292	471	1.09	0.933 J	299	541	2570	<5.00
	MW-61	Oct-20		246	339	1.06	0.820 JB	302	532	2110	<0.0500
	MW-62	Apr-18		338	266	1.73	1.36	360	793	2330	<0.394
	MW-62	Oct-18		259	264	1.91	2.22 JB	270	500	2100	<0.985
	MW-62	Apr-19		292	266	1.56	1.15	310	556	2280	<0.0197
	MW-62	Oct-19		271	285	1.60	1.12	255 O1V	593	2290	<0.985
	MW-62	Jun-20		282	280	1.19	0.973 J	235	524	2290	<2.50
	MW-62	Oct-20		304	296	1.08	1.11 JB	241	531	2370	<0.0500
	MW-62R	Oct-20		304	311	0.806	3.38	152	571	2240	<0.0500
	MW-67	Oct-17		207	305	0.568	0.500 JB	200	388	1740	<0.0985
	MW-67	Apr-18		220	328	0.636	0.573 JB	245	404	1660	<0.197
	MW-67	Oct-18		240	221	0.611	0.636 J	202	493	1580	<0.0197
	MW-67	Apr-19		202	302	0.637	0.538 J	225	447	1630	<0.0197

Table 4C - Summary of Groundwater Analytical Data - Water Quality and Cyanide

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Water Quality Parameters								Cyanide	
				Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Cyanide	
				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	TDS	NO3NO2	57-12-5	
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
CGWSL					250	1.60			600	1000	10.0	0.200	
CGWSL Source					WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH	WQCC HH	
Area	Well ID	Date	Dup										
North Refinery	MW-90	Apr-18		300	166	2.11	1.16 B	200	1620	2510	<0.197		
	MW-90	Oct-18		305	150	2.32	1.31	167	1630	2990	<0.197		
	MW-90	Apr-19		321	167	1.99	1.21	172	1900	2710	0.558 J		
	MW-90	Oct-19		434	79.1	5.45	1.73	109	2540	3480	0.0330 J		
	MW-90	Jun-20		331	173	2.25	1.13 J	142	1790	3120	<2.50		
	MW-90	Oct-20		293	210	1.05	0.913 J	171	1280	2910	<0.0500		
	MW-91	Apr-18		440	167	1.31	0.513 JB	40.0	961	2170 J3	<1.97		
	MW-91	Oct-18		433	221	1.27	0.639 J	35.2	966	2820	<0.985		
	MW-91	Apr-19		460	295	1.27	0.468 J	38.9	915	3290	<1.97		
	MW-91	Oct-19		451	422	1.29	0.520 J	39.6	1020	2430	<0.197		
	MW-91	Jun-20		478	501	1.19	<0.534	36.7	813	2830	<10.0		
	MW-92	Apr-16		130 O1	415	1.30	1.73 J	450 O1V	24.1	2310	0.602 J		
	MW-92	Oct-16		134	539	1.63	2.02	454	14.6	2150	<0.985		
	MW-93	Apr-17		489	192	2.38	2.97	167	1430	2930	<0.197		
	MW-93	Apr-18		537	193	2.39	3.55	191	1400	2760	<0.197		
	MW-93	Apr-19		505	214	2.09	3.76	195	1400	2810	0.0220 J		
	MW-93	Jun-20		491	233	1.88	3.11	163	1070	2820	<2.50		
	MW-94	Oct-15		109	245	1.01	0.224 J	355	75.8	2530	<0.197		
	MW-94	Apr-16		124	217	1.02	0.189 J	532	199	2980	<0.197		
	MW-94	Oct-16		137	172	1.04	0.467 J	319	175	2530	<0.0197		
	MW-94	Apr-17		95.6	196	0.874	0.331 J	427	85.7	2660	<0.197		
	MW-95	Apr-17		203 V	349	0.868	0.730 J	194 V	420	1710	<0.197		
	MW-95	Apr-18		229	258	0.884	0.602 J	163	471	1770	<0.0197		
	MW-95	Apr-19		246	264	0.830	0.472 J	172	561	2020	<0.0197		
	MW-95	Jun-20		250	300	0.739	<0.534	151	682	2020	<0.0500		
	MW-96	Apr-18		188	159	1.18	1.23	229	178	1450	<1.97		
	MW-96	Oct-18		186	157	1.10	0.985 J	217	235	1530	<0.197		
	MW-96	Apr-19		167	150	1.20	1.17	211	150	1360	0.141		
	MW-96	Oct-19		195	144	1.17	1.15	204	393	1520	<0.197		
	MW-96	Jun-20		147	131	1.32	1.52 J	200	95.2	1320	<2.50		
	MW-96	Oct-20		142	128	1.15	1.17 J	218	69.3 P1	1420	<0.0500		
	MW-98	Apr-18		543	81.5	1.70	0.235 JB	106	1790	2910	<1.97		
	MW-98	Oct-18		490	98.3	1.65	0.249 J	93.9	1640	2320 J3	<0.985		
	MW-98	Apr-19		575	126	1.69	<0.0370	127	1800	2980	<1.97		
	MW-98	Oct-19		575	185	1.99	0.257 J	115	1520	3330	<0.985		
	MW-98	Jun-20		561	239	1.69	<0.534	129	1590	3280	<5.00		
	MW-98	Oct-20		515	195	1.73	<0.534	125	1300	3060	<0.0500		
	MW-137	Oct-17		141	548	1.11	0.979 JB	759	683	2910	<0.394	<0.00180	
	MW-137	Apr-18		143	446	1.41	1.23	955	713	3420	<0.985	<0.180	
	MW-137	Oct-18		133	406	0.873	0.971 J	632	384	2730	<1.97	<0.180	
	MW-137	Apr-19		142	407	1.28	1.14	845	607	3380	<1.97	<0.0900	
	MW-138	Oct-17		124	453	1.06	1.50 B	401	27.9	2100	<0.0985	<0.00180	
	MW-138	Apr-18		130	453	0.874	1.58	436	26.8	1910	<0.0197	<0.00180	
	MW-138	Oct-18		122	408	0.802	1.60	362	30.3	1510	<0.0197	<0.00180	
	MW-138	Apr-19		130	435	0.966	1.62	402	41.4	1730	<0.0197	<0.00180	
	RW-1R	Apr-16		505	180	1.38	6.39	203	1500	2990	0.422 J		
	RW-1	Apr-17		558	246	1.41	7.37	268	1860	3690	<0.197		
	RW-1	Apr-18		363	255	0.913	2.24	247	1030	1810	<1.97		
	RW-1	Apr-19		337	286	0.866	1.87	266	939	2690	<1.97		
	RW-2	Apr-15		726	365	1.75	5.55 J	383	3510	5310	<0.200		
RW-2R	Apr-16		875	430	2.09	5.80	396	2200	3810	0.281 J			
RW-2	Apr-17		519	251	2.35	2.86	261	1200	3030	<0.197			
RW-2	Apr-18		402	317	1.75	2.25	335	731	2600	<0.394			
RW-7	Apr-17		266	204	0.513	0.922 J	105	693	1740	<0.197			
RW-7	Apr-18		295	217	1.22	2.54	149	475	1820	<0.985			
RW-7	Apr-19		247	239	1.05	1.63	150	426	1830	<0.197			
RW-7	Jun-20		184	218	0.995	0.651 J	151	162	1530	<2.50			
RW-8	Apr-15		227	115	0.801	0.353 J	209	473	1600	<0.200			
RW-8	Apr-17		218	163	0.731	0.360 J	161	665	1820	<0.197			
RW-9	Apr-17		355	369	1.90	2.26	326	1370	3370	<0.197			
RW-9	Apr-18		322	353	1.80	2.13	351	1170	2750	<0.985			
RW-9	Apr-19		309	399	1.46	1.91	356	1160	3100	<1.97			
RW-9	Jun-20		293	469	1.21	1.51 J	425	1140	3330	<2.50			
RW-10	Apr-17		457	88.0	3.53	3.24	110	1500	2660	<0.197			
RW-10	Apr-18		499	131	3.41	3.49	143	1530	2670	<0.985			
RW-10	Apr-19		572	65.9	3.66	3.68	102	1470	2540 J3	<0.197			
RW-10	Jun-20		485	92.9	3.87	4.43	151	1450	2520	<0.0500			
RW-16B	Apr-17		499	291	4.90	0.832 J	372	2740	5030	2.20			
RW-16B	Apr-18		546	43.5	4.89	0.788 J	259	2660	4240	0.894 J6			
RW-16B	Apr-19		540	83.0	4.48	0.677 J	333	2690	4440	1.47 J3J6			
RW-16B	Jun-20		516	181	3.78	1.65 J	492	2970	4720	<0.0500			
RW-17A	Apr-17		568	398	2.61	4.02	306	2950	4820	3.33			
RW-17A	Apr-18		635	358	2.31	3.87	345	3080	4430	0.0920 J			
RW-17A	Apr-19		563	398	2.64	2.97	286	3290	5430	<0.0197			
RW-17A	Jun-20		554	389	2.58	4.62	306	2940	5730	0.386			
North RO Field	MW-117	Apr-18		604	124	3.20	6.30	111	1070	2920	0.207		
	MW-117	Oct-18		577	327	2.78	6.12	105	1940	3500	0.102		
	MW-117	Apr-19		686	307	2.99	7.11	127	1980	3720	0.0740 J		
	MW-117	Oct-19		582	267	3.25	6.50	99.5	2010	3330	0.376		
	MW-117	Jun-20		578	299	3.43	6.39	129	2300	3640	2.46		
	MW-117	Oct-20		587	271	3.25	6.68	133	2030	3870 J3	4.05		
	MW-118	Apr-18		607	292	5.55	4.86	136	2480	3300	1.21		
	MW-118	Oct-18		559	259	5.06	4.98	136	1730	4120	1.88		
	MW-118	Apr-19		648	256	5.40	5.40	144	2390	3800	1.06		
	MW-118	Oct-19		573	286	5.28	3.78	153	2580	4260	1.76		
	MW-118	Jun-20		586	290	5.20	3.45	171	2950	4620	2.43		
	MW-118	Oct-20		558	262	5.06	3.07 B	178	2600	4640	2.03		
	MW-119	Apr-18		616	251	2.75	1.10	177	2240	2620	0.288		
	MW-119	Oct-18		596	439	2.56	1.49	225	1390	4200	0.0610 J		
	MW-119	Apr-19		654	404	2.59	1.39	249	2160	3680	0.398		
MW-119	Oct-19		633	397	2.34	1.31	203	2360	4670	0.132			
MW-119	Jun-20												

Table 4C - Summary of Groundwater Analytical Data - Water Quality and Cyanide

2020 Annual Groundwater Monitoring Report
HollyFontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Water Quality Parameters								Cyanide	
				Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Cyanide	
				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	TDS	NO3NO2	57-12-5	
				Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
CGWSL				250	1.60				600	1000	10.0	0.200	
CGWSL Source					WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH	WQCC HH	
Area	Well ID	Date	Dup										
South Refinery	MW-28	Apr-18		319	149	1.33	1.05	107	1380	2290	<0.394	<0.0180	
	MW-28	Oct-18		212	151	1.08 J3	1.72 JB	97.0	960	1810	<0.985	0.00263 JP1	
	MW-28	Apr-19		361	138	1.14	0.964 J	112	1030	2920	<0.985	<0.0180	
	MW-28	Oct-19		360	143	1.60	0.571 JB	101	1630	2860	<0.985	<0.0180 J4	
	MW-28	Jun-20		285	149	1.10	4.23	109	1310	2610	<0.250	<0.0360	
	MW-28	Oct-20		281	132	1.02	4.03	114	1140	2670	<0.0500	<0.00180	
	MW-48	Apr-18		200	689	1.90	0.776 J	269	9.52	2490	0.0860 J		
	MW-48	Oct-18		172 V	498	1.20	0.863 J	293 V	125	1730 J4	<0.394		
	MW-48	Apr-19		168	179	1.82	1.16	290	1210	1630 J4	<0.394		
	MW-48	Oct-19		159	429	1.08	1.12	297	85.7	1580 J3	<0.985		
	MW-50	Apr-18		558	415	2.12	4.09	531	3440	5320	9.78		
	MW-50	Oct-18		402	338	1.85	2.56	291	2150	3790	0.507		
	MW-50	Apr-19		469	320	1.50	2.62	334	2340	4440	1.48		
	MW-50	Oct-19		406	298	1.80	2.63	289	2450	3260	1.53		
	MW-50	Jun-20		495	418	2.92	4.42	577	3370	5550 Q	74.6		
	MW-50	Oct-20		490	390	3.64	4.05	682	4100	7810	78.5 V		
	MW-52	Apr-18		195	119	1.81	0.193 J	301	1090	2100	0.893	<0.00180	
	MW-52	Oct-18		175	115	1.81	0.209 J	272	983	2420 J4	4.22	<0.00180	
	MW-52	Apr-19		201	160	1.87	0.394 JB	321	1080	2500 J3J4	12.7	<0.00180	
	MW-52	Oct-19		206	1140	1.71	0.218 JB	322	1110	2380 J3	13.3	<0.00180	
	MW-52	Jun-20		239	195	1.71	<0.534	340	1140	2810	13.0	<0.00180	
	MW-52	Oct-20		223	195	1.62	<0.534	332	1110	2720	15.3 V	<0.00180	
	MW-64	Apr-18		93.7	323	0.795	0.697 J	362	1.84 J	1500	<0.985		
	MW-64	Oct-18		77.9	309	0.958	1.36 JB	312	3.78 J	1390	<0.985		
	MW-64	Apr-19		105	295	0.833	0.713 J	359	1.94 J	1340	<0.0197		
	MW-64	Oct-19		83.5	325	0.742	0.587 J	327	4.42 JB	1480	<0.197		
	MW-64	Jun-20		90.7	324	0.993	0.655 J	350	5.03	1620	<0.100		
	MW-64	Oct-20		88.5	310	0.710	0.586 JB	343	8.17	1590	<0.0500 J3J6		
	MW-65	Apr-18		132	306	1.33	0.732 J	264	10.2	1340	<0.0985		
	MW-65	Oct-18		127	284	1.12	0.823 JB	229	4.80 J	1280	<0.0197 J6		
	MW-65	Apr-19		155	284	0.967	0.532 JB	262	1.23 J	1310	<0.0197		
	MW-65	Oct-19		113	234	1.23	0.466 J	223	5.53 B	1080	<0.0197		
	MW-66	Apr-18		147	196	1.38	0.867 J	191	<0.0774	1110	<0.0197	<0.00180	
	MW-66	Oct-18		138	204	1.26	0.868 J	174	0.781 J	1180	<0.0197 J6	<0.00180	
	MW-66	Apr-19		145	187	1.23	1.21	189	0.718 J	1140	<0.0197	<0.00180	
	MW-66	Oct-19		121	168	1.04	1.18	131	6.99	912	<0.0197 J6	<0.00180	
	MW-66	Jun-20		136	188	1.13	0.842 J	155	1.16 J	1070	0.0979 J	<0.00180	
	MW-66	Oct-20		140	189	1.12	1.71 JB	145	6.68	1060	<0.0500	<0.00180	
	MW-99	Apr-18		179	256	0.686	0.745 J	237	128	1410	0.0540 J		
	MW-99	Oct-18		162	254	0.612	0.792 J	212	124	1420	<0.394		
	MW-99	Apr-19		184	225	0.572	1.31	214	145	1390	<0.394		
	MW-99	Oct-19		109	66.7	0.517	4.66	58.1	81.1	547	0.0300 J		
	MW-99	Jun-20		138	73.2	0.323	7.77	60.7	109	727	<0.0500		
	MW-101	Apr-18		197	228	0.909	0.538 J	154	173	1380	<0.0197		
	MW-101	Oct-18		183	215	0.759	0.482 J	133	163	1280 J3	<0.0197		
	MW-101	Apr-19		208	223	0.984	0.384 J	158	182	1370	<0.0197 J5		
	MW-101	Oct-19		192	212	0.994	0.482 JB	138	202	1370	<0.0197		
	MW-101	Jun-20		183	202	0.965	0.556 J	144	183	1330	<0.0500		
	MW-101	Oct-20		207	185	0.915	0.881 JB	137	234	1410	<0.0500		
	MW-102	Apr-18		136	26.4	0.954	0.960 J	406	5.49	1380	<0.985 J5		
	MW-102	Oct-18		88.3	254	0.883	0.605 JB	377	6.33	1490	<0.985		
	MW-102	Apr-19		101 V	281	0.797	0.275 J	401 V	23.3	1510	<0.197		
	MW-102	Oct-19		166	294	1.09	0.631 JB	392	190	1870	<0.197		
	MW-102	Jun-20		84.2	285	0.984	<0.534	446	21.2	1610	<0.0500		
	MW-102	Oct-20		91.9	282	0.812	<0.534	431	5.16	1610	<0.0500		
	MW-103	Apr-17		306	12000	1.39	3.12 J	10000	48.0	22300	0.0530 J		
	MW-103	Apr-18		94.1	6800	7.41	1.41	5980	60.4	13400	<0.394		
	MW-103	Apr-19		91.2	4550	5.85	1.16	3990	133	9260	<0.0197		
	MW-103	Jun-20		120	4480	4.50	1.21 J	2830	44.3	7620	<0.500		
	MW-104	Apr-18		207	102	1.67	5.95	74.9	417	1110	<0.394		
MW-104	Apr-18	FD	229	106	1.75	7.12	76.8	437	1110	<0.0985			
MW-104	Oct-18		275	123	1.64	8.34	86.6	736	1610	<0.985			
MW-104	Oct-18	FD	313	126	1.57	8.09	92.8	746	1640	<0.197			
MW-104	Apr-19		321	67.0	1.18	8.16	113	780	1650	<0.0197			
MW-104	Apr-19	FD	296	67.7	1.21	7.37	78.0	793	1590	<0.197			
MW-104	Oct-19		241	68.0	1.55	5.92	72.2	757	1390	<0.0197			
MW-104	Oct-19	FD	244	67.9	1.56	6.00	72.5	863	1300	<0.197			
MW-104	Jun-20		224	69.8	1.51	5.03	77.2	703	1290	<0.250			
MW-104	Jun-20	FD	218	69.2	1.33	4.88	73.6	703	1140	<0.500			
MW-104	Oct-20		256	71.7	1.34	5.63	73.9	785	1470	0.153			
MW-104	Oct-20	FD	241	71.7	1.36	5.28	73.7	702	1450	<0.0500			
MW-105	Apr-18		279	129	1.96	6.16	120	226	1400	<0.394			
MW-105	Oct-18		291	99.9	1.12	6.13	74.8	414	1470	<0.394			
MW-105	Apr-19		294	21.4	1.18	2.78	31.0	600	1360	<0.197			
MW-105	Oct-19		453	28.0	1.04	4.72	26.0	1120	2040	<0.985			
MW-105	Jun-20		243	98.8	1.43	2.74	71.7	177	1220	<2.50			
MW-105	Oct-20		170	99.9	1.47	2.73	89.5	17.4	1050	<0.0500			
MW-106	Apr-18		341	211	1.29	2.38	280	1220	2180	<1.97			
MW-106	Oct-18		298	208	1.02	0.979 J	265	979	2650	<0.985			
MW-106	Apr-19		225	150 B	0.952	2.09	153	870	1900	<0.985			
MW-106	Oct-19		360	217	1.29	1.74	264	1340	3240	<0.985			
MW-106	Jun-20		295	206	1.11	1.53 J	258	1130	2890	<10.0			
MW-106	Oct-20		285	213	0.865	0.777 J	318	980	3110	<0.0500			
MW-107	Oct-16		186	271	1.82	0.965 J	80.1	72.4	1480	0.170 B			
MW-107	Apr-17		140	313	1.76	0.655 J	75.4	<0.0774	1260	<0.197			
MW-107	Apr-18		147	269	1.66	0.555 J	81.7	1.08 J	1370	0.0410 J			
MW-107	Apr-19		147	246	1.33	0.631 J	82.5	0.657 J	1270	<0.0197			
MW-109	Apr-18		173	170	2.25	0.992 J	395	864	2220	0.0460 J			
MW-109	Oct												

Table 4C - Summary of Groundwater Analytical Data - Water Quality and Cyanide

2020 Annual Groundwater Monitoring Report
HollyFontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Water Quality Parameters							Cyanide
Analyte				Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite
CAS				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	TDS	NO3NO2
Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CGWSL					250	1.60			600	1000	10.0
CGWSL Source					WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH
Area	Well ID	Date	Dup								
South Refinery	RW-4	Apr-17		151	280	0.977	1.50	177	318	1510	<0.197
	RW-4	Apr-18		181	242	0.909	1.52	172	410	1550	<0.0197
	RW-4	Apr-19		188	228	0.691	1.24	151	325	1660	<0.197
	RW-4	Jun-20		201	232	0.778	1.13 J	130	446	1710	<0.500
	RW-5R	Apr-15		4.82	260	0.965	0.461 J	189	0.376 J	565	<0.0200
	RW-5R	Apr-16		4.61 J	262	0.564	0.364 J	203	0.655 J	399	0.495 J
	RW-6	Apr-15		168	414	0.628	0.686 J	205	129	1650	0.0335 J
	RW-6R	Apr-16		191	405	0.747	0.356 J	226	104	1470	0.485 JP1
	RW-6	Apr-18		183	409	0.804	0.684 J	224	45.6	1530	0.0460 J
	RW-6	Apr-19		165	325	0.620	0.598 J	191	3.36 J	1350	<0.394
	RW-15C	Apr-17		160	409	0.774	1.59	269	19.4	1610	0.442 J
	RW-15C	Apr-18		211 V	652	0.868	1.28	349 V	0.754 J	1850	<0.0197
South RO Field	RW-15C	Apr-19		247	264	0.882	1.63	322	1070	2110 J4	<0.0197
	MW-114	Apr-18		665	181	1.97	2.74	138	2260	3000	1.50
	MW-114	Oct-18		581	207	1.77	2.46	117	1050	3730	0.395
	MW-114	Apr-19		616	228	2.02	2.73	118	2400	3540	0.356
	MW-114	Oct-19		593	226	2.14	2.61	126	2010	3530	0.571
	MW-114	Jun-20		586	251	2.17	2.42	127	2060	3470	0.478 J5
	MW-114	Oct-20		528	233	2.07	2.37 B	119	1590	3300	0.110
	MW-115	Apr-18		455	262	1.76	0.580 J	232	2830	3420	0.0750 J
	MW-115	Oct-18		397	231	1.47	0.549 J	191	1720	4410	0.325
	MW-115	Apr-19		512 V	281	2.12	0.487 J	180 V	2720	4240	0.148
	MW-115	Oct-19		431	258	2.35	0.496 J	184	2280	4040	0.163
	MW-115	Jun-20		475	424	2.09	<0.534	187	2590	4320	3.94
	MW-115	Oct-20		467	406	1.73	<0.534	179	2350	4590	3.99
	MW-116	Apr-18		592	198	2.55	3.16	154	2040	2950	0.851
	MW-116	Oct-18		557	226	1.15	1.18	170	2150	4090	0.727
	MW-116	Apr-19		623	263	1.56	1.25	215	2470	3890	0.442
TEL	MW-116	Oct-19		546	292	1.93	1.52	175	2600	3260	0.417
	MW-116	Jun-20		559	282	1.59	1.11 J	177	2270	4210	0.520
	MW-116	Oct-20		550	260	1.53	1.14 JB	176	1920	4040	0.476
	MW-49	Apr-18		226	379	1.42	3.12	341	585	1870	<0.985
	MW-49	Oct-18		209	355	1.29	2.58	335	520	2150	<0.985
	MW-49	Apr-19		225	435	1.51	2.96	340	592	2160	<0.985
	MW-49	Oct-19		199	418	1.58	2.93	318	470	2320	<0.985
	MW-49	Jun-20		210	442	1.38	2.90	309	487	2350	<2.50
	MW-49	Oct-20		196	451	1.30	2.45	308	437	2340	<0.0500
	TEL-1	Apr-18		188	272	2.23	1.06 B	465	815	2230	<0.0197 J6
	TEL-1	Oct-18		160	238	2.13	0.650 J	474	719	2080	<0.394
	TEL-1	Apr-19		172	250	2.14	0.685 J	460	803	2000	<0.394
	TEL-1	Oct-19		144	234	2.23	0.629 J	474	640	2200	<0.0197
	TEL-1	Jun-20		143	184	1.98	0.565 J	435	699	2140	<0.500
	TEL-2	Apr-18		260	222	1.08	1.78 B	451	1200	2770	<0.0985
	TEL-2	Oct-18		266	205	0.967	1.14	363	1360	2730	<0.394
	TEL-2	Apr-19		274	224	1.09	1.73	377	1250	2940	<0.394
	TEL-2	Oct-19		298	159	1.28 B	1.30	407	1610	3550	<0.394
	TEL-2	Jun-20		280	130	0.988	1.05 J	373	1540	3400	<0.500
	TEL-3	Apr-18		302	696	2.51	6.00	308	442	2440	<0.0985
	TEL-3	Apr-19		562	52.7	2.77	5.37	44.1	1300	2290	<0.0985
	TEL-3	Oct-19		603	36.7	3.06	5.26	36.2	1470	2790	<0.985
	TEL-3	Oct-20		424	114	1.73	2.55	86.5	1290	2880	<0.0500 J6
	TEL-4	Apr-18		448	360	1.12	1.19 B	477	2400	4330	0.0230 J
	TEL-4	Apr-18	FD	439	362	1.09	1.19 B	470	2460	4490	0.0280 J
	TEL-4	Oct-18		242	28.5	1.48	0.449 J	286	2050	2840	<0.0197
	TEL-4	Oct-18	FD	246	27.9	1.43	0.446 J	289	2050	2910	0.0700 J
	TEL-4	Apr-19		262	36.8	1.45	0.438 J	204	1830	3140	<0.0197
	TEL-4	Apr-19	FD	264	36.3	1.44	0.432 J	213	1860	2830	<0.0197
	TEL-4	Oct-19		283	281	2.09	0.556 J	303	1680	3540	<0.394
	TEL-4	Oct-19	FD	285	274	2.05	0.529 J	286	1640	3570	<0.394
	TEL-4	Jun-20		305	456	0.932	<0.534	284 O1V	1480	3770	<0.500
	TEL-4	Jun-20	FD	308	455	0.841	<0.534	286	1490	3770	<0.0500
	TEL-4	Oct-20		294	400	0.904	<0.534	296 V	1140	3470	<0.0500
	TEL-4	Oct-20	FD	291	450	0.834	<0.534	307	1230	3510	<0.0500
Three Mile Ditch	MW-8	Apr-17		346	334	2.20	1.44	262	2100	3900	1.04
	MW-8	Apr-18		450	443	1.99	1.76	320	2470	4040	8.72
	MW-8	Apr-19		499	450	2.08	1.85	336	3050	4640 J4	18.7
	MW-8	Jun-20		534	599	2.04	1.98 J	393	3060	5260	16.0
	MW-16	Apr-17		558	936	2.36 J6	9.27	689	2900	4150	1.75
	MW-16	Apr-18		600	705	2.26	9.59	643	2820	4960	0.428
	MW-16	Apr-19		555	349	2.57	9.13	472	2590	4590 J4	0.790
	MW-16	Jun-20		500	446	2.69	8.82	424	2610	4390	0.331
	MW-20	Apr-17		525	588	2.27	0.425 J	274	2800	5650	8.74
	MW-20	Apr-18		537	525	2.13	0.562 J	291	2790	4700 J3	4.56
	MW-20	Apr-19		541	373	2.27	0.509 J	284	2980	4710 Q	2.02
	MW-20	Jun-20		522	382	2.26	0.601 J	284	2830	4590	2.38
	MW-21	Apr-18		550	636	1.85	2.03	425	2900	4820	18.5
	MW-21	Oct-18		599 O1V	620	1.92	2.08 O1	448 O1V	3290	4010	22.1
	MW-21	Apr-19		622	628	2.02	2.11	443	3150	4990 J4	19.9
	MW-21	Oct-19		536	592	1.68	1.98	425	2930	5410	15.1
	MW-21	Jun-20		586	641	2.02	2.17	440	3130	5480	18.6
	MW-21	Oct-20		552	616	1.41	2.15	429	2700	5600	17.5
	MW-25	Apr-17		484 V	2330	1.17	5.11	1540	2800	6240	0.152
	MW-25	Apr-18		368 V	1230	1.25	4.32	875 V	1770	4080	0.156
	MW-25	Apr-19		330	1040	1.00	4.19	771	1510	3810	2.98
	MW-25	Jun-20		323	976	1.31	3.90	653	1450	3610	0.143
	MW-26	Apr-17		707	1580	1.75	5.90	760	5120	8730	0.580
	MW-26	Apr-18		664	1120	1.61	5.46	731	3830	7170	0.986
	MW-26	Apr-19		584	1010	2.09	5.77	674	4420	7020 Q	1.66
	MW-26	Jun-20		585	671	2.06	5.18	530	3660	5990	1.69
	MW-27	Apr-17		410	138	1.29	8.43	136	1550	2150	1.22
	MW-27	Apr-18		337	80.2	1.33	7.88	129	1140	1870	0.770
	MW-27	Apr-19		297	55.2	1.42	7.82	104	1030	1720 J4	0.987
	MW-27	Jun-20		301	56.7	1.38	7.62	91.0	1070	1820	1.78
	MW-46R	Apr-18		613	282	1.78	1.43	192	2310	3620	<0.0197
	MW-46R	Oct-18		582 V	207	1.42	1.22	174 V	2330	3650	0.0670 J
	MW-46R	Apr-19		638	319	1.51	0.913 J	178	2290	4030 J4	0.293
	MW-46R	Oct-19		602	318	1.29	0.949 J	178	2390	4120	0.527
	MW-46R	Jun-20		607	204	1.43	0.731 J	172	2550	3930	0.0922 J
	MW-46R	Oct-20		553	175 B	1.16	0.725 JB	166	2070	3860	<0.0500
	MW-68	Apr-17		381	237	1.88	4.60	165	1620	2890	0.381
	MW-68	Apr-18		388	176	1.82	5.01	162	1470	2150	0.390
	MW-68	Apr-19		326	145	2.12	4.87	153	1310	2260 J4	1.08
	MW-68	Jun-20		420	354	1.89	5.27	190	1700	3040	2.05

Table 4C - Summary of Groundwater Analytical Data - Water Quality and Cyanide

2020 Annual Groundwater Monitoring Report
HollyFontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Water Quality Parameters							Cyanide	
				Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Cyanide
Analyte				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	TDS	NO3NO2	57-12-5
CAS				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Units					250	1.60			600	1000	10.0	0.200
CGWSL												
CGWSL Source					WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH	WQCC HH
Area	Well ID	Date	Dup									
Three Mile Ditch	MW-71	Apr-17		601	848	1.63	3.62	491	2940	5300	54.0	<0.00180
	MW-71	Apr-18		638	809	1.51	3.77	516	2970	5280	39.5	<0.00180
	MW-71	Apr-19		673	799	1.71	3.47	502	3260	5940 J4	32.1	<0.00180
	MW-71	Jun-20		630	770	1.89	3.51	510	3130	6020	27.8	<0.00180
	MW-89	Apr-17		550	394	3.97	12.2	289	2170	3600	4.77	
	MW-89	Apr-18		513	170	2.64	8.61	151	1630	2430	1.10	
	MW-89	Apr-19	607 V	233	3.32	11.7	193 V	1040	3470 J4	1.34		
	MW-89	Jun-20		480	162	2.92	8.84	148	1810	2810	0.151	
	NP-1	Apr-18		421	395	2.00	4.52	342	2210	3660	5.66	
	NP-1	Oct-18										
	NP-1	Apr-19		445	382	2.04	3.94	325	2280	4210 Q	3.98	
	NP-1	Oct-19										
	NP-1	Jun-20		436	409	1.89	2.59	311	2260	4060	3.27	
	NP-1	Oct-20										
	NP-6	Apr-13										
NP-6	Apr-15											
NP-6	Apr-17											
NP-6	Apr-19											
Upgradient	UG-1	Apr-17		471	178	0.928	1.14	99.1	1830	3390	15.0	<0.00180
	UG-1	Apr-18		434	107	0.751	2.12	98.3	1670	2600	6.73	0.00224 JB
	UG-1	Apr-19		525	98.3	0.623	1.29	105	1800	3150	10.1	<0.00180
	UG-1	Jun-20		503	97.3	0.784	1.16 J	84.0	2060	3550 B	10.6	<0.00180
	UG-2	Apr-17		342	78.9	1.67	1.60	94.0	1060	2270	16.3	<0.00180
	UG-2	Apr-18		321	72.5	1.62	1.33	85.4	1050	1810	14.1	<0.00180
	UG-2	Apr-19		357	61.3	1.32	1.58	90.6	1020	2040 Q	7.70 J6	<0.00180
	UG-2	Jun-20		342	75.9	1.52	1.41 J	85.7	1190	2150 B	9.75	<0.00180
	UG-3R	Apr-17		393	61.1	0.707	1.74	70.7	1310	2140	2.60	<0.00180 J5
	UG-3R	Apr-18		418	40.8	0.599	1.67	73.6	1470	2190	1.68	<0.00180
	UG-3R	Apr-19		479	36.3	0.502	1.99	37.1	1390	2440	0.905	<0.00180
	UG-3R	Jun-20		440	39.6	0.582	1.93 J	30.1	1560	2430	1.93	<0.00180
	UG-4	Apr-17		594 V	154	0.666	1.87	202 V	2750	4350	0.547 J	<0.00180
	UG-4	Apr-18		620	125	0.574	1.77	201	2680	4030	0.515	<0.00180
	UG-4	Apr-19		694	133	0.544	1.96	190	2420	4210	0.418	<0.00180
UG-4	Jun-20		622	108	0.605	1.78 J	168	2810	4210 B	0.326	<0.00180	

Definitions	
X	Reported concentration, X, exceeds the CGWSL.
X	Analyte detected above the detection limit at a concentration equal to X.
<x	Analyte not detected at detection limit equal to x.
<x	Analyte not detected at detection limit equal to x, but x exceeds the CGWSL.
	Blank cell indicates a sample was collected from the well during the indicated sampling event, but the analyte was not analyzed.
---	No applicable CGWSL.

Abbreviations	
CGWSL	Critical Groundwater Screening Level (see Table 3)
CGWSL Source	Source for CGWSL value (see Table 3)
Dup	Duplicate sample
FD	Field duplicate sample
mg/L	Milligrams per Liter
WQCC Dom	NMED Groundwater standard for domestic exposure, 20.6.2.3103.B NMAC
WQCC HH	NMED Groundwater standard for human health exposure, 20.6.2.3103.A NMAC

Lab Footnote	
B	Analyte was also detected in the associated method blank.
J	Indicates an estimated value.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
O1	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference
P1	Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.
Q	Sample was prepared and/or analyzed past recommended holding time.
V	The sample concentration is too high to evaluate accurate spike recoveries.

Table 4D - Summary of Groundwater Analytical Data - Semi-Volatile Organic Compounds
2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Analyte Group				Semi-Volatile Organic Compounds																					
				Acenaphthene	Anthracene	Atrazine	Benzo(a) pyrene	Benzo(g,h,i) perylene	1,1'-Biphenyl	Bis (2-ethylhexyl) phthalate	Butylbenzyl phthalate	Carbazole	Dibenzofuran	Diethyl phthalate	2,4-Dimethyl phenol	Di-n-butyl phthalate	Fluoranthene	Fluorene	1-Methyl naphthalene	2-Methyl naphthalene	2-Methyl phenol	Naphthalene	Phenanthrene	Phenol	Pyrene
Analyte				83-32-9	120-12-7	1912-24-9	50-32-8	191-24-2	92-52-4	117-81-7	85-68-7	86-74-8	132-64-9	84-66-2	105-67-9	84-74-2	206-44-0	86-73-7	90-12-0	91-57-6	95-48-7	91-20-3	85-01-8	108-95-2	129-00-0
CAS				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Units				0.535	1.72	0.003	0.000200	---	0.0371	0.00600	0.0160	---	0.00790	14.8	0.354	0.885	0.802	0.288	0.0300	0.0300	---	0.0300	0.117	0.00500	0.117
CGWSL				NMED TW	NMED TW	WQCC HH	WQCC HH	---	NMED TW	USEPA MCL	USEPA TW	---	USEPA TW	NMED TW	NMED TW	NMED TW	NMED TW	NMED TW	WQCC HH	WQCC HH	---	WQCC HH	NMED TW	NMED TW	NMED TW
CGWSL Source				NMED TW	NMED TW	WQCC HH	WQCC HH	---	NMED TW	USEPA MCL	USEPA TW	---	USEPA TW	NMED TW	NMED TW	NMED TW	NMED TW	NMED TW	WQCC HH	WQCC HH	---	WQCC HH	NMED TW	NMED TW	NMED TW
Area	Well ID	Date	Dup																						
North Refinery	MW-23	Apr-19		<0.00158	<0.00146	0.00173 J	<0.000191	<0.0000113	<0.00163	0.00460 J	<0.00138	0.0132 J	0.00394 J	<0.00141	<0.00312	<0.00133	<0.00155	0.00472 J	0.0531	<0.00156	<0.00156	0.0450	0.00788	0.0133 J	<0.00165
	MW-23	Oct-19		<0.00632	<0.00582	<0.00520	<0.000762	<0.0000454	<0.00650	<0.0142	<0.00550	0.0251 J	0.00924 J	<0.00564	<0.0125	<0.00532	<0.00620	0.0112 J	0.0922	<0.00622	<0.00624	0.0262	0.0146 J	0.0166 J	<0.00660
	MW-43	Apr-19		0.000872 J	<0.000294	0.000347 J	<0.0000385	<0.00000229	0.00228 J	0.000920 J	0.00115 J	0.00772 J	0.00192 J	<0.000285	0.00418 J	<0.000269	<0.000313	0.00264	0.0323	0.0232	<0.000315	0.0749	0.00224	0.00703 J	<0.000333
	MW-43	Oct-19		<0.00632	<0.00582	<0.00520	<0.000762	<0.0000454	<0.00650	<0.0142	<0.00550	0.0145 J	<0.00676	<0.00564	<0.0125	<0.00532	<0.00620	0.00946 J	0.0956	0.0603	<0.00624	0.249	0.00892 J	<0.00668	<0.00660
	MW-61	Apr-19		0.000667 J	<0.000291	<0.000260	<0.0000381	<0.00000227	0.00315 J	0.00818	<0.000275	0.00142 J	0.00293 J	<0.000282	<0.000624	<0.000266	<0.000310	0.00193	0.0722	0.0119	<0.000312	0.0701	0.00126	0.00457 J	<0.000330
	MW-61	Oct-19		0.000689 J	<0.000291	<0.000260	<0.0000381	0.00000240 J	<0.000325	0.00187 J	<0.000275	0.00127 J	0.00398 J	<0.000282	<0.000624	<0.000266	<0.000310	0.00285	0.0902	0.0163	<0.000312	0.0831	0.00146	0.00164 J	<0.000330
	MW-62	Apr-19		0.00134	<0.000291	<0.000260	<0.0000381	<0.00000227	0.00389 J	0.00168 J	<0.000275	0.00472 J	0.00458 J	<0.000282	<0.000624	<0.000266	<0.000310	0.00221	0.0628	0.0320	<0.000312	0.0861	0.00191	<0.000334	<0.000330
	MW-62	Oct-19		<0.00632	<0.00582	<0.00520	<0.000762	<0.0000454	0.00865 J	<0.0142	<0.00550	0.0103 J	0.0128 J	<0.00564	<0.0125	<0.00532	<0.00620	0.00862 J	0.144	0.0581	<0.00624	0.168	<0.00732	<0.00668	<0.00660
	MW-93	Apr-19		0.00176	0.00179	<0.000260	<0.0000381	<0.00000227	0.00229 J	0.00129 J	<0.000275	0.0257	0.00397 J	<0.000282	0.0173	<0.000266	0.000373 J	0.00784	0.0313	0.00507	0.0979	0.0307	0.0119	0.00492 J	0.000570 J
	MW-93	Jun-20		0.00190 J	0.00137 J	<0.00128	<0.000191	<0.000605	<0.00395	<0.00448	<0.00383	0.0264 J	0.00396 J	<0.00143	0.0157 J	<0.00227	<0.000510	0.00813	0.0340	<0.000585	<0.000465	0.0298	0.0132	<0.0217	0.000746 J
	MW-95	Apr-19		0.000508 J	<0.000291	0.00126 J	<0.0000381	<0.00000227	<0.000325	0.000850 J	<0.000275	<0.000260	0.00173 J	<0.000282	<0.000624	<0.000266	<0.000310	<0.000323	<0.000332	<0.000311	<0.000312	<0.000372	<0.000366	0.00279 J	<0.000330
	MW-95	Jun-20		0.000679 J	<0.000191	<0.000607	<0.0000907	<0.000288	<0.00188	<0.00213	<0.00182	<0.000264	0.00259 J	<0.000683	<0.000151	<0.00108	<0.000243	<0.000201	<0.000188	<0.000278	<0.000221	0.00115 JB	<0.000267	<0.0103	<0.000255
	MW-137	Apr-19		<0.00632	<0.00582	<0.00520	<0.000762	<0.0000454	<0.00650	<0.0142	<0.00550	<0.00520	<0.00676	0.00635 J	<0.0125	<0.00532	<0.00620	<0.00646	0.0480	0.0474	<0.00624	0.116	<0.00732	<0.00668	<0.00660
MW-138	Apr-19		0.000968 J	<0.000291	0.000420 J	<0.0000381	<0.00000227	<0.000325	<0.000709	<0.000275	0.000643 J	0.000611 J	<0.000282	<0.000624	<0.000266	<0.000310	0.00138	0.00549	0.00356	<0.000312	0.0117	0.000583 J	0.00288 J	<0.000330	
TEL	TEL-4	Apr-19		0.000493 J	<0.000291	<0.000260	0.000119 JB	<0.00000227	<0.000325	0.0641	<0.000275	<0.000260	0.00177 J	<0.000282	<0.000624	0.000273 J	<0.000310	0.00118	0.00498	<0.000311	<0.000312	<0.000372	<0.000366	0.00150 J	<0.000330
	TEL-4	Apr-19	FD	0.000532 J	<0.000291	<0.000260	<0.0000381	<0.00000227	<0.000325	0.000835 J	<0.000275	<0.000260	0.00205 J	<0.000282	<0.000624	0.000267 J	<0.000310	0.00106	0.00531	<0.000311	<0.000312	<0.000372	<0.000366	0.00177 J	<0.000330
	TEL-4	Oct-19		0.000378 J	<0.000291	0.000434 J	<0.0000381	<0.00000227	<0.000325	0.00120 J	<0.000275	0.000400 J	0.00161 J	<0.000282	<0.000624	0.000312 J	<0.000310	0.000570 J	0.00275	<0.000311	<0.000312	0.000383 J	<0.000366	0.000961 J	<0.000330
	TEL-4	Oct-19	FD	0.000465 J	<0.000291	0.000340 J	<0.0000381	<0.00000227	<0.000325	0.00146 J	<0.000275	0.000289 J	0.00169 J	<0.000282	<0.000624	0.000278 J	<0.000310	0.000676 J	0.00300	<0.000311	<0.000312	0.000395 J	<0.000366	0.00146 J	<0.000330

Definitions

X	Reported concentration, X, exceeds the CGWSL.
X	Analyte detected above the detection limit at a concentration equal to X.
<x	Analyte not detected at detection limit equal to x.
<x	Analyte not detected at detection limit equal to x, but x exceeds the CGWSL.
	Blank cell indicates a sample was collected from the well during the indicated sampling event, but the analyte was not analyzed.
---	No applicable CGWSL.

Abbreviations

CGWSL	Critical Groundwater Screening Level (see Table 3)
CGWSL Source	Source for CGWSL value (see Table 3)
Dup	Duplicate sample
FD	Field duplicate sample
mg/L	Milligrams per Liter
NMED TW	NMED Risk Assessment Guidance for Site Investigations and Remediation, February 2019, Rev 2 (6/19/19), Table A-1 Tap Water Screening Level
USEPA MCL	United States Environmental Protection Agency Maximum Contaminant Level from "Regional Screening Level (RSL) Summary Table", November 2020
USEPA TW	United States Environmental Protection Agency Tap Water Screening Level, "Regional Screening Levels (RSL) Summary Table", November 2020
WQCC Dom	NMED Groundwater standard for domestic water supply, 20.6.2.3103.B NMAC
WQCC HH	NMED Groundwater standard for human health exposure, 20.6.2.3103.A NMAC

Lab Footnote

B	Analyte was also detected in the associated method blank.
J	Indicates an estimated value.

Table 5 - Summary of Production from Recovery Trenches and Wells

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Recovery Well	Recovery Method	Volume of Water Recovered ⁽¹⁾ (gallons)					Volume of PSH Recovered ⁽¹⁾ (gallons)				
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total 2020	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total 2020
RW-1R	Automated Pump	3,739	39,369	18,302	0	61,410	0	0	33	13,475	13,508
RW-2R	Automated Pump	0	106,804	75,191	2	181,997	0	0	7	0	7
RW-4R	Automated Pump	0	0	0	0	0	0	0	0	0	0
RW-5R	Automated Pump	112,972	104,092	12,467	32,201	261,732	997	3,653	7,536	95	12,281
RW-6R	Automated Pump	726,371	658,319	234,015	303,041	1,921,746	456	1	3,213	8,882	12,552
RW-7R	Automated Pump	0	4	101,842	573,056	674,902	0	0	84	17,606	17,690
RW-8R	Automated Pump	0	3,531	30,870	203,313	237,714	0	0	1,979	11,921	13,900
RW-12R	Automated Pump	0	0	0	0	0	0	0	0	0	0
RW-13R	Automated Pump	0	96,257	73,699	203,553	373,509	0	1,759	417	2,846	5,022
RW-14R	Automated Pump	85,978	326,424	79,757	109,335	601,494	25,583	30,953	1,689	57,614	115,839
RW-15	Automated Pump	0	0	0	0	0	0	0	0	0	0
RW-19	Automated Pump	28,386	1	2	1	28,390	0	0	0	0	0
RW-20	Automated Pump	7,645	1,690	19,333	3,979	32,647	0	0	0	0	0
RW-22	Automated Pump	2	3	7	3	15	9,425	6,732	4,058	13,084	33,299
TOTAL VOLUME RECOVERED:		965,093	1,336,494	645,485	1,428,484	4,375,556	36,461	43,098	19,016	125,523	224,098

⁽¹⁾ Volumes of recovered water and PSH are based on automated system readings, rounded to the nearest gallon

Table 6 - Summary of Manual Recovery Results

2020 Annual Groundwater Monitoring Report
HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico

Area	Well	Date	Prior to Recovery			Recovered Volume		After Recovery		
			Depth to PSH (ft. btoc)	Depth to Water (ft. btoc)	PSH Thickness (ft.)	PSH (gal)	Water (gal)	Depth to PSH (ft. btoc)	Depth to Water (ft. btoc)	PSH Thickness (ft.)
Field East of Refinery	KWB-8	04/08/20	24.90	28.73	3.83	11.10	7.93	25.40	33.40	8.00
	KWB-8	04/08/20	25.40	33.40	8.00	10.00	--	26.15	33.90	7.75
	KWB-10R	03/11/20	18.35	20.94	2.59	2.11	0.79	19.07	19.20	0.13
	KWB-10R	04/08/20	18.43	21.15	2.72	1.59	1.32	19.42	19.44	0.02
	KWB-10R	04/28/20	18.75	21.45	2.70	2.11	3.96	20.10	20.15	0.05
	KWB-10R	07/01/20	18.70	21.50	2.80	2.77	2.91	19.45	19.47	0.02
	KWB-10R	07/21/20	18.82	21.52	2.70	2.25	5.02	20.30	20.35	0.05
	KWB-10R	09/29/20	18.89	21.85	2.96	2.11	1.85	20.10	20.15	0.05
	KWB-10R	08/12/20	18.65	21.70	3.05	2.38	3.17	20.25	20.50	0.25
	KWB-10R	11/04/20	19.00	22.10	3.10	3.17	1.59	19.75	19.90	0.15
	MW-111	09/29/20	27.20	28.60	1.40	0.40	1.59	28.15	28.25	0.10
	MW-112	03/11/20	22.70	24.35	1.65	1.59	2.11	23.20	23.44	0.24
	MW-112	04/08/20	23.00	24.80	1.80	0.92	1.32	23.80	23.82	0.02
	MW-112	04/28/20	23.20	25.10	1.90	0.92	2.64	24.75	24.78	0.03
	MW-112	07/01/20	23.20	25.20	2.00	1.45	2.11	23.90	24.05	0.15
	MW-112	07/21/20	23.13	25.12	1.99	1.59	1.98	24.80	24.82	0.02
	MW-112	08/12/20	23.15	25.30	2.15	1.98	2.64	24.70	24.75	0.05
	MW-112	09/29/20	23.30	25.35	2.05	1.32	2.51	24.70	24.80	0.10
	MW-112	11/04/20	23.40	25.65	2.25	2.11	1.72	--	25.20	--
	MW-127	04/21/20	22.10	23.65	1.55	2.38	5.02	22.27	22.28	0.01
	MW-127	07/21/20	22.70	24.50	1.80	4.76	7.93	23.25	23.40	0.15
	MW-127	08/12/20	22.75	24.60	1.85	2.51	3.96	23.50	23.53	0.03
	MW-127	09/29/20	22.95	24.85	1.90	2.77	7.26	23.33	24.05	0.72
	MW-128	04/21/20	17.55	19.85	2.30	0.92	1.32	17.95	18.85	0.90
	MW-128	04/28/20	17.80	19.59	1.79	0.92	2.11	18.20	18.25	0.05
	MW-128	07/01/20	18.50	20.60	2.10	1.72	4.76	19.00	19.45	0.45
	MW-128	07/29/20	18.70	20.80	2.10	1.06	3.70	19.15	19.40	0.25
	MW-131	09/29/20	26.00	27.35	1.35	0.40	3.57	26.30	26.40	0.10
	MW-132	03/11/20	20.50	23.00	2.50	2.25	4.23	21.00	21.53	0.53
	MW-132	04/08/20	20.95	23.59	2.64	1.06	3.96	21.45	21.83	0.38
	MW-132	04/28/20	21.25	23.85	2.60	1.85	6.34	21.75	21.90	0.15
	MW-132	07/01/20	21.30	23.90	2.60	3.17	4.76	21.77	21.99	0.22
	MW-132	07/21/20	21.25	23.70	2.45	1.59	6.60	21.77	21.80	0.03
	MW-132	09/29/20	21.40	23.82	2.42	3.83	1.85	21.80	22.45	0.65
	MW-132	11/04/20	21.60	24.15	2.55	1.98	3.96	22.15	22.18	0.03
	MW-133	04/08/20	21.00	22.40	1.40	0.53	1.06	21.23	21.35	0.12
	MW-133	09/29/20	19.80	20.25	0.45	0.40	2.38	19.82	19.84	0.02
	MW-133	11/04/20	20.10	21.75	1.65	1.32	2.91	20.40	20.63	0.23
South Refinery	KWB-4	04/08/20	25.70	27.77	2.07	1.06	9.51	27.05	27.10	0.05
	KWB-4	04/21/20	26.02	27.35	1.33	1.45	2.51	26.90	26.93	0.03
	KWB-5	08/12/20	25.80	28.05	2.25	1.06	3.04	--	26.75	--
	KWB-5	09/29/20	25.99	28.15	2.16	0.40	3.43	26.55	26.75	0.20
	KWB-6	03/11/20	23.25	25.00	1.75	1.19	3.96	23.67	23.77	0.10
	KWB-6	04/08/20	23.90	25.17	1.27	0.53	1.59	24.12	24.15	0.03
	KWB-6	04/28/20	23.29	26.25	2.96	0.92	4.76	24.70	24.72	0.02
	KWB-6	07/01/20	23.95	26.50	2.55	1.19	4.36	--	24.67	--
	KWB-6	08/12/20	23.90	26.45	2.55	1.19	2.64	24.60	24.62	0.02
	KWB-6	09/29/20	24.15	26.55	2.40	0.79	2.11	24.70	24.85	0.15
	KWB-6	11/04/20	24.69	26.90	2.21	1.45	4.09	--	24.95	--
	MW-107	07/01/20	16.65	18.75	2.10	2.11	--	18.85	18.90	0.05
	MW-107	07/29/20	16.93	19.00	2.07	1.32	0.79	18.89	18.90	0.01
Total Recovered Volume:						101.93	167.62			

Definitions:

btoc = below top of casing

ft. = feet

gal = gallon

PSH = Phase separated hydrocarbon

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 160741

CONDITIONS

Operator: NAVAJO REFINING COMPANY, L.L.C. P.O. Box 159 Artesia, NM 88211	OGRID: 15694
	Action Number: 160741
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
scwells	Accepted for Record Retention Purposes-Only	11/22/2022