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2019

HOLLYFRONTIER.

June 13, 2019

Mr. Carl Chavez
New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

Re: Submittal of the *2018 Annual Discharge Report* and the *2018 Annual Groundwater Monitoring Report* for the HollyFrontier Navajo Refining LLC, Artesia Refinery Discharge Permit GW-028

Dear Mr. Chavez:

Please find enclosed the original and one electronic copy of the *2018 Annual Discharge Report* and the *2018 Annual Groundwater Monitoring Report*, which fulfill requirements of Section 2.E of Discharge Permit GW-028.

If you have any questions or comments regarding this report, please feel free to contact me at 575-746-5487 or Robert Combs at 575-746-5382.

Sincerely,

Scott M. Denton
Environmental Manager
HollyFrontier Navajo Refining LLC

cc: HollyFrontier: R. Combs, A. Sahba, J. Leik, R. Dade
TRC: J. Speer, C. Smith

File Location: \Env\OCD\OCD-Annual Report\2018\Artesia

2018 Annual Groundwater Monitoring Report

NMD048918817 and DP GW-028

HollyFrontier Navajo Refining LLC
Artesia Refinery
Artesia, New Mexico

February 2019

Prepared for:

HOLLYFRONTIER

HollyFrontier Navajo Refining LLC
Artesia, New Mexico

Prepared for:

TRC

TRC Environmental Corporation
Austin, Texas

2018 Annual Groundwater Monitoring Report

NMD048918817 and DP GW-028

HollyFrontier Navajo Refining LLC
Artesia Refinery
Artesia, New Mexico

Prepared for:

HollyFrontier Navajo Refining LLC
Artesia, New Mexico

Prepared by:

TRC Environmental Corporation
Austin, Texas

TRC Project No. 270077

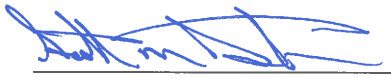
February 2019

TRC Lead _____

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.



Scott M. Denton
Environmental Manager, HollyFrontier Navajo Refining LLC

EXECUTIVE SUMMARY

This *2018 Annual Groundwater Monitoring Report* documents groundwater monitoring and recovery activities conducted at the HollyFrontier Navajo Refining LLC (Navajo) 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 Navajo 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 *2017 Facility Wide Groundwater Monitoring Work Plan* (2017 FWGMWP) that was submitted to the NMED and OCD in June 2017 and approved with modifications on October 11, 2017. 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); and
- 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 2018 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, and South Refinery areas in 2018, with a maximum measured thickness of 3.15 feet during the first semiannual event and 2.60 feet during the second semiannual event. The presence and distribution of PSH in 2018 was generally consistent with historical data and measured PSH thicknesses are overall stable to decreasing over time. 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 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 with the exception of 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 a system of recovery trenches and recovery wells throughout 2018. An estimated 1,955,630 gallons of groundwater and 23,201 gallons of PSH were recovered through operation of the automated recovery systems in 2018.

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LIST OF ACRONYMS AND ABBREVIATIONS

1,2,4-TMB	1,2,4-Trimethylbenzene
1,3,5-TMB	1,3,5-Trimethylbenzene
cis-1,2,-DCE	cis-1,2,-Dicholoroethene
CGWSL	Critical Groundwater Screening Level
COC(s)	Constituent(s) of Concern
DO	Dissolved Oxygen
DRO	Diesel Range Organics
EP(s)	Evaporation Pond(s)
FWGMWP	Facility Wide Groundwater Monitoring Workplan
GRO	Gasoline Range Organics
HMI	Hydrologic Monitoring, LLC
HWB	Hazardous Waste Bureau
Navajo	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
SWMU	Solid Waste Management Units
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
WQCC	Water Quality Control Commission

1.0 INTRODUCTION

On behalf of HollyFrontier Navajo Refining LLC (Navajo), TRC Environmental Corporation (TRC) prepared this *2018 Annual Groundwater Monitoring Report* (report) to summarize the results of groundwater monitoring and recovery activities conducted in 2018 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 Navajo 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 Navajo (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 Navajo 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 Navajo 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 2017) on May 25, 2017. 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 2018 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 2018 consisted of semiannual well gauging and groundwater sampling. The semiannual monitoring events were performed in accordance with the *2017 Facility Wide Groundwater Monitoring Work Plan* (2017 FWGMWP; TRC 2017) that was submitted to the NMED and OCD in June 2017 and approved with modifications on October 11, 2017 (NMED 2017b). Remedial activities conducted in 2018 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 areas of interest:

- The closed TEL Impoundment;
- The closed NCL;
- The inactive EPs;
- Three Mile Ditch (TMD); and
- 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, and
  - Up-gradient of Refinery.

2.0 SCOPE OF SERVICES

Groundwater monitoring, remedial, and other associated activities performed in 2018 are summarized in this section. The first semiannual groundwater monitoring event was conducted from April 2 to April 5, 2018. The second semiannual groundwater sampling event was conducted from October 2 to October 3, 2018. Routine remedial activities were conducted throughout 2018.

2.1 Monitoring Well Installation, Maintenance, and Repairs

The monitoring network was not modified in 2018. No wells were installed or abandoned in 2018. No wells were repaired or modified in 2018. The following well maintenance was performed in 2018:

- Locking J-plugs and locks were replaced on various monitoring wells as required throughout 2018.
- PSH absorbent socks were installed and maintained in various wells including MW-64, MW-85, MW-86, KWB-4, KWB-8, 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 2017 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 April 2 and April 3, 2018. All wells were gauged within 48 hours in accordance with the 2017 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. No rainfall was recorded at the NWS gauging station during the month of April 2018. A copy of the NWS data for April 2018 is provided in Appendix A.

The second semiannual gauging event was conducted on October 2 and October 3, 2018. All wells were gauged within 48 hours in accordance with the 2017 FWGMWP. No rainfall was recorded at the refinery or the NWS gauging station during the days on which gauging occurred. A total of 3.01 inches of rainfall was recorded at the NWS gauging station during the month of October 2018, all of which occurred after completion of gauging and sampling activities. A copy of the NWS data for October 2018 is provided in Appendix A.

Results of the 2018 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 2017 FWGMWP. No sample was collected from a well containing PSH with a measured thickness greater than or equal to 0.03 feet. The following wells were not sampled in accordance with the 2017 FWGMWP during each 2018 semiannual event due to the presence of PSH with a thickness greater than or equal to 0.03 feet:

- First semiannual event: MW-85, MW-86, MW-92, MW-94, MW-97, MW-112, MW-131, MW-132, MW-133, KWB-4, KWB-7, KWB-8, RW-5R, RW-8, RW-14R, RW-19, RW-20, and RW-22; and
- Second semiannual event: MW-85, MW-86, MW-92, MW-94, MW-97, MW-131, MW-112, MW-129, MW-132, MW-133, KWB-4, KWB-8, and TEL-3.

Groundwater was purged and sampled from monitoring and recovery wells with a peristaltic pump and dedicated tubing 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 irrigation 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-irrigation 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 A.

Irrigation 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 irrigation 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 2018 semiannual events were submitted to ESC Lab Sciences (renamed as Pace Analytical National Center for Testing & Innovation before the second semiannual event) in Mount Juliet, Tennessee under appropriate chain-of-custody documentation for laboratory analyses specified in the 2017 FWGMWP. Shipping containers were sent overnight to the laboratory via Federal Express. Copies of the chain-of- custody forms are included in Appendix B 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 in a portable tank in the sampling truck trailer. The liquids were disposed daily in the refinery process wastewater system upstream of the oil/water separator, by releasing the liquids into a sump designated by refinery personnel (i.e., sump adjacent to the North Bundle Cleaning Pad). 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 A.

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 2017 FWGMWP occurred during the first semiannual monitoring event conducted from April 2 to April 5, 2018:

- 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 Navajo access to these wells since 2011.
- Wells KWB-12A and RW-11 were not sampled because they were dry.
- Well KWB-2R was not gauged or sampled because it could not be located (potentially covered or destroyed during road construction activities along Highway 82).

The following exception to the 2017 FWGMWP occurred during the second semiannual monitoring event conducted from October 2 to October 3, 2018:

- 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 Navajo access to these wells since 2011.
- Well KWB-2R was not gauged or sampled because it could not be located (potentially covered or destroyed during road construction activities along Highway 82).

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 2018). 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 March 2017 (NMED 2017a). If no NMED Groundwater Screening Level value is available, then the CGWSL is the USEPA Tap Water RSL value (USEPA 2018).

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 2017 NMED guidance document included new screening methods and values for total petroleum hydrocarbons (TPH) in groundwater. The screening level value historically used for TPH diesel range organics (DRO) at the refinery, in all areas except the EPs, was the TPH screening value for potable groundwater for "unknown oil" included in Table 6-2 of the 2012 guidance document (NMED 2012). The screening value for potable groundwater for "Diesel #2/New Crankcase Oil" (Table 6-2, NMED 2012) was historically used for TPH DRO in the EP area in accordance with the approved investigation report for the EPs (Arcadis 2015a). The 2018 TPH 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 2017 guidance document (NMED 2017a). The 2018 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 2017 NMED guidance document. The 2017 TPH screening levels were approximately one order of magnitude less than the 2012 levels.

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 in the background. 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. Navajo 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 background concentrations.

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4.0 MONITORING RESULTS

Results of the 2018 semiannual groundwater monitoring events are summarized in this section.

4.1 Groundwater Gauging Results

Well gauging was conducted on April 2 and April 3, 2018, and October 2 and October 3, 2018. 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 2018 semiannual gauging results for the shallow saturated zone and the valley fill zone are presented in Figures 4 through 7.

The 2018 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 2018 gauging results are consistent with historical results.

Groundwater mounding, related with the discharge of RO reject water to the RO reject fields, was observed around wells MW-114 and MW-115 during both semiannual gauging events. 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 PSH thicknesses are shown on Figures 8 and 9 for the 2018 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), 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 Navajo 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 PSH thicknesses and groundwater elevations over time for wells that have historically contained measurable PSH are provided in Appendix C. 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. Groundwater elevations generally decreased across the site over the last four sampling events (April 2017, October 2017, April 2018, and October 2018). The reduction in groundwater elevations over 2017 and 2018 is consistent with the occurrence of drought conditions across New Mexico during this time.

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.

4.2.1 North Colony Landfarm – PSH Gauging Results

No measurable PSH was present in any of the wells in the vicinity of the NCL during the 2018 semiannual events.

4.2.2 Tetra Ethyl Lead Surface Impoundment – PSH Gauging Results

No measurable PSH was present in any TEL wells in April 2018. PSH was measured in well TEL-3 at a thickness of 0.04 feet in October 2018. PSH has intermittently been present in well TEL-3 since 2008, which correlates with reductions in groundwater elevations during those corresponding monitoring periods.

4.2.3 Evaporation Ponds – PSH Gauging Results

PSH was measured in EP wells MW-85 and MW-86 at thicknesses of 1.70 and 0.46 feet, respectively, in April 2018; and 0.13 and 0.04 feet, respectively, in October 2018. These wells are located near the original discharge point in EP 1 (Pond 1). PSH thicknesses in these two wells 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 2018 semiannual event.

4.2.5 North Refinery Area – PSH Gauging Results

PSH was measured in wells MW-92, MW-94, MW-97, MW-138, and RW-8 in April 2018 at thicknesses ranging from 0.01 feet in MW-138 to 1.59 feet in MW-97. In October 2018, PSH was measured in MW-92, MW-94, MW-97, and RW-8 at thicknesses ranging from 0.08 feet in MW-92 to 1.57 feet in MW-97.

PSH thicknesses in these wells have overall decreased over time, despite minor fluctuations of PSH thickness in these wells that are likely due to fluctuations in groundwater elevation and the influence of active PSH and groundwater recovery. PSH and groundwater are routinely removed from this plume by automated pumping from RW-1R, RW-2R, RW-7R, and RW-8R. Measurable volumes of PSH (as measured by the automated recovery system) were recovered from recovery well RW-8R in 2018 (see Section 6 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-4, RW-5R, and RW-19 in April 2018 at thicknesses ranging from 0.11 feet in RW-5R to 0.37 feet in KWB-4. In October 2018, PSH was measured in

wells KWB-4, RW-5R, RW-15C, and RW-19 at thicknesses ranging from 0.03 feet in RW-15C to 0.86 feet in KWB-4.

PSH thicknesses in these wells have overall decreased over time, despite minor fluctuations of PSH thickness in these wells that are likely due to fluctuations of groundwater elevation and the influence of active PSH recovery. 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 RW-19. Measurable volumes of PSH (as measured by the automated recovery system) were recovered from recovery wells RW-5R and RW-19 in 2018 (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-7, KWB-8, KWB-10R, MW-112, MW-131, MW-132, MW-133, RW-14R, RW-20A, RW-20B, and RW-22 in April 2018, with thicknesses ranging from 0.01 feet in KWB-10R to 3.15 feet in KWB-8. In October 2018, PSH was measured in wells KWB-8, KWB-10R, MW-58, MW-112, MW-129, MW-131, MW-132, MW-133, RW-13R, RW-14R, RW-20A, and RW-20B, with thicknesses ranging from 0.01 feet in wells KWB-10R and MW-58 to 2.60 feet in MW-112.

PSH thicknesses have generally decreased over time in most of these wells, with the exception of recent increases in newer wells MW-112, MW-129, MW-131, and MW-132 that are attributed to recent reductions in groundwater elevations, as follows:

- PSH thicknesses in wells MW-112, MW-129, and MW-132 increased during at least one 2018 semiannual event to thicknesses similar to, but less than, historical maximums measured in each well after installation in 2013 (MW-112) or 2014 (MW-129 and MW-132). The increase in PSH thicknesses in these wells is directly attributed to a reduction in groundwater elevation observed in these wells since November 2014, as shown on the PSH thickness and groundwater elevation plots provided in Appendix C. PSH thicknesses across the site are generally inversely related to fluctuations in groundwater elevations.

- PSH was first detected at measureable thicknesses in well MW-131 in April 2018 and October 2018 at 0.21 feet and 0.18 feet, respectively. The presence of measureable PSH in MW-131 in 2018 is attributed to decreasing groundwater elevations and is not indicative of a new release or PSH migration. MW-131 was installed in January 2014 when groundwater elevations across the refinery were historically high and groundwater elevations in MW-131 decreased by 4.79 feet between November 2014 and April 2018, then increased by 0.28 feet between April 2018 and October 2018. Indications of hydrocarbon impacts (odor and staining) were observed in the vadose

and saturated zones during drilling and installation of MW-131. OIL-IN-SOIL™ screening tests (shake tests) were also performed on soil samples collected from MW-131 during drilling activities and shake test results were positive for the presence of PSH within the vadose zone and saturated zone (Arcadis 2017). PSH has also been detected at measurable thicknesses in nearby up-gradient well MW-129 that was also installed in 2014.

PSH thicknesses fluctuate in the wells located near or with active PSH recovery. PSH and groundwater is routinely removed from this plume by automated pumping from RW-12R, RW-13R, RW-14R, RW-20, and RW-22. Measurable volumes of PSH (as measured by the automated recovery system) were recovered from all of these recovery wells in 2018 with the exception of RW-12R, which had no measurable PSH. 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 2018 semiannual event.

4.2.9 RO Reject Discharge Fields – PSH Gauging Results

No measurable PSH was present in any wells located within the North or South RO Reject Fields during either 2018 semiannual event.

5.0 CHEMICAL ANALYTICAL DATA

The chemical laboratory analyses and results of groundwater samples collected at the refinery in 2018 are summarized in this section.

5.1 Sample Laboratory Analyses

Groundwater samples collected during the 2018 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 2017 FWGMWP:

- TPH DRO by Method 8015 Modified
- TPH gasoline range organics (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 accordance with Table 1 of the approved 2017 FWGMWP. Laboratory analytical reports are provided in Appendix B.

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 D. Data qualifier flags were added to the data based on the data validation results and are summarized in tabulated form in Appendix B.

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 2018, and during at least the three previous sampling events, are summarized in Tables 4A through 4C, as follows:

- Table 4A – GRO, DRO, and select VOCs (VOCs that have had at least one detected value reported above the CGWSL in more than one well in 2018)
- Table 4B – Total Metals
- Table 4C – Water quality parameters (TDS, nitrate/nitrite, major cations, major anions) and Cyanide

Analytical results of the 2018 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 2018. 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 greater than or equal to 0.03 feet, lack of well access, etc.). Analytical results in Tables 4A through 4C 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 B.

Plots of historical concentrations of target COCs are provided in Appendix C 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 2018 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 2018 events in accordance with the Discharge Permit requirements: chloride, fluoride, sulfate, nitrate/nitrite, and TDS.

The 2018 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. Analytical results of groundwater samples collected from wells located in and near the NCL in 2018 indicate COCs are present in groundwater in excess of their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics, NCL

In 2018, groundwater samples were collected from the following wells located in and near the NCL for analysis of DRO:

- First Semiannual Event (13 wells): MW-18, MW-45, MW-53, 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-54A, MW-55, MW-108, NCL-31, NCL-32, NCL-33, NCL-34A, NCL-44, and NCL-49.

As highlighted in Table 4A, DRO was detected in exceedance of the CGWSL of 0.0398 mg/L in all NCL area wells sampled during both 2018 semiannual events with maximum concentrations of 8.78 mg/L in MW-108 during the first event and 8.38 mg/L in NCL-44 during the second event. As shown in the COC concentration plots included in Appendix C, DRO concentrations in NCL wells MW-18, MW-54A, MW-55, 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 watched closely during future monitoring events.

Total Petroleum Hydrocarbons – Gasoline Range Organics, NCL

Groundwater samples collected from well MW-55 during both 2018 semiannual events were analyzed for GRO. GRO was detected in MW-55 during both 2018 semiannual events at estimated J-flagged concentrations of 0.0479 J mg/L in April 2018 and 0.0888 J mg/L in October 2018. GRO concentrations in MW-55 have exhibited an increasing trend in MW-55 over the three most recent sampling events conducted in 2017 and 2018. There is no applicable CGWSL for GRO, but previous NMED guidance (NMED 2012) required analysis of VOCs when GRO is present for comparison to applicable individual VOC screening levels. VOC results are discussed in the following subsection.

Volatile Organic Compounds, NCL

In 2018, groundwater samples were collected from the following wells located in and near the NCL for analysis of VOCs:

- First Semiannual Event (13 wells): MW-18, MW-45, MW-53, 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-54A, MW-55, MW-108, NCL-31, NCL-32, NCL-33, NCL-34A, NCL-44, and NCL-49.

As highlighted in Table 4A, benzene was detected in exceedance of the CGWSL of 0.005 mg/L in wells MW-108 and NCL-34A during both 2018 semiannual events and 1,2,4-trimethylbenzene (1,2,4-TMB) was detected in exceedance of the CGWSL of 0.056 mg/L in well MW-108 during the second 2018 semiannual event (0.0637 mg/L). The maximum benzene concentration was detected in well NCL-34A during each semiannual event (1.02 mg/L in April 2018 and 1.11 mg/L in October 2018). No other VOC was detected above its respective CGWSL during either semiannual event.

The 2018 VOC results in groundwater beneath and near the NCL were consistent with historical results. Concentrations of target VOCs in wells located in and near the NCL are overall stable to declining, as shown in the COC concentration plots included in Appendix C, with the exception of MTBE in wells MW-45 and MW-55. MTBE concentrations in MW-45 and MW-55 exhibited an increasing trend since April 2016 and April 2015, respectively, but remain below the CGWSL in both wells.

Total Metals, NCL

Groundwater samples were collected from the following wells located in and near the NCL for analysis of the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium):

- First Semiannual Event (13 wells): MW-18, MW-45, MW-53, 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-54A, MW-55, MW-108, NCL-31, NCL-32, NCL-33, NCL-34A, NCL-44, and NCL-49.

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).

Barium, cadmium, chromium, cobalt, lead, mercury, nickel, selenium, and vanadium were not detected above their respective CGWSLs in any of the wells sampled during either 2018 semiannual event. Arsenic, boron, iron, manganese, and uranium were detected at concentrations in exceedance of their respective CGWSLs in at least one well, as highlighted in Table 4B and described below:

- Arsenic exceeded the CGWSL of 0.010 mg/L in wells NCL-31 and NCL-44 during both 2018 semiannual events at maximum concentrations in NCL-44 during each semiannual event (0.0387 mg/L in April 2018 and 0.0301 mg/L in October 2018).

- Boron exceeded the CGWSL of 0.75 mg/L in two wells sampled (MW-18 and MW-55) during the first 2018 semiannual event at a maximum concentration of 1.50 mg/L in MW-55; and in well MW-55 during the second 2018 semiannual event at a concentration of 1.45 mg/L.

- Iron exceeded the CGWSL of 1.00 mg/L in three wells sampled (MW-45, NCL-33, and NCL-44) during the first 2018 semiannual event at a maximum concentration of 1.64 mg/L in NCL-33; and in five wells sampled during the second 2018 semiannual event at a maximum concentration of 4.57 mg/L in MW-108.

- Manganese exceeded the CGWSL of 0.200 mg/L in seven wells sampled during the first 2018 semiannual event at a maximum concentration of 2.34 mg/L in MW-53; and in five wells sampled during the second 2018 semiannual event at a maximum concentration of 2.02 mg/L in NCL-31.

- Uranium exceeded the CGWSL of 0.030 mg/L in two wells sampled (MW-18 and MW-55) during the first 2018 semiannual event at a maximum concentration of 0.0503 mg/L in MW-55; and in well MW-55 during the second event at a concentration of 0.0504 mg/L.

The total metals results in groundwater beneath and near the NCL were generally consistent with or less than historical results, with the following exceptions:

- Iron concentrations increased in MW-108 from 0.174 mg/L during the first 2018 semiannual event to 4.57 mg/L during the second 2018 semiannual event. Iron has fluctuated above and below the CGWSL in this well and other NCL wells over time.

- Mercury concentrations increased in MW-55 from not detected above the method detection limit of 0.000049 mg/L during the second 2017 semiannual event (October 2017) to an estimated J-flagged concentration of 0.000151 J mg/L during the first 2018 semiannual event. However, mercury was not detected above the method detection limit in MW-55 during the second 2018 semiannual event.

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 C.

Cyanide, NCL

Groundwater samples collected from wells MW-18, MW-45, and MW-55 during both 2018 semiannual events were analyzed for cyanide. Cyanide was not detected above the CGWSL in groundwater samples collected from these wells.

Water Quality Parameters, NCL

In 2018, groundwater samples were collected from the following 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]):

- First Semiannual Event (13 wells): MW-18, MW-45, MW-53, 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-54A, MW-55, MW-108, NCL-31, NCL-32, NCL-33, NCL-34A, NCL-44, and NCL-49.

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 exhibit an overall stable trend across the NCL, with some seasonal fluctuations between the first and second semiannual events.

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 TEL area wells MW-49, TEL-1, TEL-2, TEL-3, and TEL-4 during the first 2018 semiannual event; and from wells MW-49, TEL-1, TEL-2, and TEL-4 during the second 2018 semiannual event. Groundwater samples collected from these TEL area 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). 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 2018 indicate COCs are present in groundwater in excess of their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics, TEL

DRO was detected in exceedance of the CGWSL of 0.0398 mg/L in all TEL area wells sampled during both 2018 semiannual events, as highlighted in Table 4A. The maximum DRO concentration was detected in TEL-2 during each semiannual event (16.7 mg/L in April 2018 and 14.8 mg/L in October 2018). DRO concentrations in all TEL area wells have exhibited a stable trend over at least the eight most recent sampling events with occasional fluctuations, as shown in the COC concentration plots included in Appendix C.

Total Petroleum Hydrocarbons – Gasoline Range Organics, TEL

GRO was detected in all TEL area wells sampled during both 2018 semiannual events with maximum concentrations detected in well MW-49 during the first semiannual event (4.42 mg/L) and in well TEL-2 during the second semiannual event (5.19 mg/L). GRO concentrations in TEL area wells exhibited stable trends over time despite occasional fluctuations between sampling events, as shown in the COC concentration plots included in Appendix C. GRO concentrations in TEL-3 increased from 0.716 mg/L in April 2017 to 2.05 mg/L in April 2018, which is consistent with the historical maximum concentration detected in April 2009. There is no applicable CGWSL for GRO, but previous NMED guidance (NMED 2012) required analysis of VOCs when GRO is present for comparison to applicable individual VOC screening levels. VOC results are discussed in the following subsection.

Volatile Organic Compounds, TEL

Benzene, MTBE, and 1,2,4-TMB were detected at concentrations in exceedance of their respective CGWSLs in at least one TEL area well, as highlighted in Table 4A and described below:

- Benzene exceeded the CGWSL of 0.005 mg/L in all TEL area wells sampled except TEL-1 during the first 2018 semiannual event at a maximum concentration of 0.619 mg/L in TEL-2; and in two wells (MW-49 and TEL-2) sampled during the second 2018 semiannual event at a maximum concentration of 0.936 mg/L in TEL-2.
- MTBE exceeded the CGWSL of 0.10 mg/L in well MW-49 during both 2018 semiannual events at concentrations of 0.113 mg/L during the first event and 0.124 mg/L during the second event.
- 1,2,4-TMB exceeded the CGWSL of 0.056 mg/L in wells MW-49 and TEL-2 during both 2018 semiannual events with maximum concentrations detected in well MW-49 during the first semiannual event (0.0861 mg/L) and in well TEL-2 during the second semiannual event (0.115 mg/L).

No other VOC was detected above its respective CGWSL in TEL area wells during either 2018 semiannual event. The 2018 VOC results of groundwater in TEL area wells were consistent with historical results. Concentrations of target VOCs in TEL area wells exhibited stable trends over time with occasional fluctuations, as shown in the COC concentration plots included in Appendix C. Target VOC MTBE increased in MW-49 from 0.0712 mg/L in October 2017 to 0.113 mg/L in April 2018 to 0.124 mg/L in October 2018. MTBE concentrations in MW-49 during both 2018 semiannual events were the first exceedances of the CGWSL over the six most recent sampling events, but they were less than historical maximums in this well.

Total Metals, TEL

Barium, boron, cadmium, cobalt, lead, mercury, nickel, selenium, uranium, and vanadium were not detected above their respective CGWSLs in any of the TEL area wells sampled during either 2018 semiannual event. Arsenic, chromium, iron, and manganese were detected at concentrations in exceedance of their respective CGWSLs in at least one well, as highlighted in Table 4B and described below:

- Arsenic exceeded the CGWSL of 0.010 mg/L in three wells (TEL-1, TEL-2, and TEL-3) during the first 2018 semiannual event at a maximum concentration of 0.0183 mg/L in TEL-2; and in two wells sampled (TEL-1 and TEL-2) during the second 2018 semiannual event at a maximum concentration of 0.0173 mg/L in TEL-1.
- Chromium exceeded the CGWSL of 0.050 mg/L in two wells sampled (TEL-3 and TEL-4) during the first 2018 semiannual event at a maximum concentration of 0.741 mg/L in TEL-4 (duplicate sample); and in well TEL-4 during the second 2018 semiannual event at a concentration of 0.293 mg/L (duplicate sample).
- Iron exceeded the CGWSL of 1.00 mg/L in TEL-3 during the first 2018 semiannual event at a concentration of 1.47 mg/L.
- Manganese exceeded the CGWSL of 0.200 mg/L in well TEL-4 during the first 2018 semiannual event at a concentration of 1.48 mg/L; and in two wells sampled (MW-49 and TEL-4) during the second 2018 semiannual event at a maximum concentration of 0.827 mg/L in TEL-4.

The 2018 total metals results in TEL wells were generally consistent with historical results, with the following exceptions:

- Arsenic concentrations in TEL-1 have exhibited an increasing trend over the six most recent sampling events, but concentrations remain below historical maximum concentrations for this well. Arsenic concentrations in TEL-3 increased from 0.00204 mg/L in April 2017 to 0.0109 mg/L in April 2018, which is first exceedance of the CGWSL in this well since September 2011. However, arsenic concentrations in TEL-3 remain below historical maximum concentrations for this well.
- Iron concentrations increased in TEL-3 from 0.473 mg/L in April 2017 to 1.47 mg/L in April 2018, which is first exceedance of the CGWSL in this well over the four most recent sampling events. However, iron concentrations have fluctuated in most TEL wells over time.

Groundwater concentrations of target COC arsenic in TEL area wells are overall stable to declining, despite recent fluctuations, as shown in the COC concentration plots included in Appendix C.

Cyanide, TEL

Groundwater samples collected from MW-49 during both 2018 semiannual events were analyzed for cyanide. Cyanide was not detected above the CGWSL in groundwater samples collected from this well.

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 2018 were overall consistent with historical results, with the exception of sulfate in TEL-2 which has exhibited an increasing trend over the five most recent sampling events ranging from 764 mg/L in October 2016 to 1,360 mg/L in October 2018. 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 or less than 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 2018 indicate COCs are present in groundwater in excess of their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics, EPs

In 2018, groundwater samples were collected from the following EP wells during each semiannual event for analysis of DRO:

- First Semiannual Event (41 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-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 (30 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-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.

DRO was detected at concentrations in exceedance of the CGWSL of 0.0473 mg/L in 38 EP wells sampled during the first 2018 semiannual event (maximum concentration of 54.4 mg/L in MW-77) and in 27 EP wells samples sampled during the second 2018 semiannual event

(maximum concentration of 41.0 mg/L in MW-84), as highlighted in Table 4A. As shown in the COC concentration plots included in Appendix C, DRO concentrations in EP wells MW-3, MW-4A, MW-6A, MW-6B, MW-10, MW-18A, MW-72 through MW-78, MW-80 through MW-84, and OCD-7AR have exhibited an overall increasing trend since approximately 2011. However, in all of these wells except MW-6A, the DRO concentrations have exhibited a stable trend over the most recent four to nine sampling events. DRO concentrations in these wells will be watched closely during future sampling events.

Total Petroleum Hydrocarbons – Gasoline Range Organics, EPs

In 2018, groundwater samples were collected from the following EP wells during each semiannual event for analysis of GRO:

- First Semiannual Event (39 wells): MW-2A, MW-3, MW-4A, MW-5A, MW-6A, MW-7A, MW-10, MW-11A, MW-15, 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-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 (29 wells): MW-2A, MW-3, MW-4A, MW-5A, MW-7A, MW-10, MW-22A, MW-70, MW-74, MW-75, MW-76, MW-79, MW-83, MW-84, 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.

GRO was detected in 26 EP wells sampled during the first 2018 semiannual event and in 21 EP wells sampled during the second 2018 semiannual event. The maximum GRO concentration was detected in well MW-22A during each semiannual event (3.3 mg/L in April 2018 [duplicate sample] and 4.46 mg/L in October 2018 [duplicate sample]). As shown in the COC concentration plots included in Appendix C, GRO concentrations in EP wells are overall stable over time despite occasional fluctuations. There is no applicable CGWSL for GRO, but previous NMED guidance (NMED 2012) required analysis of VOCs when GRO is present for comparison to applicable individual VOC screening levels. VOC results are discussed in the following subsection.

Volatile Organic Compounds, EPs

No VOCs were detected at concentrations above CGWSLs in any EP wells sampled during either 2018 semiannual events. Concentrations of target VOCs in EP wells are stable to declining over time, as shown in the COC concentration plots included in Appendix C.

Total Metals, EPs

In 2018, 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 (41 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-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 (30 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-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 and OCD-8A were analyzed for the expanded total metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium).

Barium, cadmium, cobalt, lead, mercury, nickel, and vanadium were not detected above their respective CGWSLs in any of the EP wells sampled during either 2018 semiannual event. Arsenic, boron, chromium, iron, manganese, selenium, and uranium were detected at concentrations in exceedance of their respective CGWSLs in at least one well, as highlighted in Table 4B and described below:

- Arsenic exceeded the CGWSL of 0.010 mg/L in 23 EP wells sampled during the first 2018 semiannual event at a maximum concentration of 0.187 mg/L in MW-5A; and in 18 wells sampled during the second 2018 semiannual event at a maximum concentration of 0.312 mg/L in MW-75.

- Boron exceeded the CGWSL of 0.75 mg/L in both EP wells sampled (MW-18A and OCD-8A) sampled during both 2018 semiannual events, with maximum concentrations in MW-18A of 2.31 mg/L during the first event and 2.34 mg/L during the second event.

- Chromium exceeded the CGWSL of 0.050 mg/L in MW-78 during the first 2018 semiannual event at a concentration of 0.142 mg/L; and in no wells sampled during the second 2018 semiannual event.

- Iron exceeded the CGWSL of 1.00 mg/L in 22 EP wells sampled during the first 2018 semiannual event at a maximum concentration of 46.3 mg/L in MW-70; and in 20 EP wells sampled during the second 2018 semiannual event at a maximum concentration of 11.2 mg/L in OCD-8A.

- Manganese exceeded the CGWSL of 0.200 mg/L in 36 EP wells sampled during the first 2018 semiannual event at a maximum concentration of 6.18 mg/L in MW-22A

(duplicate sample); and in all 30 EP wells sampled during the second 2018 semiannual event at a maximum concentration of 6.14 mg/L MW-22A (duplicate sample).

- Selenium exceeded the CGWSL of 0.050 mg/L in no wells sampled during the first 2018 semiannual event; and in well MW-74 during the second 2018 semiannual event at a concentration of 0.227 mg/L.
- Uranium exceeded the CGWSL of 0.030 mg/L in well MW-18A during the first 2018 semiannual event at a concentration of 0.0314 mg/L.

The 2018 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-70 increased from 0.0180 mg/L during the second 2017 semiannual event (October 2017) to 0.0508 mg/L during the first 2018 semiannual event, which is the historical maximum in this well. However, arsenic concentrations decreased to 0.0186 mg/L during the second 2018 semiannual event, which is consistent with historical concentrations.
- Arsenic concentrations in OCD-2A increased from 0.00323 mg/L during the second 2017 semiannual event (October 2017) to 0.0112 mg/L during the first 2018 semiannual event, but then decreased to 0.00227 mg/L during the second 2018 semiannual event. Arsenic concentrations in OCD-2A have fluctuated above and below the CGWSL over time.
- Iron concentrations have exhibited increasing trends in wells MW-2A, MW-3, MW-4A, MW-18A, MW-70, MW-73, MW-84, MW-122, MW-124, OCD-2A, OCD-3, OCD-4, OCD-5, OCD-6, OCD-7AR, and OCD-8A over at least the four most recent sampling events with occasional fluctuations. Iron concentrations have fluctuated in a majority of EP wells over time.
- Mercury concentrations increased in MW-18A from not detected above the method detection limit of 0.000049 mg/L during the first 2018 semiannual event to an estimated J-flagged concentration of 0.000145 J mg/L during the second 2018 semiannual event. Mercury concentrations in OCD-8A increased from not detected above the method detection limit of 0.000049 mg/L in the second 2017 semiannual event (October 2017) to estimated J-flagged concentrations of 0.000103 J mg/L and 0.000139 J mg/L during the first and second 2018 semiannual events, respectively. Mercury concentrations in these wells remain below the CGWSL of 0.002 mg/L.

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

Cyanide, EPs

Groundwater samples collected from EP wells MW-18A and OCD-8A during both 2018 semiannual events were analyzed for cyanide. Cyanide was not detected above the CGWSL in groundwater samples collected from these wells.

Water Quality Parameters, EPs

In 2018, 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 (41 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-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 (25 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-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 2018 were overall consistent with historical results, with the following exceptions:

- Chloride concentrations in MW-83 increased from 291 mg/L during the second 2017 semiannual event (October 2017) to 1,360 mg/L during the first 2018 semiannual event, but then decreased to 221 mg/L during the second 2018 semiannual event. Chloride concentrations have fluctuated above and below the CGWSL (250 mg/L) in MW-83 over the six most recent sampling events.

- Fluoride concentrations increased in MW-11A from 0.601 mg/L during the first 2018 semiannual event to 3.15 J mg/L during the second 2018 semiannual event, which was the first exceedance of the CGWSL (1.60 mg/L) over the six most recent sampling events. Fluoride concentrations increased in MW-78 from 9.91 mg/L in April 2017 to 15.3 mg/L in April 2018. Fluoride concentrations in several EP wells have fluctuated above and below the CGWSL over time.

- Nitrate/nitrite concentrations in MW-74 increased from 6.72 mg/L during the first 2018 semiannual event to 171 mg/L during the second 2018 semiannual event. Nitrate/nitrite concentrations in MW-74 have fluctuated by up to three orders of magnitude over the six most recent sampling events, with a maximum concentration of 211 mg/L in October 2016.

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 2018 indicate COCs are present in groundwater in excess of their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics, TMD

In 2018, 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.

DRO was detected at concentrations in exceedance of the CGWSL of 0.0398 mg/L in eight TMD wells sampled during the first 2018 semiannual event (maximum concentration of 0.403 mg/L in MW-89) and in well MW-21 during the second 2018 semiannual event (0.0958 J mg/L), as highlighted in Table 4A. However, none of the 2018 DRO concentrations in TMD wells exceeded the previous CGWSL (NMED 2012) of 0.2 mg/L except in MW-89 during the first 2018 semiannual event. As shown in the COC concentration plots included in Appendix C, DRO concentrations in TMD wells MW-8, MW-16, MW-20, MW-21, MW-25, MW-27, MW-68, and MW-89 have exhibited an overall increasing trend since 2011. However, the DRO concentrations in these wells have exhibited a stable to decreasing trend over at least the three most recent sampling events. DRO concentrations in these wells will be watched closely during future sampling events.

Total Petroleum Hydrocarbons – Gasoline Range Organics, TMD

Groundwater samples collected from wells MW-8 and MW-21 during the first 2018 semiannual event and from well MW-21 during the second 2018 semiannual event were analyzed for GRO. GRO was detected at a maximum concentration of 0.0561 J mg/L in MW-8 during the first 2018 semiannual event and at a concentration of 0.0645 J mg/L in MW-21 during the second 2018 semiannual event. GRO concentrations are generally stable in both TMD wells sampled in 2018 despite minor recent fluctuations.

There is no applicable CGWSL for GRO, but previous NMED guidance (NMED 2012) required analysis of VOCs when GRO is present for comparison to applicable individual VOC screening levels. VOC results are discussed in the following subsection.

Volatile Organic Compounds, TMD

In 2018, 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.

MTBE was detected in exceedance of its CGWSL of 0.10 mg/L in TMD well NP-1 during both 2018 semiannual events (0.132 mg/L in April 2018 and 0.547 mg/L in October 2018), as highlighted in Table 4A. No other VOC was detected above its respective CGWSL during either semiannual event. The 2018 VOC results for groundwater samples collected from TMD wells were consistent with historical results. As shown in the COC concentration plots included in Appendix C, concentrations of target VOCs in TMD wells are overall stable, with the exception of MTBE in wells MW-8, MW-21, NP-1, and NP-6, which have exhibited an increasing trend over at least the three most recent sampling events. MTBE remains below the CGWSL in all these wells except NP-1, but these wells will be watched closely during future events.

Total Metals, TMD

In 2018, 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 2018 semiannual event was analyzed for the expanded total metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium).

Barium, boron, cadmium, cobalt, iron, lead, mercury, nickel, selenium, and vanadium were not detected above their respective CGWSLs in any of the TMD wells sampled during either 2018 semiannual event. Arsenic, chromium, manganese, and uranium were detected at concentrations in exceedance of their respective CGWSLs in at least one TMD well, as highlighted in Table 4B and described below:

- Arsenic exceeded the CGWSL of 0.010 mg/L in well MW-89 during the first 2018 semiannual event at a concentration of 0.0112 mg/L; and in no wells sampled during the second 2018 semiannual event.
- Chromium exceeded the CGWSL of 0.050 mg/L in well MW-8 during the first 2018 semiannual event at a concentration of 0.0627 mg/L; and in no wells sampled during the second 2018 semiannual event.
- Manganese exceeded the CGWSL of 0.200 mg/L in six wells sampled during the first 2018 semiannual event at a maximum concentration of 0.702 mg/L in MW-8; and in well MW-21 during the second semiannual event at a concentration of 0.738 mg/L.
- Uranium exceeded the CGWSL of 0.030 mg/L in well MW-71 during the first 2018 semiannual event at a concentration of 0.0594 mg/L.

The 2018 analytical results of total metals in groundwater samples collected from TMD wells were generally consistent with historical results, with the exception of manganese in MW-89. Manganese concentrations increased in MW-89 from 0.0420 mg/L in April 2017 to 0.628 mg/L in April 2017, which is the first exceedance of the CGWSL over the four most recent sampling events. Manganese concentrations have fluctuated above and below the CGWSL in TMD wells over time. Concentrations of target COC arsenic in TMD wells are overall stable, as shown in the COC concentration plots included in Appendix C.

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 2018 semiannual event.

Water Quality Parameters, TMD

In 2018, 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 2018 were consistent with historical results.

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). Analytical results of groundwater samples collected from wells located within the North Refinery Area in 2018 indicate COCs are present in groundwater in excess of their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics, North Refinery Area

Groundwater samples were collected from the following North Refinery Area wells during each 2018 semiannual event for analysis of DRO:

- First Semiannual Event (27 wells): MW-23, MW-29, MW-39, MW-40, MW-41, MW-42, MW-43, MW-59, MW-60, MW-61, MW-62, MW-67, MW-90, MW-91, MW-93, MW-95, MW-96, MW-98, MW-137, MW-138, RW-1, RW-2, RW-7, RW-9, RW-10, RW-16, and RW-17.
- Second Semiannual Event (14 wells): MW-23, MW-29, MW-39, MW-43, MW-60, MW-61, MW-62, MW-67, MW-90, MW-91, MW-96, MW-98, MW-137, and MW-138.

As highlighted in Table 4A, DRO was detected at concentrations in exceedance of the CGWSL in all 27 North Refinery Area wells sampled during the first 2018 semiannual event at a maximum concentration of 13.6 mg/L in MW-23 and in all 14 North Refinery Area wells sampled during the second 2018 semiannual event at a maximum concentration of 13.7 mg/L in MW-23. As shown in the COC concentration plots included in Appendix C, DRO concentrations in North Refinery Area wells MW-29, MW-40, MW-41, MW-59, MW-60, MW-67, MW-91, MW-92, MW-95, MW-96, RW-1, RW-2, RW-7, RW-9, RW-10, and RW-17 have exhibited an overall increasing trend over time. However, the DRO concentrations have exhibited a stable trend over at least the four most recent sampling events in all of these wells except MW-41, MW-92, and RW-7. DRO concentrations in the remaining North Refinery Area wells were overall stable over time.

Total Petroleum Hydrocarbons – Gasoline Range Organics, North Refinery Area

Groundwater samples were collected from the following North Refinery Area wells during each 2018 semiannual event for analysis of GRO:

- First Semiannual Event (26 wells): MW-23, MW-29, MW-39, MW-40, MW-41, MW-42, MW-43, MW-59, MW-60, MW-61, MW-62, MW-67, MW-90, MW-91, MW-93, MW-95, MW-96, MW-98, MW-137, MW-138, RW-1, RW-2, RW-7, RW-9, RW-10, and RW-17.

- Second Semiannual Event (14 wells): MW-23, MW-29, MW-39, MW-43, MW-60, MW-61, MW-62, MW-67, MW-90, MW-91, MW-96, MW-98, MW-137, and MW-138.

GRO was detected above the method detection limit in 24 North Refinery Area wells sampled during the first 2018 semiannual event at a maximum concentration of 73.8 mg/L in MW-43 and in all 14 North Refinery Area wells sampled during the second 2018 semiannual event at a maximum concentration of 35.8 mg/L in MW-43. GRO analytical results in groundwater samples collected from North Refinery Area wells in 2018 were consistent with historical results except in wells MW-43, and RW-1, and RW-17. GRO concentrations in MW-43 increased from 28.0 mg/L in October 2017 to 73.8 mg/L in April 2018, which is the historical maximum in this well. However, GRO concentrations decreased to 35.8 mg/L in October 2018, which is consistent with recent results. GRO concentrations increased to historical maximums in wells RW-1 and RW-17 during the first 2018 semiannual event (these wells are only sampled on an annual basis). As shown in the COC concentration plots included in Appendix C, GRO concentrations in all other North Refinery Area wells are stable over time with occasional fluctuations.

There is no applicable CGWSL for GRO, but previous NMED guidance (NMED 2012) required analysis of VOCs when GRO is present for comparison to applicable individual VOC screening levels. VOC results are discussed in the following subsection.

Volatile Organic Compounds, North Refinery Area

Groundwater samples were collected from the following North Refinery Area wells during each 2018 semiannual event for analysis of VOCs:

- First Semiannual Event (27 wells): MW-23, MW-29, MW-39, MW-40, MW-41, MW-42, MW-43, MW-59, MW-60, MW-61, MW-62, MW-67, MW-90, MW-91, MW-93, MW-95, MW-96, MW-98, MW-137, MW-138, RW-1, RW-2, RW-7, RW-9, RW-10, RW-16, and RW-17.

- Second Semiannual Event (14 wells): MW-23, MW-29, MW-39, MW-43, MW-60, MW-61, MW-62, MW-67, MW-90, MW-91, MW-96, MW-98, MW-137, and MW-138.

Benzene, ethylbenzene, toluene, o-xylenes, total xylenes, MTBE, naphthalene, 1,2,4-TMB, 1,3,5,-trimethylbenzene (1,3,5-TMB), cis-1,2,-dichoroethene (cis-1,2-DCE), and trichloroethene (TCE) were detected at concentrations in exceedance of their respective CGWSLs in at least one North Refinery Area well, as highlighted in Table 4A and described below:

- Benzene exceeded the CGWSL of 0.005 mg/L in 16 wells sampled during the first 2018 semiannual event at a maximum concentration of 38.5 mg/L in MW-43; and in

10 wells sampled during the second 2018 semiannual event at a maximum concentration of 10.7 mg/L in MW-43.

- Ethylbenzene exceeded the CGWSL of 0.7 mg/L in two wells sampled (MW-98 and MW-137) during the first 2018 semiannual event at a maximum concentration of 1.86 mg/L in MW-137; and in two wells sampled (MW-98 and MW-137) during the second 2018 semiannual event at a concentration of 1.09 mg/L in each well.
- Toluene exceeded the CGWSL of 1.0 mg/L in two wells sampled (MW-91 and MW-137) during the first 2018 semiannual event at a maximum concentrations of 1.83 in MW-137; and in well MW-91 during the second 2018 semiannual event at a concentration of 1.24 mg/L.
- o-Xylene exceeded the CGWSL of 0.193 mg/L in two wells sampled (MW-43 and MW-137) during the first 2018 semiannual event at a maximum concentration of 0.398 mg/L in MW-137; and in well MW-43 during the second 2018 semiannual event at a concentration of 0.237 mg/L in MW-43.
- Total xylenes exceeded the CGWSL of 0.62 mg/L in five wells sampled (MW-43, MW-62, MW-91, MW-98, and MW-137) during both 2018 semiannual events with maximum detected concentrations in MW-98 of 1.90 mg/L during the first event and 2.16 mg/L during the second event.
- MTBE exceeded the CGWSL of 0.10 mg/L in four wells sampled (MW-67, MW-96, MW-138, and RW-17) during the first 2018 semiannual event at a maximum concentration of 29.4 mg/L in MW-96; and in three wells sampled (MW-67, MW-96, and MW-138) during the second 2018 semiannual event at a maximum concentration of 26.7 mg/L in MW-96.
- Naphthalene exceeded the CGWSL of 0.03 mg/L in 9 wells sampled during the first 2018 semiannual event at a maximum concentration of 0.373 J mg/L in MW-137; and in seven wells sampled during the second 2018 semiannual event at a maximum concentration of 0.257 mg/L in MW-98.
- 1,2,4-TMB exceeded the CGWSL of 0.056 mg/L in 9 wells sampled during the first 2018 semiannual event at a maximum concentration of 0.715 mg/L in MW-62; and in seven wells sampled during the second 2018 semiannual event at a maximum concentration of 0.602 mg/L in MW-62.
- 1,3,5-TMB exceeded the CGWSL of 0.060 mg/L in six wells sampled during the first 2018 semiannual event at a maximum concentration of 0.166 mg/L in MW-62; and in three wells sampled (MW-43, MW-62, and MW-98) during the second 2018 semiannual event at a maximum concentration of 0.144 mg/L in MW-62.

- cis-1,2,-DCE exceeded the CGWSL of 0.070 mg/L in two wells sampled (RW-1 and RW-2) during the first 2018 semiannual event at a maximum concentration of 0.681 mg/L in RW-1; and in no wells sampled during the second 2018 semiannual event.
- TCE exceeded the CGWSL of 0.005 mg/L in two wells sampled (RW-1 and RW-2) during the first 2018 semiannual event at a maximum concentration of 0.0169 mg/L in RW-1; and in no wells sampled during the second 2018 semiannual event.

The 2018 analytical results of target VOCs in groundwater samples collected from North Refinery Area wells were generally consistent with historical results. As shown in the COC concentration plots included in Appendix C, concentrations of target VOCs in North Refinery Area wells have exhibited an overall stable trend over time with occasional fluctuations, with the following exceptions:

- 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 over at least the six most recent sampling events with the exception of benzene during the first 2018 semiannual event. Benzene concentrations increased in MW-43 from 10.7 mg/L during the second 2017 semiannual event (October 2017) to 38.5 mg/L during the first 2018 semiannual event, which is the historical maximum in this well. Benzene concentrations then decreased to 10.7 mg/L during the second 2018 semiannual event, which is consistent with sampling events conducted in 2016 and 2017.
- Ethylbenzene and toluene concentrations in MW-138 have exhibited an increasing trend over the four most recent sampling events conducted in 2017 and 2018, but the concentrations remain below their respective CGWSL. Concentrations of these VOCs will be watched closely during future events.
- MTBE concentrations have overall increased over time in RW-17, but appear to be stabilizing over the three most recent annual sampling events conducted from 2015 through 2018.
- The method detection limit for target VOCs benzene, ethylbenzene, toluene, xylenes, and naphthalene in MW-96 increased by an order of magnitude compared to previous sampling events due to sample, which resulted in apparent increases on the COC concentration plot for this well. However, these target VOCs were not detected above the method detection limit in this well over the six most recent sampling events.
- 1,2,4-TMB concentrations in MW-138 increased over the four most recent sampling events from not detected above the method detection limit of 0.00373 mg/L in April 2017 to 0.00547 mg/L in October 2017 to 0.0413 mg/L in April 2018 to 0.0799 mg/L

in October 2018. The October 2018 result was the first exceedance of the CGWSL in this well over the six most recent sampling events. 1,2,4-TMB concentrations in MW-138 will be watched closely during future events.

Total Metals, North Refinery Area

In 2018, groundwater samples were collected from the following North 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 (27 wells): MW-23, MW-29, MW-39, MW-40, MW-41, MW-42, MW-43, MW-59, MW-60, MW-61, MW-62, MW-67, MW-90, MW-91, MW-93, MW-95, MW-96, MW-98, MW-137, MW-138, RW-1, RW-2, RW-7, RW-9, RW-10, RW-16, and RW-17.
- Second Semiannual Event (14 wells): MW-23, MW-29, MW-39, MW-43, MW-60, MW-61, MW-62, MW-67, MW-90, MW-91, MW-96, MW-98, MW-137, and MW-138.

In addition, groundwater samples collected from North Refinery Area wells MW-43, MW-60, MW-67, MW-137, and MW-138 were analyzed for the expanded metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium) during both 2018 semiannual events.

Cadmium, cobalt, chromium, lead, mercury, nickel, uranium, and vanadium were not detected above their respective CGWSLs in any of the North Refinery Area wells sampled during either 2018 semiannual event. Arsenic, barium, boron, iron, manganese, and selenium were detected at concentrations in exceedance of their respective CGWSLs in at least one North Refinery Area well, as highlighted in Table 4B and described below:

- Arsenic exceeded the CGWSL of 0.010 mg/L in eight wells sampled during the first 2018 semiannual event at a maximum concentration of 0.0512 mg/L in MW-137; and in well MW-137 during the second 2018 semiannual event at a concentration of 0.0129 mg/L.
- Barium exceeded the CGWSL of 2.00 mg/L in well MW-23 during both 2018 semiannual events at a concentration of 9.72 mg/L during the first event and 8.55 mg/L during the second event.
- Boron exceeded the CGWSL of 0.75 mg/L in three wells sampled (MW-43, MW-137, and MW-138) during both 2018 semiannual events at maximum concentrations in MW-43 of 1.32 mg/L during the first event and 1.22 mg/L during the second event.

- Iron exceeded the CGWSL of 1.00 mg/Lin two wells sampled (RW-1 and RW-7) during the first 2018 semiannual event at a maximum concentration of 2.92 mg/L in RW-7; and in no wells sampled during the second 2018 semiannual event.
- Manganese exceeded the CGWSL of 0.200 mg/L in seven wells sampled during the first 2018 semiannual event at a maximum concentration of 1.03 mg/L in MW-41; and in two wells sampled (MW-29 and MW-60) during the second 2018 semiannual event at a maximum concentration of 0.341 mg/L in MW-29.
- Selenium exceeded the CGWSL of 0.050 mg/L in no wells sampled during the first 2018 semiannual event; and in three wells (MW-23, MW-137, and MW-138) during the second 2018 semiannual event at a maximum concentration of 0.341 mg/L in MW-137.

The 2018 analytical results of total metals in groundwater samples collected from North Refinery Area wells were generally consistent with historical results, with the following exceptions:

- Mercury concentrations increased in MW-67 from not detected above the method detection limit of 0.000049 mg/L during the first 2018 semiannual event to an estimated J-flagged concentration of 0.000120 J mg/L during the second 2018 semiannual event, which is below the CGWSL of 0.002 mg/L.
- Selenium concentrations increased to above the CGWSL in wells MW-23, MW-137, and MW-138 during the second 2018 semiannual event, which were the first exceedance of the CGWSL in these wells over the six most recent sampling events. Selenium results have fluctuated above and below the CGWSL in various North Refinery Area wells over time.

Concentrations of target COC arsenic in North Refinery Area wells are overall stable to declining, despite occasional fluctuating, as shown in the COC concentration plots included in Appendix C. Arsenic concentrations have fluctuated above and below the CGWSL over time in wells MW-23, MW-29, MW-39, MW-40 through MW-43, MW-60 through MW-62, MW-67, MW-90, MW-91, MW-93, MW-95, MW-98, RW-1, and RW-7.

Cyanide, North Refinery Area

Groundwater samples collected from North Refinery Area wells MW-43, MW-60, MW-67, MW-137, and MW-138 during both 2018 semiannual events were analyzed for cyanide. Cyanide was not detected above the CGWSL in groundwater samples collected from these wells.

Water Quality Parameters, North Refinery Area

In 2018, groundwater samples were collected from the following North 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 (27 wells): MW-23, MW-29, MW-39, MW-40, MW-41, MW-42, MW-43, MW-59, MW-60, MW-61, MW-62, MW-67, MW-90, MW-91, MW-93, MW-95, MW-96, MW-98, MW-137, MW-138, RW-1, RW-2, RW-7, RW-9, RW-10, RW-16, and RW-17.
- Second Semiannual Event (14 wells): MW-23, MW-29, MW-39, MW-43, MW-60, MW-61, MW-62, MW-67, MW-90, MW-91, MW-96, MW-98, MW-137, and MW-138.

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 2018 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. Nitrate/nitrite did not exceed the CGWSL in any of the North Refinery Area wells during both 2018 semiannual events. The reported concentrations of these constituents were generally consistent with historical results.

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 2018 indicate COCs are present in groundwater in excess of their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

Total Petroleum Hydrocarbons – Diesel Range Organics, South Refinery Area

Groundwater samples were collected from the following South Refinery Area wells during each 2018 semiannual event for analysis of DRO:

- First Semiannual Event (22 wells): KWB-5, KWB-6, MW-28, MW-48, MW-50, MW-52, MW-64, MW-65, MW-66, MW-99, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-107, MW-109, MW-110, RW-4, RW-6, and RW-15C.
- Second Semiannual Event (17 wells): KWB-5, KWB-6, MW-28, MW-48, MW-50, MW-52, MW-64, MW-65, MW-66, MW-99, MW-101, MW-102, MW-104, MW-105, MW-106, MW-109, and MW-110.

As highlighted in Table 4A, DRO was detected at concentrations in exceedance of the CGWSL 0.0398 mg/L in all South Refinery Area wells sampled during both 2018 semiannual events with maximum concentrations of 34.6 mg/L in MW-102 during the first event and 13.4 mg/L in MW-105 during the second event. DRO concentrations in South Refinery Area wells MW-28, MW-48, MW-50, MW-52, MW-64, MW-65, MW-102, MW-104, MW-105, MW-109, and RW-6 have exhibited an overall increasing trend over time with occasional fluctuations, as shown in the COC concentration plots included in Appendix C. However, DRO concentrations have exhibited a stable trend in all of these wells except MW-48 and MW-102 over at least the four most recent sampling events. DRO concentrations in these wells will be watched closely during future sampling events.

Total Petroleum Hydrocarbons – Gasoline Range Organics, South Refinery Area

Groundwater samples were collected from the following South Refinery Area wells during each 2018 semiannual event for analysis of GRO:

- First Semiannual Event (16 wells): MW-28, MW-48, MW-52, MW-64, MW-65, MW-66, MW-99, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-107, MW-109, and MW-110.
- Second Semiannual Event (14 wells): MW-28, MW-48, MW-52, MW-64, MW-65, MW-66, MW-99, MW-101, MW-102, MW-104, MW-105, MW-106, MW-109, and MW-110.

GRO was detected in all South Refinery Area wells sampled during both 2018 semiannual events except in MW-52, with maximum concentrations in MW-64 of 102 mg/L during the first event and 141 mg/L during the second event. As shown in the COC concentration plots included in Appendix C, GRO analytical results in groundwater samples collected from South Refinery Area wells in 2018 were overall consistent with historical results except in MW-48 and MW-109. GRO concentrations exhibited an increasing trend in MW-48 and MW-109 since 2014, but appear to be stabilizing in both of these wells over at least the four most recent monitoring events. These wells will be watched closely during future monitoring events.

There is no applicable CGWSL for GRO, but previous NMED guidance (NMED 2012) required analysis of VOCs when GRO is present for comparison to applicable individual VOC screening levels. VOC results are discussed in the following subsection.

Volatile Organic Compounds, South Refinery Area

Groundwater samples were collected from the following South Refinery Area wells during each 2018 semiannual event for analysis of VOCs:

- First Semiannual Event (23 wells): KWB-5, KWB-6, MW-28, MW-48, MW-50, MW-52, MW-64, MW-65, MW-66, MW-99, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-107, MW-109, MW-110, RA-313, RW-4, RW-6, and RW-15C.
- Second Semiannual Event (17 wells): KWB-5, KWB-6, MW-28, MW-48, MW-50, MW-52, MW-64, MW-65, MW-66, MW-99, MW-101, MW-102, MW-104, MW-105, MW-106, MW-109, and MW-110.

Benzene, toluene, ethylbenzene, o-xylenes, total xylenes, MTBE, naphthalene, 1,2,4-TMB, and 1,3,5-TMB were detected at concentrations in exceedance of their respective CGWSLs in at least one South Refinery Area well, as highlighted in Table 4A and described below:

- Benzene exceeded the CGWSL of 0.005 mg/L in 19 wells sampled during the first 2018 semiannual event at a maximum concentration of 21.9 mg/L in RW-15C; and in 13 wells sampled during the second 2018 semiannual event at a maximum concentration of 38.6 mg/L in MW-64.
- Ethylbenzene exceeded the CGWSL of 0.70 mg/L in three wells sampled (MW-48, MW-102, and RW-15C) during the first 2018 semiannual event at a maximum concentration of 3.93 mg/L in RW-15C; and in well MW-64 during the second 2018 semiannual event at a concentration of 2.47 mg/L.
- Toluene exceeded the CGWSL of 0.75 mg/L in MW-48 during the first 2018 semiannual event at a concentration of 1.02 mg/L; and in well MW-64 during the second 2018 semiannual event at a concentration of 13.0 mg/L.
- o-Xylene exceeded the CGWSL of 0.193 mg/L in no wells sampled during the first 2018 semiannual event; and in well MW-64 during the second 2018 semiannual event at a concentration of 1.06 mg/L.
- Total xylenes exceeded the CGWSL of 0.62 mg/L in two wells sampled (MW-48 and RW-15C) during the first 2018 semiannual event at a maximum concentration of 3.01 mg/L in RW-15C; and in well MW-64) during the second 2018 semiannual event at a concentration of 4.72 mg/L.
- MTBE exceeded the CGWSL of 0.10 mg/L in nine wells sampled during the first 2018 semiannual event at a maximum concentration of 10.3 mg/L in KWB-5; and in nine wells sampled during the second 2018 semiannual event at a maximum concentration of 10.8 mg/L in KWB-5.
- Naphthalene exceeded the CGWSL of 0.030 mg/L in seven wells sampled during the first 2018 semiannual event at a maximum concentration of 0.253 J mg/L in MW-65;

and in three wells sampled (KWB-6, MW-64, and MW-66) during the second 2018 semiannual event at a maximum concentration of 0.161 mg/L in MW-66.

- 1,2,4-TMB exceeded the CGWSL of 0.056 mg/L in eight wells sampled during the first 2018 semiannual event at a maximum concentration of 1.06 mg/L in RW-15C; and in six wells sampled during the second 2018 semiannual event at a maximum concentration of 0.620 mg/L in MW-64.
- 1,3,5-TMB exceeded the CGWSL of 0.060 mg/L in well RW-15C during the first 2018 semiannual event at a concentration of 0.138 mg/L; and in two wells sampled (KWB-6 and MW-64) during the second 2018 semiannual event at a maximum concentration of 0.123 mg/L in MW-64.

The 2018 analytical results of target VOCs in groundwater samples collected from South Refinery Area wells were generally consistent with historical results. As shown in the COC concentration plots included in Appendix C, concentrations of target VOCs in South Refinery Area wells have exhibited overall stable trends over time with occasional fluctuations, with the following exceptions:

- Benzene concentrations have exhibited increasing trends in wells MW-48 and MW-109 since 2014, but appear to be stabilizing over the four most recent sampling events conducted in 2017 and 2018. Benzene concentrations in MW-64 decreased from 30.7 mg/L during the second 2017 semiannual event (October 2017) to 2.37 mg/L during the first 2018 semiannual event and then increased to 38.6 mg/L during the second 2018 semiannual event, which was the historical maximum concentration reported in this well. Benzene concentrations in MW-64 appear to fluctuate seasonally between the first and second events. Benzene concentrations in these wells will be watched closely during future monitoring events.
- Ethylbenzene, toluene, and total xylene concentrations have overall increased over time in wells MW-48, MW-64, and MW-99. However, concentrations of these VOCs have exhibited a stabilizing trend in these wells over at the six most recent sampling events.
- MTBE concentrations have overall increased over time in wells MW-48, MW-99, MW-102, and RW-4/RW-4R since approximately 2011. However, MTBE concentrations have exhibited a stabilizing trend over at least the seven most recent monitoring events in MW-48, MW-99, and MW-102. There is limited historical data available for RW-4R, but MTBE concentrations have stabilized over the four most recent monitoring events.
- Naphthalene concentrations have exhibited an increasing trend in MW-48 since 2011, but appears to be stabilizing over the four most recent sampling events conducted in

2017 and 2018. The method detection limit for naphthalene was increased compared to previous sampling events due to sample dilution in wells KWB-5, MW-48, MW-102, and MW-106 during both 2018 semiannual events which results in apparent increases on the COC concentration plots for these wells. Naphthalene concentrations increased in MW-103 from less than the method detection limit of 0.0500 mg/L during the first 2017 semiannual event (April 2017) to 0.116 mg/L during the first 2018 semiannual event, which is the historical maximum concentration detected in this well. Naphthalene concentrations have exhibited an increasing trend in MW-107 over the four most recent sampling events conducted in 2017 and 2018, but concentrations remain below the historical maximum (0.15 mg/L) detected in this well in November 2014. Naphthalene concentrations have fluctuated above and below the CGWSL in MW-107 and several other South Refinery Area wells over time, but naphthalene concentrations in these wells will be watched closely during future monitoring events.

Total Metals, South Refinery Area

In 2018, 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 (22 wells): KWB-5, KWB-6, MW-28, MW-48, MW-50, MW-52, MW-64, MW-65, MW-66, MW-99, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-107, MW-109, MW-110, RW-4, and RW-15C.
- Second Semiannual Event (17 wells): KWB-5, KWB-6, MW-28, MW-48, MW-50, MW-52, MW-64, MW-65, MW-66, MW-99, MW-101, MW-102, MW-104, MW-105, MW-106, MW-109, and MW-110.

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 2018 semiannual events.

Cadmium, cobalt, chromium, mercury, nickel, uranium, and vanadium were not detected above their respective CGWSLs in any of the South Refinery Area wells sampled during either 2018 semiannual event. Arsenic, barium, boron, iron, lead, manganese, and selenium were detected at concentrations in exceedance of their respective CGWSLs in at least one well, as highlighted in Table 4B and described below:

- Arsenic exceeded the CGWSL of 0.010 mg/L in 11 wells sampled during the first 2018 semiannual event at a maximum concentration of 0.0754 mg/L in MW-101; and in seven wells sampled during the second 2018 semiannual event at a maximum concentration of 0.0819 mg/L in MW-101.

- Barium exceeded the CGWSL of 2.00 mg/L in eight wells sampled during the first 2018 semiannual event at a maximum concentration of 7.83 mg/L in MW-102; and in three wells sampled (KWB-5, MW-64, and MW-102) during the second 2018 semiannual event a maximum concentration of 7.92 mg/L in MW-102.

- Boron exceeded the CGWSL of 0.75 mg/L in well MW-28 during both 2018 semiannual events at a concentration of 1.29 mg/L during the first event and 1.16 mg/L during the second event.

- Iron exceeded the CGWSL of 1.00 mg/L in nine wells sampled during the first 2018 semiannual event at a maximum concentration of 10.1 mg/L in MW-105; and in four wells sampled during the second 2018 semiannual event at a maximum concentration of 2.68 mg/L in MW-101.

- Lead exceeded the CGWSL of 0.015 mg/L in well MW-105 during the first 2018 semiannual event at a concentration of 0.0326 mg/L; and in no wells sampled during the second 2018 semiannual event.

- Manganese exceeded the CGWSL of 0.200 mg/L in 11 wells sampled during the first 2018 semiannual event at a maximum concentration of 2.03 mg/L in KWB-6; and in 10 wells sampled during the second 2018 semiannual event at a maximum concentration of 1.91 mg/L in KWB-6.

- Selenium exceeded the CGWSL of 0.050 mg/L in well MW-48 during the first 2018 semiannual event at a concentration of 0.247 mg/L; and in no wells sampled during the second 2018 semiannual event.

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

- Arsenic concentrations in MW-104 have exhibited an increasing trend over six sampling events conducted from 2015 through 2017, but appear to be stabilizing over the 2018 semiannual events. Arsenic concentrations decreased in this well from historical maximums during the 2017 semiannual events (0.0570 mg/L in April 2017 and 0.0602 mg/L in October 2017) to the 2018 semiannual events (0.0213 mg/L in April 2018 [duplicate sample] and 0.0185 mg/L in October 2018 [duplicate sample]). This well will be watched closely during future monitoring events.

- Arsenic concentrations in KWB-6 increased from 0.00898 mg/L during the second 2017 semiannual event (October 2017) to 0.0251 mg/L during the first 2018 semiannual event, which is the historical maximum detected in this well. However, arsenic concentrations in this well decreased to 0.00813 mg/L during the second 2018 semiannual event, which is consistent with historical concentrations. Arsenic

concentrations in KWB-6 appear to fluctuate seasonally between the first and second events.

- Iron concentrations increased in wells KWB-6, MW-102, and MW-105 during the first 2018 semiannual event, but decreased to concentrations consistent with historical concentrations during the second 2018 semiannual event. The iron concentrations reported in wells KWB-6 and MW-105 during the first 2018 semiannual event were the only exceedance of the CGWSL during the six most recent sampling events. Iron concentrations increased in well MW-50 from 0.323 mg/L during the first 2018 semiannual event to 1.59 mg/L during the second 2018 semiannual event, which was the first exceedance of the CGWSL over the six most recent sampling events. Iron concentrations have fluctuated above and below the CGWSL in several South Refinery Area wells and other wells at the refinery over time.

- Lead concentrations increased in MW-105 from 0.00112 J mg/L during the second 2017 semiannual event (October 2017) to 0.0326 mg/L during the first 2018 semiannual event, which was the only exceedance of the CGWSL over the six most recent sampling events. However, lead concentrations in MW-105 decreased below the CGWSL to 0.000804 J mg/L during the second 2018 semiannual event.

- Manganese concentrations in MW-105 from 0.0657 mg/L during the second 2017 semiannual event (October 2017) to 0.285 mg/L during the first 2018 semiannual event and decreased to 0.216 mg/L during the second 2018 semiannual event. The 2018 concentrations were the first exceedances of the CGWSL in these wells over the six most recent sampling events. Manganese concentrations have fluctuated above and below the CGWSL in several South Refinery Area wells and other wells at the refinery over time.

- Mercury concentrations increased in MW-28 from not detected above the method detection limit of 0.000049 mg/L during the first 2018 semiannual event to an estimated J-flagged concentration of 0.000108 J mg/L during the second 2018 semiannual event, which is below the CGWSL of 0.002 mg/L.

- Selenium concentrations increased in MW-48 from 0.0669 mg/L during the second 2017 semiannual event (October 2017) to 0.247 mg/L during the first 2018 semiannual event, but decreased to 0.00132 J mg/L during the second 2018 semiannual event. Selenium concentrations have fluctuated above and below the CGWSL in several South Refinery Area wells over time

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 C. Arsenic concentrations have fluctuated above and below the CGWSL over time in wells KWB-6, MW-28,

MW-48, MW-50, MW-52, MW-66, MW-99, MW-103, 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 2018 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 2018, 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 (22 wells): KWB-5, KWB-6, MW-28, MW-48, MW-50, MW-52, MW-64, MW-65, MW-66, MW-99, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-107, MW-109, MW-110, RA-313, RW-4, and RW-15C.
- Second Semiannual Event (17 wells): KWB-5, KWB-6, MW-28, MW-48, MW-50, MW-52, MW-64, MW-65, MW-66, MW-99, MW-101, MW-102, MW-104, MW-105, MW-106, MW-109, and MW-110.

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 South Refinery Area wells 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:

- Fluoride concentrations in MW-48 increased from 1.01 mg/L during the second 2017 semiannual event (October 2017) to 1.90 mg/L during the first 2018 semiannual event, which was the first and only exceedance of the CGWSL (1.60 mg/L) in this well over the six most recent sampling events. Fluoride concentrations in this well decreased to 1.20 mg/L during the second 2018 semiannual event.
- Fluoride concentrations in MW-103 increased from 1.39 mg/L during the first 2018 semiannual event to 7.41 mg/L during the second 2018 semiannual event, which was the historical maximum in this well over the four most recent sampling events. Fluoride concentrations have exceeded the CGWSL in this well during three of the four most recent sampling events.
- Sulfate concentrations in MW-104 increased from 437 mg/L (duplicate sample) during the first 2018 semiannual event to 746 mg/L (duplicate sample) during the second 2018

semiannual event, which was the historical maximum and first exceedance of the CGWSL (600 mg/L) in this well over the six most recent sampling events.

5.3.7 Field East of Refinery – Analytical Results

Groundwater monitoring is ongoing in the field east of the refinery located between the refinery and the EPs. Analytical results of groundwater samples collected from wells located within the field east of the refinery in 2018 indicate COCs are present in groundwater in excess of their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

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

Groundwater samples were collected from the following wells located within the field east of the refinery during each 2018 semiannual event for analysis of DRO:

- First Semiannual Event (20 wells): KWB-1A, KWB-10R, KWB-11A, KWB-11B, KWB-12B, MW-57, MW-58, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-127, MW-128, MW-129, MW-130, MW-134, MW-135, RW-12R, and RW-13R.
- Second Semiannual Event (19 wells): KWB-1A, KWB-7, KWB-10R, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-58, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-127, MW-128, MW-130, MW-134, and MW-135.

DRO was detected at concentrations in exceedance of the CGWSL of 0.0398 mg/L in all wells sampled except KWB-12B during the first 2018 semiannual event (maximum concentration of 5.73 mg/L in MW-58) and in all wells sampled except KWB-11B during the second 2018 semiannual event (maximum concentration of 4.86 mg/L in MW-58), as highlighted in Table 4A. As shown in the COC concentration plots included in Appendix C-7, DRO concentrations in wells KWB-1A, KWB-7, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-58, MW-125, and MW-134 have exhibited an overall increasing trend over time with occasional fluctuations. However, DRO concentrations have stabilized in these wells over at least the seven most recent sampling events except in KWB-11A, KWB-11B, KWB-12A, and MW-125. DRO concentrations in these wells will be watched closely during future sampling events.

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

Groundwater samples were collected from the following wells located within the field east of the refinery during each 2018 semiannual event for analysis of GRO:

- First Semiannual Event (15 wells): KWB-11A, KWB-11B, KWB-12B, MW-57, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-127, MW-128, MW-129, MW-130, MW-134, and MW-135.

- Second Semiannual Event (15 wells): KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-127, MW-128, MW-130, MW-134, and MW-135.

GRO was detected above the method detection limit in eight wells sampled during the first 2018 semiannual event (maximum concentration of 5.15 mg/L in MW-127) and in six wells sampled during the second 2018 semiannual event (maximum concentration of 3.13 mg/L in MW-127). GRO analytical results in groundwater samples collected from wells located in the field east of the refinery in 2018 were overall consistent with historical results, as shown in the COC concentration plots included in Appendix C. GRO concentrations in well KWB-11A have overall increased since 2012, but have stabilized over the nine most recent sampling events (i.e., since October 2014).

There is no applicable CGWSL for GRO, but previous NMED guidance (NMED 2012) required analysis of VOCs when GRO is present for comparison to applicable individual VOC screening levels. VOC results are discussed in the following subsection.

Volatile Organic Compounds, Field East of Refinery

Groundwater samples were collected from the following wells located in the field east of the refinery during each 2018 semiannual event for analysis of VOCs:

- First Semiannual Event (23 wells): KWB-1A, WB-10R, KWB-11A, KWB-11B, KWB-12B, MW-57, MW-58, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-127, MW-128, MW-129, MW-130, MW-134, MW-135, RA-4196, RA-4798, RW-12R, RW-13R, and RW-18A.
- Second Semiannual Event (21 wells): KWB-1A, KWB-7, KWB-10R, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-58, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-127, MW-128, MW-129, MW-130, MW-134, MW-135, RA-4196, and RA-4798.

Benzene, ethylbenzene, MTBE, naphthalene, and 1,2,4-TMB were detected at concentrations in exceedance of their respective CGWSLs in at least one well located in the field east of the refinery, as highlighted in Table 4A and described below:

- Benzene exceeded the CGWSL of 0.005 mg/L in nine wells sampled during the first 2018 semiannual event at a maximum concentration of 4.12 mg/L in MW-58; and in six wells sampled during the second 2018 semiannual event at a maximum concentration of 7.11 mg/L in MW-58.
- Ethylbenzene exceeded the CGWSL of 0.70 mg/L in well MW-58 during the first 2018 semiannual event at a concentration of 0.946 mg/L; and in no wells sampled during the second 2018 semiannual event.

- MTBE exceeded the CGWSL of 0.10 mg/L in five wells sampled during the first 2018 semiannual event at a maximum concentration of 5.40 mg/L in MW-129; and in four wells sampled during the second 2018 semiannual event at a maximum concentration of 4.12 mg/L in KWB-10R.

- Naphthalene exceeded the CGWSL of 0.030 mg/L in two wells sampled (MW-58 and MW-128) during the first 2018 semiannual event at a maximum concentration of 0.267 mg/L in MW-58; and in no wells sampled during the second 2018 semiannual event.

- 1,2,4-TMB exceeded the CGWSL of 0.015 mg/L in two wells sampled (KWB-10R and MW-58) during the first 2018 semiannual event at a maximum concentration of 0.574 mg/L in MW-58; and in well KWB-10R during the second 2018 semiannual event at a concentration of 0.215 J mg/L in KWB-10R.

The 2018 analytical results of target VOCs in groundwater samples collected from wells located in the field east of the refinery were generally consistent with historical results. As shown in the COC concentration plots included in Appendix C, concentrations of target VOCs in wells located in the field east of the refinery have wells have exhibited stable to fluctuating trends over time, with the following exceptions:

- Benzene, ethylbenzene, total xylenes, and naphthalene concentrations in MW-58 have overall increased since 2011. However, concentrations of these VOCs in MW-58 have exhibited a decreasing trend over the nine most recent sampling events with occasional fluctuations (i.e., since October 2014).

- Benzene concentrations in MW-128 increased over the four most recent sampling events from 0.0563 J mg/L in April 2017 to 0.0701 mg/L in October 2017 to 0.122 mg/L in April 2018 to 0.729 mg/L in October 2018. Benzene has historically exceeded the CGWSL in this well, but the October 2018 concentration was the historical maximum reported in this well. Benzene concentrations in this well will be watched closely during future monitoring events.

- Naphthalene concentrations increased in MW-128 from 0.00142 J mg/L during the second 2017 semiannual event (October 2017) to 0.0422 J mg/L during the first 2018 semiannual event, which was the first exceedance of the CGWSL and the historical maximum reported in this well. However, naphthalene was not detected above the method detection limit of 0.020 mg/L in MW-128 during the second 2018 semiannual event. Naphthalene concentrations have fluctuated above and below the CGWSL over time in several wells located in the field east of the refinery.

Total Metals, Field East of Refinery

In 2018, groundwater samples were collected from the following wells located in the field east of the refinery during each 2018 semiannual event for analysis of the standard total metals list (arsenic, barium, chromium, iron, lead, manganese, and selenium):

- First Semiannual Event (21 wells): KWB-1A, KWB-10R, KWB-11A, KWB-11B, KWB-12B, MW-57, MW-58, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-127, MW-128, MW-129, MW-130, MW-134, MW-135, RW-12R, RW-13R, and RW-18A.
- Second Semiannual Event (19 wells): KWB-1A, KWB-7, KWB-10R, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-58, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-127, MW-128, MW-130, MW-134, and MW-135.

In addition, groundwater samples collected from wells KWB-1A, KWB-11A, KWB-11B, KWB-12B, and MW-58 during both 2018 semiannual events, and wells KWB-7 and KWB-12A during the second 2018 semiannual event, were analyzed for the expanded metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium).

Cadmium, cobalt, chromium, lead, mercury, nickel, selenium, and vanadium were not detected above their respective CGWSLs in any of the wells sampled in the field east of the refinery during either 2018 semiannual event. Arsenic, barium, iron, manganese, and uranium were detected at concentrations in exceedance of their respective CGWSLs in at least one well, as highlighted in Table 4B and described below:

- Arsenic exceeded the CGWSL of 0.010 mg/L in five wells sampled during the 2018 semiannual event at a maximum concentration of 0.0566 mg/L in MW-128; and in three wells sampled during the second 2018 semiannual event a maximum concentration of 0.0487 mg/L in KWB-11A.
- Barium exceeded the CGWSL of 2.00 mg/L in well KWB-10R during both 2018 semiannual events at a concentration of 3.91 mg/L during the first event and 3.93 mg/L during the second event.
- Boron exceeded the CGWSL of 0.75 mg/L in well KWB-1A during the first 2018 semiannual event at a concentration of 0.759 mg/L; and in no wells during the second 2018 semiannual event.
- Iron exceeded the CGWSL of 1.00 mg/L in five wells sampled during the first 2018 semiannual event at a maximum concentration of 6.30 mg/L in MW-111; and in four wells sampled during the second 2018 semiannual event at a maximum concentration of 12.6 mg/L in KWB-11A.

- Manganese exceeded the CGWSL of 0.200 mg/L in 12 wells sampled during the first 2018 semiannual event at a maximum concentration of 2.04 mg/L in MW-128; and in nine wells sampled during the second 2018 semiannual event at a maximum concentration of 2.55 mg/L in KWB-7.

- Uranium exceeded the CGWSL of 0.030 mg/L in well KWB-12B (duplicate sample) during the first 2018 semiannual event at a concentration of 0.0304 mg/L; and in no wells sampled during the second 2018 semiannual event.

The 2018 groundwater analytical results of total metals in wells located in the field east of the refinery were generally consistent with historical results, with the following exceptions:

- Arsenic concentrations increased in KWB-11A over the four most recent sampling events from 0.00183 J mg/L in April 2017 to 0.0089 mg/L in October 2017 to 0.0112 mg/L in April 2018 to 0.0487 mg/L in October 2018. Arsenic has previously exceeded the CGWSL in this well, but the October 2018 concentration was the historical maximum reported in this well. Arsenic concentrations in this well will be watched closely during future monitoring events.

- Boron concentrations in KWB-8 increased from 0.745 mg/L during the second 2017 semiannual event (October 2017) to 0.759 mg/L during the first 2018 semiannual event, which is the first exceedance of the CGWSL (0.75 mg/L) in this well. However, boron concentrations in this well decreased to below the CGWSL during the second 2018 semiannual event at 0.734 mg/L. There is limited historical data available for this metal as it was first included in the groundwater monitoring program in 2016.

- Iron concentrations increased in KWB-11A over the four most recent sampling events from not detected above the method detection limit of 0.0150 mg/L in April 2017 to 0.100 mg/L in October 2017 to 0.595 mg/L in April 2018 to 12.6 mg/L in October 2018. The reported iron concentration in October 2018 was the first exceedance of the CGWSL in this well over the six most recent sampling events. Iron concentrations have historically fluctuated above and below the CGWSL in wells located in the field east of the refinery and other wells located across the refinery.

- Manganese concentrations increased in KWB-11A over the four most recent sampling events from 0.243 mg/L in April 2017 to 0.325 mg/L in October 2017 to 0.413 mg/L in April 2018 to 1.98 mg/L in October 2018. Manganese concentrations in this well have historically exceeded the CGWSL.

- Mercury concentrations increased an order of magnitude from not detected above the method detection limit of 0.000049 mg/L in wells KWB-1A, KWB-7, and KWB-11A during the first 2018 semiannual event to estimated J-flagged concentrations of

0.000132 J mg/L, 0.000134 J mg/L, and 0.000140 J mg/L during the second 2018 semiannual event, respectively. Mercury concentrations in KWB-11B increased from not detected above the method detection limit of 0.000049 mg/L in the second 2017 semiannual event (October 2017) to 0.0000648 J mg/L in the first 2018 semiannual event (with mercury detections in the associated laboratory method blank) to 0.000180 J mg/L in the second 2018 semiannual event. Mercury concentrations in all these wells remain below the CGWSL of 0.002 mg/L.

As shown in the COC concentration plots included in Appendix C, concentrations of target COC arsenic in wells located in the field east of the refinery are overall stable, with the exception noted above in KWB-11A. Arsenic concentrations have fluctuated above and below the CGWSL over time in wells KWB-1A, KWB-7, KWB-11A, MW-58, MW-111, and RW-18A.

Cyanide, Field East of Refinery

Groundwater samples collected from wells KWB-1A, KWB-11A, KWB-11B, KWB-12B, and MW-58 during both 2018 semiannual events, and wells KWB-7 and KWB-12A during the second 2018 semiannual event, were analyzed for cyanide. Cyanide was not detected above the method detection limit or the CGWSL in groundwater samples collected from these wells during either semiannual event.

Water Quality Parameters, Field East of Refinery

In 2018, groundwater samples were collected from the following wells located in the field east of the 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 (23 wells): KWB-1A, KWB-10R, KWB-11A, KWB-11B, KWB-12B, MW-57, MW-58, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-127, MW-128, MW-129, MW-130, MW-134, MW-135, RA-4196, RA-4798, RW-12R, RW-13R, and RW-18A.
- Second Semiannual Event (21 wells): KWB-1A, KWB-7, KWB-10R, KWB-11A, KWB-11B, KWB-12A, KWB-12B, MW-57, MW-58, MW-111, MW-113, MW-125, MW-126A, MW-126B, MW-127, MW-128, 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 the 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.

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), RA-3156 (located across southeast of the refinery), and MW-136 (located north of the refinery) were sampled during both 2016 semiannual events. Up-gradient wells UG-1, UG-2, and UG-3R, which all are located to the west of the refinery, were sampled during the first semiannual event. Analytical results of groundwater samples collected from cross-gradient and up-gradient wells in 2018 indicate COCs are present in groundwater in excess of their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

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

In 2018, groundwater samples were collected from the following cross-gradient and up-gradient wells during each semiannual event for analysis of DRO:

- 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

As shown in Table 4A, DRO was detected at concentrations in exceedance of the CGWSL of 0.0398 mg/L in up-gradient wells UG-1 and in two cross-gradient wells (KWB-13 and MW-136) during the first 2018 semiannual event; and in cross-gradient well MW-136 during the second 2018 semiannual event. However, DRO concentrations reported for these cross-gradient and up-gradient wells in 2018 did not exceed the previous CGWSL (NMED 2012) of 0.20 mg/L. The maximum DRO concentration detected in these wells was 0.0723 J mg/L in UG-1 during the first semiannual event and 0.0676 J mg/L in MW-136 during the second semiannual event.

As shown in the COC concentration plots included in Appendix C, DRO concentrations in cross-gradient and up-gradient wells are stable over time except in up-gradient well UG-1. DRO concentrations in UG-1 increased over the three most recent sampling events from estimated J-flagged concentrations of 0.0302 J mg/L in October 2017 to 0.0484 J mg/L in April 2018 to 0.0723 J mg/L.

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

In 2018, groundwater samples were collected from the following cross-gradient and up-gradient wells during each semiannual event for analysis of GRO:

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

GRO was not detected above the method detection limit in any sample collected from the up-gradient and cross-gradient wells during either 2018 semiannual event.

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

In 2018, 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, RA-3156, MW-136, UG-1, UG-2, UG-3R, and UG-4.
- Second Semiannual Event (one well): MW-136.

No VOCs were detected above the method detection limits or their respective CGWSL during either 2018 semiannual event, as shown in Table 4A. The 2018 VOC results for groundwater samples collected from cross-gradient and up-gradient wells were consistent with historical results.

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

In 2018, 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):

- 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

In addition, groundwater samples collected from wells KWB-13, UG-1, UG-2, UG-3R, and UG-4 during the first 2018 semiannual event and from well MW-136 during both 2018 semiannual events were analyzed for the expanded metals list (boron, cadmium, cobalt, mercury, nickel, uranium, and vanadium).

Arsenic, barium, cadmium, cobalt, chromium, lead, manganese, mercury, nickel, selenium, and vanadium were not detected above their respective CGWSLs in any of the cross-gradient or up-gradient wells sampled during either 2018 semiannual event. Iron, boron, and uranium were detected at concentrations in exceedance of their respective CGWSLs in at least one well, as highlighted in Table 4B and described below:

- Boron exceeded the CGWSL of 0.75 mg/L in up-gradient well UG-4 during the first 2018 semiannual event at a concentration of 1.07 mg/L; and in no wells sampled during the second 2018 semiannual event.

- Iron exceeded the CGWSL of 1.00 mg/L in cross-gradient well KWB-13 during the first 2018 semiannual event at a concentration of 3.01 mg/L; and in no wells sampled during the second 2018 semiannual event.

- Uranium exceeded the CGWSL of 0.030 in two wells sampled (MW-136 and UG-4) during the first 2018 semiannual event at a maximum concentration of 0.0675 mg/L in MW-136; and in well MW-136 during the second 2018 semiannual event at a concentration of 0.0688 mg/L.

The 2018 analytical results of total metals in groundwater samples collected from cross-gradient and up-gradient wells were generally consistent with historical results, with the exception of mercury in cross-gradient well MW-136. Mercury concentrations in MW-136 increased from not detected above the method detection limit of 0.000049 mg/L in the second 2017 semiannual event (October 2017) to 0.0000593 J mg/L in the first 2018 semiannual event (with mercury detections in the associated laboratory method blank) to 0.000168 J mg/L in the second 2018 semiannual event. Mercury concentrations in MW-136 remain below the CGWSL of 0.002 mg/L. Concentrations of target COC arsenic in cross-gradient and up-gradient wells are overall stable to decreasing over time, as shown in the COC concentration plots included in Appendix C.

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 KWB-13, MW-136, UG-1, UG-2, UG-3R, and UG-4 during either 2018 semiannual events.

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

In 2018, 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, RA-3156, MW-136, 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 groundwater samples from cross-gradient and up-gradient wells, as highlighted in Table 4C. The reported concentrations of these constituents in 2018 were consistent with historical results.

5.3.9 RO Reject Discharge Fields – Analytical Results

The reject water from Navajo's RO system is discharged to agricultural fields located north of the refinery in accordance with the Discharge Permit. These areas are referred to as the North and South RO Reject Fields. Groundwater samples were collected from the three North RO Reject Field wells (MW-117, MW-118, and MW-119) and three South RO Reject Field wells (MW-114, MW-115, and MW-116) during both 2017 semiannual events. 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 2018 indicate COCs are present in groundwater in excess of their respective CGWSLs, as highlighted in Tables 4A through 4C and discussed in the following subsections.

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

As shown in Table 4A, DRO exceeded the CGWSL of 0.0398 mg/L in North RO Reject Field well MW-119 during the first 2018 semiannual event at a concentration of 0.0470 J mg/L; and in South RO Reject Field well MW-116 during the second 2018 semiannual event at a concentration of 0.0468 J mg/L. However, DRO concentrations reported for RO Reject Field wells in 2018 did not exceed the previous CGWSL (NMED 2012) of 0.20 mg/L.

As shown in the COC concentration plots included in Appendix C, DRO concentrations in RO Reject Field wells are stable over time.

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

GRO was not detected above the method detection limit in the six RO Reject Field wells sampled during both 2018 semiannual events, which is consistent with historical results.

Volatile Organic Compounds, RO Reject Discharge Fields

VOCs were not detected above the method detection limit or their respective CGWSLs in the six RO Reject Field wells sampled during both 2018 semiannual events. The 2018 VOC results in RO Reject Field wells are consistent with historical results.

Total Metals, RO Reject Discharge Fields

Barium, chromium, iron, lead, and selenium were not detected above their respective CGWSLs in any of the six RO Reject Field wells sampled during both 2018 semiannual events. Arsenic and manganese were detected at concentrations in exceedance of their respective CGWSLs in at least one well, as highlighted in Table 4B and described below:

- Arsenic exceeded the CGWSL of 0.010 mg/L in no wells sampled during the first 2018 semiannual event; and in well MW-118 during the second 2018 semiannual event at a concentration of 0.0103 mg/L.
- Manganese exceeded the CGWSL of 0.200 mg/L in MW-114 during both 2018 semiannual events at a concentration of 0.900 mg/L during the first event and 0.867 mg/L during the second event.

The 2017 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 C.

Cyanide, RO Reject Discharge Fields

Groundwater samples collected from RO Reject Field wells in 2018 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 2018 were generally consistent with historical results, with the exception of chloride in North RO Reject well MW-118 during the both 2018 semiannual events. Chloride concentrations increased in MW-118 from 192 mg/L in the second 2017 semiannual event (October 2017) to 292 mg/L in the first 2018 semiannual event and 259 mg/L in the second 2018 semiannual event, which were the first exceedances of the CGWSL (250 mg/L) over the six most recent sampling events. Chloride concentrations have historically fluctuated above and below the CGWSL in RO Reject Field wells and other wells located across the refinery.

No CGWSLs are applicable for calcium, potassium, or sodium. The 2018 results of these analytes were consistent with historical results.

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 recovered at the refinery from a system of recovery trenches and recovery wells. 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 measureable PSH since the upgraded system was installed in 2012. A summary of the recovery system and recovery results are summarized in this section.

6.1 Recovery System

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 2018 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-15C, 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 2018 O&M activities area summarized in Appendix E. Measurable PSH was not observed in RW-1R, RW-2R, RW-4R, RW-7R, and RW-12R during 2018.

6.2 Estimated Volume of Fluids Recovered

Volumes of groundwater and PSH recovered by the recovery system during 2018 are summarized in Table 5 and additional recovery details are provided in Appendix E. An estimated 1,955,630 gallons of groundwater and an estimated 23,201 gallons of PSH were recovered through operation of the automated recovery system in 2018. The majority of recovered PSH during 2018 was from RW-8R, RW-13R, RW-14R, RW-20, and RW-22. The greatest volume of PSH was recovered during the third quarter, which correlated with the timeframe of increased PSH thicknesses measured in the recovery wells, likely due to reduced groundwater levels.

7.0 CONCLUSIONS

Conclusions based on the results of groundwater monitoring and remedial activities conducted during 2018 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. Discharge of the RO reject water to the RO reject fields creates localized mounding. Localized groundwater sinks are occasionally observed around various recovery wells due to active pumping of groundwater.

The presence and distribution of PSH were generally consistent with previous monitoring results, with minor fluctuations. PSH thicknesses across all areas of interest are overall stable to declining over time, with the exception in newer wells (MW-112, MW-131, MW-132, and MW-134) located in the Field East of Refinery that are attributed to reductions in groundwater elevations since these wells were installed in 2013 and 2014. PSH thicknesses are inversely affected by fluctuations in groundwater elevations, which have generally increased since 2011 despite recent reductions in 2017 and 2018.

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 2011 have generally exhibited stabilizing trends over the most recent sampling events. During 2018 and previous years, the following COCs were detected in groundwater at concentrations in exceedance of their respective CGWSL:

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

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 2018. An estimated 1,955,630 gallons of groundwater and an estimated 23,201 gallons of PSH were recovered in 2018.

According to the requirements of the updated PCC Permit, an updated FWGMWP will be submitted in June 2018.

8.0 References

Arcadis 2014. Background Groundwater Evaluation Work Plan, NMD048918817 and DP GW-028. July 2014.

Arcadis 2015a. Evaporation Ponds Phase IV Corrective Action Investigation Report - Revised, NMD048918817. May 2015.

Arcadis 2015b. Background Groundwater Investigation Report, RCRA Permit NMD048918817, OCD Discharge Permit GW-028. September 2015.

Arcadis 2017. Revised Contaminant Migration Evaluation Investigation Report, RCRA Permit NMD048918817. April 2017.

NMED 2010. Navajo Refining Company, Artesia Refinery, Post-Closure Care Permit. December 2010.

NMED 2012. Risk Assessment Guidance for Site Investigations and Remediation. February 2012.

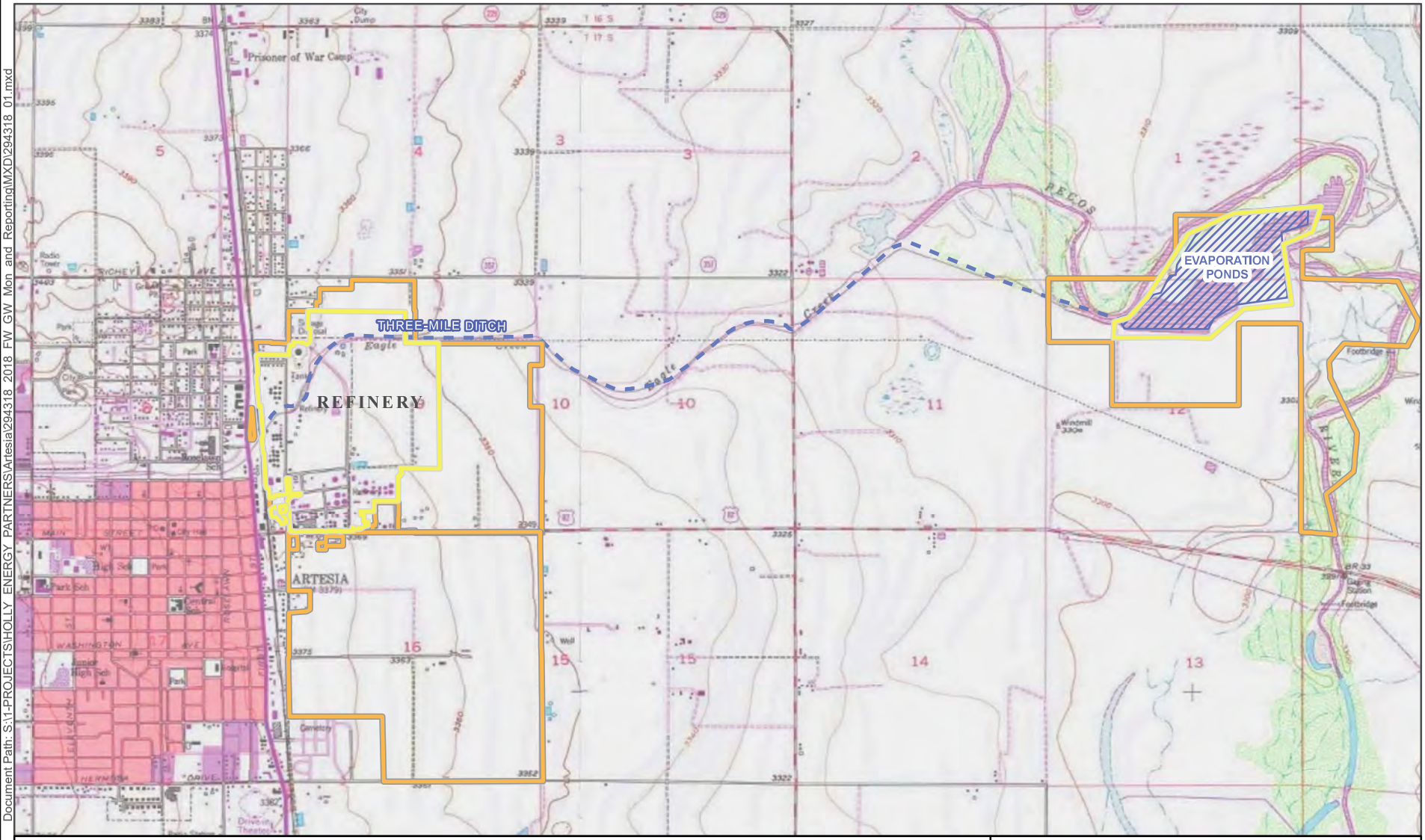
NMED 2017a. Risk Assessment Guidance for Site Investigations and Remediation. March 2017.

NMED 2017b. Approval with Modifications, 2017 Facility Wide Groundwater Monitoring Work Plan, June 2017, HollyFrontier Navajo Refining LLC - Artesia Refinery. October 2017.

OCD 2017. Discharge Permit (GW-028), Navajo Refining Company - Artesia Refinery. May 2017.

TRC 2017. 2017 Facility-Wide Groundwater Monitoring Work Plan - Artesia Refinery. June 2017.

USEPA 2018. Regional Screening Level (RSL) Summary Table. November 2018.



LEGEND

- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- THREE-MILE DITCH
- EVAPORATION PONDS

SOURCE: BASE MAP USGS 7.5 MINUTE SERIES QUADS, ARTESIA AND SPRINGLAKE QUADRANGLES, 1955, PHOTOREVISED 1983.

N

0 1,600 3,200
Feet

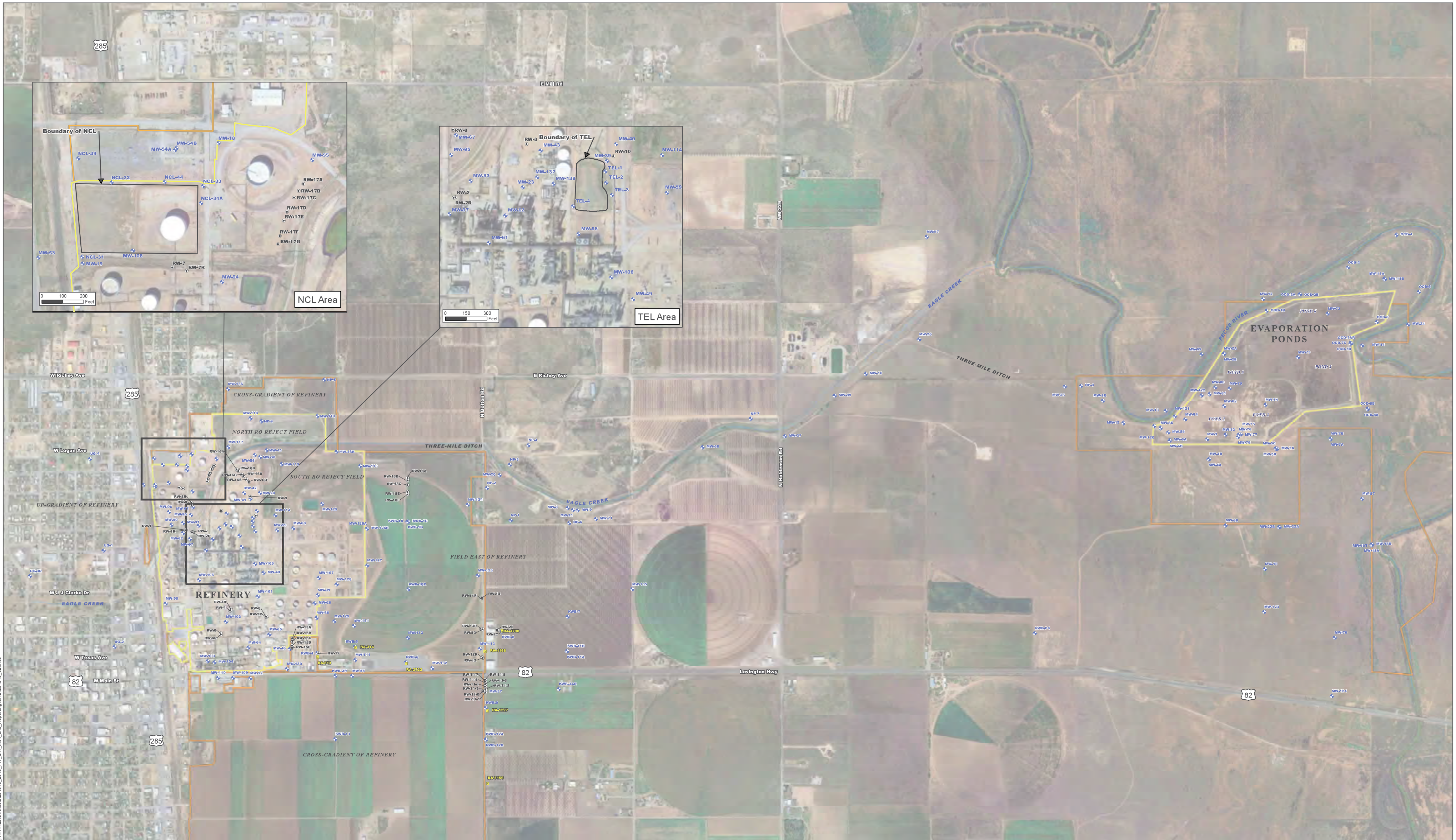
SITE LOCATION MAP

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

PROJECT NUMBER: 294318	FILE NAME: 294318_01
AUTHOR: SRAY	DATE: 2/26/2019

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

FIGURE 1



LEGEND

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

N W E S

0 750 1,500 Feet

1 IN = 750 FT

NEW MEXICO

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

Document Path: S:\1-PROJECTS\HOLLY_ENERGY_PARTNERS\Artesia\294316_2018_FW_GW_Mon_and_Reporting\MXD\294316_02.mxd

WELL LOCATION MAP

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: BRAY	SAVED: 2/26/2019	MXD: 294316_02

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

FIGURE
2

Tank Number	Location in Relation to AOCs & SWMUs	Diameter (ft)	Height / Length (ft)	Capacity (bbls)	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	Spent Caustic
41	Between AOC 3 & AOC 4	9	72	730	B. 1973	Spent Caustic
42	Between AOC 3 & AOC 4	9	67	700		Wild Naphtha
45	Between AOC 3 & AOC4	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
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	Sweet Naphtha
57	AOC 7	90	49	55,000	1981	Benfree Unit Feed
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	PG Asphalt
82	AOC 6	140	40	100,000	2009	PG Asphalt
106	AOC 3	67	40	22,500	B. 1971	Sour Water
107	AOC 3	67	40	22,500	B. 1971	Isomerate
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
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	Benfree Product
402	AOC 3	90	50	55,000	1983	Light Cat Naphtha
403	AOC 8	45	36	8,250		Out of Service
404	AOC 8	45	36	8,250		Out of Service
405	AOC 8	37	28	4,575		Out of Service
406	AOC 8	38	28	5,400		Out of Service
409	AOC 8	67	40	21,450		Out of Service
410	AOC 8	79	40	30,850	B. 1973	Asphalt
411	AOC 3	100	40	52,000	1951	Isomerate
412	AOC 3	100	40	52,000	1951	Gasoline Blend
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	Asphalt
422	AOC 8	50	30	8,200	B. 1973	Light Cycle Oil
423	AOC 8	50	30	8,200	B. 1970	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	Sour Naphtha
450	AOC 3	120	40	80,570	1997	Sour Naphtha
451	AOC 3	35	40	6,800	2015	Biodiesel
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	Pitch
821	AOC 3	105	40	65,000	2016	Light Cat Naphtha
815	SWMU 6	116	43	90,000	2005	ULSD
829	North of AOC 9	105	40	30,500	2015	Wastewater
830	North of AOC 9	150	40	100,000	2011	Stormwater (slop)
834	AOC 1	85	40	40,000	1967	Diesel
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	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
bbls = BARRELS
B. = BEFORE DATE SHOWN, ACTUAL DATE UNKNOWN
RBLT = REBUILT DATE SHOWN
RO = REVERSE OSMOSIS
OOS = OUT OF SERVICE
ULSD = ULTRA-LOW-SULFUR-DIESEL

LEGEND

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

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

N W E S

0 250 500
Feet

1 IN = 250 FT

NEW MEXICO

WELL LOCATIONS AND TANK INFORMATION WITHIN REFINERY

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY | SAVED: 10/4/2018 | MXD: 294318_03_Wells.mxd

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FIGURE 3

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LEGEND

- MONITORING WELL
- RECOVERY WELL
- GROUNDWATER FLOW DIRECTION
- SHALLOW SATURATED ZONE POTENTIOMETRIC SURFACE CONTOURS - DASHED WHERE INFERRED (FEET ABOVE MEAN SEA LEVEL)
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- 3339.38 GROUNDWATER ELEVATION (FEET)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

0 750 1,500
Feet

1 IN = 750 FT

NOTE:

1. GROUNDWATER ELEVATION COULD NOT BE MEASURED IN RECOVERY WELL BECAUSE TOP OF RECOVERY PUMP WAS ABOVE GROUNDWATER.
2. GROUNDWATER ELEVATION WAS NOT MEASURED BECAUSE WELL IS NOT IN GAUGING PROGRAM OR WELL COULD NOT BE LOCATED.

NEW MEXICO

SHALLOW SATURATED ZONE POTENTIOMETRIC SURFACE MAP 2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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FIGURE 4

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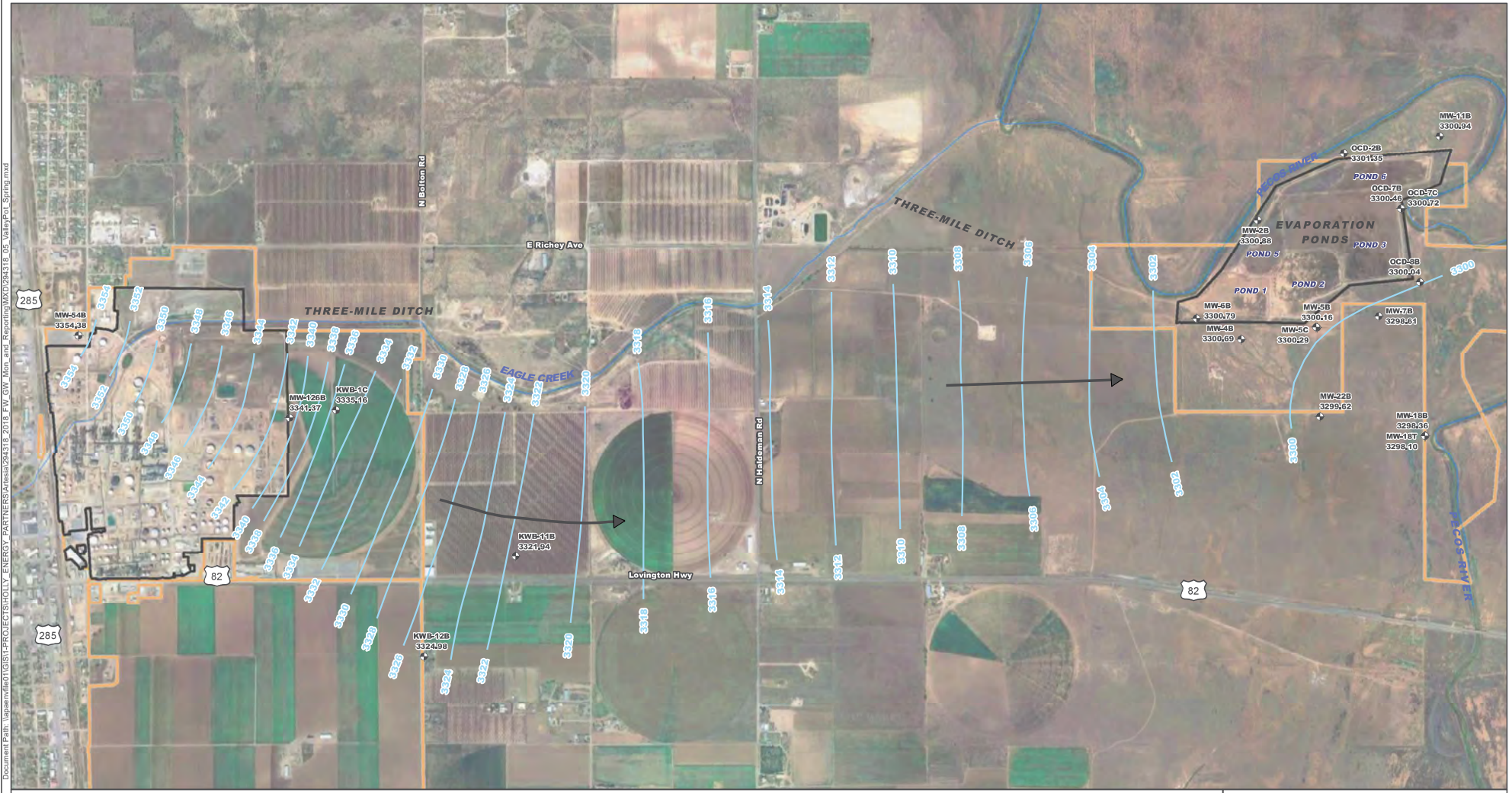

LEGEND

- MONITORING WELL
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- GROUNDWATER FLOW DIRECTION
- 3301.35 GROUNDWATER ELEVATION (FEET)
- VALLEY FILL ZONE POTENTIOMETRIC SURFACE CONTOURS (FEET ABOVE MEAN SEA LEVEL)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS. 3/12/2016.

N W E S

0 1,500 3,000
Feet

1 inch = 1,500 feet

NEW MEXICO

VALLEY FILL ZONE
POTENTIOMETRIC SURFACE MAP
2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHORN	SAVED: 2/27/2019	MXD: 294318_05_ValleyPot_Spring

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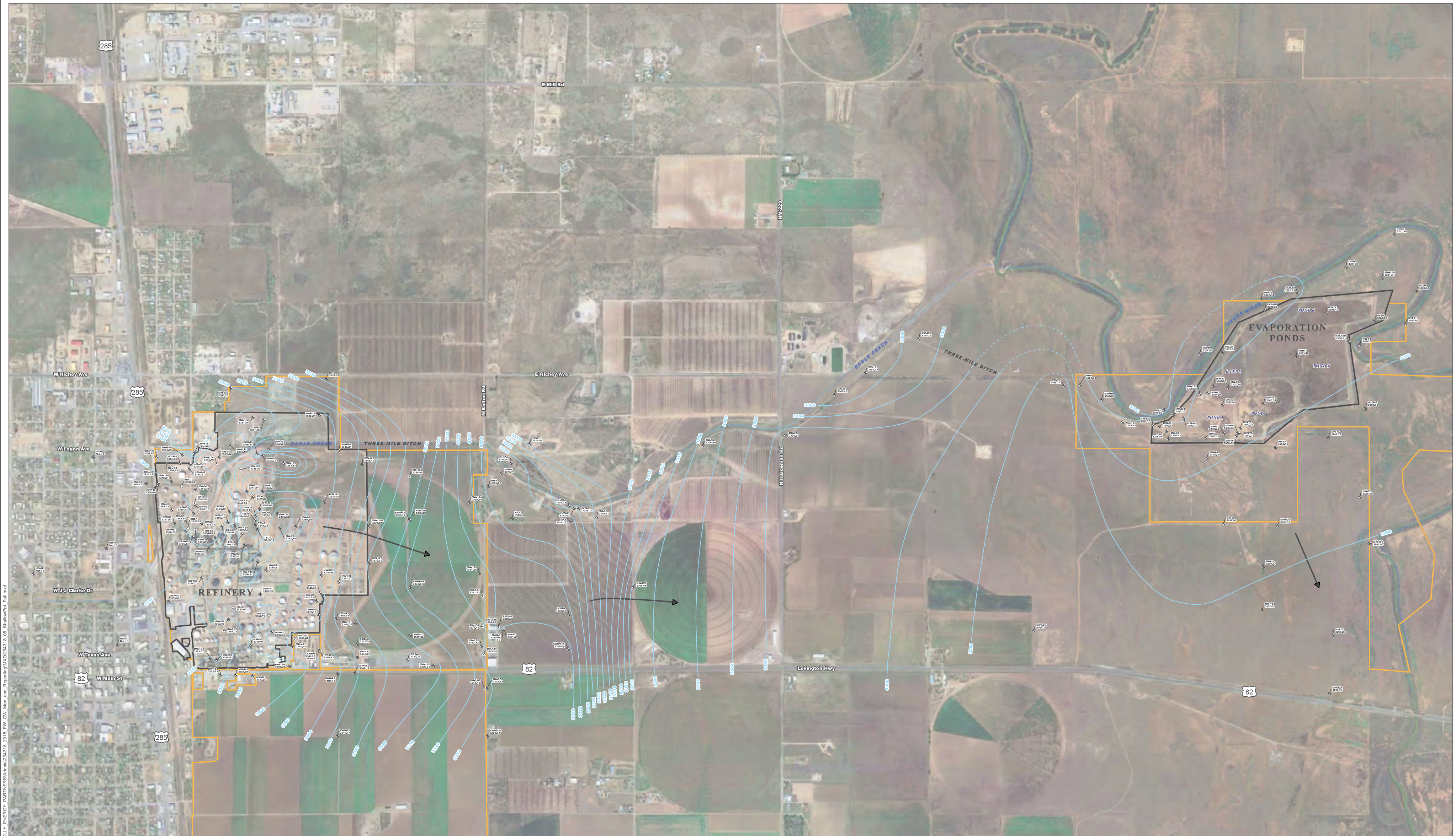
FIGURE 5

Document Path: \\agaenvfile01\GIS\1-PROJECTS\HOLLY_ENERGY_PARTNERS\Artesia\294318_2018_FW_GW_Mon_and_Reporting\MXD\294318_05_ValleyPot_Spring.mxd



LEGEND

- MONITORING WELL
- RECOVERY WELL
- GROUNDWATER FLOW DIRECTION
- SHALLOW SATURATED ZONE POTENTIOMETRIC SURFACE CONTOURS - DASHED WHERE INFERRED (FEET ABOVE MEAN SEA LEVEL)
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- 3353.97 GROUNDWATER ELEVATION (FEET)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

N W E S

0 750 1,500
Feet

1 IN = 750 FT

NOTE:
1. GROUNDWATER ELEVATION COULD NOT BE MEASURED IN RECOVERY WELL BECAUSE TOP OF RECOVERY PUMP WAS ABOVE GROUNDWATER.
2. GROUNDWATER ELEVATION NOT USED IN POTENTIOMETRIC SURFACE CONTOURING.
3. GROUNDWATER ELEVATION WAS NOT MEASURED BECAUSE WELL IS NOT IN GAUGING PROGRAM OR WELL COULD NOT BE LOCATED.

NEW MEXICO

SHALLOW SATURATED ZONE POTENTIOMETRIC SURFACE MAP 2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHORN	SAVED: 2/26/2019	MXD: 294318_06_ShallowPot_Fall

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FIGURE 6

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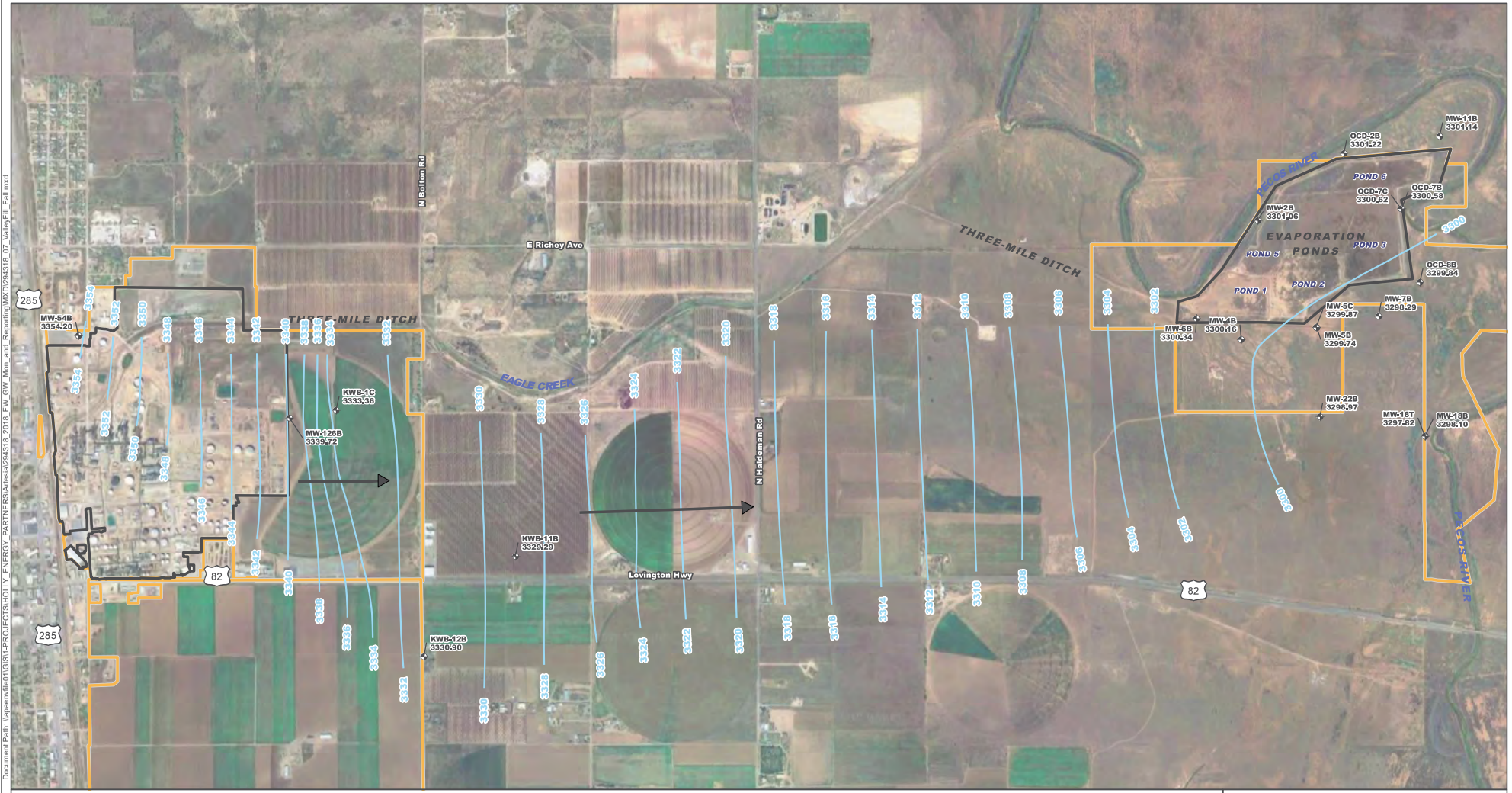

LEGEND

- MONITORING WELL
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- GROUNDWATER FLOW DIRECTION
- 3329.29 GROUNDWATER ELEVATION (FEET)
- VALLEY FILL ZONE POTENTIOMETRIC SURFACE CONTOURS (FEET ABOVE MEAN SEA LEVEL)

0 1,500 3,000
Feet

1 inch = 1,500 feet

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

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VALLEY FILL ZONE
POTENTIOMETRIC SURFACE MAP
2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHORN	SAVED: 2/27/2019	MXD: 294318_07_ValleyFill_Fall

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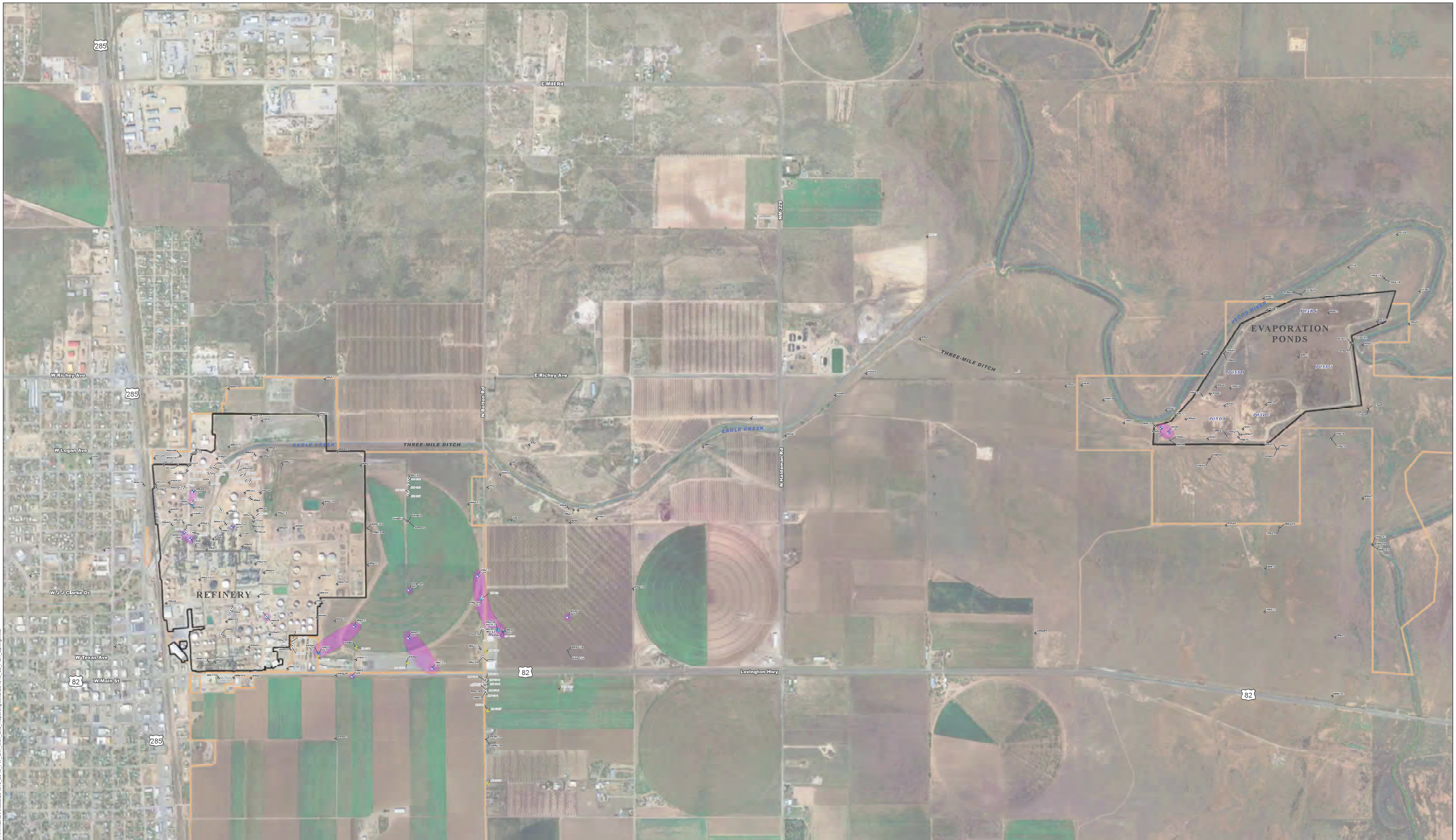
FIGURE 7



LEGEND

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

WELLS WITH PSH

- MONITORING WELL
- RECOVERY WELL
- RW-22 0.15 PSH THICKNESS
- RW-15A WELL NOT GAUGED

PSH THICKNESS IN FEET

- 0.01 - 3.15 FEET

NOTE:

1. ALL PHASE-SEPARATED HYDROCARBON (PSH) THICKNESSES PROVIDED IN FEET.
2. PSH PRESENT, BUT TOTAL PSH THICKNESS IN RECOVERY WELLS RW-20A AND RW-20B COULD NOT BE MEASURED BECAUSE GROUNDWATER ELEVATION BELOW TOP OF RECOVERY PUMP.

N W E S

0 750 1,500
Feet

1 IN = 750 FT

NEW MEXICO

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

PHASE-SEPARATED HYDROCARBON THICKNESS MAP
2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY | SAVED: 2/26/2019 | MXD: 294318_08_PSH_Spring

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FIGURE 8

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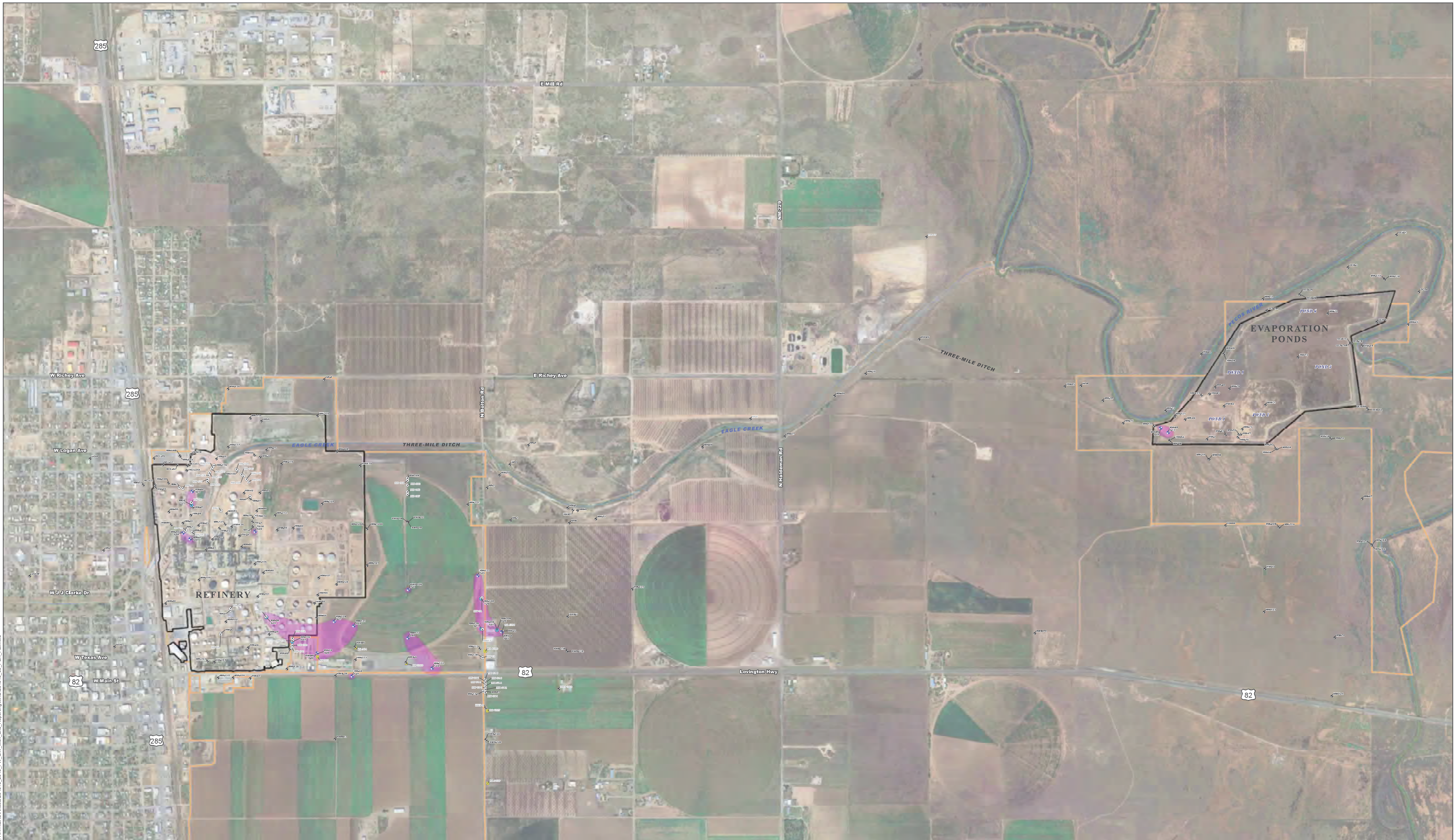

LEGEND

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

WELLS WITH PSH

- MONITORING WELL
- RECOVERY WELL
- PSH THICKNESS
- WELL NOT GAUGED

PSH THICKNESS IN FEET

- 0.01 - 2.60 FEET

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS.

NOTE:

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

0 750 1,500
Feet

1 IN = 750 FT

NEW MEXICO

PHASE-SEPARATED HYDROCARBON THICKNESS MAP
2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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FIGURE 9

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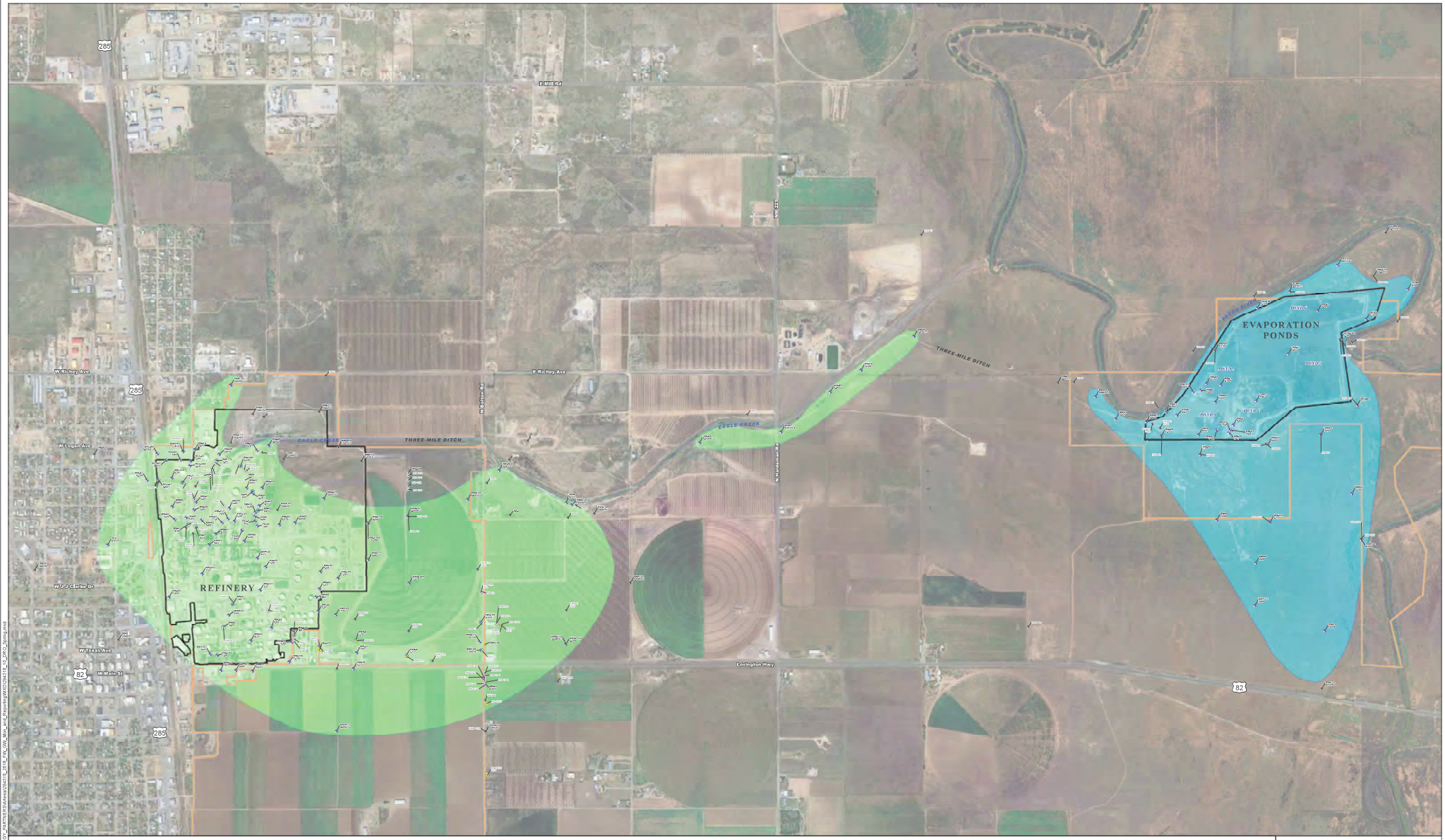

LEGEND

- 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 > 0.0398 mg/L)
- DRO CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA, EVAPORATION PONDS (CONCENTRATION > 0.0473 mg/L)
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

0 750 1,500
Feet

1 IN = 750 FT

NOTES:

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

NEW MEXICO

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/1/2019.

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DRO CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP
2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY	SAVED: 2/26/2019	MXD: 343415_FM_GW_DRO_Spring

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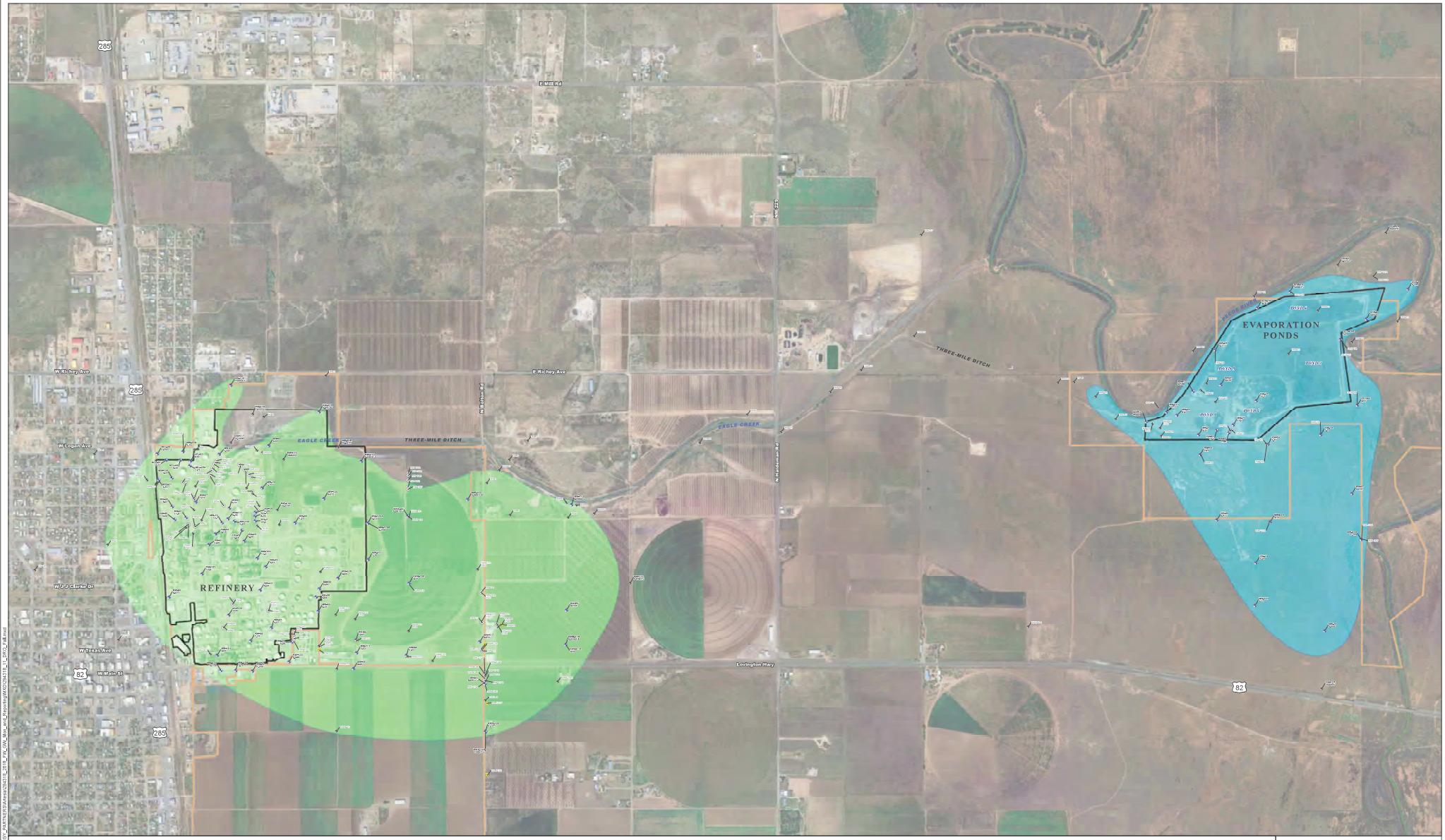
FIGURE 10



LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- 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 > 0.0398 mg/L)
- DRO CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA, EVAPORATION PONDS (CONCENTRATION > 0.0473 mg/L)
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

0 750 1,500 Feet

1 IN = 750 FT

NOTES:

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

NEW MEXICO

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/1/2019.

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DRO CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP
2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY	SAVED: 2/26/2019	MXD: 343415_1_DRO_Fall.mxd

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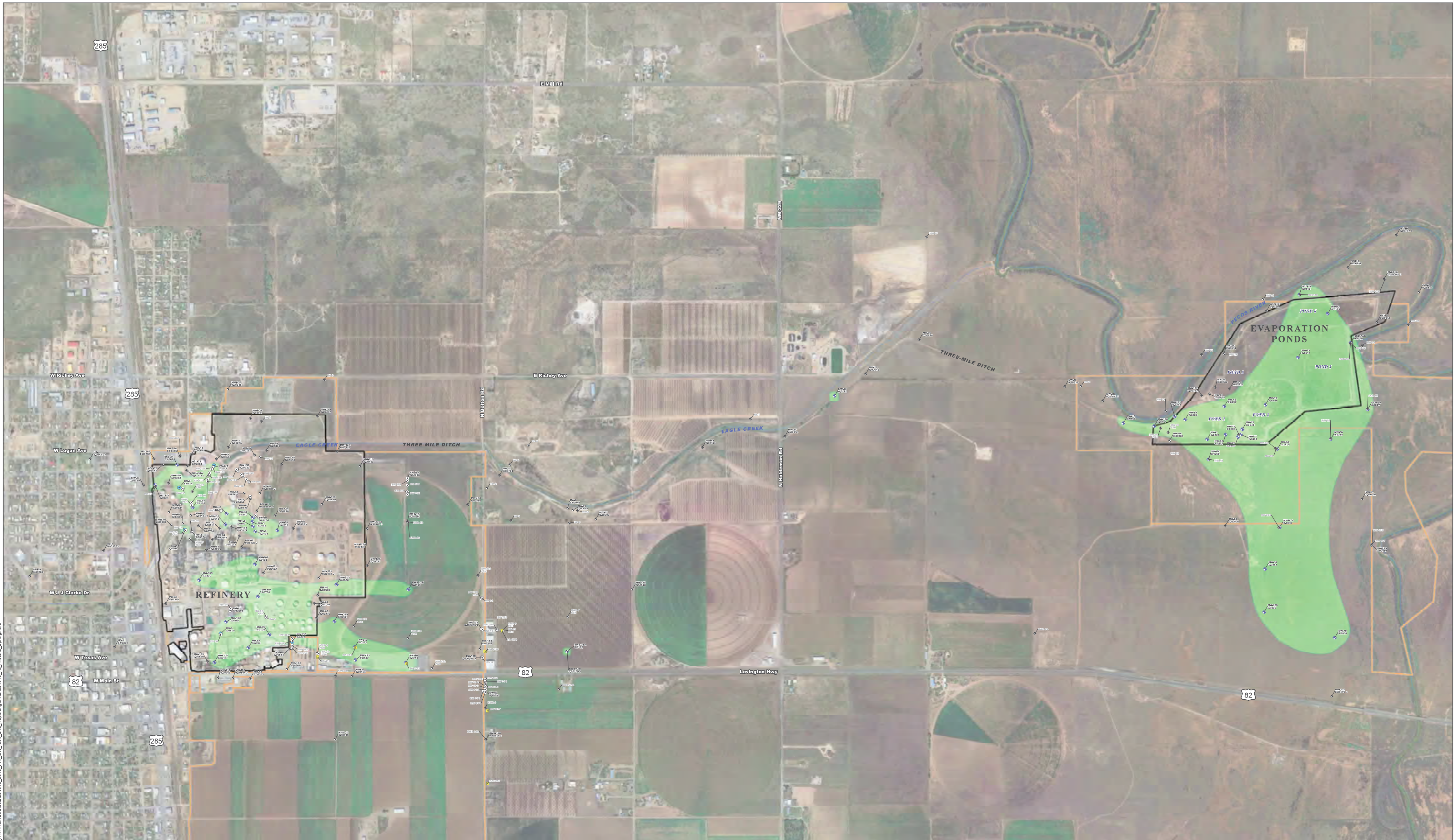
FIGURE 11



LEGEND

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

0.0213 ARSENIC CONCENTRATION

MW-19 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

NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

NOTES:

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

N W E S

0 750 1,500
Feet

1 IN = 750 FT

ARSENIC CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY	SAVED: 2/26/2019	MXD: 294318_12_Arsenic_Spring

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FIGURE 12

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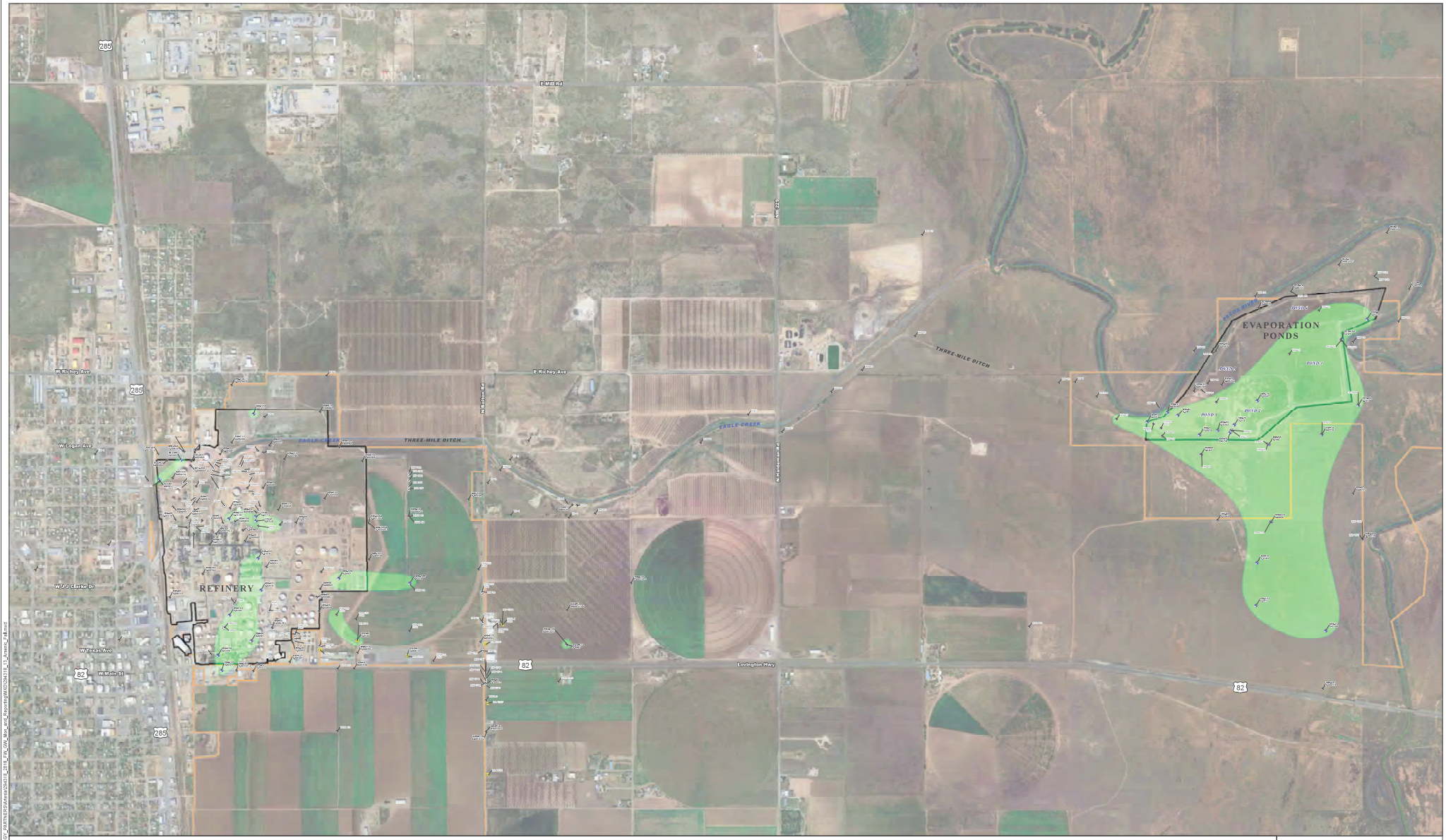

LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL
- 0.0116 ARSENIC CONCENTRATION
- MW-131 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

NOTES:

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

N W E S

0 750 1,500
Feet

1 IN = 750 FT

NEW MEXICO

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/1/2019.

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ARSENIC CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY	SAVED: 2/26/2019	MXD: 393415_13_Arsenic_Fig8

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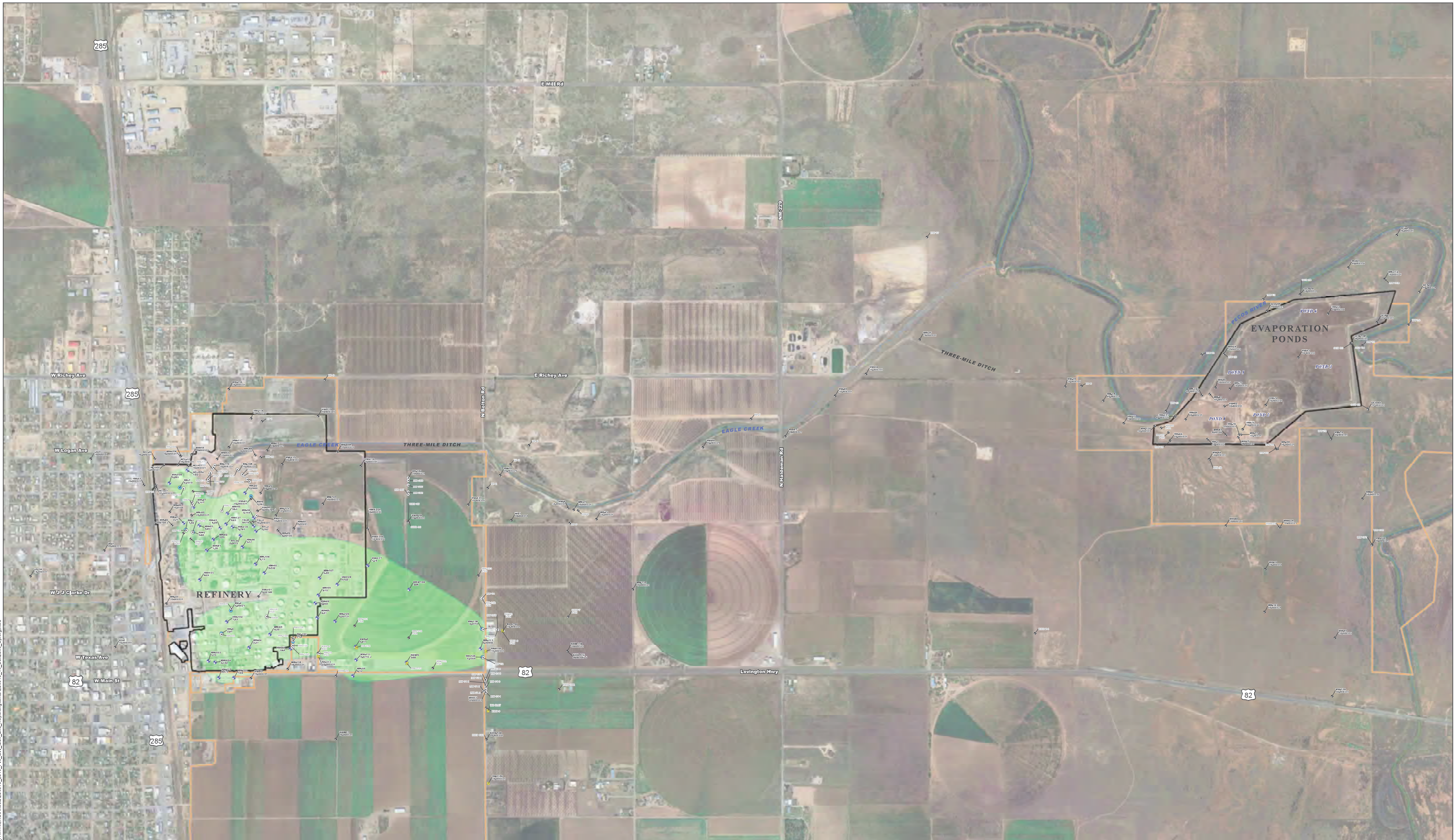
FIGURE 13



LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL
- BENZENE CONCENTRATION
- BENZENE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- WELL NOT SAMPLED
- PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- BENZENE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 0.005 mg/L)
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

NOTES:

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

0 750 1,500 Feet

1 IN = 750 FT

NEW MEXICO

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

Document Path: S:\1-PROJECTS\HOLLY_ENERGY_PARTNERS\Artesia\294318_2018_FW_GW_Mon_and_Reporting\MXD\294318_14_Benzene_Spring.mxd

BENZENE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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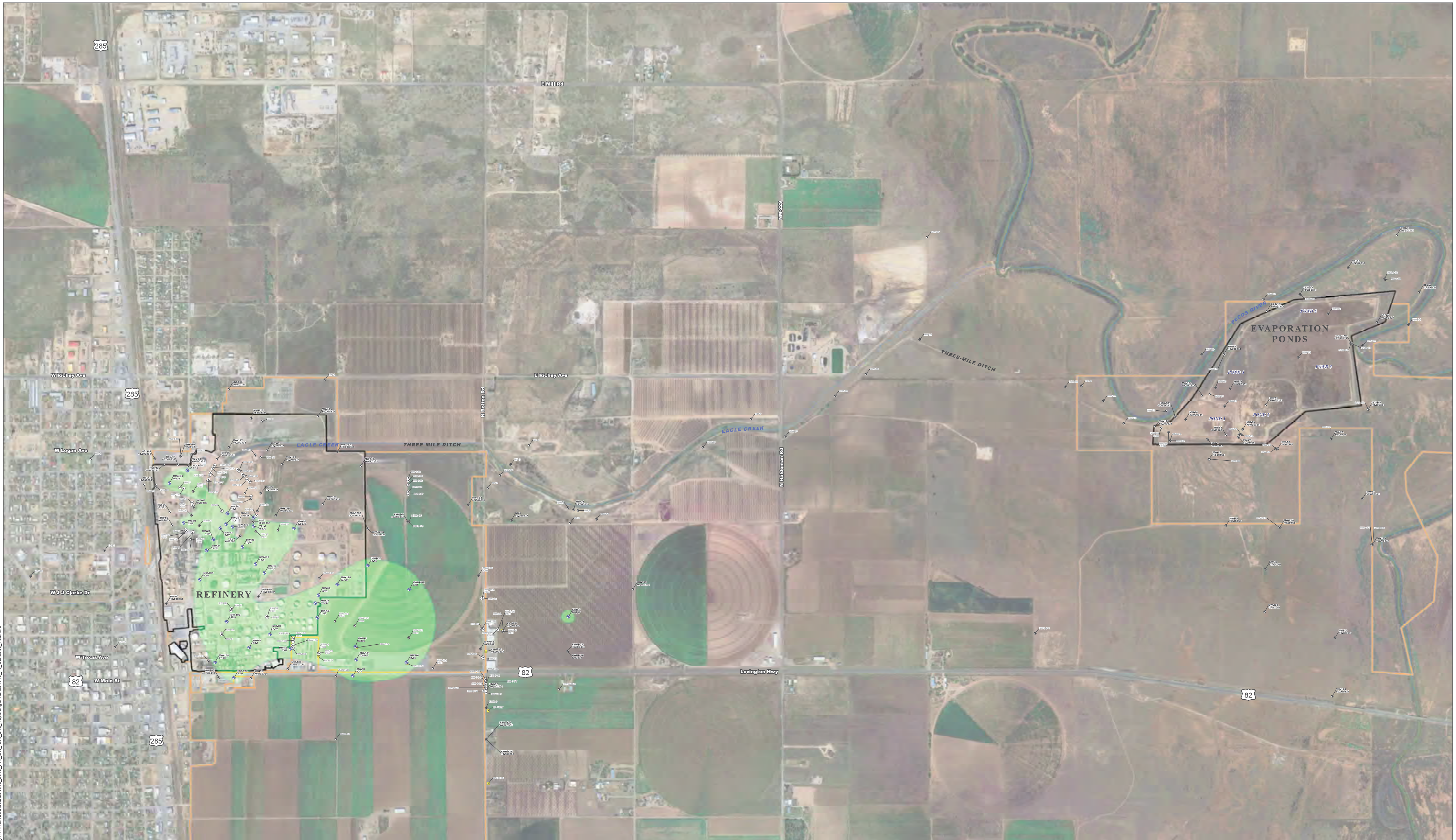
FIGURE 14



LEGEND

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

- 3.44 BENZENE CONCENTRATION
- <0.000331 BENZENE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- MW-103 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

NOTES:

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

0 750 1,500
Feet
1 IN = 750 FT

NEW MEXICO

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

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BENZENE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY	SAVED: 2/26/2019	MXD: 294318_15_Benzene_Fall

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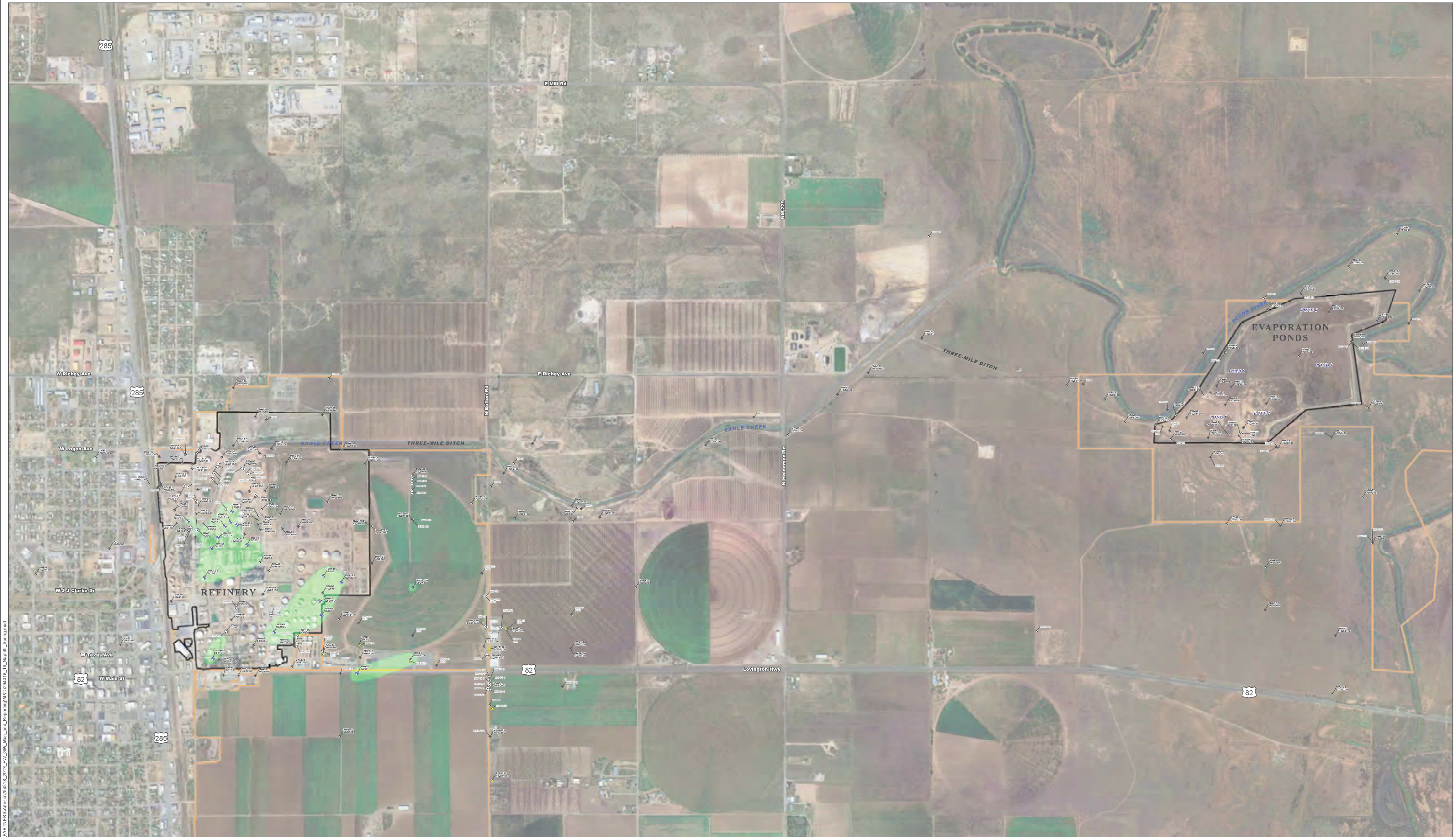
FIGURE 15



LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL
- NAPHTHALENE CONCENTRATION
- NAPHTHALENE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- WELL NOT SAMPLED
- PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- NAPHTHALENE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 0.03 mg/L)
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

NOTES:

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

N W E S

0 750 1,500
Feet

1 IN = 750 FT

NEW MEXICO

NAPHTHALENE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY	SAVED: 2/26/2019	MXD: 294318_16_Naphth_Spring

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FIGURE 16

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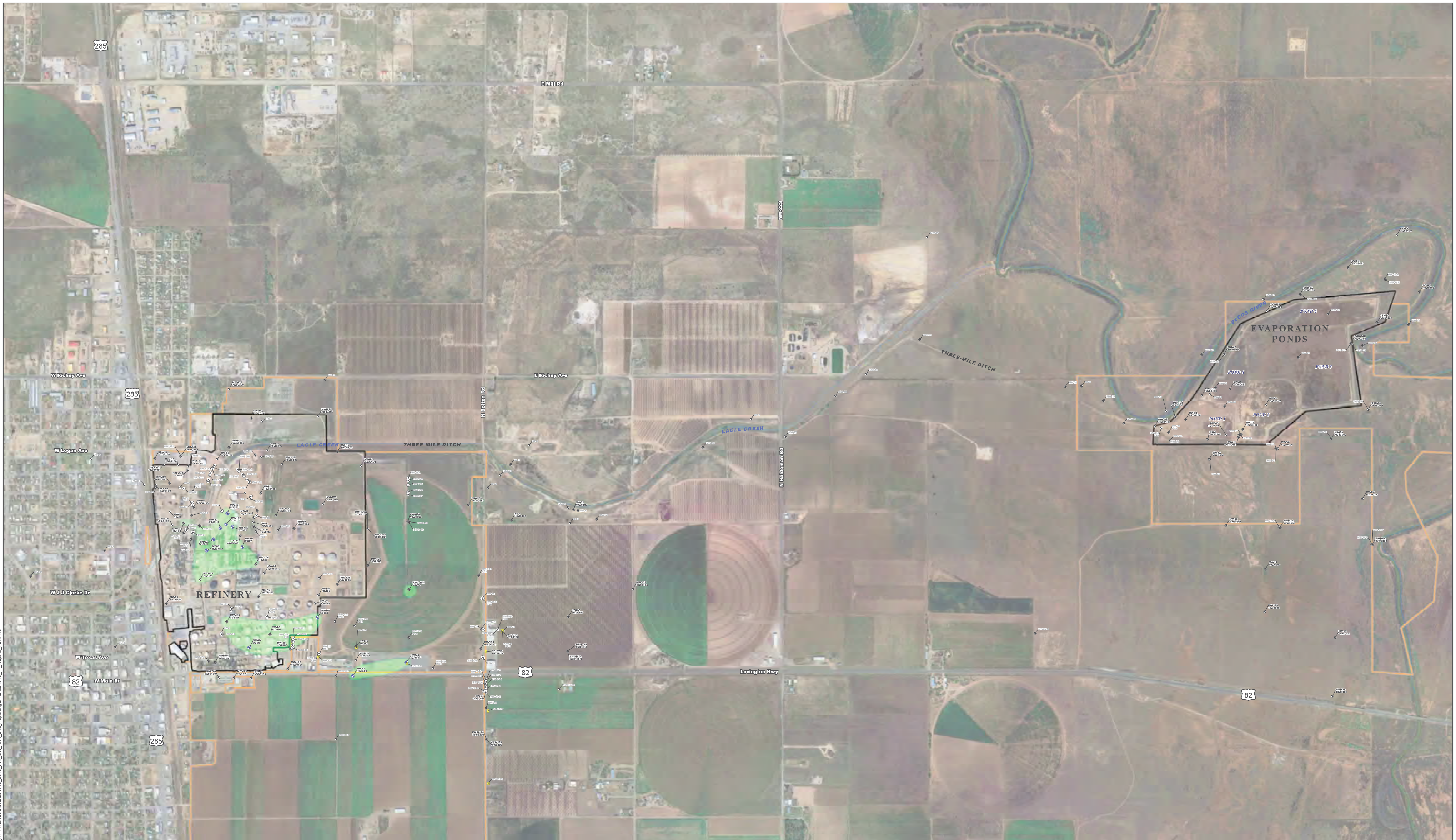

LEGEND

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

- 0.257 NAPHTHALENE CONCENTRATION
- < 0.00100 NAPHTHALENE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

NOTES:

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

N W E S

0 750 1,500
Feet

1 IN = 750 FT

NAPHTHALENE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY	SAVED: 2/27/2019	MXD: 294318_17_Naphth_Fall

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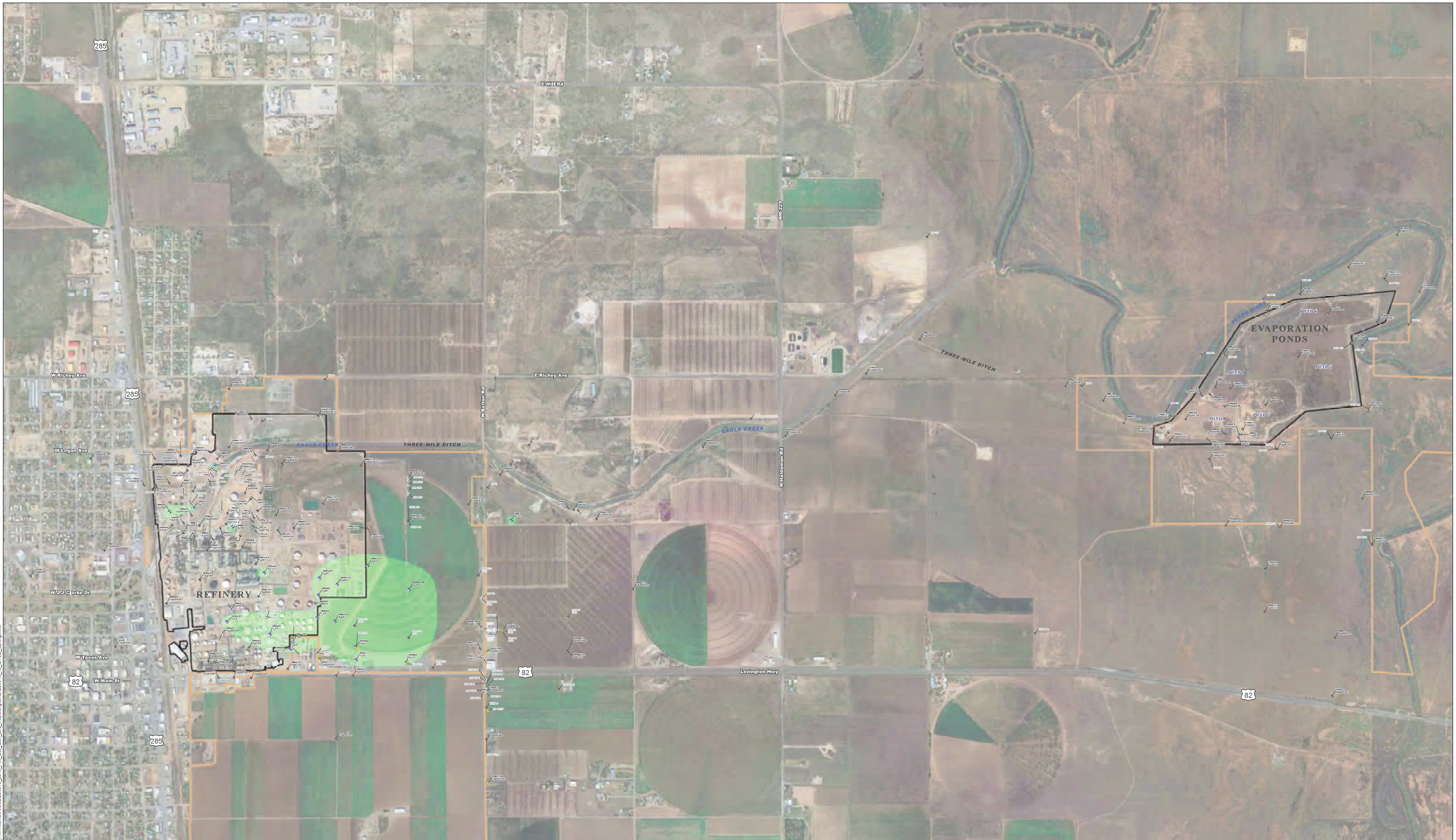
FIGURE 17



LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL
- 1.19 MTBE CONCENTRATION
- <0.000367 MTBE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- MW-10 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

NOTES:

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

0 750 1,500
Feet

1 IN = 750 FT

NEW MEXICO

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

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MTBE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY	SAVED: 2/27/2019	MXD: 294318_18_MTBE_Spring

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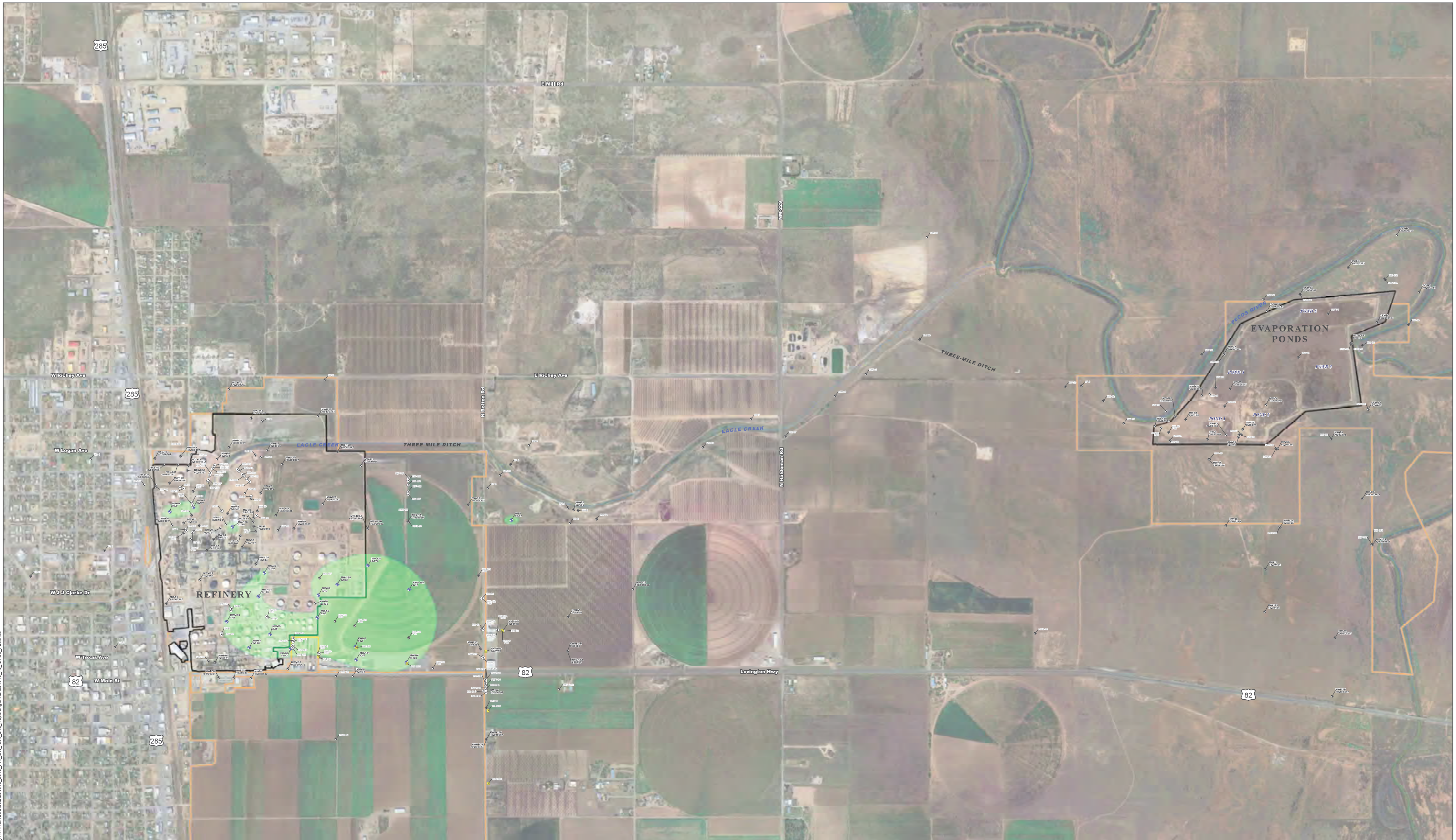
FIGURE 18



LEGEND

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

3.38 MTBE CONCENTRATION
<0.000367 MTBE NOT DETECTED ABOVE METHOD DETECTION LIMIT
MW-123 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

NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

NOTES:

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

0 750 1,500
Feet
1 IN = 750 FT

NEW MEXICO

MTBE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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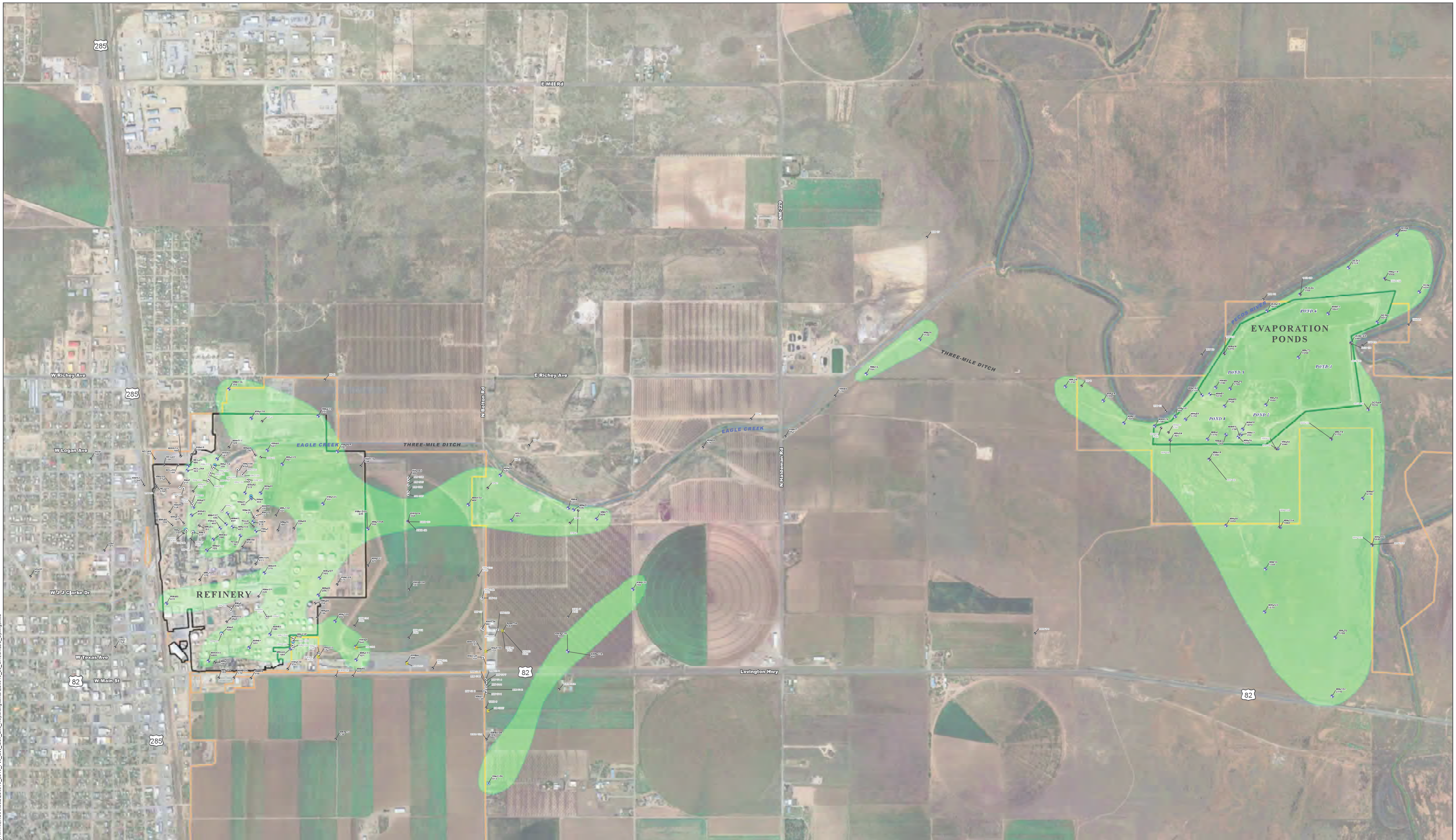
FIGURE 19



LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL EXCEEDS SCREENING LEVELS
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL
- 323 CHLORIDE CONCENTRATION
- MW-10 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

NOTES:

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

0 750 1,500
Feet

1 IN = 750 FT

NEW MEXICO

CHLORIDE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: SRAY	SAVED: 2/26/2019	MXD: 294318_20_CHLORIDE_Spring

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FIGURE 20

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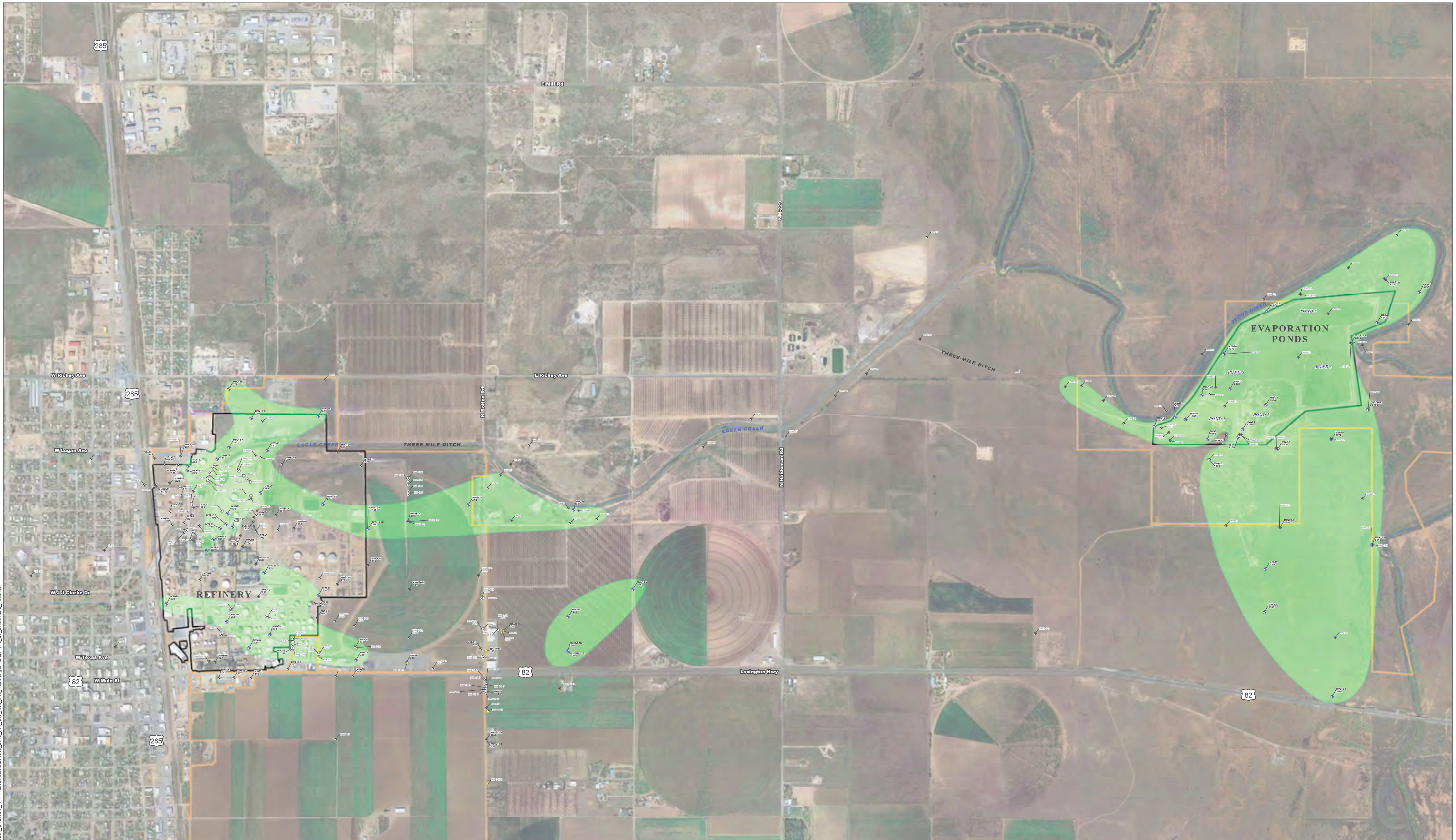

LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL
- 111 CHLORIDE CONCENTRATION
- 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

NOTES:

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

CHLORIDE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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FIGURE 21

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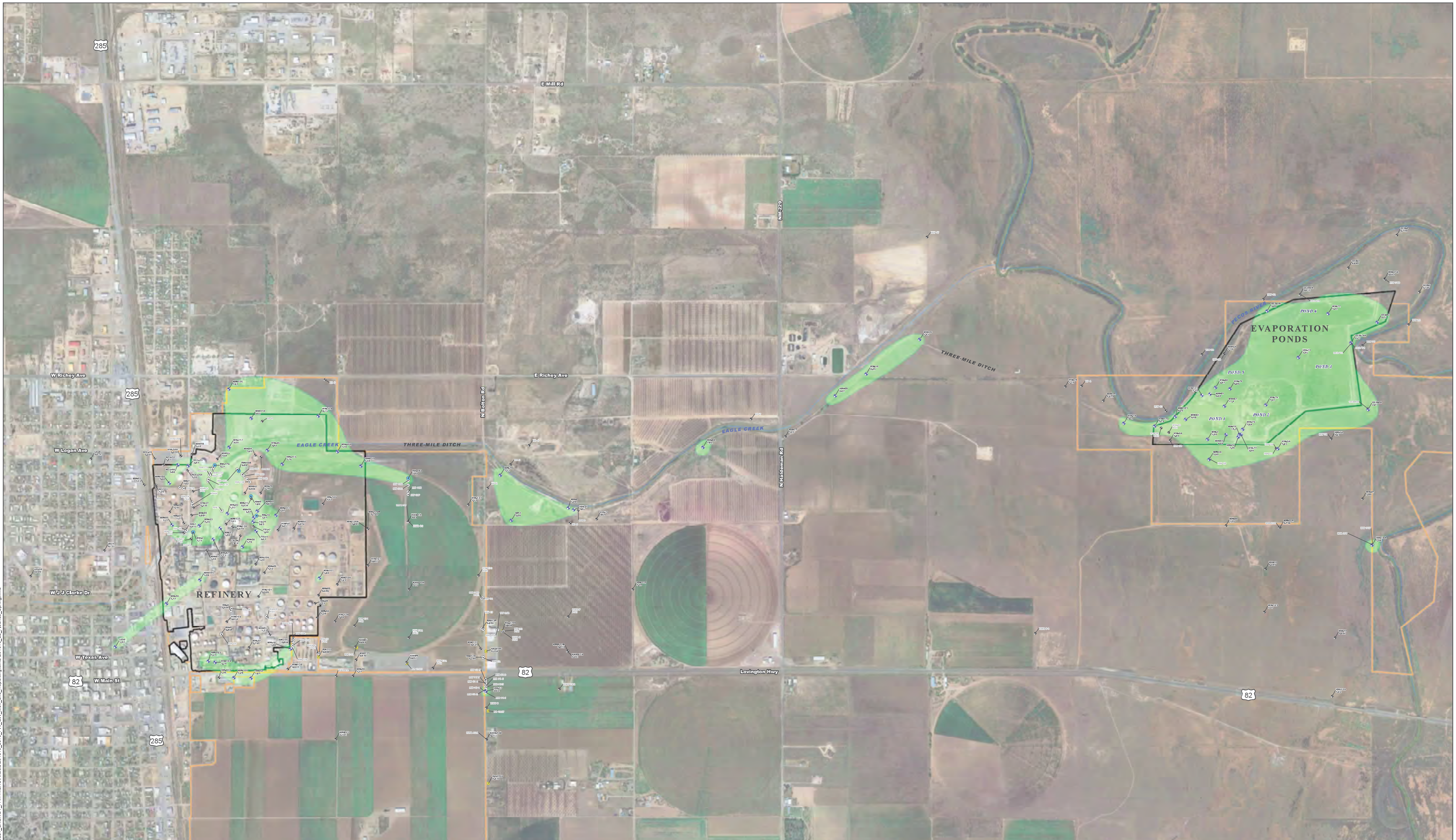

LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL
- FLUORIDE CONCENTRATION
- WELL NOT SAMPLED
- PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- FLUORIDE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 1.6 mg/L)
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

NOTES:

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

0 750 1,500
Feet

1 IN = 750 FT

NEW MEXICO

FLUORIDE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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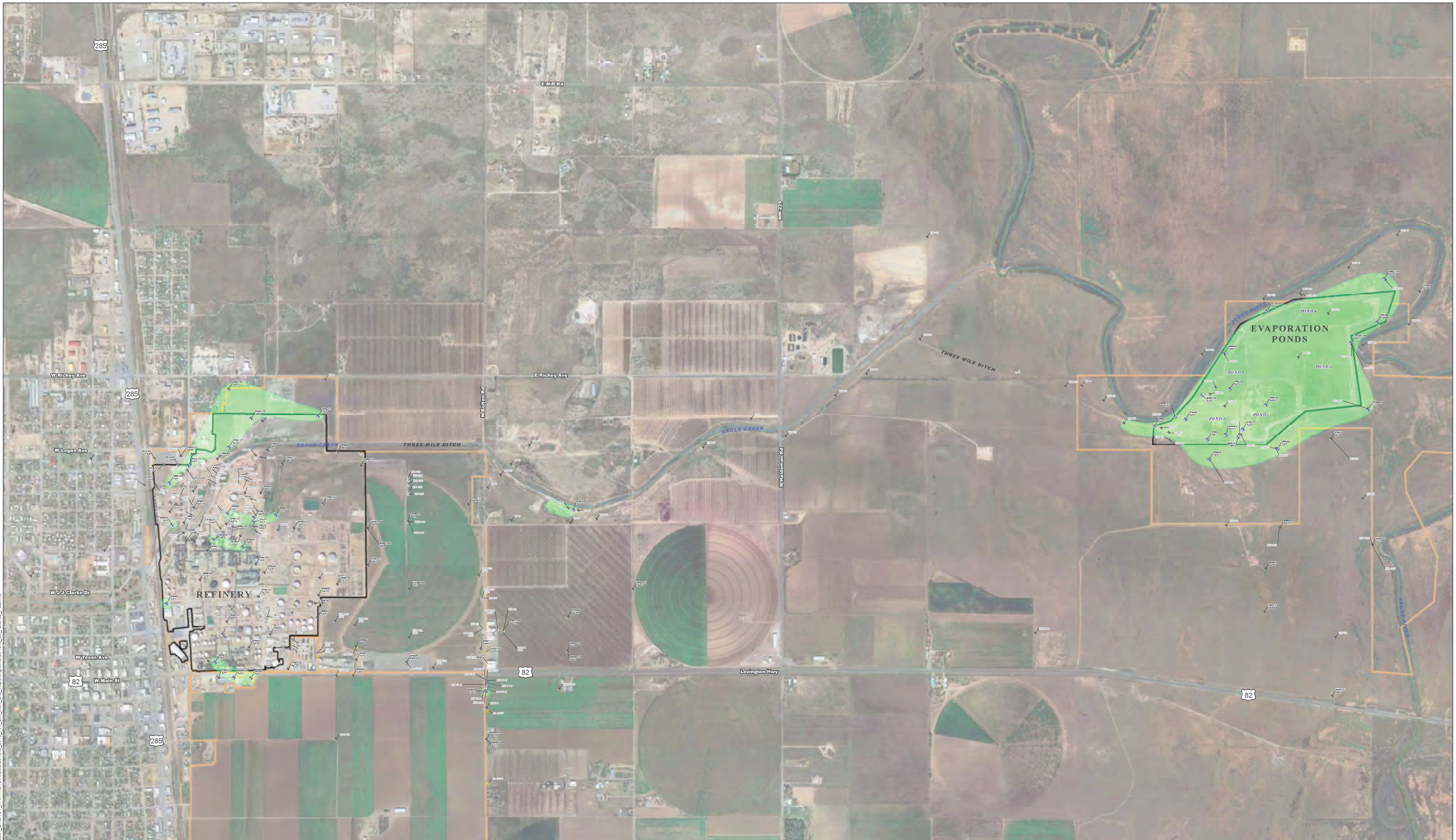
FIGURE 22



LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL
- 1.61 FLUORIDE CONCENTRATION
- MW-107 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2018.

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 2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: MHORN	SAVED: 2/27/2019	MXD: 294318_23_Fluoride_Fall

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FIGURE 23

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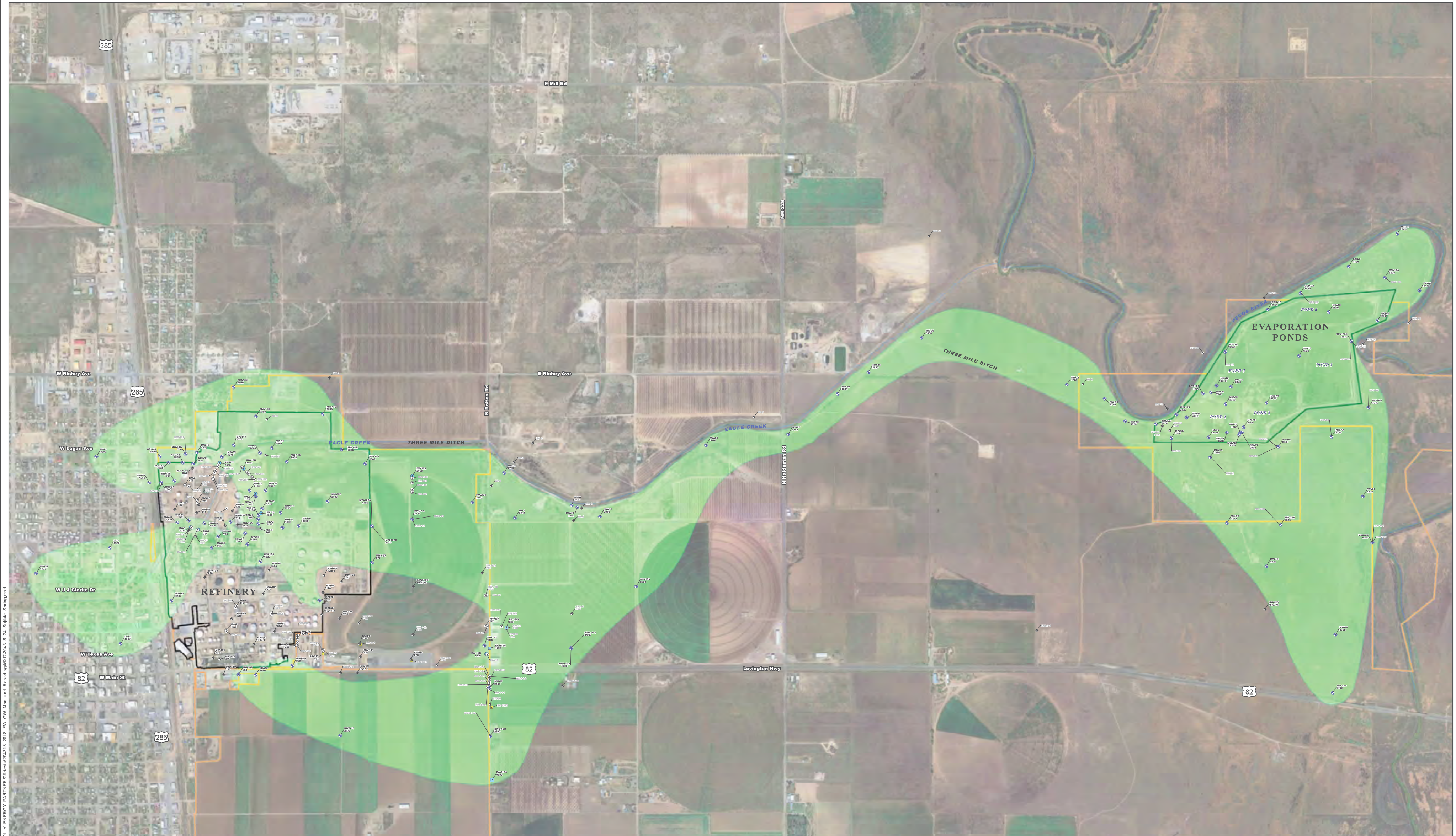

LEGEND

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

1090 SULFATE CONCENTRATION
WNLS WELL NOT SAMPLED
< 0.0774 SULFATE NOT DETECTED ABOVE METHOD DETECTION LIMIT
PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
SULFATE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 600 mg/L)
FENCELINE

NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS (3/12/2016).

NOTES:

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

0 750 1,500
Feet
1 IN = 750 FT

NEW MEXICO

SULFATE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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FIGURE 24

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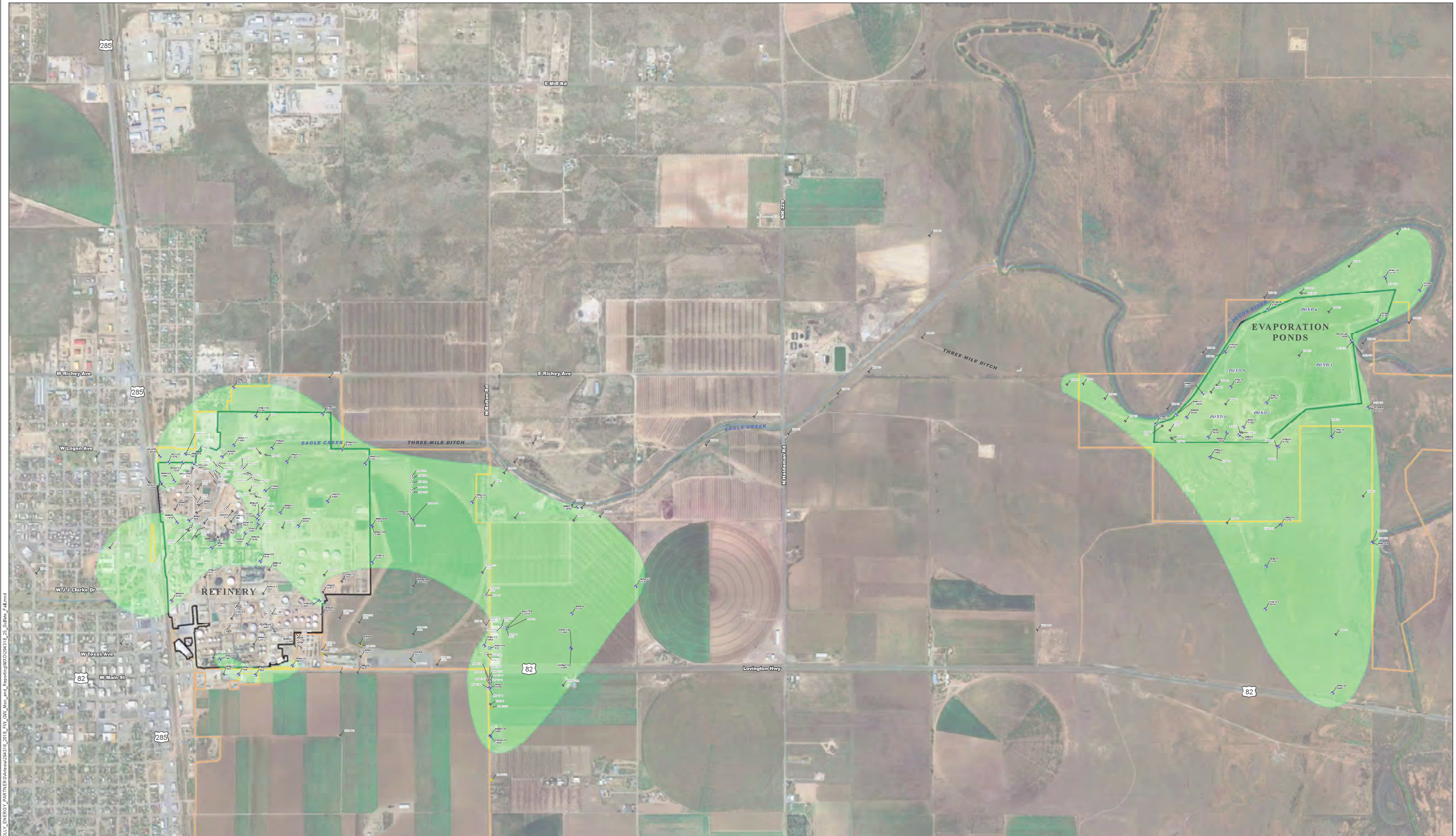

LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL EXCEEDS SCREENING LEVELS
- IRRIGATION WELL
- RECOVERY WELL
- 764 SULFATE CONCENTRATION
- MW-103 WELL NOT SAMPLED
- PSH PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- SULFATE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE AREA (CONCENTRATION > 600 mg/L)
- FENCELINE
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

NOTES:

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

0 750 1,500
Feet
1 IN = 750 FT

NEW MEXICO

SULFATE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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FIGURE 25

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 9/13/2018.

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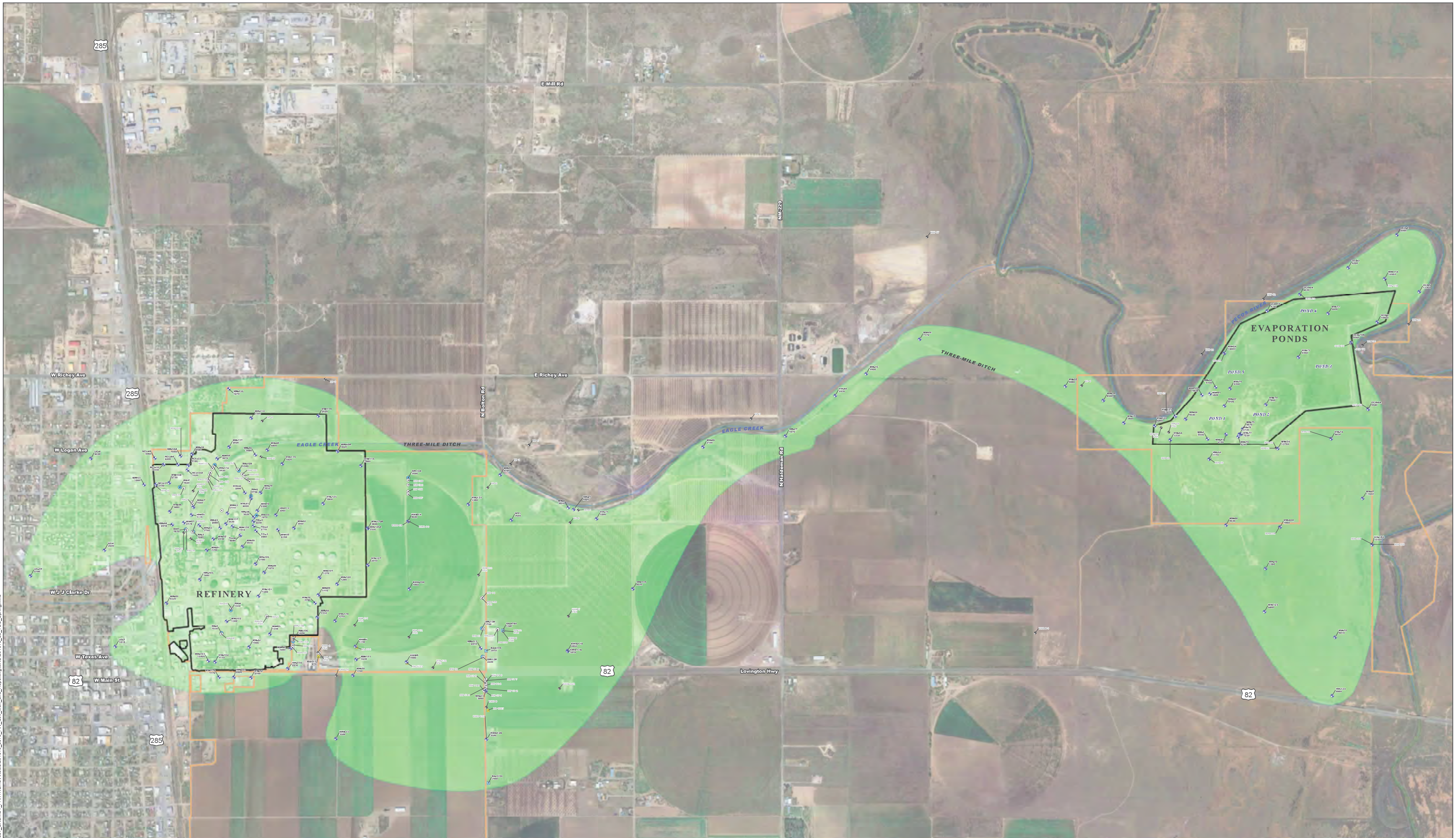

LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL EXCEEDS SCREENING LEVELS
- IRRIGATION WELL
- RECOVERY WELL EXCEEDS SCREENING LEVELS
- RECOVERY WELL
- 1170 TOTAL DISSOLVED SOLIDS CONCENTRATION
- 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

AERIAL IMAGERY SOURCE: GOOGLE AND THEIR DATA PARTNERS (3/12 2016).

NOTES:

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

TOTAL DISSOLVED SOLIDS CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP
2018 FIRST SEMIANNUAL EVENT
2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

AUTHOR: M.HORN | SAVED: 2/27/2019 | MXD: 294318_26_TDS_Spring

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FIGURE 26

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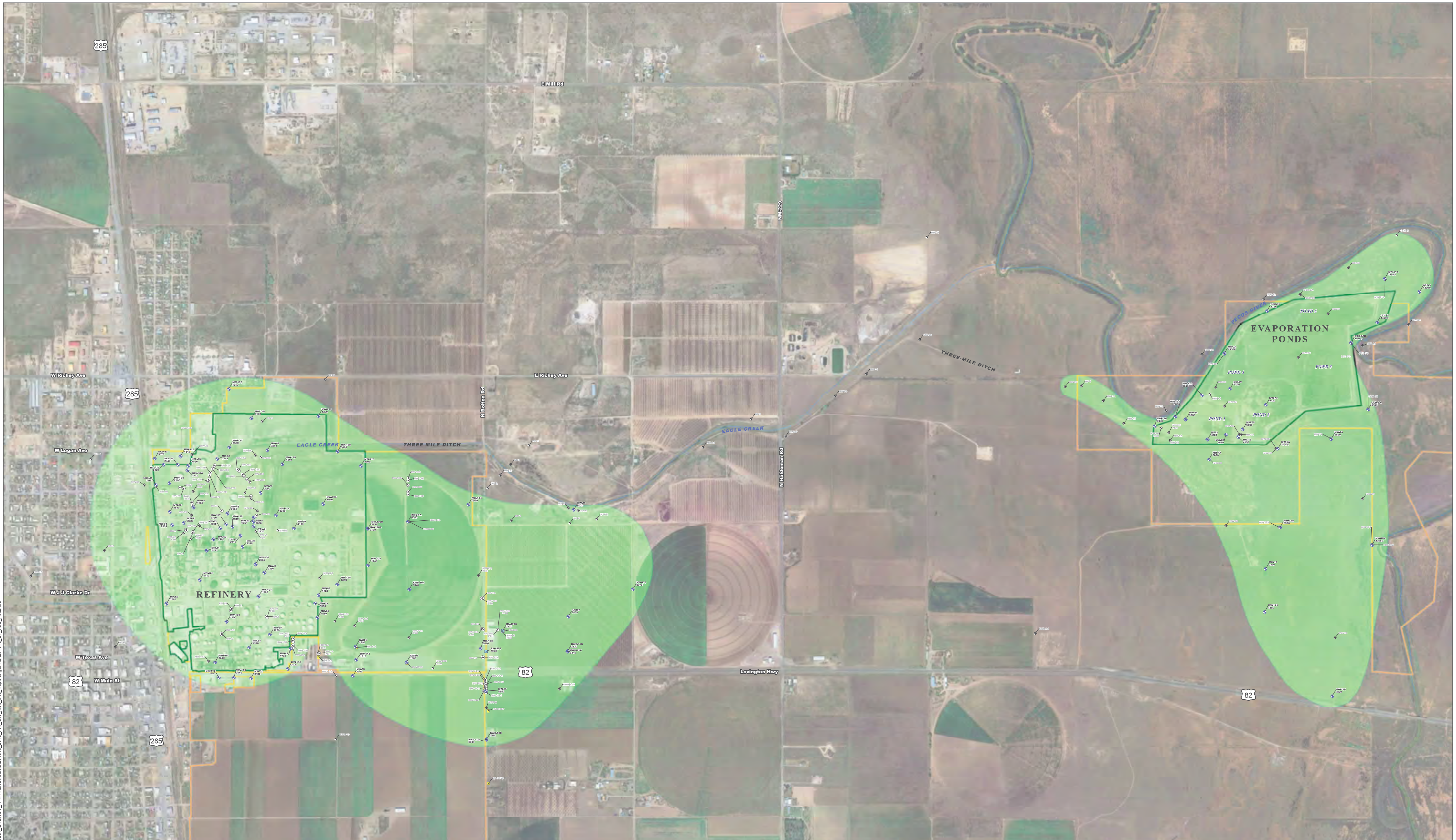

LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL EXCEEDS SCREENING LEVELS
- IRRIGATION WELL
- RECOVERY WELL
- 2100 TOTAL DISSOLVED SOLIDS CONCENTRATION
- 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2016.

NOTES:

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

N W E S

0 750 1,500 Feet

1 IN = 750 FT

NEW MEXICO

TOTAL DISSOLVED SOLIDS CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP

2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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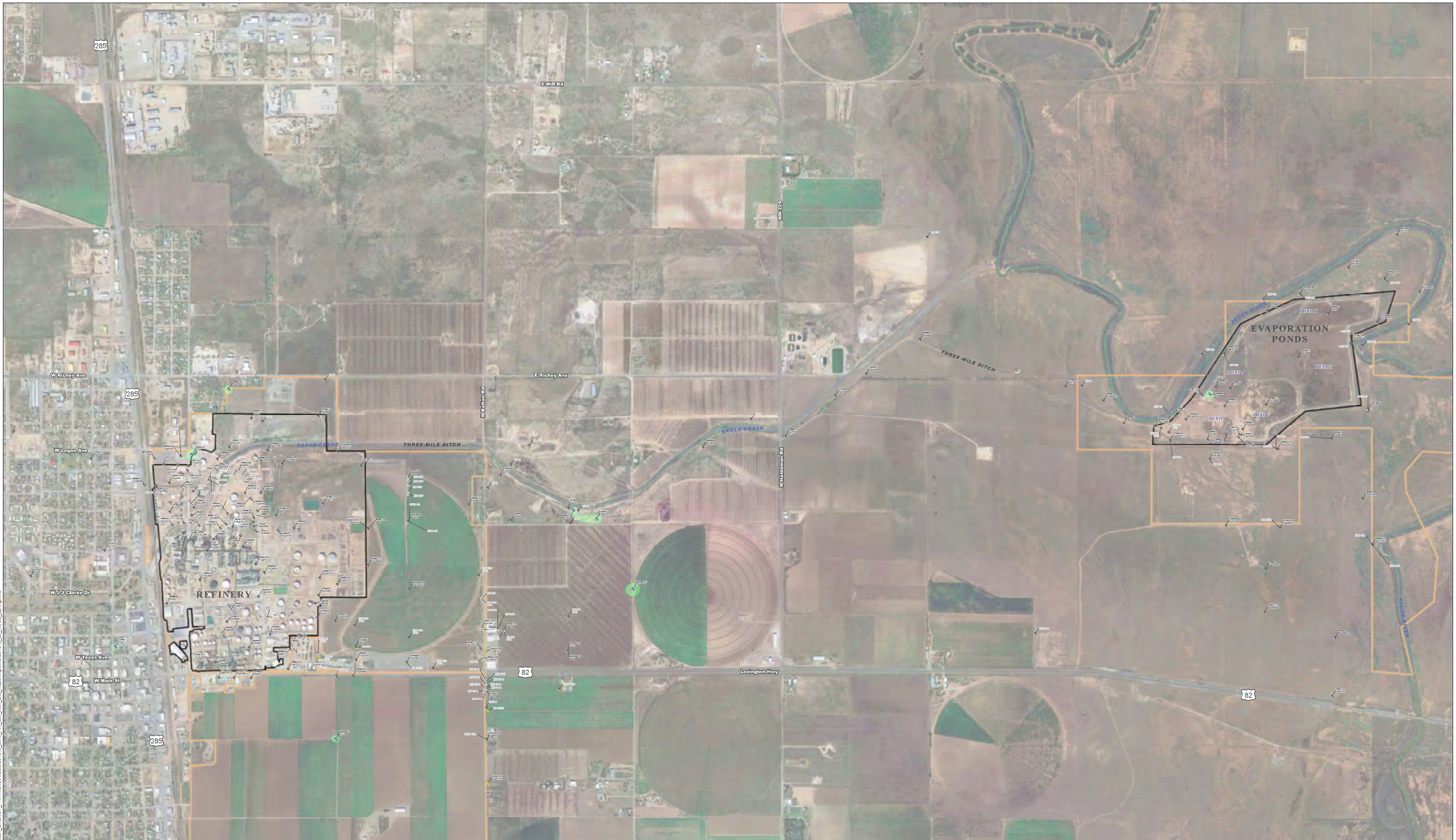
FIGURE 27



LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL
- 14.1 NITRATE/NITRITE CONCENTRATION
- < 0.107 NITRATE/NITRITE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- MW-10 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

NOTES:

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

0 750 1,500
Feet
1 IN = 750 FT

NEW MEXICO

NITRATE/NITRITE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 FIRST SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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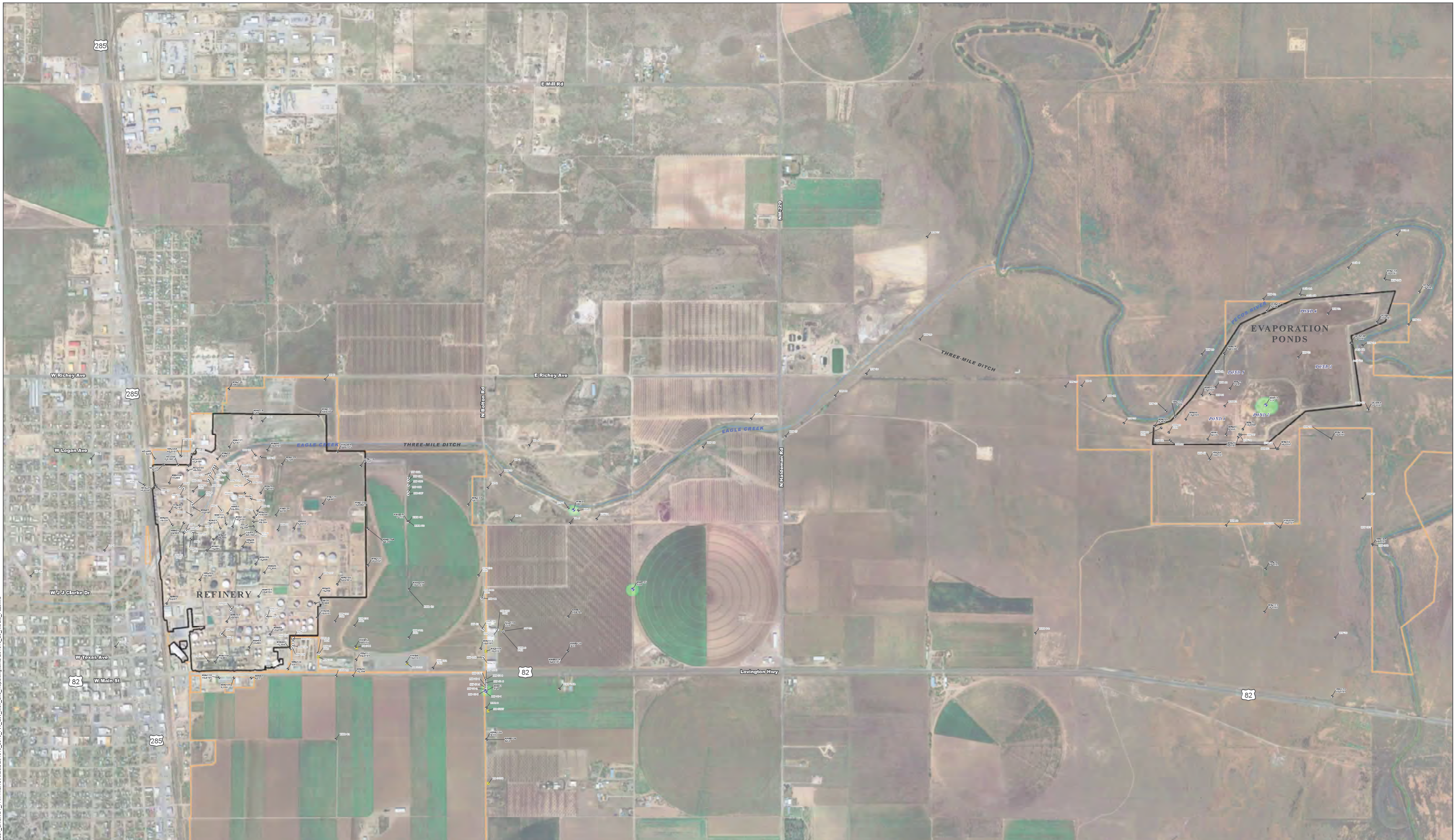
FIGURE 28

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS



LEGEND

- MONITORING WELL EXCEEDS SCREENING LEVELS
- MONITORING WELL
- IRRIGATION WELL
- RECOVERY WELL
- 4.22 NITRATE/NITRITE CONCENTRATION
- < 0.394 NITRATE/NITRITE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- MW-112 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
- NAVAJO PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)

NOTES:

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

0 750 1,500 Feet

1 IN = 750 FT

NEW MEXICO

NITRATE/NITRITE CRITICAL GROUNDWATER SCREENING LEVEL EXCEEDANCE MAP 2018 SECOND SEMIANNUAL EVENT

2018 ANNUAL GROUNDWATER REPORT
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

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FIGURE 29

AERIAL IMAGERY SOURCE: GOOGLE EARTH PRO AND THEIR DATA PARTNERS, 3/12/2018.

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Table 1 - Well Information and Gauging Data

2018 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	04/03/18	--	26.29	3,339.38	--
									10/02/18	--	23.90	3,341.77	--
	NP-5	Shallow	675512.24	524698.19	3,346.31	3,349.29	3,336.06	10.25 to 20	04/03/18	--	12.83	3,336.46	--
									10/02/18	--	11.78	3,337.51	--
	MW-136	Shallow	675343.45	522975.40	3,358.62	3,360.83	3,348.62	10 to 25	04/03/18	--	11.46	3,349.37	--
									10/02/18	--	12.57	3,348.26	--
Evaporation Ponds	MW-1R	Shallow	675135.17	538636.78	3,310.49	3,314.20	3,302.49	8 to 23	04/03/18	--	11.10	3,303.10	--
									10/02/18	--	11.37	3,302.83	--
	MW-2A	Shallow	675979.09	540803.91	3,310.55	3,312.97	Unknown	Unknown	04/03/18	--	10.88	3,302.09	--
									10/02/18	--	10.37	3,302.60	--
	MW-2B	Valley Fill	675969.73	540801.44	3,309.94	3,312.49	3,271.44	38.5 to 48	04/03/18	--	11.61	3,300.88	--
									10/02/18	--	11.43	3,301.06	--
	MW-3	Shallow	674443.34	540503.24	3,309.20	3,312.26	Unknown	Unknown	04/03/18	--	11.43	3,300.83	--
									10/02/18	--	11.87	3,300.39	--
	MW-4A	Shallow	674083.00	540529.44	3,308.63	3,312.20	Unknown	Unknown	04/03/18	--	11.58	3,300.62	--
									10/02/18	--	12.05	3,300.15	--
	MW-4B	Valley Fill	674089.71	540541.34	3,308.73	3,312.01	3,248.48	60.25 to 70	04/03/18	--	11.32	3,300.69	--
									10/02/18	--	11.85	3,300.16	--
	MW-5A	Shallow	674272.84	541759.78	3,306.59	3,308.62	Unknown	Unknown	04/03/18	--	8.57	3,300.05	--
									10/02/18	--	9.07	3,299.55	--
	MW-5B	Valley Fill	674272.33	541739.12	3,306.71	3,308.95	3,265.21	41.5 to 50.5	04/03/18	--	8.79	3,300.16	--
									10/02/18	--	9.21	3,299.74	--
	MW-5C	Valley Fill	674279.57	541728.80	3,306.55	3,309.28	3,247.30	59.25 to 68.75	04/03/18	--	8.99	3,300.29	--
									10/02/18	--	9.41	3,299.87	--
	MW-6A	Shallow	674427.07	539833.47	3,310.40	3,313.46	Unknown	Unknown	04/03/18	--	12.68	3,300.78	--
									10/02/18	--	13.14	3,300.32	--
	MW-6B	Valley Fill	674418.57	539834.04	3,310.09	3,313.35	3,270.59	39.5 to 49	04/03/18	--	12.56	3,300.79	--
									10/02/18	--	13.01	3,300.34	--
	MW-7A	Shallow	674447.64	542716.01	3,304.61	3,308.01	Unknown	Unknown	04/03/18	--	9.48	3,298.53	--
									10/02/18	--	9.81	3,298.20	--
	MW-7B	Valley Fill	674455.63	542715.61	3,306.05	3,307.87	3,266.55	39.5 to 49	04/03/18	--	9.26	3,298.61	--
									10/02/18	--	9.58	3,298.29	--
	MW-10	Shallow	672121.15	541540.05	3,304.12	3,304.76	3,304.12	0 to 19.4	04/03/18	--	5.57	3,299.19	--
									10/02/18	--	6.45	3,298.31	--
	MW-11A	Shallow	677317.73	543675.36	3,308.42	3,310.76	3,302.92	5.5 to 20	04/03/18	--	9.85	3,300.91	--
									10/02/18	--	9.62	3,301.14	--

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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)
Evaporation Ponds	MW-11B	Valley Fill	677305.72	543685.50	3,308.34	3,310.76	3,272.84	35.5 to 45	04/03/18	--	9.82	3,300.94	--
									10/02/18	--	9.62	3,301.14	--
	MW-12	Shallow	676952.63	541505.50	3,310.37	3,312.73	3,303.87	6.5 to 16	04/03/18	--	10.68	3,302.05	--
									10/03/18	--	10.39	3,302.34	--
	MW-13	Shallow	674951.80	539762.62	3,311.95	3,314.24	3,302.45	9.5 to 19	04/03/18	--	12.57	3,301.67	--
									10/03/18	--	12.62	3,301.62	--
	MW-14	Shallow	676122.48	543280.49	3,309.44	3,311.84	3,303.94	5.5 to 20	04/03/18	--	>11.86 [4]	--	--
									10/03/18	--	>11.86 [4]	--	--
	MW-15	Shallow	674731.39	539003.75	3,310.97	3,313.72	3,301.97	9 to 19	04/03/18	--	12.09	3,301.63	--
									10/02/18	--	12.33	3,301.39	--
	MW-18A	Shallow	672548.16	543447.78	3,306.33	3,308.58	3,296.33	10 to 20	04/03/18	--	10.41	3,298.17	--
									10/02/18	--	10.68	3,297.90	--
	MW-18B	Valley Fill	672557.96	543458.22	3,306.23	3,308.74	3,269.23	37 to 47	04/03/18	--	10.38	3,298.36	--
									10/02/18	--	10.64	3,298.10	--
	MW-18T	Valley Fill	672559.79	543449.75	3,306.30	3,308.55	3,269.30	37 to 47	04/03/18	--	10.45	3,298.10	--
									10/02/18	--	10.73	3,297.82	--
	MW-22A	Shallow	672866.82	541801.63	3,305.24	3,307.62	3,299.74	5.5 to 20.5	04/03/18	--	8.13	3,299.49	--
									10/02/18	--	8.83	3,298.79	--
	MW-22B	Valley Fill	672866.58	541786.97	3,305.08	3,307.63	3,262.78	42.3 to 52	04/03/18	--	8.01	3,299.62	--
									10/02/18	--	8.66	3,298.97	--
	MW-24	Shallow	676498.23	544101.56	3,310.33	3,312.85	3,295.33	15 to 20	04/03/18	--	12.46	3,300.39	--
									10/03/18	--	12.20	3,300.65	--
	MW-69	Shallow	675962.29	540401.29	3,311.40	3,313.86	3,306.40	5 to 20	04/03/18	--	11.41	3,302.45	--
									10/03/18	--	11.01	3,302.85	--
	MW-70	Shallow	670892.66	542787.60	3,303.84	3,306.30	3,298.84	5 to 20	04/03/18	--	8.27	3,298.03	--
									10/02/18	--	9.02	3,297.28	--
	MW-72	Shallow	676691.27	542662.31	3,306.40	3,308.45	3,304.40	2 to 12	04/03/18	--	7.60	3,300.85	--
									10/02/18	--	7.35	3,301.10	--
	MW-73	Shallow	675910.20	542130.56	3,308.02	3,310.18	3,306.02	2 to 17	04/03/18	--	9.52	3,300.66	--
									10/02/18	--	9.08	3,301.10	--
	MW-74	Shallow	675059.14	541546.30	3,307.78	3,310.03	3,305.78	2 to 17	04/03/18	--	9.36	3,300.67	--
									10/02/18	--	9.52	3,300.51	--
	MW-75	Shallow	674622.31	541132.78	3,307.80	3,310.21	3,304.80	3 to 18	04/03/18	--	9.55	3,300.66	--
									10/02/18	--	9.93	3,300.28	--
	MW-76	Shallow	674482.47	541053.83	3,309.70	3,311.84	3,306.70	3 to 18	04/03/18	--	11.10	3,300.74	--
									10/02/18	--	11.52	3,300.32	--

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Evaporation Ponds	MW-77	Shallow	674529.89	541104.86	3,307.97	3,310.07	3,304.97	3 to 18	04/03/18	--	9.40	3,300.67	--
									10/02/18	--	9.74	3,300.33	--
	MW-78	Shallow	674529.23	541073.45	3,307.94	3,310.14	3,305.94	2 to 17	04/03/18	--	11.41	3,298.73	--
									10/02/18	--	9.79	3,300.35	--
	MW-79	Shallow	675349.67	540906.08	3,309.08	3,311.43	3,307.08	2 to 17	04/03/18	--	10.30	3,301.13	--
									10/02/18	--	10.25	3,301.18	--
	MW-80	Shallow	675371.74	540646.46	3,310.27	3,310.79	3,308.27	2 to 17	04/03/18	--	9.21	3,301.58	--
									10/02/18	--	9.19	3,301.60	--
	MW-81	Shallow	675252.80	540544.47	3,310.19	3,312.34	3,308.19	2 to 17	04/03/18	--	11.08	3,301.26	--
									10/02/18	--	11.13	3,301.21	--
	MW-82	Shallow	675035.42	540806.88	3,308.64	3,310.75	3,306.64	2 to 17	04/03/18	--	9.79	3,300.96	--
									10/02/18	--	9.95	3,300.80	--
	MW-83	Shallow	674524.97	540832.80	3,307.93	3,310.19	3,305.93	2 to 17	04/03/18	--	9.40	3,300.79	--
									10/02/18	--	9.75	3,300.44	--
	MW-84	Shallow	674798.43	540109.13	3,309.83	3,311.59	3,307.83	2 to 17	04/03/18	--	10.01	3,301.58	--
									10/02/18	--	9.40	3,302.19	--
	MW-85	Shallow	674566.12	539805.49	3,308.99	3,311.09	3,305.99	3 to 18	04/03/18	10.11	11.81	3,300.64	1.70
									10/02/18	10.47	10.60	3,300.59	0.13
	MW-86	Shallow	674645.96	539671.17	3,308.98	3,311.06	3,306.98	2 to 17	04/03/18	9.94	10.40	3,301.03	0.46
									10/02/18	10.24	10.28	3,300.81	0.04
	MW-87	Shallow	673379.98	543280.45	3,305.42	3,307.64	3,303.42	2 to 17	04/03/18	--	8.74	3,298.90	--
									10/02/18	--	9.15	3,298.49	--
	MW-88	Shallow	672899.14	540832.09	3,306.43	3,308.68	3,303.43	3 to 18	04/03/18	--	8.83	3,299.85	--
									10/02/18	--	9.61	3,299.07	--
	MW-120	Shallow	674678.95	539555.77	3,310.66	3,313.55	3,300.66	10 to 25	04/03/18	--	12.55	3,301.00	--
									10/02/18	--	12.82	3,300.73	--
	MW-121	Shallow	674851.38	539923.70	3,311.77	3,314.68	3,301.77	10 to 25	04/03/18	--	13.02	3,301.66	--
									10/02/18	--	12.51	3,302.17	--
	MW-122	Shallow	675231.06	540401.60	3,308.78	3,311.69	3,298.78	10 to 20	04/03/18	--	10.74	3,300.95	--
									10/02/18	--	10.79	3,300.90	--
	MW-123	Shallow	671352.15	541523.94	3,302.78	3,303.98	3,292.78	10 to 25	04/03/18	--	5.92	3,298.06	--
									10/02/18	--	6.92	3,297.06	--
	MW-124	Shallow	669844.77	542735.51	3,302.99	3,305.84	3,297.99	5 to 20	04/03/18	--	8.79	3,297.05	--
									10/02/18	--	9.63	3,296.21	--
	OCD-1R	Shallow	676741.31	541568.00	3,310.69	3,314.27	Unknown	Unknown	04/03/18	--	12.27	3,302.00	--
									10/02/18	--	11.75	3,302.52	--

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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	04/03/18	--	12.48	3,301.68	--
									10/02/18	--	12.13	3,302.03	--
	OCD-2B	Valley Fill	677034.65	542167.57	3,310.66	3,313.07	3,272.16	38.5 to 48	04/03/18	--	11.72	3,301.35	--
									10/02/18	--	11.85	3,301.22	--
	OCD-3	Shallow	677516.31	543024.47	3,310.88	3,314.29	3,304.38	6.5 to 21.5	04/03/18	--	12.83	3,301.46	--
									10/02/18	--	12.60	3,301.69	--
	OCD-4	Shallow	678099.52	543893.55	3,310.10	3,313.70	3,303.60	6.5 to 21.5	04/03/18	--	12.33	3,301.37	--
									10/02/18	--	12.16	3,301.54	--
	OCD-5	Shallow	677081.54	544295.35	3,308.71	3,311.34	Unknown	Unknown	04/03/18	--	10.48	3,300.86	--
									10/02/18	--	10.36	3,300.98	--
	OCD-6	Shallow	676538.82	543540.03	3,307.20	3,311.36	3,299.20	8 to 23	04/03/18	--	11.01	3,300.35	--
									10/02/18	--	10.70	3,300.66	--
	OCD-7AR	Shallow	676169.74	543071.88	3,308.86	3,310.03	3,303.36	5.5 to 19.5	04/03/18	--	9.97	3,300.06	--
									10/02/18	--	9.52	3,300.51	--
	OCD-7B	Valley Fill	676157.36	543081.99	3,307.57	3,310.26	3,264.07	43.5 to 52.5	04/03/18	--	9.80	3,300.46	--
									10/02/18	--	9.68	3,300.58	--
	OCD-7C	Valley Fill	676155.95	543069.21	3,307.74	3,310.10	3,247.49	60.25 to 69.75	04/03/18	--	9.38	3,300.72	--
									10/02/18	--	9.48	3,300.62	--
	OCD-8A	Shallow	674976.41	543376.95	3,306.26	3,308.79	3,303.26	3 to 18	04/03/18	--	9.06	3,299.73	--
									10/02/18	--	9.15	3,299.64	--
	OCD-8B	Valley Fill	674992.24	543375.06	3,306.11	3,309.19	3,262.61	43.5 to 53	04/03/18	--	9.15	3,300.04	--
									10/02/18	--	9.35	3,299.84	--
Field East of Refinery	KWB-1A	Shallow	672969.12	526181.36	3,351.25	3,353.46	3,333.25	18 to 32	04/03/18	--	13.95	3,339.51	--
									10/02/18	--	15.73	3,337.73	--
	KWB-1B	Shallow	672968.90	526191.02	3,351.14	3,352.83	3,333.14	18 to 32	04/03/18	--	15.64	3,337.19	--
									10/02/18	--	17.40	3,335.43	--
	KWB-1C	Valley Fill	672968.22	526202.95	3,351.18	3,351.38	3,320.68	30.5 to 49.5	04/03/18	--	16.22	3,335.16	--
									10/02/18	--	18.02	3,333.36	--
	KWB-7	Shallow	671266.72	529055.47	3,343.00	3,346.16	3,325.00	18 to 32	04/03/18	24.34	24.60	3,321.77	0.26
									10/02/18	--	18.10	3,328.06	--
	KWB-8	Shallow	671000.57	527874.87	3,347.90	3,350.41	3,332.90	15 to 34	04/03/18	24.42	27.57	3,325.36	3.15
									10/02/18	17.92	17.95	3,332.48	0.03
	KWB-10R	Shallow	671756.34	526206.06	3,351.23	3,350.97	3,342.23	9 to 29	04/03/18	17.30	17.31	3,333.67	0.01
									10/02/18	17.22	17.23	3,333.75	0.01
	KWB-11A	Shallow	670643.67	529043.46	3,346.13	3,348.72	3,316.13	30 to 39.5	04/03/18	--	25.37	3,323.35	--
									10/02/18	--	17.98	3,330.74	--

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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	04/03/18	--	26.09	3,321.94	--
									10/02/18	--	18.74	3,329.29	--
	KWB-12A	Shallow	669074.44	527590.88	3,352.01	3,351.81	3,336.51	15.5 to 24.5	04/03/18	--	Dry	--	--
									10/02/18	--	20.89	3,330.92	--
	KWB-12B	Valley Fill	669064.18	527590.12	3,351.84	3,351.63	3,326.34	25.5 to 39.5	04/03/18	--	26.65	3,324.98	--
									10/02/18	--	20.73	3,330.90	--
	KWB-P4	Shallow	670970.10	537416.92	3,305.76	3,305.39	Unknown	Unknown	04/03/18	--	--	--	--
									10/02/18	--	--	--	--
	MW-57	Shallow	669935.59	527579.02	3,350.95	3,350.91	3,340.95	10 to 30	04/03/18	--	24.19	3,326.72	--
									10/02/18	--	18.40	3,332.51	--
	MW-58	Shallow	670207.27	525197.99	3,362.56	3,362.22	3,349.56	13 to 28	04/03/18	21.74	21.76	3,340.48	0.02
									10/02/18	20.10	20.11	3,342.12	0.01
	MW-111	Shallow	670494.22	525254.30	3,362.52	3,365.51	3,337.52	25 to 40	04/03/18	--	25.07	3,340.44	--
									10/02/18	--	24.09	3,341.42	--
	MW-112	Shallow	670890.64	526198.73	3,355.38	3,358.38	3,330.38	25 to 35	04/03/18	21.37	24.19	3,336.45	2.82
									10/02/18	20.30	22.90	3,337.56	2.60
	MW-113	Shallow	670693.80	527483.95	3,350.06	3,352.93	3,330.06	20 to 35	04/03/18	--	24.76	3,328.17	--
									10/02/18	--	20.11	3,332.82	--
	MW-125	Shallow	673288.01	524663.00	3,355.60	3,358.81	3,340.60	15 to 25	04/03/18	--	10.92	3,347.89	--
									10/02/18	--	11.20	3,347.61	--
	MW-126A	Shallow	672845.69	525458.24	3,353.60	3,356.60	3,334.60	19 to 34	04/03/18	--	15.42	3,341.18	--
									10/02/18	--	17.10	3,339.50	--
	MW-126B	Valley Fill	672843.26	525464.41	3,353.60	3,356.67	3,313.60	40 to 50	04/03/18	--	15.30	3,341.37	--
									10/02/18	--	16.95	3,339.72	--
	MW-127	Shallow	672184.21	525464.20	3,355.50	3,358.39	3,335.50	20 to 50	04/03/18	--	19.89	3,338.50	--
									10/02/18	--	20.43	3,337.96	--
	MW-128	Shallow	671846.09	524917.06	3,358.80	3,358.77	3,343.80	15 to 35	04/03/18	--	15.63	3,343.14	--
									10/02/18	--	15.80	3,342.97	--
	MW-129	Shallow	671185.08	524876.72	3,361.60	3,364.38	3,341.60	20 to 50	04/03/18	--	22.61	3,341.77	--
									10/02/18	22.39	22.76	3,341.92	0.37
	MW-130	Shallow	670331.35	524029.44	3,370.20	3,369.86	3,340.20	30 to 45	04/03/18	--	20.43	3,349.43	--
									10/02/18	--	19.78	3,350.08	--
	MW-131	Shallow	671104.83	525228.77	3,360.40	3,363.49	3,340.40	20 to 50	04/03/18	23.71	23.92	3,339.74	0.21
									10/02/18	23.43	23.61	3,340.02	0.18
	MW-132	Shallow	670346.80	526629.79	3,354.30	3,357.12	3,339.30	15 to 40	04/03/18	19.80	21.60	3,336.96	1.80
									10/02/18	18.28	19.80	3,338.54	1.52

Table 1 - Well Information and Gauging Data

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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)
Field East of Refinery	MW-133	Shallow	672005.89	527446.73	3,343.40	3,349.45	3,328.40	15 to 35	04/03/18	19.90	20.16	3,329.50	0.26
									10/02/18	18.38	18.43	3,331.06	0.05
	MW-134	Shallow	673271.80	527263.99	3,343.10	3,346.23	3,323.10	20 to 30	04/03/18	--	15.35	3,330.88	--
									10/02/18	--	17.58	3,328.65	--
	MW-135	Shallow	671758.72	530211.23	3,338.00	3,337.65	3,303.00	35 to 65	04/03/18	--	29.13	3,308.52	--
									10/02/18	--	28.99	3,308.66	--
	RW-12R	Shallow	670542.50	527519.20	3,350.58	3,351.54	3,335.58	15 to 35	04/03/18	--	25.11	3,326.43	--
									10/02/18	--	20.24	3,331.30	--
	RW-13R	Shallow	671049.37	527506.74	3,349.60	3,351.54	3,334.60	15 to 35	04/03/18	--	23.14	3,328.40	--
									10/02/18	19.37	19.48	3,332.15	0.11
	RW-14R	Shallow	671592.73	527504.45	3,347.39	3,349.37	3,332.39	15 to 35	04/03/18	20.29	21.72	3,328.79	1.43
									10/02/18	17.90	19.18	3,331.21	1.28
	RW-18A	Shallow	673750.19	526188.64	3,349.04	3,350.84	Unknown	Unknown	04/03/18	--	10.75	3,340.09	--
									10/02/18	--	13.96	3,336.88	--
	RW-20A	Shallow	671032.06	527790.95	3,347.75	3,348.44	Unknown	Unknown	04/03/18	>20.10 [3]	--	--	>0.00 [3]
									10/02/18	19.78	19.84	3,328.65	0.06
	RW-20B	Shallow	671032.06	527790.95	3,347.75	3,348.44	Unknown	Unknown	04/03/18	>19.40 [3]	--	--	>0.00 [3]
									10/02/18	19.63	19.70	3,328.80	0.07
	RW-22	Shallow	671009.70	527889.44	3,347.17	3,349.21	3,335.67	11.5 to 39	04/03/18	25.16	25.31	3,324.02	0.15
									10/02/18	--	18.18	3,331.03	--
North Refinery	MW-23	Shallow	672851.25	522821.05	3,365.09	3,368.38	3,350.09	15 to 20	04/03/18	--	13.52	3,354.86	--
									10/02/18	--	13.83	3,354.55	--
	MW-29	Shallow	673481.15	523544.65	3,359.79	3,360.64	3,350.04	9.75 to 19.25	04/03/18	--	13.70	3,346.94	--
									10/02/18	--	14.32	3,346.32	--
	MW-30	Shallow	674124.92	523550.16	3,359.14	3,361.98	Unknown	Unknown	04/03/18	--	9.31	3,352.67	--
									10/02/18	--	9.88	3,352.10	--
	MW-39	Shallow	673039.50	523422.93	3,357.94	3,358.79	3,343.94	14 to 24	04/03/18	--	9.58	3,349.21	--
									10/02/18	--	9.72	3,349.07	--
	MW-40	Shallow	673161.12	523489.02	3,356.56	3,356.93	Unknown	Unknown	04/03/18	--	7.81	3,349.12	--
									10/02/18	--	7.87	3,349.06	--
	MW-41	Shallow	673379.87	523374.64	3,356.38	3,356.58	3,342.38	14 to 19	04/03/18	--	7.27	3,349.31	--
									10/02/18	--	7.66	3,348.92	--
	MW-42	Shallow	673480.27	523263.53	3,355.64	3,358.44	Unknown	Unknown	04/03/18	--	10.00	3,348.44	--
									10/02/18	--	10.50	3,347.94	--
	MW-43	Shallow	673115.86	522950.40	3,363.38	3,365.49	3,347.88	15.5 to 20.5	04/03/18	--	10.19	3,355.30	--
									10/02/18	--	10.59	3,354.90	--

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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)
North Refinery	MW-59	Shallow	672814.66	523854.12	3,359.44	3,362.43	3,344.44	15 to 30	04/03/18	--	10.51	3,351.92	--
									10/02/18	--	10.13	3,352.30	--
	MW-60	Shallow	672849.58	524143.12	3,359.26	3,361.98	3,344.26	15 to 30	04/03/18	--	11.63	3,350.35	--
									10/02/18	--	11.18	3,350.80	--
	MW-61	Shallow	672453.76	522578.38	3,369.45	3,369.47	3,355.45	14 to 29	04/03/18	--	12.77	3,356.70	--
									10/02/18	--	12.81	3,356.66	--
	MW-62	Shallow	672650.76	522696.50	3,368.35	3,368.81	3,354.35	14 to 29	04/03/18	--	13.72	3,355.09	--
									10/02/18	--	14.05	3,354.76	--
	MW-67	Shallow	673224.88	522342.43	3,365.59	3,365.45	3,353.59	12 to 27	04/03/18	--	9.98	3,355.47	--
									10/02/18	--	10.35	3,355.10	--
	MW-90	Shallow	672909.28	521960.18	3,367.13	3,369.42	3,362.13	5 to 20	04/03/18	--	12.22	3,357.20	--
									10/02/18	--	12.40	3,357.02	--
	MW-91	Shallow	672945.86	522167.26	3,365.72	3,367.73	3,358.72	7 to 22	04/03/18	--	11.49	3,356.24	--
									10/02/18	--	11.79	3,355.94	--
	MW-92	Shallow	672766.10	522167.26	3,366.75	3,368.72	3,361.75	5 to 20	04/03/18	12.21	12.29	3,356.49	0.08
									10/02/18	12.47	12.55	3,356.23	0.08
	MW-93	Shallow	672897.25	522446.83	3,364.22	3,363.79	3,359.22	5 to 20	04/03/18	--	8.15	3,355.64	--
									10/02/18	--	8.50	3,355.29	--
	MW-94	Shallow	673510.54	522336.27	3,365.82	3,367.97	3,360.82	5 to 20	04/03/18	12.79	12.99	3,355.14	0.20
									10/02/18	13.24	13.43	3,354.69	0.19
	MW-95	Shallow	673084.72	522308.89	3,366.48	3,368.70	3,359.48	7 to 22	04/03/18	--	12.97	3,355.73	--
									10/02/18	--	13.27	3,355.43	--
	MW-96	Shallow	673143.60	521917.50	3,366.83	3,368.92	3,359.83	7 to 22	04/03/18	--	12.04	3,356.88	--
									10/02/18	--	12.19	3,356.73	--
	MW-97	Shallow	672660.45	522295.96	3,366.38	3,365.92	3,358.38	8 to 23	04/03/18	10.13	11.72	3,355.47	1.59
									10/02/18	10.58	12.15	3,355.03	1.57
	MW-98	Shallow	672517.05	523220.39	3,358.96	3,361.36	3,345.96	13 to 23	04/03/18	--	9.88	3,351.48	--
									10/02/18	--	9.90	3,351.46	--
	MW-137	Shallow	672923.48	522924.27	3,363.15	3,364.83	3,353.15	10 to 30	04/03/18	--	8.47	3,356.36	--
									10/02/18	--	8.76	3,356.07	--
	MW-138	Shallow	672876.52	523041.05	3,364.73	3,363.24	3,354.73	10 to 25	04/03/18	10.03	10.04	3,353.21	0.01
									10/02/18	--	10.40	3,352.84	--
	RW-1	Shallow	672825.27	522204.68	3,365.29	3,367.03	Unknown	Unknown	04/03/18	--	11.14	3,355.89	--
									10/02/18	--	11.45	3,355.58	--
	RW-2	Shallow	672781.86	522337.29	3,368.17	3,368.17	Unknown	Unknown	04/03/18	--	12.40	3,355.77	--
									10/02/18	--	12.71	3,355.46	--

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North Refinery	RW-7	Shallow	673579.35	522098.94	3,365.03	3,367.09	Unknown	Unknown	04/03/18	--	11.84	3,355.25	--
									10/02/18	--	13.05	3,354.04	--
	RW-8	Shallow	673266.20	522321.21	3,364.89	3,368.10	Unknown	Unknown	04/03/18	11.65	12.54	3,356.27	0.89
									10/02/18	12.02	13.15	3,355.85	1.13
	RW-9	Shallow	673423.49	523371.16	3,356.30	3,359.51	Unknown	Unknown	04/03/18	--	9.38	3,350.13	--
									10/02/18	--	9.86	3,349.65	--
	RW-10	Shallow	673076.17	523469.29	3,356.12	3,360.61	Unknown	Unknown	04/03/18	--	9.39	3,351.22	--
									10/02/18	--	9.49	3,351.12	--
	RW-16B	Shallow	673876.71	523156.09	3,357.20	3,360.97	Unknown	Unknown	04/03/18	--	11.84	3,349.13	--
									10/02/18	--	12.48	3,348.49	--
	RW-17A	Shallow	673978.33	522723.59	3,362.76	3,364.72	Unknown	Unknown	04/03/18	--	10.63	3,354.09	--
									10/02/18	--	10.93	3,353.79	--
North RO Reject Field	MW-117	Shallow	674301.52	522979.73	3,360.07	3,363.01	3,350.07	10 to 25	04/03/18	--	9.84	3,353.17	--
									10/02/18	--	9.91	3,353.10	--
	MW-118	Shallow	674819.18	523375.94	3,359.62	3,361.95	3,349.62	10 to 25	04/03/18	--	10.73	3,351.22	--
									10/02/18	--	10.47	3,351.48	--
	MW-119	Shallow	674860.11	524575.80	3,353.83	3,356.11	3,343.83	10 to 25	04/03/18	--	10.09	3,346.02	--
									10/02/18	--	9.80	3,346.31	--
NCL	MW-18	Shallow	674172.45	522318.86	3,358.54	3,361.02	3,343.54	15 to 19	04/03/18	--	11.03	3,349.99	--
									10/02/18	--	11.36	3,349.66	--
	MW-19	Shallow	673597.29	521670.75	3,366.00	3,368.00	3,361.00	5 to 19.5	04/03/18	--	11.79	3,356.21	--
									10/02/18	--	11.06	3,356.94	--
	MW-45	Shallow	674247.07	523663.75	3,351.32	3,351.51	3,340.82	10.5 to 15.5	04/03/18	--	4.41	3,347.10	--
									10/02/18	--	4.84	3,346.67	--
	MW-53	Shallow	673626.07	521459.12	3,368.86	3,368.73	3,355.06	13.8 to 23.8	04/03/18	--	12.08	3,356.65	--
									10/02/18	--	11.31	3,357.42	--
	MW-54A	Shallow	674138.65	522110.51	3,363.55	3,366.49	3,350.85	12.7 to 27.7	04/03/18	--	12.04	3,354.45	--
									10/02/18	--	12.24	3,354.25	--
	MW-54B	Valley Fill	674148.44	522118.80	3,363.47	3,366.47	3,329.67	33.8 to 43.8	04/03/18	--	12.09	3,354.38	--
									10/02/18	--	12.27	3,354.20	--
	MW-55	Shallow	674091.95	522766.46	3,361.90	3,364.77	3,348.20	13.7 to 23.7	04/03/18	--	11.03	3,353.74	--
									10/02/18	--	11.13	3,353.64	--
	MW-56	Shallow	674160.38	523450.14	3,354.84	3,357.44	3,341.44	13.4 to 23.4	04/03/18	--	10.50	3,346.94	--
									10/02/18	--	10.93	3,346.51	--
	MW-108	Shallow	673659.33	521910.16	3,366.25	3,369.11	3,357.25	9 to 24	04/03/18	--	13.61	3,355.50	--
									10/02/18	--	13.70	3,355.41	--

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NCL	NCL-31	Shallow	673629.51	521669.01	3,366.21	3,367.54	3,353.21	13 to 18	04/03/18	--	11.41	3,356.13	--
									10/02/18	--	10.75	3,356.79	--
	NCL-32	Shallow	673984.83	521808.14	3,364.96	3,364.91	3,347.96	17 to 22	04/03/18	--	10.19	3,354.72	--
									10/02/18	--	10.12	3,354.79	--
	NCL-33	Shallow	673967.20	522245.18	3,364.26	3,363.97	3,351.26	13 to 18	04/03/18	--	9.42	3,354.55	--
									10/02/18	--	9.58	3,354.39	--
	NCL-34A	Shallow	673885.52	522235.08	3,364.82	3,365.49	3,348.82	16 to 21	04/03/18	--	11.02	3,354.47	--
									10/02/18	--	11.22	3,354.27	--
	NCL-44	Shallow	673986.41	522062.11	3,364.01	3,364.45	Unknown	Unknown	04/03/18	--	9.42	3,355.03	--
									10/02/18	--	9.59	3,354.86	--
	NCL-49	Shallow	674099.16	521648.40	3,368.26	3,371.13	3,351.46	16.8 to 17.8	04/03/18	--	16.26	3,354.87	--
									10/02/18	--	16.14	3,354.99	--
South Refinery	KWB-2R	Shallow	670207.24	524897.59	3,364.56	3,364.32	Unknown	Unknown	04/03/18	--	NM	--	--
									10/02/18	--	NM	--	--
	KWB-4	Shallow	670616.38	524572.44	3,368.36	3,370.25	3,348.36	20 to 39	04/03/18	24.60	24.97	3,345.58	0.37
									10/02/18	23.78	24.64	3,346.30	0.86
	KWB-5	Shallow	670729.55	525244.51	3,362.60	3,364.72	3,337.90	24.7 to 38.7	04/03/18	--	23.96	3,340.76	--
									10/02/18	--	23.24	3,341.48	--
	KWB-6	Shallow	670449.36	526158.70	3,358.02	3,360.30	3,340.52	17.5 to 36.5	04/03/18	--	22.75	3,337.55	--
									10/02/18	--	21.02	3,339.28	--
	MW-28	Shallow	671508.38	524521.56	3,366.79	3,370.27	3,341.79	25 to 30	04/03/18	--	22.81	3,347.46	--
									10/02/18	--	22.95	3,347.32	--
	MW-48	Shallow	670689.39	524080.35	3,363.04	3,362.97	Unknown	Unknown	04/03/18	--	18.74	3,344.23	--
									10/02/18	--	18.19	3,344.78	--
	MW-50	Shallow	671502.45	521857.84	3,368.91	3,371.05	Unknown	Unknown	04/03/18	--	15.68	3,355.37	--
									10/02/18	--	15.35	3,355.70	--
	MW-52	Shallow	670165.24	523370.99	3,368.36	3,368.30	Unknown	Unknown	04/03/18	--	19.14	3,349.16	--
									10/02/18	--	18.47	3,349.83	--
	MW-64	Shallow	670716.03	523338.61	3,365.56	3,369.52	3,350.56	15 to 30	04/03/18	--	19.71	3,349.81	--
									10/02/18	--	19.61	3,349.91	--
	MW-65	Shallow	670949.22	523711.75	3,363.84	3,363.60	3,349.34	14.5 to 29.5	04/03/18	--	16.22	3,347.38	--
									10/02/18	--	16.14	3,347.46	--
	MW-66	Shallow	671247.57	524560.06	3,363.66	3,363.46	3,349.06	14.6 to 29.6	04/03/18	--	17.09	3,346.37	--
									10/02/18	--	16.99	3,346.47	--
	MW-99	Shallow	671652.52	524579.74	3,365.11	3,364.51	3,353.11	12 to 27	04/03/18	--	17.97	3,346.54	--
									10/02/18	--	17.60	3,346.91	--

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South Refinery	MW-101	Shallow	671628.25	523506.58	3,362.07	3,364.23	3,354.07	8 to 23	04/03/18	--	14.84	3,349.39	--
									10/02/18	--	14.85	3,349.38	--
	MW-102	Shallow	671176.70	522937.01	3,365.51	3,367.64	3,353.51	12 to 27	04/03/18	--	15.90	3,351.74	--
									10/02/18	--	15.64	3,352.00	--
	MW-103	Shallow	670472.55	522607.80	3,370.89	3,372.47	3,363.89	7 to 22	04/03/18	--	18.68	3,353.79	--
									10/02/18	--	18.50	3,353.97	--
	MW-104	Shallow	670450.35	522729.44	3,369.41	3,371.43	3,366.41	3 to 18	04/03/18	--	17.84	3,353.59	--
									10/02/18	--	17.40	3,354.03	--
	MW-105	Shallow	671924.44	522454.93	3,365.20	3,364.99	3,357.20	8 to 18	04/03/18	--	10.70	3,354.29	--
									10/02/18	--	10.28	3,354.71	--
	MW-106	Shallow	672207.14	523454.55	3,359.29	3,358.98	3,359.29	0 to 11	04/03/18	--	8.49	3,350.49	--
									10/02/18	--	8.67	3,350.31	--
	MW-107	Shallow	671961.38	524600.45	3,359.63	3,359.44	3,347.63	12 to 22	04/03/18	--	13.20	3,346.24	--
									10/02/18	--	13.46	3,345.98	--
	MW-109	Shallow	670174.25	523065.52	3,368.27	3,368.09	3,353.27	15 to 29.5	04/03/18	--	17.74	3,350.35	--
									10/02/18	--	17.08	3,351.01	--
	MW-110	Shallow	670174.33	522796.69	3,368.46	3,368.03	3,353.46	15 to 29.5	04/03/18	--	15.79	3,352.24	--
									10/02/18	--	15.30	3,352.73	--
	RW-4	Shallow	671378.27	523010.47	3,364.41	3,364.86	Unknown	Unknown	04/03/18	--	14.40	3,350.46	--
									10/02/18	--	14.23	3,350.63	--
	RW-5R	Shallow	671258.01	523662.01	3,362.79	3,368.56	3,349.79	13 to 33	04/03/18	18.22	18.33	3,350.32	0.11
									10/02/18	16.75	16.99	3,351.76	0.24
	RW-6	Shallow	670969.39	522843.22	3,366.03	3,368.36	Unknown	Unknown	04/03/18	--	15.42	3,352.94	--
									10/02/18	--	15.13	3,353.23	--
	RW-11-0	Shallow	669938.15	527541.66	3,351.48	3,353.95	Unknown	Unknown	04/03/18	--	Dry	--	--
									10/02/18	--	20.50	3,333.45	--
	RW-15C	Shallow	670820.45	524123.41	3,362.65	3,361.41	Unknown	Unknown	04/03/18	--	16.58	3,344.83	--
									10/02/18	16.34	16.37	3,345.06	0.03
	RW-19	Shallow	670611.43	524592.99	3,367.09	3,369.11	3,356.09	11 to 46	04/03/18	24.83	25.06	3,344.23	0.23
									10/02/18	24.13	24.43	3,344.92	0.30
South RO Reject Field	MW-114	Shallow	673082.16	523818.86	3,358.62	3,361.68	3,338.62	20 to 35	04/03/18	--	9.01	3,352.67	--
									10/02/18	--	7.76	3,353.92	--
	MW-115	Shallow	673997.34	523932.93	3,356.48	3,359.31	3,346.48	10 to 25	04/03/18	--	5.88	3,353.43	--
									10/02/18	--	5.20	3,354.11	--
	MW-116	Shallow	673966.06	525339.63	3,350.99	3,353.77	3,340.99	10 to 25	04/03/18	--	6.62	3,347.15	--
									10/02/18	--	10.37	3,343.40	--

Table 1 - Well Information and Gauging Data

2018 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)
TEL	MW-49	Shallow	672051.80	523610.79	3,359.73	3,359.63	Unknown	Unknown	04/03/18	--	10.70	3,348.93	--
									10/02/18	--	10.76	3,348.87	--
	TEL-1	Shallow	672966.33	523412.82	3,356.79	3,358.23	3,343.79	13 to 23	04/03/18	--	9.02	3,349.21	--
									10/02/18	--	9.19	3,349.04	--
	TEL-2	Shallow	672885.90	523419.29	3,356.80	3,359.12	3,343.80	13 to 23	04/03/18	--	9.91	3,349.21	--
									10/02/18	--	10.04	3,349.08	--
	TEL-3	Shallow	672796.06	523459.33	3,356.43	3,358.33	3,343.43	13 to 23	04/03/18	--	9.19	3,349.14	--
									10/02/18	9.19	9.23	3,349.13	0.04
	TEL-4	Shallow	672715.99	523181.18	3,358.21	3,360.24	3,345.21	13 to 23	04/03/18	--	9.48	3,350.76	--
									10/02/18	--	9.52	3,350.72	--
TMD	MW-8	Shallow	673215.93	529055.18	3,334.81	3,336.42	Unknown	Unknown	04/03/18	--	14.43	3,321.99	--
									10/02/18	--	15.04	3,321.38	--
	MW-9	Shallow	673169.56	529232.03	3,334.50	3,336.20	Unknown	Unknown	04/03/18	--	15.06	3,321.14	--
									10/02/18	--	15.47	3,320.73	--
	MW-16	Shallow	675613.35	534389.17	3,313.50	3,316.12	3,305.00	8.5 to 19	04/03/18	--	11.19	3,304.93	--
									10/02/18	--	8.33	3,307.79	--
	MW-20	Shallow	673800.56	527834.67	3,338.43	3,340.91	3,328.93	9.5 to 23.5	04/03/18	--	10.65	3,330.26	--
									10/02/18	--	15.17	3,325.74	--
	MW-21	Shallow	673180.38	529150.62	3,334.65	3,337.31	3,327.15	7.5 to 22	04/03/18	--	13.62	3,323.69	--
									10/02/18	--	14.39	3,322.92	--
	MW-25	Shallow	675386.30	537955.86	3,310.35	3,312.29	3,294.60	15.75 to 25.25	04/03/18	--	13.89	3,298.40	--
									10/02/18	--	15.55	3,296.74	--
	MW-26	Shallow	676229.18	535348.61	3,312.08	3,314.87	3,296.83	15.25 to 24.25	04/03/18	--	12.33	3,302.54	--
									10/02/18	--	9.69	3,305.18	--
	MW-27	Shallow	674495.64	532942.65	3,319.46	3,320.85	3,301.21	18.25 to 27.75	04/03/18	--	19.20	3,301.65	--
									10/02/18	--	19.20	3,301.65	--
	MW-46R	Shallow	674223.03	524920.28	3,350.41	3,350.11	3,346.91	3.5 to 18.5	04/03/18	--	4.22	3,345.89	--
									10/02/18	--	4.87	3,345.24	--
	MW-68	Shallow	674301.02	531466.90	3,325.81	3,328.21	3,311.06	14.75 to 24.5	04/03/18	--	22.34	3,305.87	--
									10/02/18	--	21.22	3,306.99	--
	MW-71	Shallow	673016.80	529560.41	3,332.99	3,335.29	3,323.24	9.75 to 19.5	04/03/18	--	15.64	3,319.65	--
									10/02/18	--	15.42	3,319.87	--
	MW-89	Shallow	675221.56	533835.00	3,316.38	3,318.32	3,314.38	2 to 17	04/03/18	--	13.28	3,305.04	--
									10/02/18	--	10.89	3,307.43	--
	NP-1	Shallow	672992.73	528035.04	3,339.69	3,342.40	3,330.19	9.5 to 19	04/03/18	--	15.98	3,326.42	--
									10/02/18	--	17.24	3,325.16	--

Table 1 - Well Information and Gauging Data

2018 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)
TMD	NP-2	Shallow	673571.19	527611.64	3,340.58	3,342.77	3,331.08	9.5 to 18.5	04/03/18	--	13.94	3,328.83	--
									10/02/18	--	16.94	3,325.83	--
	NP-3	Shallow	673990.66	528019.54	3,340.40	3,342.93	3,330.90	9.5 to 18.5	04/03/18	--	11.95	3,330.98	--
									10/02/18	--	17.11	3,325.82	--
	NP-4	Shallow	674337.35	528351.85	3,343.24	3,345.73	3,318.74	24.5 to 33.5	04/03/18	--	21.66	3,324.07	--
									10/02/18	--	27.88	3,317.85	--
	NP-6	Shallow	672945.23	529083.91	3,336.31	3,338.05	3,327.56	8.75 to 18.75	04/03/18	--	13.64	3,324.41	--
									10/02/18	--	13.87	3,324.18	--
	NP-8	Shallow	675399.60	538245.49	3,310.53	3,314.67	Unknown	Unknown	04/03/18	--	12.82	3,301.85	--
									10/02/18	--	13.06	3,301.61	--
	NP-9	Shallow	674767.14	523571.69	3,357.86	3,360.62	Unknown	Unknown	04/03/18	--	9.10	3,351.52	--
									10/02/18	--	9.22	3,351.40	--
Up-Gradient	UG-1	Shallow	672453.27	520746.73	3,373.02	3,372.94	3,365.02	8 to 23	04/02/18	--	13.33	3,359.61	--
									10/02/18	--	--	--	--
	UG-2	Shallow	670726.77	520942.36	3,380.30	3,380.41	3,365.30	15 to 30	04/02/18	--	18.51	3,361.90	--
									10/02/18	--	--	--	--
	UG-3R	Shallow	671992.70	519424.77	3,384.62	3,384.08	3,367.62	17 to 37	04/02/18	--	22.78	3,361.30	--
									10/02/18	--	--	--	--
	UG-4	Shallow	674087.85	520541.74	3,377.78	3,377.36	3,358.28	19.5 to 39.5	04/02/18	--	20.07	3,357.29	--
									10/02/18	--	--	--	--

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] Top of recovery pump prevented deeper measurement.

[4] Blockage in well prevented deeper measurement.

Definitions:

ft = feet
-- = not applicable
amsl = above mean sea level
bgs = below ground surface
btoc = below top of casing
NCL = North Colony Landfarm
NM = Not measured
PSH = phase separated hydrocarbons
RO = Reverse Osmosis
TEL = Tetra Ethyl Lead Surface Impoundment
TMD = Three Mile Ditch
TOC = Top of Casing
unknown = screen interval not readily availble

Table 2 - Well Purging and Water Quality Field Measurement Data

2018 Annual Groundwater Monitoring Report

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

Area	Well	Purge Method[1]	Date	Time	Temperature (°C)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water [2]
Cross-Gradient	KWB-13	Bladder	4/3/2018	15:45	25.9	0.3390	5.4	7.01	-1.6	Colorless; cloudy
	RA-3156	Grab	4/4/2018	8:05	20.2	0.1821	3.8	6.89	18.6	Clear; colorless
	MW-136	Low Flow	4/4/2018	17:50	16.6	0.3950	2.7	6.94	10.8	Colorless and slightly cloudy to colorless and clear
			10/2/2018	10:30	18.6	0.4030	1.2	6.64	21.9	Clear; colorless
Evaporation Ponds	MW-1R	Low Flow	4/4/2018	12:45	17.3	0.8670	0.5	6.84	-112.3	Clear; colorless
	MW-2A	Low Flow	4/5/2018	10:05	18.1	2.0500	1.1	7.06	-117.3	Clear; colorless with small particles
			10/3/2018	11:25	24.3	1.9660	1.1	6.92	-149.9	Clear; colorless
	MW-3	Low Flow	4/4/2018	12:25	18.8	0.6110	1.2	7.15	-29.9	Clear; colorless
			10/2/2018	15:50	24.0	0.6000	1.1	7.17	-31.5	Clear
	MW-4A	Low Flow	4/3/2018	16:40	21.5	0.6090	2.5	7.33	-159.2	Clear with black particles
			10/2/2018	12:10	23.9	0.6060	2.4	7.29	-146.2	Clear; colorless with black particles
	MW-5A	Low Flow	4/3/2018	15:35	20.5	1.3650	1.5	7.25	-148.9	Clear; colorless with orange particles
			10/2/2018	11:15	24.1	1.1140	1.5	7.19	-148.2	Clear; colorless with orange particles
	MW-6A	Low Flow	4/5/2018	9:30	16.6	0.4210	1.3	7.50	-82.8	Clear; colorless
	MW-7A	Low Flow	4/3/2018	13:35	19.8	0.8580	1.3	7.23	-103.5	Clear; colorless with orange particles
			10/2/2018	10:05	22.1	0.8540	1.3	7.17	-113.1	Clear; colorless with orange particles
	MW-10	Low Flow	4/3/2018	12:05	21.5	0.5920	1.4	7.10	-43.8	Clear; colorless with small orange particles
			10/2/2018	14:30	24.3	0.5950	1.2	6.47	-43.9	Clear; colorless with orange particles
	MW-11A	Low Flow	4/4/2018	18:00	18.4	2.5600	0.7	6.60	38.7	Clear; colorless with orange particles
			10/2/2018	18:00	22.6	2.4200	0.5	6.76	-78.7	Clear; colorless with orange particles
	MW-15	Low Flow	4/4/2018	13:30	18.8	0.4810	0.6	6.79	28.3	Clear; colorless
	MW-18A	Low Flow	4/4/2018	9:25	16.8	2.0700	0.5	6.89	33.1	Clear; colorless
			10/2/2018	10:00	20.8	2.0200	0.4	7.05	-202.4	Clear; colorless
	MW-22A	Low Flow	4/3/2018	11:00	20.0	0.7310	1.3	6.94	-78.1	Clear; colorless with orange particles
			10/2/2018	13:45	23.5	0.7270	1.2	6.95	-75.8	Clear; colorless
	MW-70	Low Flow	4/4/2018	10:10	15.9	0.6620	0.6	6.87	-31.8	Clear; colorless; orange particles
			10/2/2018	10:45	21.4	0.6150	0.5	7.14	-143.1	Clear; colorless
	MW-72	Low Flow	4/4/2018	17:10	17.9	1.2120	0.9	7.33	32.5	Clear; colorless
	MW-73	Low Flow	4/4/2018	8:40	15.3	1.0860	1.1	7.60	45.7	Clear; colorless
	MW-74	Low Flow	4/4/2018	9:25	16.8	1.0210	1.5	6.80	14.8	Clear; colorless
			10/3/2018	12:55	24.0	1.0280	1.2	6.94	14.9	Clear; colorless
	MW-75	Low Flow	4/3/2018	17:25	20.9	0.7820	1.4	7.19	-82.3	Clear; gold tint; odor
			10/3/2018	8:25	23.2	0.7310	1.4	7.16	-84.6	Clear; gold tint; odor
	MW-76	Low Flow	4/4/2018	10:55	18.3	0.6130	1.5	6.94	-117.5	Clear; colorless
			10/2/2018	17:25	23.8	0.6170	1.5	6.96	-125.5	Clear; colorless
	MW-77	Low Flow	4/3/2018	18:10	20.6	0.8220	2.7	6.98	-73.7	Clear; gold tint; odor
	MW-78	Low Flow	4/4/2018	10:10	17.4	0.4840	2.1	7.07	38.9	Clear with gold tint
	MW-79	Low Flow	4/4/2018	16:25	18.1	0.6970	1.3	6.76	-27.5	Clear; colorless
			10/3/2018	13:50	24.2	0.6770	1.3	6.66	-29.4	Clear; colorless

Table 2 - Well Purging and Water Quality Field Measurement Data

2018 Annual Groundwater Monitoring Report

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

Area	Well	Purge Method[1]	Date	Time	Temperature (°C)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water [2]
Evaporation Ponds	MW-80	Low Flow	4/4/2018	15:40	17.8	0.8980	1.5	7.46	-122.5	Clear; colorless
	MW-81	Low Flow	4/4/2018	14:55	18.8	0.7010	2.5	7.37	-101.5	Clear; colorless
	MW-82	Low Flow	4/4/2018	13:25	20.0	0.6930	1.0	7.47	-76.6	Clear; colorless with orange particles
	MW-83	Low Flow	4/4/2018	11:40	18.9	0.5230	1.6	6.96	-152.3	Clear with gold tint
			10/2/2018	16:45	24.0	0.5340	1.3	6.95	-145.6	Clear; colorless
	MW-84	Low Flow	4/4/2018	14:10	19.4	0.9530	1.1	7.01	-111.9	Clear with gold tint
			10/3/2018	12:10	24.5	0.9710	1.2	7.23	-95.1	Clear; colorless
	MW-87	Low Flow	4/4/2018	8:35	15.6	1.5060	0.6	7.18	-135.1	Clear; colorless
			10/2/2018	9:10	20.8	1.4750	0.5	7.09	-173.2	Clear; colorless
	MW-88	Low Flow	4/3/2018	10:15	20.9	0.6730	1.1	6.71	-145.6	Clear; colorless with orange particles
			10/2/2018	12:55	23.9	0.6650	1.2	6.92	-139.1	Clear; colorless with orange particles
	MW-120	Low Flow	4/5/2018	10:15	15.8	0.7780	0.8	7.32	-122.5	Clear; colorless
			10/3/2018	9:10	24.5	0.7900	0.9	7.25	-94.6	Clear; colorless
	MW-121	Low Flow	4/5/2018	11:00	16.5	0.5520	1.5	7.33	-22.7	Slightly cloudy to clear; colorless
			10/3/2018	9:55	24.4	0.5780	1.4	7.16	-22.5	Clear; colorless
	MW-122	Low Flow	4/5/2018	9:20	17.8	0.6450	1.0	7.22	-116.5	Clear; colorless with orange particles
			10/3/2018	10:40	23.6	0.5880	1.1	7.19	-110.4	Clear; colorless with orange particles
	MW-123	Low Flow	4/3/2018	12:50	20.7	0.6480	1.4	7.17	-60.1	Clear; colorless
			10/2/2018	15:15	22.9	0.6440	1.3	7.08	-60.5	Clear; colorless
	MW-124	Low Flow	4/4/2018	10:55	16.8	1.1990	0.5	6.76	-87.6	Clear; colorless
			10/2/2018	11:30	21.4	1.1530	0.5	7.04	-113.3	Clear; colorless
	OCD-1R	Low Flow	4/4/2018	14:20	18.2	0.9040	0.6	6.90	50.9	Clear; colorless
			10/2/2018	14:35	22.6	0.7380	0.5	7.16	-41.9	Clear; colorless
	OCD-2A	Low Flow	4/4/2018	15:05	18.4	0.5050	1.0	7.06	-17.3	Clear; colorless with orange particles
			10/2/2018	15:20	21.5	0.6520	0.4	7.22	-103.5	Clear; colorless
	OCD-3	Low Flow	4/4/2018	15:50	18.6	0.7560	0.5	6.70	7.5	Clear; colorless with orange particles
			10/2/2018	16:00	22.4	0.5440	0.4	7.04	-96.2	Clear; colorless
	OCD-4	Low Flow	4/4/2018	16:35	18.8	0.3380	1.0	6.77	41.8	Clear; colorless
			10/2/2018	16:40	22.4	1.6370	0.5	6.92	-76.4	Clear; colorless
	OCD-5	Low Flow	4/4/2018	17:20	18.2	1.4680	0.5	6.72	31.9	Slightly cloudy; orange tint with orange particles
			10/2/2018	17:20	22.1	1.4820	0.4	6.95	-121.5	Clear; orange tint with orange particles
	OCD-6	Low Flow	4/4/2018	17:55	19.7	1.4120	1.1	7.02	-59.8	Clear; colorless with small particles
			10/3/2018	12:10	22.0	1.4090	0.7	6.84	-88.7	Slightly cloudy; colorless with orange particles
	OCD-7AR	Low Flow	4/4/2018	18:40	19.6	1.2020	1.1	6.95	-110.6	Clear; colorless with orange particles
			10/3/2018	11:25	24.2	1.1620	0.5	6.94	-160.9	Clear; colorless with orange particles
	OCD-8A	Low Flow	4/3/2018	14:45	20.1	1.1010	1.3	6.96	-153.9	Clear; colorless with orange particles
			10/2/2018	9:10	22.5	1.0870	1.4	6.96	-144.7	Clear; colorless

Table 2 - Well Purging and Water Quality Field Measurement Data

2018 Annual Groundwater Monitoring Report

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

Area	Well	Purge Method[1]	Date	Time	Temperature (°C)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water [2]
Field East of Refinery	KWB-1A	Low Flow	4/3/2018	10:35	18.7	0.4300	1.8	6.81	47.2	Clear; colorless
			10/2/2018	9:45	17.3	0.4230	1.6	6.75	-16.1	Clear; colorless
	KWB-7	Low Flow	10/2/2018	9:20	19.8	0.4935	1.0	6.98	-194.8	Clear; colorless; strong odor
	KWB-10R	Low Flow	4/3/2018	9:50	20.7	0.1568	2.7	6.62	-100.6	Clear; colorless; odor
			10/2/2018	9:00	18.6	0.1550	1.9	6.67	-128.7	Clear; colorless; odor
	KWB-11A	Low Flow	4/3/2018	9:40	19.4	0.4786	1.0	6.74	-64.2	Clear; colorless; sheen observed on interface probe.
			10/2/2018	10:30	19.7	0.6365	1.2	6.79	-69.8	Clear; colorless
	KWB-11B	Low Flow	4/3/2018	10:25	20.2	0.2645	1.0	6.91	17.2	Clear; colorless
			10/2/2018	11:15	19.6	0.4524	0.6	6.97	12.1	Clear; colorless
	KWB-12A	Low Flow	10/3/2018	12:30	21.1	0.3080	3.7	6.73	52.9	Clear; colorless
	KWB-12B	Bladder	4/4/2018	14:35	16.3	0.3220	3.2	6.91	-3.2	Clear; colorless
			10/3/2018	13:10	20.4	0.3230	4.0	6.78	53.6	Clear; colorless
	MW-57	Low Flow	4/4/2018	13:50	17.3	0.3800	2.6	6.80	-37.7	Clear; colorless
			10/3/2018	11:50	20.2	0.4390	3.6	6.67	50.6	Clear; colorless
	MW-58	Low Flow	4/3/2018	16:35	19.9	0.1752	1.6	6.80	-167.3	Colorless; odor; slightly cloudy to clear
			10/3/2018	14:25	21.4	0.1491	1.7	6.71	-215.6	Colorless; odor; clear
	MW-111	Low Flow	4/4/2018	12:10	17.9	0.2510	2.6	6.64	-41.9	Colorless and slightly cloudy to colorless and clear
			10/2/2018	13:50	24.1	0.2520	2.8	6.56	-98.8	Clear; colorless
	MW-113	Low Flow	4/4/2018	11:00	19.2	0.2847	1.4	6.89	-57.2	Clear; colorless
			10/2/2018	13:35	22.3	0.3933	1.4	6.76	-52.5	Clear; colorless
	MW-125	Low Flow	4/3/2018	9:35	22.6	0.4870	2.2	6.77	183.1	Clear; colorless
			10/3/2018	12:55	24.3	0.4120	1.8	6.54	-99.1	Clear
	MW-126A	Low Flow	4/3/2018	13:55	19.5	0.3150	3.4	6.81	-109.9	Colorless and slightly cloudy to colorless and clear
			10/2/2018	11:15	19.2	0.2770	1.6	6.74	-154.0	Clear; colorless
	MW-126B	Low Flow	4/3/2018	14:35	18.5	0.3550	3.1	6.78	-56.0	Clear; colorless
			10/2/2018	11:55	18.7	0.3640	1.3	6.63	-55.8	Clear; colorless
	MW-127	Low Flow	4/3/2018	13:10	20.8	0.2320	2.6	6.86	-264.3	Colorless and slightly cloudy to colorless and clear
			10/2/2018	12:35	21.5	0.2340	1.8	6.65	-242.8	Clear; colorless
	MW-128	Low Flow	4/4/2018	16:40	23.3	0.2030	4.1	6.66	-47.6	Colorless and slightly cloudy to clear
			10/3/2018	12:10	25.0	0.1694	3.4	6.40	-209.5	Clear; colorless
	MW-129	Low Flow	4/3/2018	12:20	22.7	0.1941	3.9	6.70	-86.4	Clear; colorless; sheen observed on interface probe.
	MW-130	Low Flow	4/5/2018	9:55	21.5	0.2978	1.1	6.79	102.8	Clear; colorless
			10/3/2018	14:40	25.5	0.3301	1.4	6.82	58.1	Clear; colorless
	MW-134	Low Flow	4/4/2018	10:10	18.0	0.5090	1.3	6.73	90.1	Clear; colorless
			10/3/2018	10:55	21.3	0.6405	1.4	6.89	45.3	Clear; colorless
	MW-135	Bladder	4/3/2018	11:35	19.6	0.6679	1.9	7.71	53.2	Clear with tiny white particles
			10/2/2018	12:20	19.4	0.8477	1.5	6.94	52.2	Slightly cloudy

Table 2 - Well Purging and Water Quality Field Measurement Data

2018 Annual Groundwater Monitoring Report

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

Area	Well	Purge Method[1]	Date	Time	Temperature (°C)	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	4/3/2018	13:05	23.2	0.2434	2.1	6.97	18.6	Clear; colorless
			10/3/2018	12:20	27.1	0.2634	2.2	7.04	-18.6	Clear; colorless
	RA-4798	Grab	4/3/2018	13:35	19.4	0.1208	1.9	6.99	43.6	Clear; colorless
			10/3/2018	11:50	20.3	0.1653	2.2	7.03	12.4	Clear; colorless
	RW-12R	Low Flow	4/4/2018	12:00	19.3	0.2861	0.3	7.44	-254.8	Clear; colorless; strong odor
	RW-13R	Low Flow	4/4/2018	12:50	17.7	0.2220	1.2	6.93	-234.6	Clear; colorless
	RW-18A	Low Flow	4/3/2018	11:20	17.3	0.3590	1.6	7.05	50.0	Clear; colorless
North Refinery	MW-23	Low Flow	4/4/2018	19:00	24.9	0.2610	0.4	6.98	-289.4	Clear; colorless
			10/3/2018	13:00	32.8	0.3210	1.0	7.10	-309.0	Clear; colorless; odor
	MW-29	Low Flow	4/4/2018	13:25	20.0	0.3590	1.0	6.95	-191.2	Clear; colorless
			10/3/2018	12:15	28.6	0.3940	1.0	6.83	-253.9	Clear; colorless
	MW-39	Low Flow	4/4/2018	10:45	18.5	0.3430	1.0	7.07	-343.4	Clear; black tint; odor
			10/3/2018	11:25	25.8	0.3720	0.9	7.12	-342.1	Clear; colorless; odor
	MW-40	Low Flow	4/4/2018	12:20	20.7	0.2450	0.5	6.80	-351.4	Clear; colorless
	MW-41	Low Flow	4/4/2018	15:20	20.2	0.4140	0.5	6.45	-309.9	Clear; colorless
	MW-42	Low Flow	4/4/2018	16:10	19.8	0.3420	0.4	6.82	-317.7	Clear; colorless
	MW-43	Low Flow	4/4/2018	16:30	23.1	0.4700	1.2	6.86	-395.0	Clear; yellow color; odor
			10/3/2018	13:05	26.8	0.4850	1.4	6.74	-398.1	Clear; colorless
	MW-59	Low Flow	4/4/2018	13:00	22.2	0.3490	1.1	6.80	-266.2	Clear; colorless
	MW-60	Low Flow	4/4/2018	13:50	22.1	0.4150	3.8	6.80	-300.1	Clear; colorless
			10/3/2018	10:50	25.2	0.3840	3.6	6.54	-419.1	Clear
	MW-61	Low Flow	4/5/2018	9:35	22.4	0.2600	0.3	6.89	-365.1	Clear; colorless; odor
			10/2/2018	14:45	27.5	0.3050	0.9	6.65	-372.5	Clear; colorless
	MW-62	Low Flow	4/5/2018	8:25	20.1	0.2860	0.4	6.61	-359.4	Clear; colorless; odor
			10/2/2018	15:30	26.5	0.3190	1.0	6.52	-369.2	Clear; colorless; odor
	MW-67	Low Flow	4/3/2018	16:20	24.0	0.2570	1.7	7.27	-357.5	Clear; light yellow color; odor; small black particles
			10/2/2018	14:15	25.6	0.2601	1.6	6.72	-335.5	Clear; light yellow color; odor
	MW-90	Low Flow	4/3/2018	14:35	23.5	0.3240	1.4	7.16	-349.0	Clear; colorless; odor
			10/2/2018	12:40	25.9	0.3690	1.6	6.70	-365.1	Clear; colorless
	MW-91	Low Flow	4/3/2018	13:55	24.5	0.2740	1.7	6.77	-374.8	Clear with black color; odor
			10/2/2018	12:00	25.7	0.2914	2.1	6.43	-388.6	Clear with black color; odor
	MW-93	Low Flow	4/4/2018	18:00	22.8	0.3040	1.2	6.49	-371.0	Clear; colorless; sheen; odor
	MW-95	Low Flow	4/4/2018	8:55	22.2	0.2240	1.8	6.90	-282.6	Clear; colorless; odor
	MW-96	Low Flow	4/3/2018	15:15	22.7	0.2080	1.8	6.98	-350.7	Clear; colorless; white particles; odor
			10/2/2018	13:15	26.0	0.2374	1.9	6.68	-362.1	Clear; colorless; odor
	MW-98	Low Flow	4/3/2018	13:20	23.0	0.3000	0.3	6.62	-374.8	Clear; colorless; odor
			10/2/2018	13:55	26.3	0.3380	1.0	6.60	-381.8	Clear; colorless; odor
	MW-137	Low Flow	4/5/2018	9:50	25.7	0.5060	2.0	6.71	-387.2	Clear; colorless; odor
			10/3/2018	14:30	25.6	0.4610	3.1	6.65	-393.3	Clear; light yellow color; odor

Table 2 - Well Purging and Water Quality Field Measurement Data

2018 Annual Groundwater Monitoring Report

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

Area	Well	Purge Method[1]	Date	Time	Temperature (°C)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water [2]
North Refinery	MW-138	Low Flow	4/5/2018	9:05	28.8	0.2890	2.0	6.60	-305.6	Clear; odor; sheen; colorless to brown color
			10/3/2018	13:45	25.8	0.3080	2.3	6.60	-328.1	Clear; odor; sheen; yellow color
	RW-1	Low Flow	4/3/2018	13:10	24.5	0.3240	1.2	6.89	-365.8	Clear with black color and black particles; sheen; odor
	RW-2	Low Flow	4/4/2018	17:15	23.7	0.3320	1.0	6.64	-375.1	Slightly cloudy to clear; yellow color; sheen; black particles; odor
	RW-7	Low Flow	4/4/2018	9:40	22.6	0.2330	1.3	6.58	-353.7	Clear; black color; small black particles; sheen; odor
	RW-9	Low Flow	4/4/2018	14:20	20.0	0.3250	0.8	6.70	-356.7	Clear with black tint; odor
	RW-10	Low Flow	4/4/2018	11:35	18.6	0.2710	0.2	6.88	-359.8	Clear; colorless
	RW-16B	Low Flow	4/4/2018	17:05	19.6	0.3500	0.7	7.02	-188.1	Clear; colorless
	RW-17A	Low Flow	4/3/2018	18:45	22.7	0.5460	1.6	6.77	-186.2	Clear; colorless
North RO Reject Field	MW-117	Low Flow	4/4/2018	8:50	12.9	0.3310	1.7	6.82	48.3	Clear; colorless
			10/3/2018	9:35	18.5	0.3580	1.9	6.64	34.6	Clear; colorless
	MW-118	Low Flow	4/4/2018	9:35	12.9	0.3810	3.3	6.92	55.8	Colorless and slightly cloudy to colorless and clear
			10/3/2018	10:20	19.0	0.3930	2.5	6.69	44.1	Clear; colorless
	MW-119	Low Flow	4/4/2018	10:20	14.2	0.3490	1.4	7.00	56.0	Clear; colorless
			10/3/2018	11:05	21.0	0.4080	1.3	6.68	36.4	Clear; colorless
NCL	MW-18	Low Flow	4/4/2018	14:55	23.7	0.3160	1.7	6.94	-192.7	Clear; colorless
	MW-45	Low Flow	4/4/2018	8:25	17.1	0.4430	1.5	6.63	-0.6	Clear; colorless with white particles
			10/3/2018	14:25	24.2	0.5190	1.3	6.83	-114.4	Clear; colorless
	MW-53	Low Flow	4/3/2018	11:10	24.7	0.2390	1.2	7.09	86.8	Clear; colorless
	MW-54A	Low Flow	4/3/2018	9:35	22.3	0.2240	1.7	6.52	101.5	Clear; colorless
			10/2/2018	9:10	22.2	0.2467	1.9	6.54	54.0	Clear; colorless
	MW-55	Low Flow	4/4/2018	15:40	23.3	0.3830	1.3	6.73	-77.6	Clear; colorless
			10/3/2018	12:15	26.7	0.4210	1.5	6.67	-76.7	Clear; colorless
	MW-56	Low Flow	4/4/2018	18:00	22.3	0.3280	0.7	6.74	-154.9	Clear; colorless
	MW-108	Low Flow	4/4/2018	11:50	23.1	0.3080	1.6	7.22	-347.0	Clear with yellow color; odor
			10/3/2018	9:10	21.8	0.2656	1.7	6.68	-379.4	Clear with yellow color; odor
	NCL-31	Low Flow	4/4/2018	12:35	23.1	0.2660	1.1	7.07	-263.9	Clear; colorless
			10/3/2018	9:55	26.3	0.3370	1.2	6.87	-238.4	Clear; colorless
	NCL-32	Low Flow	4/4/2018	13:20	23.4	0.2610	1.1	7.05	-223.5	Clear; colorless
			10/3/2018	10:45	25.1	0.2963	1.3	6.83	-118.6	Clear; colorless
	NCL-33	Low Flow	4/4/2018	11:05	23.3	0.3060	1.8	6.80	-253.8	Clear; colorless
			10/2/2018	16:00	25.2	0.3190	1.8	6.47	-213.2	Clear; colorless
	NCL-34A	Low Flow	4/4/2018	10:25	22.3	0.2100	1.9	6.53	-357.8	Clear; colorless; odor; sheen
			10/2/2018	15:20	25.1	0.2230	1.7	6.54	-368.1	Clear; colorless; odor; sheen
	NCL-44	Low Flow	4/4/2018	14:10	23.3	0.2670	1.5	6.72	-283.2	Clear; colorless
			10/3/2018	11:30	25.6	0.2851	1.7	6.60	-258.0	Clear; colorless; odor
	NCL-49	Low Flow	4/3/2018	10:20	24.8	0.3480	1.8	6.95	100.2	Clear; colorless
			10/2/2018	9:55	21.8	0.3200	1.5	6.88	84.0	Clear; colorless

Table 2 - Well Purging and Water Quality Field Measurement Data

2018 Annual Groundwater Monitoring Report

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

Area	Well	Purge Method[1]	Date	Time	Temperature (°C)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water [2]
South Refinery	KWB-5	Low Flow	4/4/2018	11:25	16.6	0.2470	2.2	6.73	-120.6	Clear; colorless
			10/2/2018	14:45	24.1	0.2510	2.9	6.63	-152.8	Clear; colorless
	KWB-6	Low Flow	4/4/2018	13:00	17.5	0.2020	1.5	6.86	-265.1	Clear with black tint; odor
			10/3/2018	13:55	24.8	0.2580	1.4	6.63	-223.9	Clear; colorless with white particles
	MW-28	Low Flow	4/4/2018	12:05	21.3	0.3050	1.1	6.73	-313.5	Clear; colorless
			10/2/2018	13:15	26.5	0.2270	1.0	6.54	-421.8	Clear; colorless
	MW-48	Low Flow	4/5/2018	9:55	24.5	0.4070	0.8	6.80	-336.3	Clear; gray tint; odor
			10/3/2018	14:55	24.8	0.3660	0.7	6.97	-323.9	Clear; gray tint; odor
	MW-50	Low Flow	4/3/2018	11:55	23.8	0.6600	1.4	7.02	65.0	Clear; colorless
			10/2/2018	10:50	23.4	0.5240	1.7	6.79	-139.5	Clear; colorless
	MW-52	Low Flow	4/5/2018	9:05	19.8	0.2707	1.2	6.94	88.5	Clear; colorless
			10/3/2018	13:25	23.0	0.2550	0.8	6.88	13.7	Clear; colorless
	MW-64	Low Flow	4/3/2018	13:55	29.6	0.2770	1.1	6.96	-322.8	Clear; colorless
			10/2/2018	9:25	23.3	0.2210	1.3	6.82	-406.8	Clear; colorless
	MW-65	Low Flow	4/3/2018	14:50	27.3	0.2340	2.0	6.75	-252.2	Clear; colorless with small black particles; odor
			10/2/2018	11:35	25.8	0.1924	1.6	6.57	-350.1	Clear; colorless with small black particles; odor; sheen on probe
	MW-66	Low Flow	4/4/2018	11:05	21.5	0.1942	0.8	6.73	-230.6	Clear; colorless
			10/3/2018	9:25	22.5	0.1732	1.0	6.60	-263.9	Clear with black particles
	MW-99	Low Flow	4/4/2018	10:10	21.8	0.2400	2.0	6.71	-315.0	Clear; colorless
			10/3/2018	10:05	24.1	0.2100	1.8	6.60	-418.9	Clear
	MW-101	Low Flow	4/4/2018	9:10	18.4	0.1868	1.5	6.62	-82.2	Clear; colorless
			10/3/2018	9:15	23.6	0.2010	1.2	6.83	-192.2	Clear; colorless
	MW-102	Low Flow	4/3/2018	15:55	25.3	0.2520	1.9	6.81	-317.6	Clear; colorless
			10/2/2018	12:25	25.0	0.2100	1.4	6.57	-415.0	Clear; colorless
	MW-103	Low Flow	4/3/2018	13:00	31.0	2.2400	2.4	7.21	-340.7	Clear; colorless
	MW-104	Low Flow	4/3/2018	12:00	24.2	0.2070	1.6	6.79	-301.5	Clear; colorless
			10/2/2018	10:05	22.7	0.1882	1.4	6.63	-421.9	Clear; colorless
	MW-105	Low Flow	4/5/2018	10:25	22.4	0.1767	0.4	6.76	-352.2	Cloudy with gray tint
			10/3/2018	8:25	25.7	0.2010	0.7	6.43	-353.2	Clear; colorless
	MW-106	Low Flow	4/3/2018	14:15	24.1	0.3050	0.4	6.52	-372.5	Clear; colorless; odor
			10/3/2018	10:35	26.5	0.3590	1.1	6.45	-373.3	Clear; colorless; odor
	MW-107	Low Flow	4/4/2018	15:20	23.0	0.2210	1.3	6.81	-194.1	Clear; colorless
	MW-109	Low Flow	4/5/2018	9:05	19.9	0.3440	0.7	6.37	-363.7	Clear; colorless; odor
			10/3/2018	14:10	23.9	0.3210	0.5	6.58	-405.1	Clear; colorless with black tint
	MW-110	Low Flow	4/5/2018	9:45	20.7	0.1636	0.5	6.42	-367.5	Slightly cloudy; colorless; odor
			10/3/2018	15:15	21.7	0.1849	1.0	7.02	-205.8	Clear; colorless
	RA-313	Grab	4/4/2018	18:30	22.2	0.1103	3.1	6.89	-29.9	Clear; colorless
	RW-4	Low Flow	4/4/2018	8:55	21.7	0.2290	0.9	6.91	-289.9	Clear; colorless
	RW-6	Low Flow	4/4/2018	9:40	21.9	0.2630	1.2	6.63	-272.9	Clear; colorless
	RW-15C	Low Flow	4/5/2018	9:05	23.0	0.3260	0.7	6.73	-251.8	Clear; colorless

Table 2 - Well Purging and Water Quality Field Measurement Data

2018 Annual Groundwater Monitoring Report

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

Area	Well	Purge Method[1]	Date	Time	Temperature (°C)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water [2]
South RO Reject Field	MW-114	Low Flow	4/4/2018	16:50	19.0	0.3795	1.4	6.85	80.1	Clear; colorless
			10/3/2018	9:50	22.1	0.0000	1.2	6.81	48.8	Clear; colorless
	MW-115	Low Flow	4/4/2018	15:55	17.3	0.4731	1.7	6.70	45.9	Clear; colorless
			10/3/2018	9:10	19.4	0.5094	1.4	6.98	12.1	Clear; colorless
	MW-116	Low Flow	4/3/2018	10:15	20.5	0.3940	2.1	6.86	173.4	Clear; colorless
			10/3/2018	13:35	22.3	0.3700	1.7	6.62	-111.4	Clear
TEL	MW-49	Low Flow	4/4/2018	9:55	21.0	0.2540	0.5	6.55	-353.5	Clear; colorless; odor
			10/3/2018	9:45	26.6	0.3280	1.0	6.53	-361.5	Clear; colorless
	TEL-1	Low Flow	4/3/2018	12:35	22.5	0.2730	0.3	7.20	-229.9	Clear; colorless
			10/2/2018	10:45	23.4	0.3130	0.9	6.93	-190.2	Clear; colorless
	TEL-2	Low Flow	4/3/2018	11:45	23.2	0.3250	0.5	6.58	-350.6	Clear; colorless
			10/2/2018	11:30	24.2	0.3830	1.3	6.57	-350.1	Clear; colorless; odor
	TEL-3	Low Flow	4/3/2018	10:45	21.5	0.3340	0.3	6.48	-321.8	Clear; dark tint; light sheen
	TEL-4	Low Flow	4/3/2018	9:25	21.1	0.4530	0.4	6.30	-226.7	Clear; colorless with black particles
			10/2/2018	12:55	24.7	0.3410	0.6	7.43	-316.7	Clear; colorless
TMD	MW-8	Low Flow	4/4/2018	14:30	16.1	0.4150	1.7	7.21	-8.6	Clear; colorless
	MW-16	Low Flow	4/3/2018	16:25	18.6	0.5810	1.1	6.76	99.7	Clear; colorless
	MW-20	Low Flow	4/4/2018	13:40	19.8	0.5124	1.5	6.97	-22.8	Clear; colorless
	MW-21	Low Flow	4/4/2018	17:20	16.3	0.5000	2.5	7.08	10.8	Clear; colorless
			10/2/2018	17:00	21.7	0.7428	2.2	6.98	4.7	Clear; colorless
	MW-25	Low Flow	4/4/2018	12:00	19.2	0.5830	0.6	7.01	44.7	Clear; colorless
	MW-26	Low Flow	4/3/2018	15:35	18.5	0.7945	1.4	6.95	53.1	Clear; colorless
	MW-27	Low Flow	4/3/2018	18:05	21.4	0.2077	1.3	6.56	106.2	Clear; colorless
	MW-46R	Low Flow	4/3/2018	11:00	23.5	0.4340	2.2	6.81	190.5	Clear; colorless
			10/3/2018	14:15	25.5	0.3670	1.5	6.51	-96.8	Clear
	MW-68	Low Flow	4/3/2018	18:55	21.0	0.2853	0.8	6.93	117.2	Clear; colorless
	MW-71	Low Flow	4/4/2018	8:55	17.2	0.6395	2.3	6.91	92.6	Clear; colorless
	MW-89	Low Flow	4/3/2018	17:15	18.8	0.2996	2.3	6.96	53.7	Clear; colorless
	NP-1	Low Flow	4/4/2018	9:20	17.4	0.4573	1.7	6.87	77.3	Clear; colorless
			10/2/2018	16:10	21.3	0.6146	1.9	6.78	-13.9	Clear; colorless

Table 2 - Well Purging and Water Quality Field Measurement Data

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

Area	Well	Purge Method[1]	Date	Time	Temperature (°C)	Specific Conductivity (S/m)	DO (mg/L)	pH (std units)	ORP (mV)	Field Observations of Purge Water [2]
Up-Gradient	UG-1	Low Flow	4/2/2018	17:50	27.1	0.3180	4.5	6.96	590.0	Clear; colorless
	UG-2	Low Flow	4/2/2018	19:25	25.1	0.2440	4.5	7.29	233.7	Clear; colorless
	UG-3R	Bladder	4/2/2018	17:00	26.9	0.2590	5.5	6.72	207.1	Clear; colorless
	UG-4	Low Flow	4/2/2018	18:35	23.8	0.4330	3.0	6.83	272.6	Clear; colorless

[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, and orange 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

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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									
TPH - diesel range organics							3.98E-02	3.98E-02	NMED TPH (2017)
TPH - diesel range organics (Evaporation Ponds)							4.73E-02	4.73E-02	NMED TPH (2017)
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-Tetrachloroethene	2.00E-02							2.00E-02	WQCC GW Human Health (20.6.2.3103.A)
1,1,2-Trichloroethane	1.00E-02			5.00E-03				5.00E-03	USEPA MCL
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						5.50E-02		5.50E-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			1.43E-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)
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)
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)
Combined Radium 226 and 228 (pCi/L)	5.00E+00			5.00E+00				5.00E+00	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, March 2017, Table A-1, Tap Water Screening Level

NMED TPH = NMED Risk Assessment Guidance for Site Investigations and Remediation, March 2017, 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 2018

USEPA Tap Water = United States Environmental Protection Agency Tap Water Screening Level from"Regional Screening Level (RSL) Summary Table", November 2018

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

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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	Ethyl-benzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
					ARC-GRO	ARC-TPH-D	ARC-TPH-D	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:	---	0.0398	0.0473	0.056	0.060	0.005	0.070	0.700	0.10	0.030	0.193	1.0	0.620	0.005
				CGWSL Source:		NMED TPH	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-15				**0.0630 J**		0.00302	0.000456 J	<0.000330	<0.000260	<0.000380	<0.000370	0.00317 J	<0.000340	<0.000780	0.00254 J	<0.000400
	KWB-13	Apr-16				**0.0505 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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
	MW-17	Apr-14				0.0380 J												
	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
	RA-3156	Apr-14						<0.00050	<0.000600	<0.000600	<0.00060	<0.000500	<0.000600	<0.000700	<0.000500	<0.000500	<0.00150	<0.000500
	RA-3156	Apr-16						<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<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
	MW-136	Apr-16		<0.0314	**0.162**			<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-136	Oct-16		<0.0314	**0.118**			<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-136	Apr-17		<0.0314	**0.0731 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-17		<0.0314	**0.0937 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-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
Evaporation Ponds	MW-1R	Apr-15					**0.124**	<0.000373	<0.000387	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-1R	Apr-16					**0.163**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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-2A	Apr-16		<0.0314			**0.212**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-2A	Oct-16		0.0435 JB			**0.195**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-2A	Apr-17		<0.0314			**0.164**	<0.00373	<0.00387	<0.00331	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-2A	Oct-17		0.0354 J			**0.265**	<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-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-3	Apr-16		0.499			**10.2**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-3	Apr-16	FD	0.490			**9.97**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-3	Oct-16		0.611			**11.0**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-3	Oct-16	FD	0.571			**10.5**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-3	Apr-17		0.205			**8.09**	<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-17	FD	0.263			**7.74**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-3	Oct-17		0.602			**13.1**	<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-17	FD	0.834			**4.17**	<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		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-4A	Apr-16		0.402			**8.76**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000605 J	<0.00100	0.000352 J	<0.000780	0.00201 J	<0.000398
	MW-4A	Oct-16		0.396			**5.84**	0.000553 J	<0.000387	<0.000331	<0.000260	<0.000384	0.000516 J	<0.00100	0.000870 J	<0.000780	0.00365	<0.000398
	MW-4A	Apr-17		0.607			**8.15**	0.000390 J	<0.000387	<0.000331	<0.000260	<0.000384	0.000444 J	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-4A	Oct-17		0.730			**7.49**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	0.000597 J	<0.000412	<0.00106	<0.000398
	MW-4A	Apr-18		0.448			**5.10**	0.000492 J	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	0.00266 J	<0.000398
	MW-4A	Oct-18		0.803			**5.23**	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-4B	Apr-13		0.102			**0.360**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	MW-4B	Apr-15		0.119			**1.31**	<0.000370	<0.000390	0.00183	<0.000260	0.000462 J	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-4B	Apr-17		0.318			**1.21**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-5A	Apr-16		2.09			**8.92**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00212	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-5A	Oct-16		1.17			**3.08**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00130	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-5A	Apr-17		3.00			**7.60**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00160	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-5A	Oct-17		2.75			**7.16**	0.000456 J	<0.000387	<0.000331	<0.000260	<0.000384	0.00150	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-5A	Apr-18		1.95			**6.89**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00147	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-5A	Oct-18		3.29			**7.51**	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-5B	Apr-13		1.78			**7.10**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	MW-5B	Apr-15		1.14			**11.0**	0.000976 J	<0.000390	<0.000330	<0.000260	<0.000380	0.00148	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-5B	Apr-17		2.08			**11.2**	0.000499 J	<0.000387	<0.000331	<0.000260	<0.000384	0.00140	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-5C	Apr-13		0.0652			**0.220**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	MW-5C	Apr-15		<0.0310			**0.580**	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	0.000507 J	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-5C	Apr-17		<0.0314			**0.500**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000369 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-6A	Apr-15		<0.0310			**4.50**	<0.000370	<0.000390	0.000715 J	<0.000260	<0.000380	<0.000370	<0.00100	0.000920 J	<0.000780	<0.00110	<0.000400
	MW-6A	Apr-16		<0.0314			**4.81**	<0.000373	<0.000387	<0.000331	<0.000260	0.00116	<0.000367	<0.00100	0.00119	<0.000780	0.00119 J	<0.000398
	MW-6A	Apr-17		0.335			**14.2**	<0.00373	<0.00387	<0.00331	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-6A	Apr-18		0.406			**9.27**	<0.000373	<0.000387	<0.000331	<0.000260	0.00117	<0.000367	<0.00100	0.00192	0.00139	0.00360	<0.000398
	MW-6B	Mar-13		<0.0500			**<0.0530**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	MW-6B	Mar-13	FD	<0.0500			**<0.0540**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	MW-6B	Apr-15		<0.0310			**0.386**	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-6B	Apr-17		<0.0314			**0.276**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-7A	Apr-16		0.251			**1.22**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00168	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-7A	Apr-16	FD	0.269			**1.32**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00168	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-7A	Oct-16		0.235			**1.21**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00188	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-7A	Oct-16	FD	0.212			**1.25**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00166	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-7A	Apr-17		0.501			**1.12**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00150	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-7A	Apr-17	FD	0.402			**1.24**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00148	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-7A	Oct-17		0.473			**1.30**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00140	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-7A	Oct-17	FD	0.523			**1.39**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00178	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-7A	Apr-18		0.378			**1.26**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00130	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-7A	Apr-18	FD	0.379			**1.28**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00191	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-7A	Oct-18		0.755			**1.29**	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-7A	Oct-18	FD	0.649			**1.13**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00148	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-7B	Apr-13		<0.0500			**<0.0530**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	MW-7B	Apr-15		<0.0310			**0.120**	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-7B	Apr-17		<0.0314			**0.0845 J**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-10	Apr-16		1.06			**3.19**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00216	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-10	Oct-16		1.05			**2.65**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00190	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-10	Apr-17		0.877			**2.75**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00195	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-10	Oct-17		1.11			**2.51**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00141	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-10	Apr-18		0.734			**2.28**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00141	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-10	Oct-18		0.915			**2.03**	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-11A	Apr-16		<0.0314		<0.0247		<0.00100	<0.00100	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-11A	Oct-16																
	MW-11A	Apr-17		<0.0314		<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-11A	Oct-17																
	MW-11A	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-11A	Oct-18																
	MW-11B	Mar-13		<0.0500			**<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-11B	Apr-15		<0.0310		<0.0250		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-11B	Apr-17		<0.0314		<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-12	Apr-14				<0.0200												
	MW-13	Apr-14				<0.0200												
	MW-15	Apr-15		<0.160			**1.01**	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	0.000809 J	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-15	Apr-16		0.203			**0.549**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000602 J	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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

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

2018 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	Ethyl-benzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
				ARC-GRO	ARC-TPH-D	ARC-TPH-D	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:		---	0.0398	0.0473	0.056	0.060	0.005	0.070	0.700	0.10	0.030	0.193	1.0	0.620	0.005
		CGWSL Source:			NMED TPH	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-18A	Apr-16				**0.460**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000490 J	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-18A	Oct-16				**0.424**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000586 J	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-18A	Apr-17				**0.516**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000650 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-18A	Oct-17				**0.520**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000529 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	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-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-22A	Apr-16		3.53		**7.43**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00907	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-22A	Apr-16	FD	4.02		**7.66**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00887	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-22A	Oct-16		3.48		**5.73**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00805	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-22A	Oct-16	FD	3.25		**6.18**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00620	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-22A	Apr-17		3.63		**6.65**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00774	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Apr-17	FD	4.22		**6.63**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00654	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Oct-17		4.51		**6.03**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00552	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-22A	Oct-17	FD	4.42		**6.50**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00631	<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-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 J	<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-70	Apr-16		1.46		**0.896**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-70	Oct-16		1.32		**0.772**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-70	Apr-17		2.35		**0.899**	<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-17		1.78		**0.865**	<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-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-72	Apr-15		<0.0310		**1.30**	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-72	Apr-16		<0.0314		**0.950**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-72	Apr-17		0.118		**1.03**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-72	Apr-18		0.0713 J		**0.555**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-73	Apr-15		0.378		**4.00**	0.00171	<0.000390	<0.000330	<0.000260	<0.000380	0.00290	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-73	Apr-16		0.925		**5.17**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00270	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-73	Apr-17		0.367		**3.68**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00120	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-73	Apr-18		0.575		**2.85**	0.000735 J	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-74	Apr-16		1.20		**18.4**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000972 J	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-74	Oct-16		0.135		**64.3**	0.000718 J	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-74	Apr-17		1.01		**31.5**	0.000893 J	<0.000387	<0.000331	<0.000260	<0.000384	0.000473 J	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-74	Oct-17		1.18		**36.5**	0.00124	<0.000387	<0.000331	<0.000260	<0.000384	0.000527 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-74	Apr-18		1.18		**14.1**	0.000852 J	<0.000387	<0.000331	<0.000260	<0.000384	0.000608 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-74	Oct-18		0.889		**35.3**	0.000732 J	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-75	Apr-16		1.39		**18.2**	<0.000373	<0.000387	0.00134	<0.000260	<0.000384	0.00577	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-75	Oct-16		2.46		**16.6**	0.000631 J	0.00103	<0.000331	<0.000260	<0.000384	0.00407	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-75	Apr-17		1.46		**16.7**	<0.000373	<0.000387	0.00145	<0.000260	<0.000384	0.00645	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-75	Oct-17		2.52		**20.6**	0.000387 J	0.000912 J	<0.000331	<0.000260	<0.000384	0.00224	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-75	Apr-18		1.41		**9.88**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00467	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-75	Oct-18		3.31		**14.4**	<0.000373	0.000709 J	<0.000331	<0.000260	<0.000384	0.00276	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-76	Apr-16		0.759		**24.1**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00756	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-76	Oct-16		2.19		**43.7**	0.00187	0.00166	0.00227	<0.000260	0.000437 J	0.0245	<0.00100	<0.000341	<0.000780	0.00214 J	<0.000398
	MW-76	Apr-17		1.02		**31.1**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0130	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-76	Oct-17		1.92		**45.5**	0.000428 J	0.000827 J	<0.000331	<0.000260	<0.000384	0.0143	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-76	Apr-18		1.52		**15.1**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0127	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-76	Oct-18		1.69		**29.2**	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	0.0119	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-77	Apr-16		0.968		**101**	<0.000373	0.00161	0.00287	<0.000260	0.00300	0.00647	<0.00100	0.000583 J	0.00138 J	0.00390	<0.000398
	MW-77	Oct-16		1.53 J		**86.1**	0.00432 J	<0.00387	<0.00331	<0.00260	0.00766 J	0.00552 J	<0.0100	<0.00341	<0.00780	<0.0106	<0.00398
	MW-77	Apr-17		1.11		**57.5**	0.00384 J	<0.00387	<0.00331	<0.00260	<0.00384	0.00452 J	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-77	Apr-18		1.15		**54.4**	<0.00373	<0.00387	<0.00331	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-78	Apr-15		0.279		**67.0**	0.00132	0.000829 J	**0.0114**	<0.000260	0.00262	0.000629 J	<0.00100	0.00356	0.00385 J	0.00502	<0.000400
	MW-78	Apr-16		0.269		**63.2**	<0.000373	<0.000387	0.00275	<0.000260	0.000942 J	<0.000367	<0.00100	0.00135	0.00125 J	0.00135 J	<0.000398
	MW-78	Apr-17		<0.314		**59.1**	<0.00373	<0.00387	<0.00331	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-78	Apr-18		<0.314		**26.4**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-79	Apr-16		<0.0314		**0.516**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-79	Oct-16		0.0513 J		**0.413**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-79	Apr-17		<0.0314		**0.498**	<0.00373	<0.00387	<0.00331	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-79	Oct-17		0.0568 J		**0.454**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-79	Apr-18		0.0414 J		**0.389**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-79	Oct-18		0.0571 J		**0.533**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-80	Apr-15		<0.0310		**0.750**	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-80	Apr-16		<0.0314		**0.317**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-80	Apr-17		<0.0314		**0.680**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-80	Apr-18		<0.0314		**0.150**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-81	Apr-15		<0.0310		**8.00**	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-81	Apr-16		0.0339 J		**8.64**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-81	Apr-17		<0.0314		**4.84**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-81	Apr-18		<0.0314		**0.922**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-82	Apr-15		0.361		**14.0**	<0.000370	<0.000390	0.000339 J	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-82	Apr-16		0.334		**8.41**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-82	Apr-17		0.660		**6.40**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-82	Apr-18		0.432		**3.03**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-83	Apr-16		0.310		**26.0**	<0.000373	<0.000387	0.00114	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-83	Oct-16		0.234		**28.9**	<0.000373	<0.000387	0.000449 J	<0.000260	<0.000384	<0.000367	<0.00100	0.000569 J	<0.000780	<0.00106	<0.000398
	MW-83	Apr-17		0.305		**29.8**	<0.00373	<0.00387	<0.00331	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-83	Oct-17		0.805		**36.2**	0.000411 J	<0.000387	<0.000331	<0.000260	0.000439 J	<0.000367	<0.00100	0.00120	<0.000412	0.00240 J	<0.000398
	MW-83	Apr-18		1.18		**7.92**	0.000650 J	<0.000387	0.00166	<0.000260	<0.000384	0.000465 J	<0.00100	<0.000341	<0.000412	0.00258 J	<0.000398
	MW-83	Oct-18		0.597		**19.5**	<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	<0.00184	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-84	Apr-16		0.519		**83.8**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00129	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-84	Oct-16		1.58 J		**95.3**	<0.00373	<0.00387	<0.00331	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00780	<0.0106	<0.00398
	MW-84	Apr-17		<0.314		**4.92**	<0.00373	<0.00387	<0.00331	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-84	Oct-17		1.16		**67.0**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00174	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-84	Apr-18		0.765		**22.3**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00124	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-84	Oct-18		1.21		**41.0**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00128	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-87	Apr-16		0.0421 J		**0.449**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000646 J	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-87	Oct-16		<0.0314		**0.405**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00107	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-87	Apr-17		<0.0314		**0.356**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000665 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-87	Oct-17		0.0463 J		**0.399**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000728 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	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-88	Apr-16		<0.0314		**0.636**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-88	Oct-16		0.0848 J		**0.635**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-88	Apr-17		<0.0314		**0.516**	<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-17		0.0514 J		**0.627**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	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

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

2018 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	Ethyl-benzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
					ARC-GRO	ARC-TPH-D	ARC-TPH-D	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:	---	0.0398	0.0473	0.056	0.060	0.005	0.070	0.700	0.10	0.030	0.193	1.0	0.620	0.005
				CGWSL Source:		NMED TPH	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-120	Apr-16		0.0845 J		**1.82**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-120	Oct-16		<0.0314		**0.920**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-120	Apr-17		0.0584 J		**0.813**	<0.00373	<0.00387	<0.00331	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-120	Oct-17		0.150		**0.737**	<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-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-121	Apr-16		<0.0314		**0.456**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-121	Oct-16		0.0514 JB		**0.593**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-121	Apr-17		<0.0314		**0.428**	<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-17		<0.0314		**0.567**	<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-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-122	Apr-16		<0.0314		**0.824**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-122	Oct-16		0.0443 JB		**0.412**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-122	Apr-17		<0.0314		**0.850**	<0.00373	<0.00387	<0.00331	<0.00260	<0.00384	<0.00367	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-122	Oct-17		0.0385 J		**0.429**	<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-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-123	Apr-16		1.83		**3.82**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00143	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-123	Oct-16		1.50		**3.53**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00163	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-123	Apr-17		1.96		**3.36**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00114	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-123	Oct-17		1.96		**3.08**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00139	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	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-124	Apr-16		<0.0314		<0.0247	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-124	Oct-16		<0.0314		<0.0247	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-124	Apr-17		<0.0314		0.0365 J	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-124	Oct-17		<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
	MW-124	Apr-18		<0.0314		0.0328 J	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-124	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
	OCD-1R	Apr-16		<0.0314		**0.241**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-1R	Oct-16		0.0450 J		**0.267**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-1R	Apr-17		<0.0314		**0.255**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-1R	Oct-17		0.0377 J		**0.268**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-1R	Apr-18		<0.0314		**0.187**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-1R	Oct-18		<0.0314		**0.141**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-2A	Apr-16		<0.0314		**0.0682 J**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-2A	Oct-16		0.0333 J		**0.0722 J**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-2A	Apr-17		<0.0314		**0.0497 J**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-2A	Oct-17		<0.0314		**0.123**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-2A	Apr-18		<0.0314		**0.0703 J**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-2A	Oct-18		<0.0314		0.0442 J	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-3	Apr-16		<0.0314		<0.0247	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-3	Oct-16		<0.0314		<0.0247	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-3	Apr-17		<0.0314		<0.0247	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-3	Oct-17		<0.0314		**0.173**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-3	Apr-18		<0.0314		**0.0510 J**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-3	Oct-18		<0.0314		0.0262 J	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-4	Apr-16		<0.0314		<0.0247	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-4	Oct-16		<0.0314		<0.0247	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-4	Apr-17		<0.0314		<0.0247	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-4	Oct-17		<0.0314		**0.0981 J**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-4	Apr-18		<0.0314		0.0255 J	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-4	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
	OCD-5	Apr-16		<0.0314		**0.0576 J**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-5	Oct-16		0.0391 J		0.0423 J	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-5	Apr-17		0.0353 J		**0.102**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-5	Oct-17		0.255		**0.331**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-5	Apr-18		0.194		**0.249**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-5	Oct-18		0.312		**0.259**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-6	Apr-16		0.0939		**1.11**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-6	Oct-16		0.242		**1.11**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-6	Apr-17		0.199		**0.858**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-6	Oct-17		0.294		**1.04**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-6	Apr-18		0.218		**0.585**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-6	Oct-18		0.293		**0.651**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-7AR	Apr-16		0.443		**5.24**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00141	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-7AR	Oct-16		1.08		**5.28**	0.00172	<0.000387	<0.000331	<0.000260	<0.000384	0.00179	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-7AR	Apr-17		0.710		**4.43**	0.000840 J	<0.000387	<0.000331	<0.000260	<0.000384	0.00110	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-7AR	Oct-17		1.29		**4.52**	0.00109	<0.000387	<0.000331	<0.000260	<0.000384	0.00107	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-7AR	Apr-18		0.808		**3.30**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00124	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-7AR	Oct-18		1.32		**3.89**	0.00103	<0.000387	<0.000331	<0.000260	<0.000384	0.00139	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-7B	Mar-13		<0.0500		**<0.0520**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	OCD-7B	Apr-15		<0.0310		**0.120**	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	OCD-7B	Apr-17		<0.0314		**0.0746 J**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-8A	Apr-16		0.726		**3.26**	0.000482 J	<0.000387	<0.000331	<0.000260	<0.000384	0.00475	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-8A	Oct-16		0.714		**3.23**	0.00108	<0.000387	<0.000331	<0.000260	<0.000384	0.00507	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	OCD-8A	Apr-17		1.23		**3.46**	0.000518 J	<0.000387	<0.000331	<0.000260	<0.000384	0.00420	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-8A	Oct-17		1.34		**3.49**	0.000832 J	<0.000387	<0.000331	<0.000260	<0.000384	0.00392	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-8A	Apr-18		0.861		**3.15**	0.000562 J	<0.000387	<0.000331	<0.000260	<0.000384	0.00380	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-8A	Oct-18		1.39		**2.95**	0.00124	<0.000387	<0.000331	<0.000260	<0.000384	0.00463	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	OCD-8B	Apr-13		0.298		**0.890**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	OCD-8B	Apr-15		<0.0310		**0.840**	<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	0.00155	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	OCD-8B	Apr-17		<0.0314		**0.585**	<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000919 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
Field East of Refinery	KWB-1A	Apr-16			**0.127**		<0.000370	<0.000390	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-1A	Oct-16			**0.166**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-1A	Apr-17			**0.102**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-1A	Oct-17			**0.158**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-1A	Apr-18			**0.0900 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-1A	Oct-18			**0.0970 J**		<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-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-7	Apr-15			**1.43**		**0.0766**	0.000982 J	**0.929**	<0.000260	0.0285	0.0225	0.0120	0.00377	0.00213 J	0.00718	<0.000400
	KWB-7	Oct-15			**0.721**		0.00557	<0.000387	**0.0164**	<0.000260	0.0240	0.00677	0.00225 J	0.000608 J	<0.000780	0.00145 J	<0.000398
	KWB-7	Apr-16			**1.22**		0.0482	0.00903	**0.0365**	<0.000260	0.0248	0.0104	0.0141	0.00167	<0.000780	0.0235	<0.000398
	KWB-7	Oct-16			**1.06**		0.00700	0.000877 J	**0.0364**	<0.000260	0.0167	0.00582	0.00120 JJ4	<0.000341	0.00155 J	0.0196	<0.000398
	KWB-7	Apr-17			**1.40**		0.0115	<0.000387	**0.0135**	<0.000260	0.00858	0.00678	0.00409 J	0.000576 J	<0.000412	0.00757	<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-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**	**0.0519**	0.0133	0.336	**0.795**	<0.000398

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

2018 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	Ethyl-benzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
					ARC-GRO	ARC-TPH-D	ARC-TPH-D	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:	---	0.0398	0.0473	0.056	0.060	0.005	0.070	0.700	0.10	0.030	0.193	1.0	0.620	0.005
				CGWSL Source:		NMED TPH	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-10R	Apr-16			**5.24**		**0.323**	**0.0886**	**5.26**	<0.0130	0.437	**3.71**	**0.150 J**	0.184	0.0937 J	**0.829**	**<0.0199**
	KWB-10R	Oct-16			**7.50**		**0.307**	**0.0765**	**0.565**	<0.00520	0.513	**3.62**	**0.133**	**0.196**	0.110	**0.860**	**<0.00796**
	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-16		0.267	**3.74**		0.0256	0.00122	**0.00541**	<0.000260	<0.000384	0.00477	0.0134	0.000423 J	<0.000780	<0.00106	<0.000398
	KWB-11A	Oct-16		0.223 B	**1.36**		0.0341	0.000945 J	**0.00725**	<0.000260	<0.000384	0.00416	0.00936 J4	0.000483 J	<0.000780	0.00158 J	<0.000398
	KWB-11A	Apr-17		0.155	**0.511**		0.0142	<0.000387	0.00359	<0.000260	<0.000384	<0.000367	0.00841	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-11A	Oct-17		0.371	**12.2**		0.0230	0.00129	**0.0116**	<0.000260	<0.000384	0.00273	0.00563	<0.000341	<0.000412	<0.00106	<0.000398
	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-11B	Apr-16		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-11B	Oct-16		0.0565 JB	0.0388 J		0.000394 J	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	0.00153 JJ4	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-11B	Apr-17		<0.0314	0.0339 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	KWB-11B	Oct-17		<0.0314	**0.203**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000565 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	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-12A	Apr-15		<0.0310	0.0310 J		0.000452 J	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	KWB-12A	Apr-15	FD	<0.0310	**0.305**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	KWB-12A	Oct-15		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-12A	Apr-16		<0.0314	0.0377 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-12A	Oct-16		0.0348 JB	0.0329 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-12A	Apr-17		<0.0314	0.0359 J		<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-17		0.0318 J	**0.0474 J**		<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-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-12B	Apr-16		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-12B	Apr-16	FD	<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-12B	Oct-16		0.0581 JB	0.0351 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-12B	Oct-16	FD	0.0416 JB	**0.0806 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	0.0139	<0.000341	<0.000780	<0.00106	<0.000398
	KWB-12B	Apr-17		<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	Apr-17	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-17		<0.0314	**0.0424 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-17	FD	<0.0314	**0.0765 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-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-P4	Apr-13			**<0.0520**		<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	KWB-P4	Apr-15			**0.0820 J**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	KWB-P4	Apr-17			**0.0526 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-57	Apr-16		<0.0314	**0.198**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-57	Oct-16		0.0467 JB	**0.103**		<0.000373	<0.000387	0.000681 J	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000780	<0.00106	<0.000398
	MW-57	Apr-17		<0.0314	**0.195**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-57	Oct-17		<0.0314	**0.0940 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	0.00273 J	<0.000341	<0.000412	<0.00106	<0.000398
	MW-57	Apr-18		<0.0314	**0.103 B**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-57	Oct-18		<0.0314	**0.0417 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-58	Apr-16			**6.27**		**0.753**	0.0179	**4.12**	<0.00260	**1.11**	**0.200**	**0.257**	0.0183	0.00806 J	**0.848**	<0.00398
	MW-58	Oct-16			**7.78**		**0.387**	0.00321	**5.92**	<0.000260	**1.10**	0.0468	**0.0867**	0.0201	0.0159	**0.893**	<0.000398
	MW-58	Apr-17			**7.23**		**0.517**	<0.0387	**3.00**	<0.0260	**0.720**	<0.0367	**0.191 J**	<0.0341	<0.0412	0.533	**<0.0398**
	MW-58	Oct-17			**9.77**		**0.166**	0.00130	**4.08**	<0.000260	0.0965	0.0987	**0.0469**	0.00179	0.0101	0.222	<0.000398
	MW-58	Apr-18			**5.73**		**0.574**	<0.0194	**4.12**	<0.0130	**0.946**	0.0303 J	**0.267**	<0.0170	<0.0206	0.268	**<0.0199**
	MW-58	Oct-18			**4.86**		0.0235 J	<0.0194	**7.11**	<0.0130	0.0351 J	0.0624	**<0.0500**	<0.0170	<0.0206	<0.0530	**<0.0199**
	MW-111	Apr-16		1.31	**2.04**		<0.000373	<0.000387	**0.0299**	<0.000260	0.00122	**1.54**	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-111	Oct-16		1.13	**2.04**		0.00215	<0.000387	**0.0432**	<0.000260	0.00226	**1.29**	0.00103 J	<0.000341	<0.000780	0.00177 J	<0.000398
	MW-111	Apr-17		1.27	**2.08**		0.00219	<0.000387	**0.0205**	<0.000260	0.000432 J	**0.955**	0.00310 J	<0.000341	<0.000412	0.00237 J	<0.000398
	MW-111	Oct-17		1.28	**2.39**		0.00188	<0.000387	**<0.0331**	<0.000260	<0.0384	**1.40**	0.00175 J	<0.0341	<0.000412	<0.106	<0.000398
	MW-111	Apr-18		1.69	**1.52**		<0.00932	<0.00968	**0.0216 J**	<0.00650	<0.00960	**1.25**	<0.0250	<0.00852	<0.0103	<0.0265	**<0.00995**
	MW-111	Oct-18		1.36	**2.63**		<0.00932	<0.00968	**0.0268**	<0.00650	<0.00960	**1.47**	<0.0250	<0.00852	<0.0103	<0.0265	**<0.00995**
	MW-113	Apr-16		0.581	**0.156**		0.000753 J	<0.000387	**0.0136**	<0.000260	0.00354	0.0143	<0.00100	<0.000341	<0.000780	0.00518	<0.000398
	MW-113	Apr-16	FD	0.627	**0.180**		0.000813 J	<0.000387	**0.0148**	<0.000260	0.00364	0.0143	<0.00100	<0.000341	<0.000780	0.00531	<0.000398
	MW-113	Oct-16		0.215 B	**0.236**		0.00977	<0.000387	**0.00660**	<0.000260	0.0199	0.0137	0.00208 JJ4	<0.000341	<0.000780	0.0143	<0.000398
	MW-113	Oct-16	FD	0.218 B	**0.188**		0.00933	<0.000387	**0.00588**	<0.000260	0.0175	0.0143	0.00200 JJ4	<0.000341	<0.000780	0.0127	<0.000398
	MW-113	Apr-17		0.984	**0.169**		0.00389	<0.000387	**0.0136**	<0.000260	0.0084	0.0147	0.00157 J	<0.000341	<0.000412	0.0133	<0.000398
	MW-113	Apr-17	FD	1.03	**0.214**		0.00448	<0.000387	**0.0145**	<0.000260	0.00937	0.0140	0.00176 J	<0.000341	<0.000412	0.0148	<0.000398
	MW-113	Oct-17		0.444	**0.335**		0.0229	0.000442 J	**0.0132**	<0.000260	0.0269	0.0123	0.00420 J	<0.000341	0.000501 J	0.0279	<0.000398
	MW-113	Oct-17	FD	0.368	**0.355**		0.0212	<0.000387	**0.0138**	<0.000260	0.0215	0.0117	0.00399 J	<0.000341	0.000660 J	0.0234	<0.000398
	MW-113	Apr-18		0.683	**0.142 B**		0.00240	<0.000387	**0.00908**	<0.000260	0.00604	0.0114	<0.00100	<0.000341	<0.000412	0.00849	<0.000398
	MW-113	Apr-18	FD	0.756	**0.174**		0.00274	<0.000387	**0.00996**	<0.000260	0.00667	0.0120	<0.00100	<0.000341	<0.000412	0.00901	<0.000398
	MW-113	Oct-18		0.285	**0.100 J**		0.00393	<0.000387	0.00182	<0.000260	0.00885	0.0128	<0.00100	<0.000341	<0.000412	0.00867	<0.000398
	MW-113	Oct-18	FD	0.259	**0.215**		0.00388	<0.000387	0.00130	<0.000260	0.00992	0.0100	0.00117 J	<0.000341	<0.000412	0.00939	<0.000398
	MW-125	Apr-16		<0.0314	**0.0578 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-125	Oct-16		<0.0314	**0.0756 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-125	Apr-17		<0.0314	**0.0964 J**		<0.000373	<0.000387	0.000603 J	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-125	Oct-17		<0.0314	**0.0631 J**		<0.000373	<0.000387	0.000404 J	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-125	Apr-18		<0.0314	**0.0475 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-125	Oct-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-126A	Apr-16		0.202	**0.751**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-126A	Oct-16		0.702	**0.924**		<0.000373	<0.000387	**0.0503**	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000780	<0.00106	<0.000398
	MW-126A	Apr-17		0.209	**0.665**		<0.000373	<0.000387	0.000354 J	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	0.00141 J	<0.000398
	MW-126A	Oct-17		0.223	**0.793**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-126A	Apr-18		0.0634 J	**0.390**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-126A	Oct-18		0.182	**0.723**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-126B	Apr-16		<0.0314	**0.361**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-126B	Oct-16		0.0546 JB	**0.346**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000780	<0.00106	<0.000398
	MW-126B	Apr-17		<0.0314	**0.245**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-126B	Oct-17		<0.0314	**0.329**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-126B	Apr-18		<0.0314	**0.244**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-126B	Oct-18		<0.0314	**0.298**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-127	Apr-16		6.40	**1.43**		**0.0941**	0.00632	**2.01**	<0.000260	0.348	**0.629**	**0.0425**	0.0375	0.287	0.149	<0.000398
	MW-127	Oct-16		3.81 B	**1.22**		0.0332	<0.00387	**0.644**	<0.00260	0.120	**0.575**	<0.0100 J4	0.0127	0.0877	0.0514	<0.00398
	MW-127	Apr-17		4.45	**1.38**		**0.0562**	0.00490	**1.04**	<0.000260	0.186	**0.525**	0.0175	0.00990	0.0958	0.0810	<0.000398
	MW-127	Oct-17		1.68	**1.41**		0.0327	0.00452	**0.462**	<0.000260	0.0937	**0.885**	0.00901	0.00373	0.0396	0.0482	<0.000398
	MW-127	Apr-18		5.15	**1.06**		0.0375	<0.00774	**1.18**	<0.00520	0.121	**0.623**	<0.0200	<0.00682	0.0424	0.0654	**<0.00796**
	MW-127	Oct-18		3.13	**1.30**		0.0272	<0.00774	**1.15**	<0.00520	0.0797	**0.774**	<0.0200	<0.00682	0.0397	0.0458 J	**<0.00796**
	MW-128	Apr-16		0.62	**2.45**		0.00209	<0.000387	**0.0231**	<0.000260	0.00494	**0.846**	0.00104 J	<0.000341	<0.000780	0.00153 J	<0.000398
	MW-128	Oct-16		0.907	**2.75**		0.00197	<0.000387	**0.109**	<0.000260	0.00408	**0.832**	0.00225 J	<0.000341	<0.000780	0.00370	<0.000398
	MW-128	Apr-17		1.09	**2.42**		0.00276	<0.000387	**0.0563**	<0.000260	0.00166	**0.821**	0.00140 J	<0.000341	<0.000412	0.00159 J	<0.000398
	MW-128	Oct-17		1.14	**2.37**		0.00233	<0.000387	**0.0701**	<0.000260	0.00128	**0.785**	0.00142 J	<0.000341	0.000781 J	0.00336	<0.000398
	MW-128	Apr-18		0.932	**1.58**		<0.00746	<0.00774	**0.122**	<0.00520	<0.00768	**0.961**	**0.0422 J**	<0.00682	<0.00824	<0.0212	**<0.00796**
	MW-128	Oct-18		2.76	**2.04**		<0.00746	<0.00774	**0.729**	<0.00520	0.0247	**0.963**	<0.0200	<0.00682	<0.00824	<0.0212	**<0.00796**
	MW-129	Apr-16		2.7	**1.68**		0.00382	0.000880 J	**<0.0166**	<0.000260	<0.0192	**4.59**	0.00534	0.000796 J	<0.0390	0.00278 J	<0.000398
	MW-129	Oct-16		2.17	**1.68**		0.00143	0.000479 J	**0.00791**	<0.000260	0.000985 J	**4.73**	0.00186 JJ4	<0.000341	0.000920 J	0.00124 J	<0.000398
	MW-129	Apr-17		1.79	**2.13**		0.00101	<0.000387	0.00299	<0.000260	<0.000384	**4.34**	0.00247 J	<0.000341	0.000543 J	<0.00106	<0.000398
	MW-129	Apr-18		4.33	**1.40**		0.000452 J	<0.000387	**0.00731**	<0.000260	0.00130	**5.40**	0.00124 J	<0.000341	0.000816 J	0.00125 J	<0.000398

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

2018 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	Ethyl-benzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
					ARC-GRO	ARC-TPH-D	ARC-TPH-D	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:	---	0.0398	0.0473	0.056	0.060	0.005	0.070	0.700	0.10	0.030	0.193	1.0	0.620	0.005
				CGWSL Source:		NMED TPH	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 Field East of Refinery	MW-130	Apr-16		<0.0314	**1.08**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000538 J	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-130	Oct-16		0.200	**1.09**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00130	0.00112 J	<0.000341	<0.000780	<0.00106	<0.000398
	MW-130	Apr-17		<0.0314	**1.08**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00130	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-130	Oct-17		<0.0314	**1.22**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00136	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	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-131	Apr-15		7.68	**2.80**		0.0486	0.0119	**1.91**	<0.000260	0.0692	**5.23**	**0.0468**	0.0606	0.215	0.145	<0.000400
	MW-131	Oct-15		6.76	**4.00**		0.0231	0.00694	**2.19**	<0.000260	0.0480	**4.54**	**0.0589**	0.0243	0.0522	0.0859	<0.000398
	MW-131	Apr-16		9.16	**2.12**		0.0212	0.00562	**2.42**	<0.000260	0.0535	**3.69**	**0.0353**	0.0370	0.142	0.0883	<0.000398
	MW-131	Oct-16		6.31	**1.86**		0.0133	0.00398 J	**1.58**	<0.00130	0.0324	**4.09**	0.0135 JJ4	0.0182	0.0299	0.0613	<0.00199
	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-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-16		0.0420 J	**0.0971 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.00100	<0.000780	<0.00106	<0.000398
	MW-134	Apr-16	FD	<0.0314	**0.0774 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-134	Oct-16		<0.0314	**0.184**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-134	Oct-16	FD	<0.0314	**0.135**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-134	Apr-17		<0.0314	**0.0894 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-17	FD	<0.0314	**0.0738 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-17		<0.0314	**0.109**		<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-17	FD	<0.0314	**0.250**		<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		<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-135	Apr-16		<0.0314	**0.162**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00197	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-135	Oct-16		0.0638 JB	**0.147**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000685 J	<0.00100 J4	<0.000341	<0.000780	<0.00106	<0.000398
	MW-135	Apr-17		<0.0314	**0.0767 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-17		<0.0314	**0.102**		<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-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
	RA-4196	Apr-16					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00507	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	RA-4196	Oct-16					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00657	<0.00100 J4	<0.000341	<0.000780	<0.00106	<0.000398
	RA-4196	Apr-17					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00618	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RA-4196	Oct-17					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00763	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RA-4196	Apr-18					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00693	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RA-4196	Oct-18					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00753	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RA-4798	Apr-16					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0121	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	RA-4798	Oct-16					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0124	<0.00100 J4	<0.000341	<0.000780	<0.00106	<0.000398
	RA-4798	Apr-17					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00360	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RA-4798	Oct-17					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00889	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RA-4798	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-4798	Oct-18					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00788	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RW-12R	Apr-16			**1.38**		0.0145	<0.00194	**0.424**	<0.00130	0.00606	0.00568	<0.00500	<0.00170	<0.00390	0.0140 J	<0.00199
	RW-12R	Apr-17			**1.61**		0.0338	<0.00194	**0.335**	<0.00130	0.00823	0.00210 J	0.00877 J	0.00177 J	0.00354 J	0.0257	<0.00199
	RW-12R	Apr-18			**0.514 B**		0.00448	<0.000387	**0.0358**	<0.000260	0.00269	0.00315	0.00130 J	<0.000341	0.00157	0.00648	<0.000398
	RW-13R	Apr-16			**0.808**		0.0443	0.00539	**0.878**	<0.000260	0.0691	0.0779	0.0148	0.0139	0.0175	0.108	<0.000398
	RW-13R	Apr-18			**0.526 B**		0.0443	0.000443 J	**0.0770**	<0.000260	0.00855	0.0559	0.00114 J	0.00159	0.00322	0.0299	<0.000398
	RW-18	Apr-15					<0.000373	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	RW-18	Apr-16					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	RW-18A	Apr-17					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RW-18A	Apr-18					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RW-20	Apr-15			**2.10**		**0.539**	**0.113**	**1.87**	<0.00260	**0.973**	**0.209**	**0.183**	0.0590	0.211	**1.35**	<0.00400
	RW-22	Apr-15			**5.40**		**0.575**	**0.0853**	**4.07**	<0.00260	**1.09**	**0.178**	**0.164**	0.0952	0.216	**0.945**	<0.00400
	MW-23	Apr-16		34.7	**28.7**		<0.00186	<0.00194	**15.5**	<0.00130	0.179	0.0297	**0.193**	0.00284 J	0.00412 J	0.0176	<0.00199
	MW-23	Oct-16		37.1	**21.2**		<0.00932	<0.00968	**12.2**	<0.00650	0.168	0.0433	**0.220**	<0.00852	<0.0195	<0.0265	**<0.00995**
	MW-23	Apr-17		29.1	**2.78**		<0.000373	<0.000387	**8.49**	<0.000260	0.0958	0.0270	**0.190**	0.00188	0.00243	0.00549	<0.000398
	MW-23	Oct-17		17.6	**32.0**		0.000578 J	<0.000387	**8.11**	<0.000260	0.0421	0.0203	**0.137**	0.00198	0.00561	0.00525	<0.000398
	MW-23	Apr-18		19.3	**13.6**		<0.0373	<0.0387	**9.68**	<0.0260	0.114	<0.0367	**0.247 J**	<0.0341	<0.0412	<0.106	**<0.0398**
	MW-23	Oct-18		13.4	**13.7**		<0.0373	<0.0387	**6.27**	<0.0260	0.0392 J	<0.0367	**0.145 J**	<0.0341	<0.0412	<0.106	**<0.0398**
	MW-29	Apr-16		<0.0314	**1.27**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-29	Oct-16		<0.0314	**1.04**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000424 J	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-29	Apr-17		<0.0314	**0.857**		<0.000373	<0.000387	0.000616 J	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-29	Oct-17		<0.0314	**4.44**		<0.000373	<0.000387	0.000442 J	<0.000260	<0.000384	0.000990 J	<0.00100	<0.000341	0.000676 J	<0.00106	<0.000398
	MW-29	Apr-18		<0.0314	**1.03**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000482 J	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-29	Oct-18		0.126	**1.10**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00403	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-39	Apr-16		5.16	**12.5**		0.0526	<0.00968	**2.14**	<0.00650	0.0211 J	<0.00918	<0.0250	0.0365	0.0293 J	0.181	**<0.00995**
	MW-39	Oct-16		7.24	**9.26**		**0.0673 J**	<0.0387	**3.62**	<0.0260	<0.0384	<0.0367	**<0.100**	0.0428 J	<0.0780	0.204 J	**<0.0398**
	MW-39	Apr-17		5.20	**9.81**		**0.0710**	0.00534 J	**1.33**	<0.00260	0.0284	0.00429 J	0.0158 J	0.0454	0.0251	0.186	<0.00398
	MW-39	Oct-17		2.66	**9.16**		**0.0599**	0.00604	**0.476**	<0.000260	0.0206	0.00243	0.00239 J	0.0368	0.00816	0.150	<0.000398
	MW-39	Apr-18		1.36	**6.39**		**0.0678**	0.00685	**0.144**	<0.000260	0.0263	0.00147	0.00102 J	0.0452	0.00472	0.186	<0.000398
	MW-39	Oct-18		0.758	**4.99**		0.0156	0.00347	**0.0638**	<0.000260	0.0100	0.00180	<0.00100	0.0244	0.00321	0.0737	<0.000398
	MW-40	Apr-15		0.735	**4.50**		<0.000373	<0.000387	**0.0198**	<0.000260	0.000399 J	<0.000370	<0.00100	<0.000340	<0.000780	0.00606	<0.000400
	MW-40	Apr-16		1.03	**4.92**		0.000760 J	<0.000387	**0.0112**	<0.000260	0.000609 J	<0.000367	<0.00100	<0.000341	<0.000780	0.0144	<0.000398
	MW-40	Apr-17		1.29	**4.15**		0.000538 J	<0.000387	**0.00857**	<0.000260	0.000721 J	<0.000367	<0.00100	<0.000341	0.000732 J	0.0117	<0.000398
	MW-40	Apr-18		1.18	**2.45**		<0.000373	<0.000387	0.000769 J	<0.000260	0.000567 J	<0.000367	<0.00100	<0.000341	0.000543 J	0.00619	<0.000398
	MW-41	Apr-15		0.103	**1.60**		<0.000370	<0.000390	0.00190	<0.000260	<0.000380	0.00440	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-41	Apr-16		0.171	**2.26**		<0.000373	<0.000387	0.00360	<0.000260	<0.000384	0.00384	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-41	Apr-17		0.249	**1.58**		<0.000373	<0.000387	0.00339	<0.000260	<0.000384	0.00380	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-41	Apr-18		0.111	**3.30**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00796	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-42	Apr-15		1.37	**7.00**		0.0247	<0.00390	**0.216**	<0.00260	<0.00380	0.0145	<0.0100	<0.00340	<0.00780	0.0484	<0.00400
	MW-42	Apr-16		0.737	**5.88**		0.0169	<0.00194	**0.103**	<0.00130	<0.00192	0.0114	<0.00500	<0.00170	<0.00390	0.0380	<0.00199
	MW-42	Apr-17		0.262	**3.41**		0.00352	<0.000387	**0.0240**	<0.000260	<0.000384	0.0104	<0.00100	<0.000341	0.000845 J	0.00365	<0.000398
	MW-42	Apr-18		0.626	**2.98**		0.00362	<0.000387	**0.0488**	<0.000260	<0.000384	0.00598	<0.00100	<0.000341	0.000959 J	0.00420	<0.000398
	MW-43	Apr-16		31.6	**6.24**		**0.502**	**0.112 J**	**12.4**	<0.0650	**0.968**	<0.0918	**<0.250**	**0.626**	**1.66**	**1.86**	**<0.0995**
	MW-43	Oct-16		38.0	**6.51**		**0.433**	**<0.0968**	**12.4**	<0.0650	**0.810**	<0.0918	**<0.250**	**0.555**	0.618 J	**1.81**	**<0.0995**
	MW-43	Apr-17		29.6	**6.53**		**0.497**	**0.108**	**9.62**	<0.0130	0.445	0.0484 J	**0.163 J**	**0.539**	0.519	**1.80**	**<0.0199**
	MW-43	Oct-17		28.0	**6.03**		**0.839**	**0.182**	**10.7**	<0.0130	0.197	0.0578	**0.305**	**0.421**	0.285	**1.76**	**<0.0199**
	MW-43	Apr-18		73.8	**5.89**		**0.665**	**0.151**	**38.5**	<0.0130	0.215	0.0477 J	**0.303**	**0.264**	0.124	**1.78**	**<0.0199**
	MW-43	Oct-18		35.8	**6.37**		**0.585**	**0.131**	**10.7**	<0.0130	0.0818	0.0545	**0.235 J**	**0.237**	0.239	**1.57**	**<0.0199**
	MW-59	Apr-15		<0.0310	**0.860**		<0.000370	<0.000390	**0.0119**	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-59	Apr-16		<0.0314	**0.919**		<0.000373	<0.000387	0.00329	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-59	Apr-17		0.163	**0.835**		<0.000373	<0.000387	0.00218	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-59	Apr-18		0.232	**0.576**		<0.000373	<0.000387	0.00105	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-60	Apr-16		0.575	**1.21**		<0.000373	<0.000387	0.00473	<0.000260	0.000604 J	<0.000367	<0.00100	<0.000341	<0.000780	0.00283 J	<0.000398
	MW-60	Apr-16	FD	0.396	**1.19**		0.000402 J	<0.000387	**0.00565**	<0.000260	0.000533 J	<0.000367	<0.00100	<0.000341	<0.000780	0.00272 J	<0.000398
	MW-60	Oct-16		0.331	**0.628**		0.000948 J	<0.000387	**0.00898**	<0.000260	0.000935 J	<0.000367	<0.00100	<0.000341	<0.000780	0.00736	<0.000398
	MW-60	Oct-16	FD	0.251	**0.573**		0.000618 J	<0.000387	**0.00574**	<0.000260	0.000825 J	<0.000367	<0.00100	<0.000341	<0.000780	0.00552	<0.000398
	MW-60	Apr-17		0.309	**0.923**		<0.000373	<0.000387	0.00262	<0.000260	0.000481 J	<0.000367	<0.00100	<0.000341	<0.000412	0.00195 J	<0.000398
	MW-60	Apr-17	FD	0.343	**0.947**		<0.000373	<0.000387	**0.00526**	<0.000260	0.000556 J	<0.000367	<0.00100	<0.000341	<0.000412	0.00240 J	<0.000398
	MW-60	Oct-17		0.479	**1.07**		0.000685 J	<0.000387	**0.0110**	<0.000260	0.00137	<0.000367	<0.00100	<0.000341	0.000476 J	0.00622	<0.000398
	MW-60	Oct-17	FD	0.469	**1.54**		0.000753 J	<0.000387	**0.0122**	<0.000260	0.00121	<0.000367	<0.00100	<0.000341	<0.000412	0.00514	<0.000398
	MW-60	Apr-18		0.319	**0.633**		<0.000373	<0.000387	0.00261	<0.000260	0.000526 J	<0.000367	<0.00100	<0.000341	<0.000412	0.00229 J	<0.000398
	MW-60	Apr-18	FD	0.347	**0.688**		<0.000373	<0.000387	0.00176	<0.000260	0.000433 J	<0.000367	<0.00100	<0.000341	<0.000412	0.00196 J	<0.000398
	MW-60	Oct-18		0.593	**1.23**		<0.000373	<0.000387	**0.0265**	<0.000260	0.00115	<0.000367	<0.00100	<0.000341	0.000664 J	0.00573	<0.000398
	MW-60	Oct-18	FD	0.502	**1.09**		<0.000373	<0.000387	**0.0277**	<0.000260	0.000973 J	<0.000367	<0.00100	<0.000341	0.000704 J	0.00540	<0.000398

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

2018 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	Ethyl-benzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
					ARC-GRO	ARC-TPH-D	ARC-TPH-D	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:	---	0.0398	0.0473	0.056	0.060	0.005	0.070	0.700	0.10	0.030	0.193	1.0	0.620	0.005
				CGWSL Source:		NMED TPH	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-61	Apr-16		2.60	**3.59**		**0.139**	<0.00194	**0.493**	<0.00130	0.0292	<0.00184	**0.0340**	0.00263 J	0.0185 J	0.226	<0.00199
	MW-61	Oct-16		4.21	**3.55**		**0.119**	<0.00968	**0.501**	<0.00650	0.0353	<0.00918	**0.0335 J**	<0.00852	0.0260 J	0.225	**<0.00995**
	MW-61	Apr-17		6.48	**2.70**		**0.118**	<0.00968	**0.769**	<0.00650	0.0225 J	<0.00918	**0.0307 J**	<0.00852	0.0312	0.228	**<0.00995**
	MW-61	Oct-17		7.01	**4.21**		**0.141**	0.00349	**0.976**	<0.000260	0.0420	<0.000367	**0.0522**	0.00327	0.0612	0.378	<0.000398
	MW-61	Apr-18		7.59	**2.55**		**0.198**	<0.0194	**1.36**	0.0379 J	0.0846	<0.0184	**0.250 J**	<0.0170	0.0844	0.450	**<0.0199**
	MW-61	Oct-18		13.4	**4.40**		**0.165**	<0.0194	**1.52**	<0.0130	0.0367 J	<0.0184	**0.0940 J**	<0.0170	0.0795	0.353	**<0.0199**
	MW-62	Apr-16		7.81	**7.54**		**0.502**	**0.114**	**1.12**	<0.00650	0.356	<0.00918	**0.236**	<0.00852	<0.0195	**1.80**	**<0.00995**
	MW-62	Oct-16		11.3	**4.72**		**0.620 J6**	**0.149 J6**	**3.28 J6**	<0.0260 J6	0.0535 JJ6	<0.0367 J6	**0.189 JJ6**	<0.0341 J6	<0.0780 J6	**1.14 J6**	**<0.0398** J6
	MW-62	Apr-17		8.61	**5.93**		**0.646**	**0.149**	**1.59**	<0.0130	0.248	<0.0184	**0.204 J**	<0.0170	<0.0206	**1.13**	**<0.0199**
	MW-62	Oct-17		9.55	**8.69**		**0.759**	**0.173**	**0.984**	<0.0260	0.268	<0.0367	**0.206 J**	<0.0341	<0.0412	**1.35**	**<0.0398**
	MW-62	Apr-18		9.38	**4.28**		**0.715**	**0.166**	**1.59**	<0.0260	0.129	<0.0367	**0.313 J**	<0.0341	<0.0412	**1.15**	**<0.0398**
	MW-62	Oct-18		11.6	**7.19**		**0.602**	**0.144**	**1.54**	<0.0260	0.106	<0.0367	**0.183 J**	<0.0341	<0.0412	**0.871**	**<0.0398**
	MW-67	Apr-16		1.29	**11.1**		<0.00746	<0.00774	**0.223**	0.00527 J	0.00869 J	**0.359**	<0.0100	<0.00341	<0.00780	<0.0106	<0.00398
	MW-67	Oct-16		1.03	**9.36**		0.0108	<0.00387	**0.214**	0.00322 J	0.0124	**0.253**	0.0298 J	0.00407 J	<0.00780	0.0120 J	<0.00398
	MW-67	Apr-17		1.77	**9.40**		0.00498 J	<0.00194	**0.191**	0.00265	0.0128	**0.195**	0.00571 J	<0.00170	0.00361 J	0.0121 J	<0.00199
	MW-67	Oct-17		0.649	**8.48**		0.00119	<0.000387	**0.130**	0.00275	0.00330	**0.201**	<0.00100	<0.000341	0.00140	0.00245 J	0.000515 J
	MW-67	Apr-18		1.53	**4.25**		0.00206 J	<0.00194	**0.147**	<0.00130	0.00500	**0.219**	<0.00500	<0.00170	0.00261 J	0.00916 J	<0.00199
	MW-67	Oct-18		0.562	**7.73**		0.000557 J	<0.000387	0.00480	0.00122	0.000620 J	**0.289**	<0.00100	<0.000341	<0.000412	0.00113 J	0.000424 J
	MW-90	Apr-16		0.119	**4.03**		<0.000373	<0.000387	**0.00662**	0.000294 J	<0.000384	<0.000367	0.00105 J	<0.000341	<0.000780	<0.00106	<0.000398
	MW-90	Oct-16		<0.0314	**1.11**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-90	Apr-17		0.217	**4.20**		<0.000373	<0.000387	0.00225	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-90	Oct-17		0.160	**4.63**		<0.000373	<0.000387	0.00311	<0.000260	<0.000384	<0.000367	<0.00100	0.000368 J	0.000744 J	<0.00106	<0.000398
	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-91	Apr-16		22.1	**22.2**		**0.266**	**0.0719**	**3.85**	<0.0130	**0.899**	<0.0184	**0.124 J**	**0.365**	**4.01**	**1.69**	**<0.0199**
	MW-91	Oct-16		20.6	**16.3**		**0.218 J**	**<0.0968**	**3.15**	<0.0650	**0.816**	<0.0918	**<0.250**	**0.310**	**3.33**	**1.58**	**<0.0995**
	MW-91	Apr-17		17.0	**19.8**		**0.235**	**0.0634 J**	**2.67**	<0.0260	0.473	<0.0367	**<0.100**	**0.216**	**1.61**	**1.05**	**<0.0398**
	MW-91	Oct-17		13.6	**17.9**		**0.221**	**0.0693 J**	**3.36**	<0.0260	0.384	<0.0367	**<0.100**	**0.219**	**1.12**	**0.975**	**<0.0398**
	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-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-16		1.06	**7.83**		0.0331	0.00543	**0.258**	<0.00130	0.0106	<0.00184	0.0113 J	<0.00170	<0.00390	0.0567	<0.00199
	MW-93	Oct-16		2.57	**8.66**		**0.103**	0.0146	**0.567**	<0.00260	0.0114	<0.00367	**0.0326 J**	<0.00341	<0.00780	0.250	<0.00398
	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-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-15		<0.0310	**7.58**		<0.000370	<0.000390	0.00148	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-95	Apr-16		0.129	**8.06**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000379 J	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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-96	Apr-16		25.3	**10.8**		<0.00746	<0.00774	<0.000331	<0.00520	<0.00768	**32.9**	<0.0200	<0.00682	<0.0156	<0.0212	**<0.00796**
	MW-96	Oct-16		20.0	**7.74**		**<0.0186**	<0.0194	**<0.0166**	<0.0130	<0.0192	**39.6**	**<0.0500**	<0.0170	<0.0390	<0.0530	**<0.0199**
	MW-96	Apr-17		25.1	**9.02**		**<0.0186**	<0.0194	**<0.0166**	<0.0130	<0.0192	**30.6**	**<0.0500**	<0.0170	<0.0206	<0.0530	**<0.0199**
	MW-96	Oct-17		13.9	**7.85**		**<0.0186**	<0.0194	**<0.0166**	<0.0130	<0.0192	**40.0**	**<0.0500**	<0.0170	<0.0206	<0.0530	**<0.0199**
	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-98	Apr-16		14.7	**6.88**		**0.177**	0.0462 J	**4.07**	<0.0260	0.430	<0.0367	**0.139 J**	<0.0341	0.220 J	**0.865**	**<0.0398**
	MW-98	Oct-16		20.0	**4.97**		**0.299**	**0.0823 J**	**3.59**	<0.0260	0.698	<0.0367	**<0.100**	<0.0341	0.245 J	**1.37**	**<0.0398**
	MW-98	Apr-17		15.9	**5.94**		**0.382**	**0.0852 J**	**4.39**	<0.0260	**1.05**	<0.0367	**0.239 J**	0.0443 J	0.356	**1.88**	**<0.0398**
	MW-98	Oct-17		20.1	**5.92**		**0.488**	**0.118**	**4.09**	<0.0130	**1.26**	<0.0184	**0.245 J**	0.0525	0.421	**2.21**	**<0.0199**
	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-137	Apr-16		33.8	**11.8**		**0.460**	**0.102 J**	**9.65**	<0.0650	**1.65**	<0.0918	**0.262 J**	**0.539**	**2.53**	**1.23**	**<0.0995**
	MW-137	Oct-16		30.9	**9.65**		**0.421**	**<0.0968**	**10.5**	<0.0650	**1.54**	<0.0918	**<0.250**	**0.343**	**1.51**	**1.10**	**<0.0995**
	MW-137	Apr-17		14.1 J	**12.6**		**0.414**	**0.0969 J**	**9.69**	<0.0520	**1.58**	<0.0734	**0.272 J**	**0.427**	**2.08**	**1.15**	**<0.0796**
	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**	<0.0520	**1.09**	0.0876 J	**0.237 J**	0.165 J	0.977	**0.688**	**<0.0796**
	MW-138	Apr-16		4.86	**15.5**		<0.00373	<0.00387	**1.46**	<0.00260	0.309	0.0955	**0.0959**	<0.00341	0.0158 J	<0.0106	<0.00398
	MW-138	Oct-16		2.28	**10.3**		<0.00373	<0.00387	**0.494**	<0.00260	0.0149	0.0935	**0.0364 J**	<0.00341	<0.00780	<0.0106	<0.00398
	MW-138	Apr-17		1.00	**14.6**		<0.00373	<0.00387	**0.484**	<0.00260	0.0167	**0.125**	**0.0639**	<0.00341	<0.00412	<0.0106	<0.00398
	MW-138	Oct-17		2.20	**15.0**		0.00547	<0.00194	**0.701**	<0.00130	0.0244	**0.163**	**0.0635**	<0.00170	0.00577	0.00565 J	<0.00199
	MW-138	Apr-18		2.44	**6.05**		0.0413	0.00633	**0.741**	<0.00130	0.222	**0.188**	**0.0667**	0.00541	0.0128	0.0492	<0.00199
	MW-138	Oct-18		4.06	**6.00**		**0.0799**	0.0121	**0.628**	<0.00130	0.423	**0.269**	**0.0379**	0.00635	0.00806	0.115	<0.00199
	RW-1	Apr-15		2.95 J	**12.0**		**<0.0190**	<0.0190	**0.962**	**1.02**	0.0470 J	<0.0180	**<0.0500**	<0.0170	<0.0390	<0.0530	**<0.0200**
	RW-1R	Apr-16		2.13	**8.54**		0.00369	0.000516 J	**0.426**	**2.14**	0.0214	0.0133	0.00762	0.00110	0.00542	0.0122	**0.00959**
	RW-1	Apr-17		2.20	**21.5**		<0.00373	<0.00387	**0.696**	**0.624**	0.0169	0.0441	<0.0100	<0.00341	0.0102	<0.0106	**0.00896 J**
	RW-1	Apr-18		6.05	**8.92**		0.0303	0.00550	**1.52**	**0.681**	0.0964	0.0292	0.0132	0.00282	0.0176	0.0855	**0.0169**
	RW-2	Apr-15		18.3	**19.7**		**0.330**	**0.0772**	**5.34**	**0.619**	**1.02**	<0.00370	**0.157 J**	0.0853	0.115	0.530	**0.0326**
	RW-2R	Apr-16		20.8	**17.3**		**0.188**	0.0419 J	**5.86**	**0.555**	0.591	0.0226 J	**0.145 J**	0.0461 J	0.0569 J	0.299	**0.0285 J**
	RW-2	Apr-17		17.2	**11.6**		**0.271**	**0.0664**	**7.78**	**0.828**	**0.837**	<0.0184	**0.145 J**	0.0183 J	0.0430 J	0.431	**0.0249 J**
	RW-2	Apr-18		20.5	**8.31**		**0.329**	**0.0783**	**4.68**	**0.543**	0.672	0.0120	**0.190**	0.00601	0.0312	0.446	**0.00521**
	RW-7	Apr-15		1.05	**9.70**		**0.0818**	0.000663 J	**0.0535**	<0.000260	0.0185	0.0122	0.0112	0.00176	0.00396 J	0.0367	<0.000400
	RW-7R	Apr-16		0.0588 J	**1.97**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0687	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	RW-7	Apr-17		<0.0314	**1.15**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0325	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RW-7	Apr-18		0.177	**11.3**		0.00502	0.000415 J	**0.0319**	<0.000260	0.00132	0.0378	0.00204 J	0.00114	0.00106	0.00545	<0.000398
	RW-8	Apr-15			**7.30**		0.00710 J	<0.00390	**0.0412**	<0.00260	0.00801 J	**2.41**	<0.0100	<0.00340	<0.00780	<0.0110	<0.00400
	RW-8	Apr-17			**11.6**		**0.0928**	0.0249	**0.0718**	0.000478 J	0.0198	**1.94**	**0.0320**	0.0112	0.00213	0.0498	0.00110
	RW-9	Apr-15		2.55	**3.20**		**<0.0190**	<0.0190	**0.790**	<0.0130	<0.0190	<0.0180	**<0.0500**	<0.0170	<0.0390	<0.0530	**<0.0200**
	RW-9	Apr-16		0.492 J	**3.44**		0.0283	<0.00194	**0.466**	<0.00130	0.00775	0.00656	0.00554 J	<0.00170	<0.00390	0.0708	<0.00199
	RW-9	Apr-17		2.36	**3.21**		0.000991 J	<0.000387	**0.290**	<0.000260	0.00105	0.00435	<0.00100	<0.000341	0.00184	0.0193	<0.000398
	RW-9	Apr-18		2.20	**2.31**		0.00314	<0.000387	**0.243**	<0.000260	0.00159	0.00409	<0.00100	<0.000341	0.00218	0.0180	<0.000398
	RW-10	Apr-15		<0.0310	**4.80**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	RW-10	Apr-16		<0.157	**3.66**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	RW-10	Apr-17		0.207	**2.90**		<0.000373	<0.000387	<0.000331	<0.000260	0.000403 J	<0.000367	<0.00100	0.00299	0.00119	0.00378	<0.000398
	RW-10	Apr-18		0.380	**2.81**		0.000631 J	<0.000387	<0.000331	<0.000260	0.000727 J	<0.000367	<0.00100	0.00346	0.00163	0.00474	<0.000398
	RW-16	Apr-15			**1.90**		<0.000373	<0.000387	<0.000330	<0.000260	<0.000380	0.0190	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	RW-16	Apr-16			**2.29**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0186	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	RW-16	Apr-17			**1.08**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0152	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RW-16	Apr-18			**0.350**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00172	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RW-17	Apr-15		<0.0310	**1.20**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	0.00772	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	RW-17	Apr-16		<0.0314	**1.75**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	**0.195**	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	RW-17	Apr-17		0.0622 J	**2.57**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	**0.189**	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RW-17	Apr-18		0.0927 J	**1.57**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	**0.107**	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398

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

2018 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	Ethyl-benzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
					ARC-GRO	ARC-TPH-D	ARC-TPH-D	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:	---	0.0398	0.0473	0.056	0.060	0.005	0.070	0.700	0.10	0.030	0.193	1.0	0.620	0.005
				CGWSL Source:		NMED TPH	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 RO Reject Field	MW-117	Apr-16		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-117	Oct-16		<0.0314	0.0265 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000780	<0.00106	<0.000398
	MW-117	Apr-17		<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-117	Oct-17		<0.0314	**0.385**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-117	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-117	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-118	Apr-16		<0.0314	0.0248 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-118	Oct-16		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000780	<0.00106	<0.000398
	MW-118	Apr-17		<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-118	Oct-17		<0.0314	**0.0524 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-118	Apr-18		<0.0314	<0.0282		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-118	Oct-18		<0.0314	0.0325 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-119	Apr-16		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-119	Oct-16		0.0557 JB	**0.0570 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000780	<0.00106	<0.000398
	MW-119	Apr-17		<0.0314	**0.0622 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-119	Oct-17		<0.0314	**0.0805 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-119	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-119	Oct-18		<0.0314	**0.0470 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
NCL	MW-18	Apr-15			**2.41**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-18	Apr-16			**2.02**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-18	Apr-17			**0.960**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-18	Apr-18			**0.672**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-45	Apr-16			**1.11**		<0.000373	<0.000387	<0.000331	<0.000418	<0.000384	0.00152	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-45	Oct-16			**1.15**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00206	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-45	Apr-17			**0.857**		<0.000373	<0.000387	<0.000331	0.00152	<0.000384	0.00316	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-45	Oct-17			**0.864**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00305	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-45	Apr-18			**0.502**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00506	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-45	Oct-18			**1.30**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00766	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-53	Apr-15			**0.296**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-53	Apr-16			**0.316**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-53	Apr-17			**0.258**		<0.000373	<0.000387	<0.000331	0.000391 J	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-53	Apr-18			**0.158**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-54A	Apr-16			**3.34**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-54A	Oct-16			**3.24**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-54A	Apr-17			**2.55**		<0.000373	<0.000387	<0.000331	0.000888 J	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-54A	Oct-17			**2.38**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-54A	Apr-18			**2.51**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-54A	Oct-18			**2.18**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-54B	Apr-13		<0.0500	**0.630**		<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.0150	<0.00500
	MW-54B	Apr-15		<0.0310	**2.47**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-54B	Apr-17		<0.0314	**0.881**		<0.000373	<0.000387	<0.000331	0.000616 J	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-55	Apr-16		<0.0314	**0.691**		**0.0599**	<0.000387	<0.000331	<0.000260	<0.000384	0.0163	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-55	Oct-16		<0.0314	**0.354**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00521	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-55	Apr-17		<0.0314	**1.08**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0535	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-55	Oct-17		0.0634 J	**0.697**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0390	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-55	Apr-18		0.0479 J	**0.518**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0302	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-55	Oct-18		0.0888 J	**1.09**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0604	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-56	Apr-16			**1.07**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0160	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-56	Oct-16			**1.18**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00819	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-56	Apr-17			**1.15**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0222	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-56	Apr-18			**0.287**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00328	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-108	Apr-16			**9.20**		**0.0599**	<0.0194	**0.504**	<0.0130	<0.0192	<0.0184	**<0.0500**	<0.0170	<0.0390	0.0795 J	**<0.0199**
	MW-108	Oct-16			**15.2**		**0.0561**	<0.00968	**0.362**	<0.00650	<0.00960	<0.00918	<0.0250	<0.00852	<0.0195	0.0721 J	**<0.00995**
	MW-108	Apr-17			**6.80**		**0.0605**	<0.00968	**0.382**	<0.00650	<0.00960	<0.00918	<0.0250	<0.00852	<0.0103	0.0815	**<0.00995**
	MW-108	Oct-17			**7.93**		0.0451	0.00330 J	**0.282**	<0.00130	0.00404 J	<0.00184	0.00744 J	0.00238 J	0.00383 J	0.0626	<0.00199
	MW-108	Apr-18			**8.78**		0.0462	<0.00968	**0.265**	<0.00650	<0.00960	<0.00918	<0.0250	<0.00852	<0.0103	0.0646 J	**<0.00995**
	MW-108	Oct-18			**4.41**		**0.0637**	0.00773	**0.404**	<0.00130	0.00532	<0.00184	<0.00500 J4	0.00363 J	0.00660	0.0888	<0.00199
	NCL-31	Apr-16			**1.87**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-31	Oct-16			**24.2**		0.000554 J	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-31	Apr-17			**1.37**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-31	Oct-17			**1.16**		0.000489 J	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-31	Apr-18			**0.927**		0.000514 J	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-31	Oct-18			**1.45**		<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-16			**4.05**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000751 J	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-32	Oct-16			**2.70**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.000385 J	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-32	Apr-17			**1.88**		<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-17			**1.27**		<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-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-33	Apr-16			**4.53**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-33	Oct-16			**6.55**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-33	Apr-17			**4.80**		<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-17			**4.78**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	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-34A	Apr-16			**19.2**		**0.102**	<0.0194	**3.25**	<0.0130	0.0758	<0.0184	**<0.0500**	<0.0170	<0.0390	0.188	**<0.0199**
	NCL-34A	Oct-16			**10.8**		**0.0754 J**	<0.0387	**1.13**	<0.0260	<0.0384	<0.0367	**<0.100**	<0.0341	<0.0780	0.111 J	**<0.0398**
	NCL-34A	Apr-17			**11.4**		0.0560	<0.0194	**1.78**	<0.0130	<0.0192	<0.0184	**<0.0500**	<0.0170	<0.0206	0.100 J	**<0.0199**
	NCL-34A	Oct-17			**6.04**		0.0290	0.00141	**0.805**	<0.000260	0.00230	0.000379 J	0.00132 J	0.000631 J	<0.000412	0.0768	<0.000398
	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-44	Apr-16			**7.59**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-44	Oct-16			**8.88**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-44	Apr-17			**7.97**		<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-17			**6.69**		<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-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-49	Apr-16			**0.0890 J**		<0.000373	<0.00774	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-49	Apr-16	FD		**0.0664 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-49	Oct-16			**0.0712 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-49	Oct-16	FD		**0.0626 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NCL-49	Apr-17			**0.0515 J**		<0.000373	<0.000387	<0.000331	0.000449 J	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-49	Apr-17	FD		**0.0582 J**		<0.000373	<0.000387	<0.000331	0.000303 J	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NCL-49	Oct-17			0.0373 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-17	FD		0.0355 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			**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

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

2018 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	Ethyl-benzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
					ARC-GRO	ARC-TPH-D	ARC-TPH-D	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:	---	0.0398	0.0473	0.056	0.060	0.005	0.070	0.700	0.10	0.030	0.193	1.0	0.620	0.005
				CGWSL Source:		NMED TPH	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	KWB-2R	Apr-16			**1.49**		0.0497	0.000489 J	**0.0558**	<0.000260	0.0483	0.0231	0.00806	0.00189	0.00152 J	0.0515	<0.000398
	KWB-2R	Oct-16			**1.84**		0.0347	0.000427 J	**0.398**	<0.000260	0.0130	0.0184	0.00440 J	0.00185	0.00290 J	0.0289	<0.000398
	KWB-2R	Apr-17			**1.35**		0.0341	<0.000387	**0.0260**	<0.000260	0.00543	0.0192	0.00609	0.000772 J	<0.000412	0.0281	<0.000398
	KWB-2R	Oct-17			**4.84**		**0.150**	<0.000387	**1.12**	<0.000260	0.325	0.0202	**0.0675**	0.00977	0.0161	0.193	<0.000398
	KWB-5	Apr-16			**2.36**		0.00535	0.000901 J	**0.688**	<0.000260	0.00678	**12.6**	0.0114	0.00349	0.00412 J	0.0158	<0.000398
	KWB-5	Oct-16			**1.89**		<0.00186	<0.00194	**0.367**	<0.00130	<0.00192	**9.88**	0.00511 JJ4	<0.00170	<0.00390	<0.00530	<0.00199
	KWB-5	Apr-17			**1.98**		0.0172	0.00179	**0.525**	<0.000260	0.0103	**8.84**	**0.0302**	0.00472	0.00470	0.0434	<0.000398
	KWB-5	Oct-17			**1.55**		**<0.0932**	<0.000387	**0.336**	<0.000260	<0.0960	**12.4**	0.0131	<0.0852	0.00156	<0.265	<0.000398
	KWB-5	Apr-18			**1.70**		**<0.0932**	**<0.0968**	**0.411**	<0.0650	<0.0960	**10.3**	**<0.250**	<0.0852	<0.103	<0.265	**<0.0995**
	KWB-5	Oct-18			**1.62**		**<0.0932**	**<0.0968**	**0.278**	<0.0650	<0.0960	**10.8**	**<0.250**	<0.0852	<0.103	<0.265	**<0.0995**
	KWB-6	Apr-16			**3.75**		**0.876**	**0.134**	**12.4**	<0.00130	**0.799**	**0.138**	**0.137**	**0.243**	0.120	**1.88**	<0.00199
	KWB-6	Oct-16			**1.78**		**0.292**	0.0449	**3.41**	<0.00520	0.241	**0.135**	**0.0549 J**	0.0232	0.0167 J	0.417	**<0.00796**
	KWB-6	Apr-17			**2.04**		**0.399**	0.0517	**4.67**	<0.00130	0.346	**0.154**	**0.0563**	0.0179	0.0205	0.391	<0.00199
	KWB-6	Oct-17			**2.16**		**0.206**	0.0302	**3.22**	<0.000260	0.183	**0.102**	**0.0436**	0.00804	0.0122	0.283	<0.000398
	KWB-6	Apr-18			**1.77**		**0.164**	0.0557	**3.88**	<0.00520	0.156	**0.122**	**0.0587 J**	0.035	0.00879 J	0.258	**<0.00796**
	KWB-6	Oct-18			**1.52**		**0.122**	**0.0611**	**2.64**	<0.00520	0.102	**0.120**	**0.0469 J**	0.0234	0.0126 J	0.379	**<0.00796**
	MW-28	Apr-16		4.83	**17.0**		**0.113**	0.00861 J	**1.37**	<0.00260	0.0276	**0.261**	0.0247 J	0.00496 J	0.0350 J	0.161	<0.00398
	MW-28	Oct-16		6.13	**22.2**		**0.253**	0.0202 J	**2.55**	<0.0130	0.0796	**0.630**	**0.0504 J**	<0.0170	0.0683 J	0.338	**<0.0199**
	MW-28	Apr-17		9.38	**14.4**		**0.168**	<0.0194	**2.58**	<0.0130	0.0489 J	**0.423**	**0.0668 J**	<0.0170	0.0587	0.238	**<0.0199**
	MW-28	Oct-17		7.24	**7.51**		**0.142**	<0.0194	**1.58**	<0.0130	0.0578	**0.158**	**<0.0500**	<0.0170	0.0474 J	0.216	**<0.0199**
	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-48	Apr-16		23.3	**15.3**		**0.310**	0.0223	**7.17**	<0.00520	**0.790**	**0.326**	**0.101**	0.0788	0.214	**0.750**	**<0.00796**
	MW-48	Oct-16		15.8	**7.81**		**0.323**	0.0284	**5.12**	<0.00130	0.448	**0.851**	**0.0832**	0.0356	0.214	0.538	<0.00199
	MW-48	Apr-17		31.5	**10.6**		**0.482**	0.0577	**11.7**	<0.0130	**1.27**	**0.214**	**0.224 J**	0.115	0.667	**1.16**	**<0.0199**
	MW-48	Oct-17		28.7	**18.5**		**0.368**	0.0465	**11.0**	<0.000260	**0.917**	**0.263**	**0.138**	0.0924	0.722	**0.797**	<0.000398
	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-50	Apr-16			**1.10**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-50	Oct-16			**1.02**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-50	Apr-17			**0.835**		<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-17			**1.12**		<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-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-52	Apr-16		<0.0314	**0.324**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-52	Oct-16		0.0386 J	**0.367**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-52	Apr-17		<0.0314	**0.271**		<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-17		<0.0314	**0.380**		<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-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-64	Apr-16		136	**12.3**		**0.666**	**0.140**	**25.3**	<0.0130	**3.11**	**0.666**	**0.195 J**	**2.44**	**18.8**	**7.70**	**<0.0199**
	MW-64	Oct-16		90.7	**12.0**		**0.435**	**0.0904 J**	**30.9**	<0.0260	**2.61**	**0.531**	**0.140 J**	**1.51**	**11.6**	**5.30**	**<0.0398**
	MW-64	Apr-17		109	**9.88**		**0.793**	**0.163 J**	**3.22**	<0.0650	**3.35**	**0.408**	**<0.250**	**2.09**	**13.2**	**7.58**	**<0.0995**
	MW-64	Oct-17		88.3	**12.6**		**0.643**	**0.130 J**	**30.7**	<0.0650	**3.20**	**0.484**	**<0.250**	**1.44**	**9.81**	**6.01**	**<0.0995**
	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-65	Apr-16		19.6	**10.6**		0.0309	0.0165	**9.73**	<0.00260	0.288	**3.71**	**0.155**	0.0149	0.0211 J	0.0971	<0.00398
	MW-65	Oct-16		19.2	**7.99**		<0.00746	<0.00774	**8.04**	<0.00520	0.0574	**2.70**	**0.194**	0.00937 J	0.0271 J	0.0298 J	**<0.00796**
	MW-65	Apr-17		18.5	**8.30**		**<0.0373**	<0.0387	**6.70**	<0.0260	0.0768 J	**2.27**	**0.205 J**	<0.0341	<0.0412	<0.106	**<0.0398**
	MW-65	Oct-17		17.1	**7.44**		**<0.0373**	<0.0387	**6.25**	<0.0260	0.0507 J	**2.13**	**0.223 J**	<0.0341	<0.0412	<0.106	**<0.0398**
	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-66	Apr-16		6.09	**4.19**		0.00940 J	<0.00387	**3.09**	<0.00260	0.0181	**1.48**	**0.0638**	<0.00341	<0.00780	0.0285 J	<0.00398
	MW-66	Oct-16		7.32	**4.24**		0.00241	0.000547 J	**3.80**	<0.000260	0.0214	**1.48**	**0.0979**	0.00365	0.0109	0.0265	<0.000398
	MW-66	Apr-17		6.04	**4.18**		**<0.0186**	<0.0194	**1.89**	<0.0130	<0.0192	**1.21**	**0.104 J**	<0.0170	<0.0206	<0.0530	**<0.0199**
	MW-66	Oct-17		9.46	**3.58**		<0.00373	<0.00387	**0.276**	<0.00260	<0.00384	**0.134**	0.0147 J	<0.00341	<0.00412	<0.0106	<0.00398
	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-99	Apr-16		18.1	**4.29**		**0.498**	0.0129	**5.59**	<0.00260	0.629	**1.99**	**0.0656**	0.0843	0.0427 J	0.615	<0.00398
	MW-99	Oct-16		17.8 B	**2.26**		**0.343**	<0.00774	**5.08**	<0.00520	0.635	**2.45**	**0.0343 J**	0.108	0.190	**0.699**	**<0.00796**
	MW-99	Apr-17		14.4	**2.06**		**0.252**	0.0196 J	**2.79**	<0.0130	0.402	**4.65**	**<0.0500**	0.106	0.0860	0.522	**<0.0199**
	MW-99	Oct-17		10.4	**2.23**		**0.152**	<0.0387	**2.58**	<0.0260	0.146	**2.71**	**<0.100**	<0.0341	<0.0412	0.228 J	**<0.0398**
	MW-99	Apr-18		11.9	**1.52**		**0.168**	<0.0387	**2.15**	<0.0260	0.275	**2.99**	**<0.100**	0.0467 J	0.0896 J	0.332	**<0.0398**
	MW-99	Oct-18		11.9	**2.23**		**0.284**	<0.0387	**2.54**	<0.0260	0.201	**3.10**	**<0.100**	<0.0341	<0.0412	0.358	**<0.0398**
	MW-101	Apr-16		0.614	**5.84**		<0.000373	<0.000387	**0.0664 J6**	<0.000260	0.00176	**0.119**	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-101	Oct-16		0.208	**2.95**		<0.000373	<0.000387	0.000845 J	<0.000260	<0.000384	**0.104**	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-101	Apr-17		0.311	**3.72**		<0.000373	<0.000387	**0.00650**	<0.000260	0.000830 J	**0.107**	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-101	Oct-17		0.377	**5.50**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	**0.132**	<0.00100	<0.000341	0.000439 J	<0.00106	<0.000398
	MW-101	Apr-18		0.485 J	**3.21**		<0.000373	<0.000387	0.00149	<0.000260	<0.000384	0.0900	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-101	Oct-18		0.452	**5.05**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	**0.125**	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-102	Apr-16		26.2	**9.69**		**0.402**	**0.110**	**10.8**	<0.0260	**0.858**	**2.07**	**0.278 J**	0.0881 J	0.541	**0.632**	**<0.0398**
	MW-102	Oct-16		31.5	**14.8**		**0.337**	**0.0773 J**	**13.2**	<0.0260	**1.03**	**1.61**	**0.278 J**	0.0952 J	0.626	**0.719**	**<0.0398**
	MW-102	Apr-17		26.4	**11.9**		**0.291**	0.0282	**8.38**	<0.00520	**0.726**	**1.87**	**0.200**	0.0189 J	0.243	0.391	**<0.00796**
	MW-102	Oct-17		335	**18.1**		**0.278**	0.0413 J	**9.24**	<0.0130	**0.897**	**1.89**	**0.483**	0.0353 J	0.275	0.501	**<0.0199**
	MW-102	Apr-18		32.7	**34.6**		**0.288 J**	**<0.194**	**7.63**	**<0.130**	**0.903**	**1.19**	**<0.500**	<0.170	<0.206	<0.530	**<0.199**
	MW-102	Oct-18		41.8	**10.4**		**0.196 J**	**<0.194**	**12.9**	**<0.130**	0.648	**1.68**	**<0.500**	<0.170	0.889	<0.530	**<0.199**
	MW-103	Apr-15		4.15	**8.66**		0.0102	<0.000390	<0.000330	<0.000260	0.0879	0.000441 J	0.0220	0.00549	0.0154	0.0137	<0.000400
	MW-103	Apr-16		3.55	**7.35**		<0.00186	<0.00194	**1.35**	<0.00130	0.0508	<0.00184	0.0108 J	0.00422 J	0.0153 J	<0.00530	<0.00199
	MW-103	Apr-17		3.46	**6.94**		**<0.0186**	<0.0194	**1.30**	<0.0130	<0.0192	<0.0184	**<0.0500**	<0.0170	<0.0206	<0.0530	**<0.0199**
	MW-103	Apr-18		6.45	**6.23**		**<0.000373**	<0.000387	**1.75**	<0.000260	0.0384	<0.000367	**0.116**	0.00461	0.0408	0.0124	**<0.000398**
	MW-104	Apr-16		0.797	**2.23**		<0.000373	<0.000387	**0.0707**	<0.000260	0.00108	0.00130	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-104	Apr-16	FD	0.775	**2.19**		<0.000373	<0.000387	**0.0685**	<0.000260	0.00107	0.00120	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-104	Oct-16		1.35	**2.55**		<0.00186	<0.00194	**0.341**	<0.00130	0.00837	<0.00184	<0.00500	<0.00170	<0.00390	<0.00530	<0.00199
	MW-104	Oct-16	FD	1.26	**2.68**		<0.00186	<0.00194	**0.284**	<0.00130	0.00721	0.00509	<0.00500	<0.00170	<0.00390	<0.00530	<0.00199
	MW-104	Apr-17		1.66	**5.36**		<0.00373	<0.00387	**0.741**	<0.00260	0.0244	<0.00367	<0.0100	<0.00341	<0.00412	<0.0106	<0.00398
	MW-104	Apr-17	FD	2.41	**4.91**		0.00209 J	<0.00194	**0.529**	<0.00130	0.0168	0.0132	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-104	Oct-17		1.52	**5.42**		0.000544 J	<0.000387	**0.144**	<0.000260	0.00651	0.00837	0.00196 J	<0.000341	<0.000412	<0.00106	<0.000398
	MW-104	Oct-17	FD	1.36	**4.95**		<0.00186	<0.00194	**0.15**	<0.00130	0.00774	0.00820	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-104	Apr-18		1.40	**1.85**		<0.000373	<0.000387	**0.142**	<0.000260	0.000906 J	0.00320	0.00239 J	<0.000341	0.000415 J	<0.00106	<0.000398
	MW-104	Apr-18	FD	1.53	**1.80**		<0.00186	<0.00194	**0.139**	<0.00130	<0.00192	0.00393 J	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-104	Oct-18		1.44	**3.05**		<0.000373	<0.000387	**0.198**	<0.000260	0.00315	0.00661	0.00175 J	<0.000341	0.000463 J	<0.00106	<0.000398
	MW-104	Oct-18	FD	1.38	**2.87**		<0.00186	<0.00194	**0.186**	<0.00130	0.00316 J	0.00582	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	MW-105	Apr-16		33.6	**21.2**		**0.103 J**	**<0.0968**	**13.5**	<0.0650	**2.02**	<0.0918	**<0.250**	<0.0852	<0.195	0.379 J	**<0.0995**
	MW-105	Oct-16		43.7	**8.66**		**0.141**	<0.0387	**18.2**	<0.0260	**2.77**	<0.0367	**0.129 J**	<0.0341	<0.0780	**0.683**	**<0.0398**
	MW-105	Apr-17		33.9	**13.8**		**0.104**	<0.0387	**13.3**	<0.0260	**1.71**	<0.0367	**0.104 J**	<0.0341	<0.0412	0.446	**<0.0398**
	MW-105	Oct-17		24.0	**19.0**		**0.0964**	0.0250	**9.19**	<0.000260	**0.927**	0.0209	**0.0737**	<0.0341	0.0192	0.39	<0.000398
	MW-105	Apr-18		21.4	**11.4**		**0.0805 J**	<0.0387	**8.04**	<0.0260	0.517	<0.0367	**0.106 J**	<0.0341	<0.0412	0.304	**<0.0398**
	MW-105	Oct-18		17.7	**13.4**		**0.0751 J**	<0.0387	**6.29**	<0.0260	0.257	<0.0367	**<0.100**	<0.0341	<0.0412	0.277 J	**<0.0398**
	MW-106	Apr-16		23.9	**19.5**		**0.0824**	0.0114 J	**12.7**	<0.00650	0.0446	0.0580	**0.0442 J**	<0.00852	0.124 J	0.203	**<0.00995**
	MW-106	Oct-16		27.1	**21.8**		**0.126**	0.0219 J	**11.3**	<0.0130	0.0440 J	**0.109**	**0.0690 J**	<0.0170	0.146 J	0.297	**<0.0199**
	MW-106	Apr-17		21.4	**17.9**		**0.0853**	<0.0194	**9.71**	<0.0130	0.0301 J	0.0832	**<0.0500**	<0.0170	0.116	0.236	**<0.0199**
	MW-106	Oct-17		21.9	**22.2**		**0.0731**	<0.0194	**10.6**	<0.0130	0.0438 J	0.0949	**<0.0500**	<0.0170	0.272	0.195	**<0.0199**
	MW-106	Apr-18		25.9	**9.31**		**0.110 J**	**<0.0774**	**8.13**	<0.0520	0.0772 J	0.0813 J	**<0.200**	<0.0682	0.237	0.299 J	**<0.0796**
	MW-106	Oct-18		33.9	**11.2**		**<0.186**	**<0.194**	**11.6**	**<0.130**	<0.192	**<0.184**	**<0.500**	<0.170	0.250 J	<0.530	**<0.199**
	MW-107	Apr-16		4.89	**6.80**		0.00111	0.000591 J	**1.28**	<0.000260	0.00466	**2.44**	0.00773	0.00145	0.00399 J	0.00572	<0.000398
	MW-107	Oct-16		17.7	**7.24**		0.00205 J	<0.00194	**6.35**	<0.00130	0.0192	**3.05**	**0.0614**	0.00265 J	0.00800 J	0.0112 J	<0.00199
	MW-107	Apr-17		6.67	**7.91**		**<0.0186**	<0.0194	**3.37**	<0.0130	<0.0192	**2.78**	**0.0788 J**	<0.0170	<0.0206	<0.0530	**<0.0199**
	MW-107	Apr-18		21.6	**4.50**		**0.00228**	0.00425	**6.55**	<0.000260	0.0382	**3.02**	**0.143**	0.00279	0.0142	0.0159	**<0.000398**

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

2018 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	Ethyl-benzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
					ARC-GRO	ARC-TPH-D	ARC-TPH-D	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:	---	0.0398	0.0473	0.056	0.060	0.005	0.070	0.700	0.10	0.030	0.193	1.0	0.620	0.005
				CGWSL Source:		NMED TPH	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-109	Apr-16		1.93	**5.92**		0.00418 J	<0.00194	**0.532**	<0.00130	0.00864	<0.00184	<0.00500	<0.00170	0.00837 J	0.0142 J	<0.00199
	MW-109	Oct-16		2.12	**3.19**		<0.00746	<0.00774	**0.995**	<0.00520	0.0115 J	<0.00734	<0.0200	<0.00682	<0.0156	<0.0212	**<0.00796**
	MW-109	Apr-17		5.26	**5.78**		0.00751	<0.00387	**1.25**	<0.00260	0.0098 J	<0.00367	<0.0100	<0.00341	0.0172	0.0272 J	<0.00398
	MW-109	Oct-17		4.62	**6.74**		0.00547	0.00167	**1.30**	<0.000260	0.0124	<0.000367	0.00191 J	<0.000341	0.0182	0.0230	<0.000398
	MW-109	Apr-18		5.96	**2.84**		<0.00746	<0.00774	**1.54**	<0.00520	0.0122 J	<0.00734	<0.0200	<0.00682	0.0208	0.0257 J	**<0.00796**
	MW-109	Oct-18		6.56	**3.76**		<0.00746	<0.00774	**1.64**	<0.00520	0.0111 J	<0.00734	<0.0200	<0.00682	0.0204	0.0220 J	**<0.00796**
	MW-110	Apr-16		0.735	**1.55**		0.000871 J	0.000525 J	**0.0132**	<0.000260	0.000927 J	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-110	Oct-16		0.503	**1.00**		<0.000373	<0.000387	0.000511 J	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-110	Apr-17		2.69	**2.53**		0.0193	<0.00194	**0.299**	<0.00130	0.0262	<0.00184	<0.00500	<0.00170	0.00378 J	0.0161	<0.00199
	MW-110	Oct-17		0.379	**1.01**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-110	Apr-18		2.04	**1.27**		0.0445	0.00247	**0.173**	<0.000260	0.109	<0.000367	0.0135	0.000580 J	0.00447	0.0582	<0.000398
	MW-110	Oct-18		0.377	**0.774**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RA-313	Apr-15					<0.000370	<0.000390	0.000366 J	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	RA-313	Apr-16					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	RA-313	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-313	Apr-18					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	RW-4	Apr-15			**3.72**		<0.000370	<0.000390	**0.0167**	<0.000260	0.00245	0.0902	<0.00100	<0.000340	<0.000780 J	<0.00110	<0.000400
	RW-4R	Apr-16			**5.03**		<0.000373	<0.000387	**0.0140**	<0.000260	<0.000384	**0.191**	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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-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	0.15	<0.000398
	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**
South RO Reject Field	MW-114	Apr-16		<0.0314	0.0317 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-114	Oct-16		<0.0314	**0.0410 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-114	Apr-17		<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-17		<0.0314	**0.0650 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	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-115	Apr-16		<0.0314	**0.0616 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-115	Oct-16		<0.0314	**0.0582 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-115	Apr-17		<0.0314	**0.0657 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-17		<0.0314	**0.109**		<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-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-116	Apr-16		<0.0314	**0.112**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-116	Oct-16		<0.0314	**0.0868 J**		0.000389 J	<0.000387	0.000536 J	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-116	Apr-17		<0.0314	**0.0549 J**		<0.000373	<0.000387	0.000430 J	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-116	Oct-17		<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-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
TEL	MW-49	Apr-16		1.75	**8.63**		0.0305	<0.000387	**0.196**	<0.00520	<0.00768	0.0535	<0.0200	<0.00682	<0.0156	0.0540 J	**<0.00796**
	MW-49	Oct-16		2.82	**9.26**		0.0457 J	<0.0387	**0.241**	<0.0260	<0.0384	0.0628 J	**<0.100**	<0.0341	<0.0780	<0.106	**<0.0398**
	MW-49	Apr-17		2.65	**7.62**		0.0409	0.00628 J	**0.227**	<0.00260	0.00427 J	0.0811	<0.0100	<0.00341	<0.00412	0.0564	<0.00398
	MW-49	Oct-17		3.45	**8.36**		**0.118**	0.0225	**0.573**	<0.00520	0.0184 J	0.0712	<0.0200	<0.00682	0.0109 J	0.195	**<0.00796**
	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**
	TEL-1	Apr-16		0.153	**8.51**		0.000807 J	<0.000387	<0.000331	<0.000260	0.000718 J	0.00229	<0.00100	0.00160	0.000793 J	0.00160 J	<0.000398
	TEL-1	Oct-16		0.193	**3.58**		0.000939 J	<0.000387	<0.000331	<0.000260	0.000666 J	0.000724 J	<0.00100	0.00183	<0.000780	0.00183 J	<0.000398
	TEL-1	Apr-17		0.285	**9.45**		0.00050 J	<0.000387	0.000647 J	<0.000260	0.000506 J	0.00231	<0.00100	0.000572 J	0.000539 J	<0.00106	<0.000398
	TEL-1	Oct-17		0.467	**12.7**		0.00219	0.000626 J	<0.000331	<0.000260	0.00119	0.00285	<0.00100	0.00319	0.00203	0.00488	<0.000398
	TEL-1	Apr-18		0.415	**8.29**		0.000848 J	<0.000387	<0.000331	<0.000260	0.000482 J	0.00337	<0.00100	0.00136	0.000872 J	0.00223 J	<0.000398
	TEL-1	Oct-18		0.381	**8.36**		<0.00186	<0.00194	<0.00166	<0.00130	<0.00192	0.00255 J	<0.00500	<0.00170	<0.00206	<0.00530	<0.00199
	TEL-2	Apr-16		3.12	**18.1**		**0.125**	0.0143	**0.709**	<0.000260	0.00692	0.0156	0.00966	0.0102	0.0243	0.146	<0.000398
	TEL-2	Oct-16		3.08	**17.0**		**0.0976**	0.00929 J	**0.962**	<0.00260	0.00418 J	0.0110	<0.0100	0.00660 J	0.0218 J	0.123	<0.00398
	TEL-2	Apr-17		3.02	**14.8**		**0.0706**	0.00599 J	**0.556**	<0.00260	<0.00384	0.0104	<0.0100	0.00370 J	0.00914 J	0.0874	<0.00398
	TEL-2	Oct-17		2.51	**22.8**		**0.108**	<0.00387	**0.590**	<0.00260	<0.00384	0.00964 J	<0.0100	<0.00341	0.0143	0.101	<0.00398
	TEL-2	Apr-18		3.84	**16.7**		**0.0855**	0.00503 J	**0.619**	<0.00260	<0.00384	0.00795 J	<0.0100	<0.00341	0.0134	0.0962	<0.00398
	TEL-2	Oct-18		5.19	**14.8**		**0.115**	0.0165 J	**0.936**	<0.00650	0.0121 J	<0.00918	<0.0250	<0.00852	0.0209 J	0.123	**<0.00995**
	TEL-3	Apr-16		1.05	**14.1**		0.0128 J	<0.00968	**0.317**	<0.00650	<0.00960	0.0445	<0.0250	<0.00852	<0.0195	<0.0265	**<0.00995**
	TEL-3	Oct-16		0.589	**4.22**		0.0157	0.00115	**0.0123**	<0.000260	0.000539 J	0.00109	0.00107 J	0.00232	0.00119 J	0.0105	<0.000398
	TEL-3	Apr-17		0.716	**5.32**		0.0163	0.000748 J	**0.0799**	<0.000260	0.000764 J	0.00327	<0.00100	0.00192	0.00219	0.0102	<0.000398
	TEL-3	Apr-18		2.05	**7.42**		0.0200	0.000983 J	**0.392**	<0.000260	0.00162	0.0637	<0.00100	0.00313	0.00394	0.0219	<0.000398
	TEL-4	Apr-16		2.36	**9.13**		**0.142**	<0.00387	**0.530**	<0.00260	0.0160	**0.105**	<0.0100	<0.00341	0.0132 J	0.142	<0.00398
	TEL-4	Apr-16	FD	2.65	**8.65**		**0.147**	<0.00387	**0.557**	<0.00260	0.0161	0.0945	<0.0100	<0.00341	0.0128 J	0.147	<0.00398
	TEL-4	Oct-16		2.52	**6.36**		**0.0775**	<0.00387	**0.514**	<0.00260	<0.00384	0.0415	<0.0100	<0.00341	<0.00780	0.0668	<0.00398
	TEL-4	Oct-16	FD	2.72	**6.66**		**0.105**	<0.00387	**0.479**	<0.00260	<0.00384	0.0476	<0.0100	<0.00341	<0.00780	0.0863	<0.00398
	TEL-4	Apr-17		1.25	**8.44**		0.0287	<0.00387	**0.0595**	<0.00260	<0.00384	0.0522	<0.0100	<0.00341	<0.00412	0.0243 J	<0.00398
	TEL-4	Apr-17	FD	1.29	**8.00**		0.0352	<0.000387	**0.0583**	<0.000260	0.000616 J	0.0492	<0.00100	0.000606 J	0.00218	0.0287	<0.000398
	TEL-4	Oct-17		1.53	**10.0**		0.0387	<0.000387	**0.0161**	<0.000260	0.000587 J	0.0975	<0.00100	0.000782 J	0.00131	0.0269	<0.000398
	TEL-4	Oct-17	FD	1.77	**9.67**		0.0343	<0.000387	**0.0149**	<0.000260	0.000497 J	0.0874	<0.00100	0.000684 J	0.00118	0.0242	<0.000398
	TEL-4	Apr-18		1.32	**3.99**		0.00454	<0.000387	**0.0415**	<0.000260	<0.000384	0.0670	<0.00100	<0.000341	0.00124	0.00408	<0.000398
	TEL-4	Apr-18	FD	1.16	**4.24**		0.00438	<0.000387	**0.0405**	<0.000260	<0.000384	0.0671	<0.00100	<0.000341	0.00126	0.00401	<0.000398
	TEL-4	Oct-18		0.815	**1.15**		0.00321	<0.000387	0.00285	<0.000260	<0.000384	0.00101	<0.00100	<0.000341	<0.000412	0.00185 J	<0.000398
	TEL-4	Oct-18	FD	0.737	**1.18**		0.00395	<0.000387	0.00289	<0.000260	<0.000384	0.000874 J	<0.00100	<0.000341	<0.000412	0.00221 J	<0.000398
TMD	MW-8	Apr-15		<0.0310	**0.380**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-8	Apr-16		<0.0314	**0.230**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-8	Apr-17		0.585	**0.238**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.00228	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-8	Apr-18		0.0561 J	**0.112**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0388	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-16	Apr-14			**0.0580**		<0.00050	<0.000600	<0.000600	<0.00060	<0.000500	<0.000600	<0.000700	<0.000500	<0.000500	<0.00150	<0.000500
	MW-16	Apr-15			**0.340**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100 J	<0.000340	<0.000780	<0.00110	<0.000400
	MW-16	Apr-17			**0.275**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-16	Apr-18			**0.189**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-20	Apr-15			**0.150**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-20	Apr-16			**0.149**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-20	Apr-17			**0.280**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-20	Apr-18			**0.0810 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-21	Apr-16		<0.0314	**0.190**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0101	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-21	Oct-16		<0.0314	**0.132**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0112	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-21	Apr-17		0.0721 J	**0.169**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0149	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-21	Oct-17		0.0416 J	**0.106**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0180	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-21	Apr-18		0.0452 J	**0.0542 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0382	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-21	Oct-18		0.0645 J	**0.0958 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	0.0695	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-25	Apr-15			**0.690**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100 J	<0.000340	<0.000780	<0.00110	<0.000400
	MW-25	Apr-16			**0.348**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-25	Apr-17			**0.107**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100 J4	<0.000341	<0.000412	<0.00106	<0.000398
	MW-25	Apr-18			0.0327 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-26	Apr-15			**0.0530 J**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-26	Apr-16			**0.103**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-26	Apr-17			**0.0773 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-26	Apr-18			**0.0492 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398

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

2018 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	Ethyl-benzene	MTBE	Naphthalene	o-Xylene	Toluene	Total Xylenes	TCE
					ARC-GRO	ARC-TPH-D	ARC-TPH-D	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:	---	0.0398	0.0473	0.056	0.060	0.005	0.070	0.700	0.10	0.030	0.193	1.0	0.620	0.005
				CGWSL Source:		NMED TPH	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**															
TMD	MW-27	Apr-15			**0.110**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-27	Apr-16			**0.134**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-27	Apr-17			**0.0992 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-27	Apr-18			**0.0537 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-46R	Apr-16			**0.0622 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-46R	Oct-16			**0.0459 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-46R	Apr-17			**0.0889 J**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-46R	Oct-17			0.0327 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-46R	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-46R	Oct-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-68	Apr-15			**0.130**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-68	Apr-16			**0.162**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	MW-68	Apr-17			**0.138**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	MW-68	Apr-18			**0.0508 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-15			**0.0930 J**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	MW-71	Apr-16			0.0252 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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-89	Apr-15			**2.40**		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100 J	0.000538 J	<0.000780	<0.00110	<0.000400
	MW-89	Apr-16			**3.38**		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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
	NP-1	Apr-16					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	**0.213**	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NP-1	Oct-16					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	**0.283**	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	NP-1	Apr-17					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	**0.391**	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	NP-1	Oct-17					<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	**0.407**	<0.00100	<0.000341	<0.000412	<0.00106	<0.000398
	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-2	Apr-13		<0.0500	**<0.0520**		<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-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 J	<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
Upgradient	UG-1	Apr-15		<0.0310	<0.0250 B		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	UG-1	Apr-16		<0.0314	0.0302 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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-2	Apr-15		<0.0310	<0.0250 B		<0.00050	<0.000600	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	UG-2	Apr-16		<0.0314	**0.0692 J**		<0.000370	<0.000390	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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-3R	Apr-15		<0.0310	<0.0250 B		<0.000370	<0.000390	<0.000330	<0.000260	<0.000380	<0.000370	<0.00100	<0.000340	<0.000780	<0.00110	<0.000400
	UG-3R	Apr-16		<0.0314	<0.0247		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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-4	Apr-16		<0.0314	0.0349 J		<0.000373	<0.000387	<0.000331	<0.000260	<0.000384	<0.000367	<0.00100	<0.000341	<0.000780	<0.00106	<0.000398
	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

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, March 2017, Table 6-4 TPH Groundwater Screening Levels
TCE	Trichloroethene
TPH	Total Petroleum Hydrocarbons
USEPA TW	United States Environmental Protection Agency Tap Water Screening Level, "Regional Screening Levels (RSL) Summary Table", November 2017
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.
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.

Table 4B - Summary of Groundwater Analytical Data - Total Metals

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Total Metals													
				Analyte:	Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
					7440-38-2	7440-39-3	7440-42-8		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
				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:	0.010	2.00	0.75	0.005	0.050	0.050	1.00	0.015	0.200	0.002	0.200	0.050	0.030	0.0631
				CGWSL Source:	WQCC HH	WQCC HH	WQCC Irr	WQCC HH	WQCC Irr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	WQCC HH	NMED TW
Area	**Well ID**	**Date**	**Dup**															
Cross-Gradient	KWB-13	Apr-15			**0.0118**	0.122				0.0182	**12.3**	**0.0190**	**0.399**	<0.0000490	0.0144	0.0110		0.0426
	KWB-13	Apr-16			0.00484 J	0.0459	0.384	<0.00500	0.00161 J	0.00621 J	**4.00**	0.00403 J	0.0747	<0.0000490	<0.00175	0.0188	0.0261 J	0.0304
	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
	MW-17	Apr-14			<0.00200	0.0152				<0.00200	<0.100	0.00724 J	<0.00500			0.0104		
	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		
	RA-3156	Apr-14													<0.00500			
	RA-3156	Apr-16																
	RA-3156	Apr-17																
	RA-3156	Apr-18																
	MW-136	Apr-16			0.00280 J	0.0270	0.695	<0.00500	0.00132 J	<0.00270	0.599	<0.00120	0.0591	<0.0000490	<0.00350	0.0112	**0.0702**	0.0197 J
	MW-136	Oct-16			0.00284	0.0134	0.512	<0.000160	0.000279 J	0.00118 JB	0.0892 JB	0.000940 JB	0.0112 B	<0.0000490	0.00184 JB	0.00562	**0.0720**	0.0176
	MW-136	Apr-17			0.00237	0.0117	0.588	<0.000160	<0.000260	<0.000540	0.0262 J	<0.000240	0.00602	<0.0000490	0.00102 J	0.00563	**0.0664**	0.0171
	MW-136	Oct-17			0.00239	0.0144	0.724	<0.000160	0.000362 J	0.000794 J	0.193	0.000313 J	0.0209	<0.0000490	0.00157 J	0.00608	**0.0729**	0.0181
	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
Evaporation Ponds	MW-1R	Apr-15			0.00366 J	0.0240 J				<0.00270	**3.49**	<0.00120	**2.14 J**			<0.00190		
	MW-1R	Apr-16			0.00917 J	0.0301				0.0188	**9.67**	<0.00120	**2.94**			<0.00190		
	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-2A	Apr-16			**0.0154**	0.0228 J				<0.00270	**3.37**	<0.00120	**2.50**			0.00432 J		
	MW-2A	Oct-16			0.00798	0.0208				0.00105 J	0.146	<0.000240	**1.43**			0.000560 J		
	MW-2A	Apr-17			0.00923	0.0188				0.000757 J	**3.02**	<0.000240	**1.43**			0.00105 J		
	MW-2A	Oct-17			0.00731	0.0164				<0.000540	0.578	<0.000240	**0.788**			0.00128 J		
	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-3	Apr-16			**0.0388**	0.0175 J				<0.00270	0.677	<0.00120	**2.61**			0.00580 J		
	MW-3	Apr-16	FD		**0.0348**	0.0168 J				<0.00270	0.612	<0.00120	**2.62**			0.00575 J		
	MW-3	Oct-16			**0.0550**	0.0152				0.000868 J	**1.82**	0.000241 JB	**1.60**			0.00258		
	MW-3	Oct-16	FD		**0.0553**	0.0152				0.000869 J	**1.75**	0.000692 JB	**1.60**			0.00263		
	MW-3	Apr-17			**0.0213**	0.0140				<0.000540	0.532	0.000306 J	**0.945**			0.00303		
	MW-3	Apr-17	FD		**0.0228**	0.0148				0.000571 J	0.718	0.000272 J	**1.10**			0.00386		
	MW-3	Oct-17			**0.0520**	0.0153				0.000568 J	**2.00**	0.000425 J	**1.15**			0.00335		
	MW-3	Oct-17	FD		**0.0519**	0.0148				0.00107 J	**1.99**	0.000243 J	**1.20**			0.00399		
	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-4A	Apr-16			**0.188**	0.0125 J				<0.00270	**3.21**	<0.00120	**2.39**			<0.00190		
	MW-4A	Oct-16			**0.172**	0.0121				0.000815 J	**1.08**	0.000566 JB	**1.69**			0.000608 J		
	MW-4A	Apr-17			**0.172**	0.0123				<0.000540	**2.34**	0.000274 J	**1.91**			0.000665 J		
	MW-4A	Oct-17			**0.100**	0.0143				<0.000540	**2.22**	<0.000240	**1.95**			0.000494 J		
	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-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-5A	Apr-16			**0.213**	0.0149 J				<0.00270	**8.10**	<0.00120	**1.34**			<0.00190		
	MW-5A	Oct-16			**0.0638**	0.0117				<0.000540	**4.19**	0.000445 JB	**1.73**			0.000606 J		
	MW-5A	Apr-17			**0.149**	0.0135				<0.000540	**6.69**	<0.000240	**1.15**			0.000824 J		
	MW-5A	Oct-17			**0.216**	0.0153				<0.000540	**8.41**	<0.000240	**0.811**			0.00119 J		
	MW-5A	Apr-18			**0.187**	0.0124				<0.000540	**8.07**	0.000629 J	**1.15**			0.00121 J		
	MW-5A	Oct-18			**0.196**	0.0137 J				<0.000540	**6.17**	<0.00120	**0.946**			0.00100 J		
	MW-5B	Apr-13			**0.122**	<0.0250				<0.0250	<1.00	**<0.0250**	**2.44**			<0.0250		
	MW-5B	Apr-15			**0.201**	0.0112 J				0.00277 J	**6.11**	<0.00120	**3.87**			0.00197 J		
	MW-5B	Apr-17			**0.154**	0.0115				<0.000540	**4.61**	<0.000240	**3.32**			0.00139 J		
	MW-5C	Apr-13			**0.0139**	0.0166				<0.0100	**1.04**	<0.0100	**0.943**			<0.0100		
	MW-5C	Apr-15			**0.0145**	0.0200 J				<0.00270	**1.15**	<0.00120	**0.975**			<0.00190		
	MW-5C	Apr-17			**0.0113**	0.0237				<0.000540	**1.09**	0.000287 J	**0.918**			<0.000380		
	MW-6A	Apr-15			**0.0129**	0.0308				<0.00270	0.155 J	<0.00120	**1.40**			0.0308		
	MW-6A	Apr-16			0.00953 J	0.0158 J				<0.00270	0.0787 J	<0.00120	**0.505**			<0.00190		
	MW-6A	Apr-17			**0.0105**	0.0135				<0.000540	0.193	0.000366 J	**0.385**			0.000910 J		
	MW-6A	Apr-18			0.00960	0.0132				0.00136 JB	0.275 B	0.000553 J	**0.301**			0.000614 J		
	MW-6B	Mar-13			**0.0493**	0.0139				<0.00500	**1.54**	<0.00500	**2.39**			<0.00500		
	MW-6B	Mar-13	FD		**0.0537**	0.0163				<0.00500	**1.69**	<0.00500	**2.43**			<0.00500		
	MW-6B	Apr-15			**0.0333**	0.0164				<0.00110	**1.37**	<0.000480	**3.45**			<0.000760		
	MW-6B	Apr-17			**0.0115**	0.0134				<0.000540	0.149	<0.000240	**0.889**			<0.000380		
	MW-7A	Apr-16			**0.0382**	0.0170 J				0.00370 J	**6.35**	<0.00120	**0.682**			<0.00190		
	MW-7A	Apr-16	FD		**0.0305**	0.0158 J				<0.00270	**4.43**	<0.00120	**0.588**			<0.00190		
	MW-7A	Oct-16			**0.0181**	0.0173				0.00184 J	**1.66**	0.000527 JB	**0.563**			0.000402 J		
	MW-7A	Oct-16	FD		**0.0186**	0.0159				0.00184 J	**1.66**	0.000618 JB	**0.563**			0.000507 J		
	MW-7A	Apr-17			**0.0182**	0.0148				0.000819 J	**3.20**	<0.000240	**0.530**			0.000425 J		
	MW-7A	Apr-17	FD		**0.0195**	0.0154				0.000720 J	**3.07**	<0.000240	**0.521 V**			<0.000380		
	MW-7A	Oct-17			**0.0278**	0.0211				0.00136 J	**4.76**	0.000335 J	**0.509**			<0.000380		
	MW-7A	Oct-17	FD		**0.0286**	0.0168				0.00128 J	**4.82**	<0.000240	**0.522**			<0.000380		
	MW-7A	Apr-18			**0.0348**	0.0162				0.00319	**5.95**	0.000534 J	**0.483**			0.000393 J		
	MW-7A	Apr-18	FD		**0.0298**	0.0164				0.00109 J	**5.05**	0.000599 J	**0.481**			<0.000380		
	MW-7A	Oct-18			**0.0311**	0.0163 J				0.00129 J	**4.69**	<0.00120	**0.449**			<0.000380		
	MW-7A	Oct-18	FD		**0.0316**	0.0179				0.000814 J	**4.52**	0.000623 JB	**0.480**			0.000485 J		
	MW-7B	Apr-13			**<0.0250**	<0.0250				<0.0250	<1.00	**<0.0250**	**0.397**			<0.0250		
	MW-7B	Apr-15			0.00588	0.0111				0.000702 J	0.188	<0.000240	**0.580**			<0.000380		
	MW-7B	Apr-17			0.00397	0.0111				<0.000540	0.146	<0.000240	**0.472**			<0.000380		
	MW-10	Apr-16			**0.0196**	0.0123 J				<0.00270	<0.0750	<0.00120	**2.83**			<0.00190		
	MW-10	Oct-16			**0.0191**	0.0184				<0.000540	0.589	0.000399 JB	**2.21**			<0.000380		
	MW-10	Apr-17			**0.0156**	0.0118				<0.000540	0.0992 J	0.000290 J	**2.24**			0.000483 J		
	MW-10	Oct-17			**0.0156**	0.0110				<0.000540	0.147	<0.000240	**2.74**			<0.000380		
	MW-10	Apr-18			**0.0161**	0.0188				0.000870 J	0.632	0.00180 J	**2.62**			0.000478 J		
	MW-10	Oct-18			**0.0153**	0.0109 J				<0.000540	0.114	<0.00120	**2.70**			0.000472 J		
	MW-11A	Apr-16			<0.00125	0.0301				0.00353 J	0.416 J	<0.00120	**0.876 V**			<0.00190		
	MW-11A	Oct-16																
	MW-11A	Apr-17			0.00056 J	0.0306				0.00121 J	0.804	<0.000240	**0.758**			<0.000380		
	MW-11A	Oct-17																
	MW-11A	Apr-18			0.00046 J	0.0321				0.00104 J	**1.02**	0.00146 JB	**0.294**			<0.000380		
	MW-11A	Oct-18																
	MW-11B	Mar-13			**<0.0250**	<0.0250				<0.0250	**3.25**	**<0.0250**	**0.316**			<0.0250		
	MW-11B	Apr-15			0.00453 J	0.0189 J				<0.00540	**4.38**	<0.00240	**0.427**			<0.00380		
	MW-11B	Apr-17			0.00420	0.0189				<0.000540	**4.59**	<0.000240	**0.374**			<0.000380		
	MW-12	Apr-14			<0.00500	0.0194				<0.00500	0.441 J	<0.00140	0.200			0.0172 J		
	MW-13	Apr-14			0.00205 J	0.0310				<0.00200	<0.100	<0.00140	0.192			<0.00200		
	MW-15	Apr-15			**0.0279**	0.0236 J				<0.00270	<0.0750	<0.00120	**0.861**			0.0195		
	MW-15	Apr-16			**0.0216**	0.0203 J				<0.00270	<0.0750	<0.00120	**0.887**			0.00201 J		
	MW-15	Apr-17			**0.0130**	0.0180				<0.000540	0.0239 B	<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		

Table 4B - Summary of Groundwater Analytical Data - Total Metals

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Total Metals														
				Analyte:	Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
					7440-38-2	7440-39-3	7440-42-8		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
				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:	0.010	2.00	0.75	0.005	0.050	0.050	1.00	0.015	0.200	0.002	0.200	0.050	0.030	0.0631
				CGWSL Source:	WQCC HH	WQCC HH	WQCC Irr	WQCC HH	WQCC Irr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	WQCC HH	NMED TW
Area	**Well ID**	**Date**	**Dup**															
Evaporation Ponds	MW-18A	Apr-16			0.00644 J	0.0155 J	**3.14**	<0.00500	<0.00130	<0.00270	0.358 J	<0.00120	**0.366**	<0.0000490	0.0121 J	<0.00190	**0.0417 J**	0.00258 J
	MW-18A	Oct-16			0.00411	0.0166	**2.73**	<0.000160	<0.000260	<0.000540	0.722	<0.000240	**0.576**	<0.0000490	0.00618	0.000448 J	**0.0375**	0.00128 J
	MW-18A	Apr-17			0.00466	0.0152	**2.04**	<0.000160	<0.000260	<0.000540	0.637	<0.000240	**0.723**	<0.0000490	0.00762	0.000491 J	**0.0305**	0.000435 J
	MW-18A	Oct-17			0.00600 J	0.0173 J	**2.53**	<0.000800	0.00282 J	<0.000540	**1.47**	<0.00120	**2.05**	<0.0000490	0.00793 J	<0.00190	**0.0302 J**	<0.000900
	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-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-22A	Apr-16			**0.0449**	0.0174 J				<0.00270	**4.42**	<0.00120	**6.06**			<0.00190		
	MW-22A	Apr-16	FD		**0.0455**	0.0167				<0.00270	**4.46**	<0.00120	**6.20**			<0.00190		
	MW-22A	Oct-16			**0.0452**	0.0179				0.000678 J	**5.41**	<0.000240	**7.28**			0.000938 J		
	MW-22A	Oct-16	FD		**0.0447**	0.0183				0.000633 J	**5.26**	<0.000240	**7.15**			0.000874 J		
	MW-22A	Apr-17			**0.0411**	0.0161				<0.000540	**6.07**	0.000354 J	**5.82**			0.000886 J		
	MW-22A	Apr-17	FD		**0.0412**	0.0155				0.000813 J	**6.33**	<0.000240	**6.41**			0.000774 J		
	MW-22A	Oct-17			**0.0427**	0.0167				0.0233	**4.91**	0.000434 J	**6.34**			0.000800 J		
	MW-22A	Oct-17	FD		**0.0432**	0.0158				0.000695 J	**4.94**	<0.000240	**6.52**			0.000858 J		
	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-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-70	Apr-16			**0.0238**	0.0147 J				<0.00270	**6.19**	<0.00120	**0.543**			<0.00190		
	MW-70	Oct-16			**0.0189**	0.0162				<0.000540	**4.69**	<0.000240	**0.381**			<0.000380		
	MW-70	Apr-17			**0.0156**	0.0149				<0.000540	**2.19**	<0.000240	**0.440**			<0.000380		
	MW-70	Oct-17			**0.0180**	0.0159 J				<0.000540	**4.58**	<0.00120	**0.272**			<0.00190		
	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-72	Apr-15			**0.149**	0.0321				<0.00270	**32.3**	<0.00120	**3.05**			0.0155		
	MW-72	Apr-16			**0.0318**	0.0195 J				<0.00270	**7.20**	<0.00120	**4.86**			<0.00190		
	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-73	Apr-15			**0.0757**	0.00999 J				<0.00270	**2.40**	<0.00120	**2.61**			0.00233 J		
	MW-73	Apr-16			**0.0990**	0.0114 J				<0.00270	**8.28**	<0.00120	**3.17**			0.00201 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-74	Apr-16			**0.136**	0.0151 J				<0.00270	0.756	<0.00120	**2.19**			0.0150		
	MW-74	Oct-16			**0.0699**	0.0147				0.00120 J	0.203 B	<0.000240	0.0907			**0.585**		
	MW-74	Apr-17			**0.0672**	0.0132				<0.000540	0.0369 J	<0.000240	**1.04**			**0.156**		
	MW-74	Oct-17			**0.0696**	0.0146				<0.000540	0.0463 J	<0.000240	**1.05**			**0.144**		
	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-75	Apr-16			**0.183**	0.0218 J				<0.00270	**2.52**	<0.00120	**1.01**			0.00310 J		
	MW-75	Oct-16			**0.275**	0.0150				0.00156 J	**3.29**	<0.000240	**0.916**			0.00245		
	MW-75	Apr-17			**0.220**	0.0174				<0.000540	**3.39**	<0.000240	**0.828**			0.00229		
	MW-75	Oct-17			**0.296**	0.0159				0.00133 J	**3.58**	0.000323 J	**0.834**			0.00196 J		
	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-76	Apr-16			**0.0610**	0.0140 J				<0.00270	**4.68**	<0.00120	**1.07**			0.00298 J		
	MW-76	Oct-16			**0.0818**	0.0163				0.00266	**6.79**	<0.000240	**1.25**			0.00582		
	MW-76	Apr-17			**0.0561**	0.0120				<0.000540	**4.06**	<0.000240	**0.780**			0.00327		
	MW-76	Oct-17			**0.0594**	0.0134				0.00185 J	**3.93**	<0.000240	**0.741**			0.00399		
	MW-76	Apr-18			**0.0549**	0.0166				0.00166 JB	**3.51**	<0.000240	**0.688**			0.00321		
	MW-76	Oct-18			**0.0718**	0.0714				0.00888	**7.39**	0.00261 JB	**0.737**			0.00404		
	MW-77	Apr-16			**0.0749**	0.0136 J				0.0132	**12.2**	<0.00120	**0.687**			0.0137		
	MW-77	Oct-16			**0.0505**	0.0120 JB				0.00899 J	**7.87**	<0.00120	**0.706**			0.00996 J		
	MW-77	Apr-17			**0.0466**	0.0100				0.00752	**7.88**	<0.000240	**0.521**			0.0106		
	MW-77	Apr-18			**0.0431**	0.00992				0.00946	**5.64**	0.000745 J	**0.540**			0.00983		
	MW-78	Apr-15			**0.0211**	0.0318				**0.133**	**12.3**	<0.00120	**1.29**			0.0156		
	MW-78	Apr-16			**0.0210**	0.0445				**0.0761**	**14.8**	<0.00120	**0.946**			0.0141		
	MW-78	Apr-17			0.00820	0.0388				0.0422	0.469	<0.000240	**0.435**			0.00957		
	MW-78	Apr-18			0.0100	0.0459				**0.142**	0.185 B	0.000249 J	0.198			0.0119		
	MW-79	Apr-16			**0.0113**	0.0181 J				<0.00270	0.882	<0.00120	**3.00**			<0.00190		
	MW-79	Oct-16			**0.0208**	0.0184				<0.000540	**5.37**	<0.000240	**3.68 V**			<0.000380		
	MW-79	Apr-17			0.00521	0.0166				<0.000540	0.150	<0.000240	**1.11 V**			0.000569 J		
	MW-79	Oct-17			0.00441	0.0178				<0.000540	0.751	<0.000240	**3.82**			<0.000380		
	MW-79	Apr-18			0.00536	0.0160				0.000558 JB	0.0528 JB	<0.000240	**0.227**			0.000902 J		
	MW-79	Oct-18			0.00332	0.0179				<0.000540	0.114	<0.000240	**2.69**			0.000411 J		
	MW-80	Apr-15			**0.0187**	0.0151 J				<0.00270	**1.73**	<0.00120	**0.555**			<0.00190		
	MW-80	Apr-16			0.00788 J	0.0185 J				0.0465	**1.34**	<0.00120	**0.234**			<0.00190		
	MW-80	Apr-17			0.00643	0.0173				0.00138 J	0.160	<0.000240	**0.598**			0.00218		
	MW-80	Apr-18			0.00302	0.0110				0.00109 JB	0.139 B	<0.000240	0.129			0.00111 J		
	MW-81	Apr-15			**0.0220**	0.0131 J				<0.00270	0.183 J	<0.00120	0.132			0.0235		
	MW-81	Apr-16			**0.0300**	0.0212 J				<0.00270	0.136 J	<0.00120	0.106			0.0467		
	MW-81	Apr-17			**0.0157**	0.0144				<0.000540	<0.0150	0.000248 J	0.0117			0.0182		
	MW-81	Apr-18			0.00875	0.0154				0.000676 JB	<0.0150	0.000245 J	0.0200			0.00666		
	MW-82	Apr-15			**0.0929**	0.0302				0.00570 J	**1.68**	<0.00120	**1.38**			0.00302 J		
	MW-82	Apr-16			**0.0510**	0.0387				<0.00270	0.414 J	<0.00120	**1.76**			0.00199 J		
	MW-82	Apr-17			**0.0468**	0.0273				0.00182 J	0.792	0.000744 J	**2.02**			0.00137 J		
	MW-82	Apr-18			**0.0297**	0.0260				0.00125 J	0.0904 JB	0.000271 J	**2.00**			0.00146 J		
	MW-83	Apr-16			**0.0313**	0.0248 J				0.0153	**5.63**	<0.00120	**0.573**			0.00364 J		
	MW-83	Oct-16			**0.0131**	0.121				0.00973	**1.85**	0.00141 JB	**0.434**			0.00925		
	MW-83	Apr-17			**0.0236**	0.0387				0.0224	**8.80**	0.00153 J	**0.570**			0.00556		
	MW-83	Oct-17			**0.0237**	0.0457				0.0338	**5.69**	0.00154 J	**0.460**			0.00446		
	MW-83	Apr-18			**0.0562**	0.0316				0.0137	**4.08**	0.00133 J	**0.342**			0.00218		
	MW-83	Oct-18			**0.0343**	0.0365				0.0477	**7.25**	0.00814	**0.472**			0.0124		
	MW-84	Apr-16			**0.115**	0.0173 J				0.00771 J	**1.27**	<0.00120	**3.30**			0.00714 J		
	MW-84	Oct-16			**0.0981**	0.0189				0.00917	0.868	<0.000240	**2.71**			0.0110		
	MW-84	Apr-17			**0.0798**	0.0132				0.000849 J	0.439	0.000346 J	**2.28**			0.00527		
	MW-84	Oct-17			**0.151**	0.0133				0.00353	**6.03**	<0.000240	**2.90**			0.00432		
	MW-84	Apr-18			**0.0904**	0.0126				0.00224	**1.30**	<0.000240	**2.66**			0.00438		
	MW-84	Oct-18			**0.150**	0.0135				0.00213	**8.01**	0.000288 J	**2.83**			0.00367		
	MW-87	Apr-16			**0.0106**	0.0200 JO1				<0.00270	**4.56**	<0.00120	**2.70 V**			<0.00190		
	MW-87	Oct-16			0.00673	0.0179				<0.000540	**1.53**	<0.000240	**0.731**			<0.000380		
	MW-87	Apr-17			0.00551	0.0155				<0.000540	**1.52**	<0.000240	**1.62**			<0.000380		
	MW-87	Oct-17			0.00776 J	0.0174 J				<0.000540	**1.71**	0.00473 J	**1.48**			<0.00190		
	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-88	Apr-16			0.00976 J	0.0107 J				<0.00270	<0.0750	<0.00120	**0.844**			<0.00190		
	MW-88	Oct-16			0.00911	0.0104				0.000551 J	<0.0150	<0.000240	**0.976**			<0.000380		
	MW-88	Apr-17			0.00709	0.0101				<0.000540	<0.0150	<0.000240	**0.819**			<0.000380		
	MW-88	Oct-17			0.00742	0.0113				<0.000540	0.0458 J	0.000315 J	**0.823**			<0.000380		
	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		

Table 4B - Summary of Groundwater Analytical Data - Total Metals

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Total Metals														
				Analyte:	Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
					7440-38-2	7440-39-3	7440-42-8		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
				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:	0.010	2.00	0.75	0.005	0.050	0.050	1.00	0.015	0.200	0.002	0.200	0.050	0.030	0.0631
				CGWSL Source:	WQCC HH	WQCC HH	WQCC Irr	WQCC HH	WQCC Irr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	WQCC HH	NMED TW
Area	**Well ID**	**Date**	**Dup**															
Evaporation Ponds	MW-120	Apr-16			**0.0138**	0.0176 J				<0.00270	**7.32**	<0.00120	**2.14**			0.00511 J		
	MW-120	Oct-16			**0.0135**	0.0194				<0.000540	**5.90**	<0.000240	**1.96**			<0.000380		
	MW-120	Apr-17			**0.0106**	0.0144				<0.000540	**4.54**	0.000345 J	**1.48**			0.00251		
	MW-120	Oct-17			**0.0112**	0.0160				0.000571 J	**4.59**	<0.000240	**1.49**			0.000531 J		
	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** O1	0.000327 J	**1.35** O1V			<0.000380		
	MW-121	Apr-16			**0.0443**	0.0179 J				<0.00270	0.530	<0.00120	**3.56**			0.00777 J		
	MW-121	Oct-16			**0.0377**	0.0130				<0.000540	0.262	<0.000240	**2.33**			0.00746		
	MW-121	Apr-17			**0.0322**	0.0128				<0.000540	0.304	<0.000240	**2.66**			0.00468		
	MW-121	Oct-17			**0.0345**	0.0136				<0.000540	0.221	<0.000240	**2.40**			0.00788		
	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-122	Apr-16			0.00444 J	0.0291				<0.00270	0.610	<0.00120	**1.50**			<0.00190		
	MW-122	Oct-16			0.00559	0.0272				<0.000540	**5.20**	<0.000240	**1.61**			<0.000380		
	MW-122	Apr-17			0.00519	0.0300				<0.000540	**2.02**	<0.000240	**2.03**			0.000551 J		
	MW-122	Oct-17			0.00559	0.0231				<0.000540	**5.01**	<0.000240	**1.28**			<0.000380		
	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-123	Apr-16			**0.0275**	0.0242 J				<0.00270	<0.0750	<0.00120	**2.92**			<0.00190		
	MW-123	Oct-16			**0.0226**	0.0236				<0.000540	0.0599 J	0.000364 JB	**2.59**			<0.000380		
	MW-123	Apr-17			**0.0231**	0.0213 O1				<0.000540	0.0684 B	<0.000240	**2.59**			0.000395 J		
	MW-123	Oct-17			**0.0221**	0.0239				<0.000540	<0.0150	<0.000240	**2.88**			<0.000380		
	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-124	Apr-16			0.00477 J	0.0288				<0.00270	**4.08**	<0.00120	**0.749**			<0.00190		
	MW-124	Oct-16			0.00303	0.0323				0.00124 J	**4.99**	0.000546 JB	**0.469**			<0.000380		
	MW-124	Apr-17			0.00565	0.0205				<0.000540	**10.6**	<0.000240	**0.448**			<0.000380		
	MW-124	Oct-17			0.00354 J	0.0219 J				<0.000540	**5.08**	<0.00120	**0.521**			<0.00190		
	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 O1				<0.000540	**4.05**	0.000355 JB	**0.527**			<0.000380		
	OCD-1R	Apr-16			0.00729 J	0.0141 J				**0.105**	**1.54**	<0.00120	**0.462**			0.00420 J		
	OCD-1R	Oct-16			0.00524	0.0286				0.00312	**3.04**	<0.000240	**3.92**			0.000543 J		
	OCD-1R	Apr-17			0.00319	0.0150				0.00119 J	0.275 B	<0.000240	**1.27**			0.000988 J		
	OCD-1R	Oct-17			0.00433	0.0192				0.000885 J	0.830	0.000662 J	**1.56**			0.000822 J		
	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-2A	Apr-16			0.00640 J	0.0209 J				0.00304 J	**5.47**	<0.00120	**1.66**			<0.00190		
	OCD-2A	Oct-16			0.00234	0.0264				0.000783 J	**1.50**	0.000260 J	**0.535**			<0.000380		
	OCD-2A	Apr-17			0.00591	0.0213				<0.000540	**6.76**	<0.000240	**1.22**			<0.000380		
	OCD-2A	Oct-17			0.00323	0.0197				<0.000540	**3.74**	<0.000240	**0.966**			<0.000380		
	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-3	Apr-16			0.00389 J	0.0214 J				<0.00270	**1.23**	<0.00120	0.0524			<0.00190		
	OCD-3	Oct-16			0.00422	0.0228				<0.000540	**2.31**	<0.000240	**0.527**			<0.000380		
	OCD-3	Apr-17			0.00141 J	0.0207				<0.000540	0.681	<0.000240	0.0337			<0.000380		
	OCD-3	Oct-17			**0.0104**	0.0255				0.000587 J	**5.44**	<0.000240	**0.770**			<0.000380		
	OCD-3	Apr-18			0.00258	0.0219				<0.000540	**1.82**	0.000364 JB	**0.412**			<0.000380		
	OCD-3	Oct-18			0.00175 J	0.0184				<0.000540	**1.36**	0.000312 JB	**0.248**			<0.000380		
	OCD-4	Apr-16			0.00209 J	0.0226 J				<0.00270	0.855	<0.00120	0.119			<0.00190		
	OCD-4	Oct-16			0.00374	0.0255				<0.000540	**3.46**	<0.000240	**0.285**			<0.000380		
	OCD-4	Apr-17			0.00227	0.0219				<0.000540	**2.00**	<0.000240	0.0669			<0.000380		
	OCD-4	Oct-17			**0.0105**	0.0248				<0.000540	**10.0**	<0.000240	**0.270**			<0.000380		
	OCD-4	Apr-18			0.00167 J	0.0223				0.00361	**1.15**	<0.000240	0.0438			0.000780 J		
	OCD-4	Oct-18			0.00318	0.0278				0.00118 J	**2.31**	0.000457 JB	**0.323**			<0.000380		
	OCD-5	Apr-16			**0.0126**	0.0279				<0.00270	**15.4**	0.00177 J	**0.267**			<0.00190		
	OCD-5	Oct-16			0.00863	0.0288				0.000559 J	**9.09**	<0.000240	**0.295**			<0.000380		
	OCD-5	Apr-17			**0.0108**	0.0269				<0.000540	**17.0**	<0.000240	**0.343**			<0.000380		
	OCD-5	Oct-17			**0.0124**	0.0261				0.000602 J	**12.6**	<0.000240	**0.271**			<0.000380		
	OCD-5	Apr-18			0.00513	0.0257				<0.000540	**4.65**	<0.000240	0.182			<0.000380		
	OCD-5	Oct-18			0.00753	0.0255				<0.000540	**6.56**	<0.00120	**0.262**			0.000417 J		
	OCD-6	Apr-16			**0.0139**	0.0214 J				<0.00270	**2.39**	<0.00120	**2.22**			<0.00190		
	OCD-6	Oct-16			**0.0120**	0.0253				0.000759 JB	**1.82**	0.000501 JB	**2.61**			0.00090 J		
	OCD-6	Apr-17			0.00911	0.0222				<0.000540	**2.28**	<0.000240	**2.09**			0.000598 J		
	OCD-6	Oct-17			**0.0200**	0.0256				<0.000540	**11.4**	<0.000240	**2.29**			<0.000380		
	OCD-6	Apr-18			0.00951	0.0203				<0.000540	**2.17**	<0.000240	**2.26**			0.000743 J		
	OCD-6	Oct-18			**0.0125**	0.0262				<0.000540	**6.45**	0.000466 J	**2.35**			<0.000380		
	OCD-7AR	Apr-16			**0.150**	0.0145 J				<0.00270	**2.89**	<0.00120	**2.25**			0.00195 J		
	OCD-7AR	Oct-16			**0.169**	0.0151				0.000837 J	**10.3**	<0.000240	**2.92**			0.00178 J		
	OCD-7AR	Apr-17			**0.113**	0.0134				<0.000540	**1.77**	<0.000240	**2.14**			0.00141 J		
	OCD-7AR	Oct-17			**0.181**	0.0150				<0.000540	**10.9**	<0.000240	**2.69**			0.00160 J		
	OCD-7AR	Apr-18			**0.110**	0.0133				0.00180 JB	**1.42**	0.000318 J	**2.49**			0.00181 J		
	OCD-7AR	Oct-18			**0.124**	0.0156				<0.000540	**9.57**	0.000362 J	**2.98**			0.00153 J		
	OCD-7B	Mar-13			<0.00500	0.0160				<0.00500	<0.200	<0.00500	0.0246			<0.00500		
	OCD-7B	Apr-15			0.00294 J	0.0196 J				<0.00270	**3.52**	<0.00120	**0.710**			<0.00190		
	OCD-7B	Apr-17			0.00194 J	0.0179				<0.000540	**2.73**	<0.000240	**0.621**			<0.000380		
	OCD-8A	Apr-16			**0.0618**	0.0199 J	**0.813**	<0.00500	<0.00130	<0.00270	**8.89**	<0.00120	**3.80**	<0.0000490	0.0306	<0.00190	<0.00165	0.00190 J
	OCD-8A	Oct-16			**0.0616**	0.0213	**0.776**	<0.000160	0.00124 J	0.000710 J	**6.60**	0.000478 JB	**3.08**	<0.0000490	0.0260	0.000984 J	0.00108 J	0.000745 J
	OCD-8A	Apr-17			**0.0632**	0.0177	**0.837**	<0.000160	0.00103 J	<0.000540	**6.72**	<0.000240	**2.91**	<0.0000490	0.0246	0.000793 J	0.00102 J	0.000626 J
	OCD-8A	Oct-17			**0.0857**	0.0196	**0.888**	<0.000160	0.00180 J	0.000994 J	**7.29**	<0.000240	**3.25**	<0.0000490	0.0230	0.000961 J	0.000983 J	0.00103 J
	OCD-8A	Apr-18			**0.0847**	0.0174	**0.770**	<0.000160	0.000833 J	<0.000540	**6.63**	0.000279 J	**3.85**	0.000103 J	0.0234	0.00112 J	0.000801 J	0.000500 J
	OCD-8A	Oct-18			**0.101**	0.0358	**0.853**	<0.000800	0.00489	0.00233	**11.2**	0.00152 JB	**3.52**	0.000139 J	0.0279	0.00141 J	<0.00165	0.00359 J
	OCD-8B	Apr-13			**<0.0250**	<0.0250				<0.0250	<1.00	**<0.0250**	**0.417**			<0.0250		
	OCD-8B	Apr-15			**0.0126**	0.0141				0.000872 J	0.239	0.000392 J	**5.98**			0.000525 J		
	OCD-8B	Apr-17			0.00912	0.0124				<0.000540	0.266	0.000256 J	**6.36**			<0.000380		
Field East of Refinery	KWB-1A	Apr-16			0.00401 J	0.0131 J	0.741	<0.00500	0.0122	<0.00270	<0.0750	<0.00120	**0.552**	<0.0000490	0.0100	0.00528 J	0.0247 J	0.0258
	KWB-1A	Oct-16			0.00296	0.00944	0.608 O1V	<0.000160	0.0143	0.00127 JB	0.0845 JB	0.000408 J	**0.500**	<0.0000490	0.00846	0.00106 J	0.0188	0.0204
	KWB-1A	Apr-17			0.00319	0.00857	0.706	<0.000160	0.00583	<0.000540	<0.0150	<0.000240	**0.447**	<0.0000490	0.00881	0.00164 J	0.0232	0.0221
	KWB-1A	Oct-17			0.00342	0.00856	0.745	<0.000160	0.00612	<0.000540	<0.0150	<0.000240	**0.413**	<0.0000490	0.00841	0.000912 J	0.0174	0.0237
	KWB-1A	Apr-18			0.00344	0.00777	**0.759**	<0.000160	0.00513	<0.000540	<0.0150	0.000342 J	**0.379**	<0.0000490	0.00815	0.000859 J	0.0197	0.0209
	KWB-1A	Oct-18			0.00263 J	0.00840	0.734	<0.000160	0.00583 J	<0.00270	<0.0750	<0.00120	**0.394**	0.000132 J	0.00823 J	<0.00190	0.0153 J	0.0210 J
	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-7	Apr-15			**0.0200**	0.0645				0.000832 J	**1.44**	0.000625 J	**5.65**	<0.0000490	0.00901	<0.000380		0.00133 J
	KWB-7	Oct-15			0.00939	0.0647				<0.000540	**1.04**	<0.000240	**4.09**	<0.0000490	0.00442	<0.000380		0.00182 J
	KWB-7	Apr-16			**0.0104**	0.0550	0.503	<0.00500	0.00739 J	<0.00270	**1.42**	<0.00120	**3.48**	<0.0000490	0.0121	<0.00190	0.00299 J	0.00196 J
	KWB-7	Oct-16			0.00597	0.0560	0.455	<0.000160	0.00298	<0.000540	0.677	0.000441 J	**3.04**	<0.0000490	0.0107	<0.000380	0.00286 J	0.000901 J
	KWB-7	Apr-17			0.00307	0.0650	0.436	<0.000160	0.00206	<0.000540	**1.47**	0.000707 J	**3.44**	<0.0000490	0.00746	<0.000380	0.00159 J	0.00102 J
	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			0.00037 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-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 J6	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

Table 4B - Summary of Groundwater Analytical Data - Total Metals

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Total Metals													
				Analyte:	Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
					7440-38-2	7440-39-3	7440-42-8		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
				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:	0.010	2.00	0.75	0.005	0.050	0.050	1.00	0.015	0.200	0.002	0.200	0.050	0.030	0.0631
				CGWSL Source:	WQCC HH	WQCC HH	WQCC Irr	WQCC HH	WQCC Irr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	WQCC HH	NMED TW
Area	Well ID	Date	Dup															
Field East of Refinery	KWB-10R	Apr-16			**0.0226**	**4.31**				<0.00270	**7.43**	0.00131 J	0.199			<0.00190		
	KWB-10R	Oct-16			**0.0301**	0.816				0.000798 JB	**6.11**	0.00102 J	0.161			<0.000380		
	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-16			0.00231 J	0.00508	0.502	<0.00500	0.00175 J	<0.00270	<0.0750	0.00851 J	**0.222**	<0.0000490	0.00476 J	0.00852 J	**0.0326 J**	0.0118 J
	KWB-11A	Oct-16			0.00220	0.0227	0.449	<0.000160	0.00194 J	<0.000540	<0.0150	0.00525	**0.212**	<0.0000490 J3J6O1	0.00476 B	0.00529	0.0217	0.0102
	KWB-11A	Apr-17			0.00183 J	0.0214	0.412	<0.000160	0.00126 J	<0.000540	<0.0150	0.00281	**0.243**	<0.0000490	0.00431	0.00536	0.0187	0.0113
	KWB-11A	Oct-17			0.00890	0.0190	0.502	<0.000160	0.00470	<0.000540	0.100	0.00271	**0.325**	<0.0000490	0.00598	0.00200 J	0.0127	0.00608
	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-11B	Apr-16			<0.00125	0.0135 J	0.173 JJ6O1	<0.00500	<0.00130	<0.00270	0.121 J	<0.00120	0.00188 J	<0.0000490	<0.00175	0.00949 J	0.00987 J	0.00814 J
	KWB-11B	Oct-16			0.00109 J	0.0116	0.105	<0.000160	<0.000260	<0.000540	<0.0150	<0.000240	0.000800 J	<0.0000490 J3	0.000559 JB	0.00701	0.0101	0.00727
	KWB-11B	Apr-17			0.00126 J	0.0138	0.121	<0.000160	<0.000260	<0.000540	<0.0150	<0.000240	0.000954 J	<0.0000490	<0.000350	0.00959	0.0113	0.00846
	KWB-11B	Oct-17			0.00133 J	0.0127	0.133 J	<0.000160	<0.000260	0.000977 J	0.0153 J	<0.000240	0.00153 J	<0.0000490	0.00144 J	0.00907	0.0112	0.00864
	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-12A	Apr-15			0.00160 J	0.0168				0.00164 J	0.269	0.000780 J	0.00353 J	<0.0000490	0.000930 J	0.00435		0.0108
	KWB-12A	Apr-15	FD		0.00145 J	0.0138				<0.000540	<0.0150	<0.000240	0.000251 J	<0.0000490	0.000503 J	0.00375		0.0100
	KWB-12A	Oct-15			0.00242	0.0170				0.000659 J	0.0285 J	<0.000240	0.000862 J	<0.0000490	0.000959 J	0.00368		0.0139
	KWB-12A	Apr-16			0.00162 J	0.0164 J	0.695	<0.00500	<0.00130	<0.00270	<0.0750	<0.00120	<0.00125	<0.0000490	<0.00175	0.00370 J	**0.0331 J**	0.0132 J
	KWB-12A	Oct-16			0.00159 J	0.0156	0.481	<0.000160	<0.000260	0.00159 JB	<0.0150	0.000256 J	<0.000250	<0.0000490 J3	0.000739 J	0.00360	0.0288	0.0110
	KWB-12A	Apr-17			0.00149 J	0.0157	0.492	<0.000160	<0.000260	<0.000540	<0.0150	<0.000240	0.00213 J	<0.0000490	<0.000350	0.00372 B	0.0260	0.0112
	KWB-12A	Oct-17			0.00142 J	0.0144	0.593	<0.000160	<0.000260	<0.000540	<0.0150	<0.000240	0.000334 J	<0.0000490	0.000495 J	0.00334	0.0252	0.0127
	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-12B	Apr-16			0.00178 J	0.0130 J	0.712	<0.00500	<0.00130	<0.00270	<0.0750	<0.00120	0.00441 J	<0.0000490	<0.00175	0.00307 J	**0.0302 J**	0.0125 J
	KWB-12B	Apr-16	FD		0.00165 J	0.0116 J	0.651	<0.00500	<0.00130	<0.00270	<0.0750	<0.00120	0.00434 J	<0.0000490	<0.00175	0.00301 J	0.0282 J	0.0117 J
	KWB-12B	Oct-16			0.00159 J	0.0101	0.464	<0.000160	<0.000260	0.00136 JB	0.0358 J	<0.000240	0.00955	<0.0000490 J3	0.000824 J	0.00248	0.0263	0.0112
	KWB-12B	Oct-16	FD		0.00161 J	0.0108	0.533	<0.000160	<0.000260	0.00147 JB	0.0369 J	0.000299 J	0.0104	<0.0000490 J3	0.000703 J	0.00295	0.0265	0.0114
	KWB-12B	Apr-17			0.00157 J	0.00901	0.525	<0.000160	<0.000260	<0.000540	<0.0150	<0.000240	0.00232 J	<0.0000490	<0.000350	0.00382 B	0.0273	0.0122
	KWB-12B	Apr-17	FD		0.00167 J	0.00968	0.558	<0.000160	<0.000260	<0.000540	0.0486 J	<0.000240	0.00129 J	<0.0000490	0.000513 JB	0.00356	**0.0307**	0.0127
	KWB-12B	Oct-17			0.00159 J	0.00870	0.616	<0.000160	<0.000260	0.000543 J	0.0534 J	<0.000240	0.00158 J	<0.0000490	0.000457 J	0.00346	0.0264 J	0.0127
	KWB-12B	Oct-17	FD		0.00169 J	0.00878	0.629	<0.000160	<0.000260	<0.000540	0.0374 J	<0.000240	0.00122 J	<0.0000490	0.000453 J	0.00298	0.0273	0.0122
	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-P4	Apr-13																
	KWB-P4	Apr-15																
	KWB-P4	Apr-17																
	MW-57	Apr-16			0.00654 J	0.0344				0.00322 J	0.881	0.00266 J	**0.378**			0.0131		
	MW-57	Oct-16			0.00564	0.0253				0.000798 JB	0.559	0.000516 J	0.104			0.0169		
	MW-57	Apr-17			0.00502	0.0202				<0.000540	0.353	0.000515 J	**0.278**			0.0231		
	MW-57	Oct-17			0.00391	0.0176				0.000652 J	0.0996 J	<0.000240	0.0323			0.0171		
	MW-57	Apr-18			0.00550	0.0169				<0.000540	0.120 B	0.000325 JB	**0.481**			0.0140 B		
	MW-57	Oct-18			0.00512	0.0170				0.000612 J	0.209	<0.000240	0.0900			0.0120		
	MW-58	Apr-16			**0.0135**	0.744	0.518	<0.00500	<0.00130	<0.00270	**1.06**	0.00297 J	**0.391**	<0.0000490	<0.00175	0.00524 J	<0.00165	0.00259 J
	MW-58	Oct-16			0.00683	0.915	0.455	<0.000160	0.000318 J	0.00108 JB	**1.01**	0.00234	0.114	<0.0000490 J3	0.00133 J	<0.000380	<0.000330	0.00451 J
	MW-58	Apr-17			**0.0115**	0.716	0.453	<0.000160	<0.000260	<0.000540	0.521	0.00218	**0.333**	<0.0000490	0.000637 J	<0.000380	<0.000330	0.00233 J
	MW-58	Oct-17			0.00648	1.15	0.471	<0.000160	<0.000260	<0.000540	0.385	0.00204	**0.319**	<0.0000490	0.00129 J	<0.000380	<0.00165	0.00422 J
	MW-58	Apr-18			0.00453	1.35	0.511	<0.000160	<0.000260	<0.000540	**1.54**	0.00185 J	**0.210**	<0.0000490	0.00105 J	<0.000380	<0.000330	0.00270 J
	MW-58	Oct-18			0.00336	1.29	0.348	<0.000160	<0.000260	0.000567 J	0.721	0.00167 J	**0.335**	<0.0000490	0.000975 J	<0.000380	0.000458 J	0.00305 J
	MW-111	Apr-16			**0.0131**	0.0926				<0.00270	**6.67**	<0.00120	**1.66**			<0.00190		
	MW-111	Oct-16			**0.0108**	0.0757				0.000976 JB	**6.14**	0.000310 J	**1.41**			<0.000380		
	MW-111	Apr-17			**0.0127**	0.0697				<0.000540	**6.15**	<0.000240	**1.57**			<0.000380		
	MW-111	Oct-17			0.00926	0.0714				<0.000540	**7.15**	<0.000240	**1.45**			<0.000380		
	MW-111	Apr-18			**0.0137**	0.0620				<0.000540	**6.30**	<0.000240	**1.68**			0.000847 J		
	MW-111	Oct-18			0.00849 J	0.0674				<0.00270	**6.39**	<0.00120	**1.42**			<0.00190		
	MW-113	Apr-16			0.00282 J	0.0251				<0.00270	0.270 J	<0.00120	**0.734**			<0.00190		
	MW-113	Apr-16	FD		0.00306 J	0.0289				<0.00270	0.347 J	<0.00120	**0.823**			<0.00190		
	MW-113	Oct-16			0.00138 J	0.0249				<0.000540	**1.17 O1**	<0.000240	**1.36 O1V**			<0.000380		
	MW-113	Oct-16	FD		0.00125 J	0.0245				<0.000540	**1.13**	<0.000240	**1.37**			<0.000380		
	MW-113	Apr-17			0.00284	0.0257				<0.000540	0.512	<0.000240	**1.08**			<0.000380		
	MW-113	Apr-17	FD		0.00285	0.0244				<0.000540	0.480	<0.000240	**1.05**			<0.000380		
	MW-113	Oct-17			0.00138 J	0.0253				<0.000540	0.764	<0.000240	**1.14**			0.000401 J		
	MW-113	Oct-17	FD		0.00140 J	0.0235				<0.000540	0.774	0.000324 J	**1.19**			<0.000380		
	MW-113	Apr-18			0.00199 J	0.0212				0.00154 J	0.454	<0.000240	**0.856**			<0.000380		
	MW-113	Apr-18	FD		0.00257	0.0245				0.00532 B	0.550	<0.000240	**0.892**			<0.000380		
	MW-113	Oct-18			0.00240	0.0200				<0.000540	0.487	<0.000240	**1.06 V**			<0.000380		
	MW-113	Oct-18	FD		0.00265	0.0228				<0.000540	0.522	0.000639 JB	**1.15**			<0.000380		
	MW-125	Apr-16			0.00408 J	0.00922 J				<0.00270	<0.0750	<0.00120	**0.438**			0.00410 J		
	MW-125	Oct-16			0.00383	0.00806				0.000898 JB	<0.0150	<0.000240	**0.370**			0.00253		
	MW-125	Apr-17			0.00336	0.00822				<0.000540	<0.0150	<0.000240	**0.374**			0.00962		
	MW-125	Oct-17			0.00386	0.0153				0.00253	0.0228 J	<0.000240	**0.329**			0.00635		
	MW-125	Apr-18			0.00440	0.00924				<0.000540	0.0793 J	<0.000240	**0.393**			0.00275		
	MW-125	Oct-18			0.00334	0.00858				<0.000540	<0.0150	<0.000240	**0.390**			0.00238		
	MW-126A	Apr-16			0.00222	0.0174				<0.00270	0.803	<0.00120	**0.797**			<0.00190		
	MW-126A	Oct-16			0.00257	0.0109				<0.000540	0.299	<0.000240	**0.371**			<0.000380		
	MW-126A	Apr-17			0.00171 J	0.0157				<0.000540	0.602	<0.000240	**0.821**			<0.000380		
	MW-126A	Oct-17			0.00118 J	0.0133				<0.000540	0.485	<0.000240	**0.651**			<0.000380		
	MW-126A	Apr-18			0.00200 J	0.0170				<0.000540	0.653	0.000242 J	**0.851**			<0.000380		
	MW-126A	Oct-18			0.00135 J	0.0153				0.00132 J	0.537	<0.000480	**0.642**			<0.000760		
	MW-126B	Apr-16			0.00430 J	0.0133 J				<0.00270	0.170 J	<0.00120	0.0744			0.00285 J		
	MW-126B	Oct-16			0.00404	0.00919				<0.000540	0.0351 J	<0.000240	0.0539			0.00133 J		
	MW-126B	Apr-17			0.00367	0.0101				<0.000540	0.0356 J	<0.000240	0.0612			0.00207		
	MW-126B	Oct-17			0.00360	0.0100				0.000749 J	0.0330 J	0.000777 J	0.0547			0.00256		
	MW-126B	Apr-18			0.00339	0.00918				<0.000540	<0.0150	<0.000240	0.0516			0.00364		
	MW-126B	Oct-18			0.00387 J	0.00911				0.00139 J	<0.0300	<0.00120	0.0593			0.00383 J		
	MW-127	Apr-16			0.00535 J	0.137				<0.00270	0.357 J	<0.00120	0.103			<0.00190		
	MW-127	Oct-16			0.00453	0.0797				<0.000540	0.296	<0.000240	0.101			<0.000380		
	MW-127	Apr-17			0.00383	0.0718				<0.000540	0.187	<0.000240	0.0940			<0.000380		
	MW-127	Oct-17			**0.0114**	0.212				0.00109 J	**1.39**	0.000965 J	0.135			<0.000380		
	MW-127	Apr-18			0.00381	0.0682				0.00370 B	0.144 B	<0.000240	0.106			<0.000380		
	MW-127	Oct-18			0.00439	0.0589				<0.00108	0.0981 J	<0.000480	0.121			<0.000760		
	MW-128	Apr-16			**0.341**	0.372				0.00347 J	**15.4**	0.00336 J	**12.9**			<0.00190		
	MW-128	Oct-16			**0.0643**	0.0676				0.00182 JB	**3.12**	0.00222	**2.11**			<0.000380		
	MW-128	Apr-17			**0.0583**	0.0621				0.000580 J	**2.98**	0.00114 J	**2.09**			0.00973		
	MW-128	Oct-17			**0.0554**	0.0610				0.000618 J	**3.07**	0.000404 J	**2.09**			0.00122 J		
	MW-128	Apr-18			**0.0566**	0.0728				0.00278	**4.19**	0.00257 B	**2.04**			0.000436 JB		
	MW-128	Oct-18			**0.0447**	0.0604				<0.000540	**2.40**	0.000261 J	**1.78 O1V**			<0.000380		
	MW-129	Apr-16			**0.0272**	0.593				<0.00270	**5.49**	<0.00120	**1.10**			<0.00190		
	MW-129	Oct-16			**0.0236**	0.607				0.000625 JB	**4.79**	0.000529 J	**1.00**			<0.000380		
	MW-129	Apr-17			**0.0226**	0.627				<0.000540	**5.10**	<0.000240	**0.987**			<0.000380		
	MW-129	Apr-18			**0.0252**	0.516				<0.000540	**5.42**	<0.000240	**1.01**			<0.000380		

Table 4B - Summary of Groundwater Analytical Data - Total Metals

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Total Metals													
				Analyte:	Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
					7440-38-2	7440-39-3	7440-42-8		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
				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:	0.010	2.00	0.75	0.005	0.050	0.050	1.00	0.015	0.200	0.002	0.200	0.050	0.030	0.0631
				CGWSL Source:	WQCC HH	WQCC HH	WQCC Irr	WQCC HH	WQCC Irr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	WQCC HH	NMED TW
Area	**Well ID**	**Date**	**Dup**															
Field East of Refinery	MW-130	Apr-16		0.00449 J	0.0228 J				<0.00270	0.451 J	<0.00120	0.105			0.00575 J		
	MW-130	Oct-16		0.00403	0.0188				0.000869 JB	0.104	<0.000240	0.0891			0.00675		
	MW-130	Apr-17		0.00391	0.0198				<0.000540	0.0756 J	<0.000240	0.0972			0.0101		
	MW-130	Oct-17		0.00374	0.0179				<0.000540	0.0360 J	<0.000240	0.0918			0.00852		
	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-131	Apr-15		**0.0220**	**2.67**				0.000747 J	**2.34**	0.000919 J	**0.316**			<0.000380		
	MW-131	Oct-15		**0.0261**	**2.88**				0.00371	**4.71**	0.00294	**0.337**			<0.000380		
	MW-131	Apr-16		**0.0222**	**2.67**				<0.00270	**1.46**	<0.00120	**0.305**			<0.00190		
	MW-131	Oct-16		**0.0207**	**2.69**				<0.000540	**1.34**	<0.000240	**0.285**			<0.000380		
	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-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-16		0.00566 J	0.0112 J				<0.00270	<0.0750	0.00131 J	0.0102 J			0.00812 J		
	MW-134	Apr-16	FD	0.00555 J	0.00895 J				<0.00270	0.0767 J	<0.00120	0.0110 J			0.00711 J		
	MW-134	Oct-16		0.00511	0.00827				0.00158 JB	0.0181 JB	<0.000240	0.00886			0.00647		
	MW-134	Oct-16	FD	0.00475	0.00833				0.00148 JB	0.0293 JB	0.000513 J	0.00817			0.00416		
	MW-134	Apr-17		0.00453	0.00963				<0.000540	<0.0150	<0.000240	0.00801			0.00537		
	MW-134	Apr-17	FD	0.00464	0.00877				0.000611 J	<0.0150	<0.000240	0.00808			0.00572		
	MW-134	Oct-17		0.00432	0.00942				0.000691 J	<0.0150	<0.000240	0.00999			0.00743		
	MW-134	Oct-17	FD	0.00445	0.0100				0.000840 J	0.0489 J	<0.000240	0.0109			0.00554		
	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-135	Apr-16		**0.0216**	0.303				0.0130	**5.54**	0.00566 J	**0.225**			**0.128**		
	MW-135	Oct-16		0.00394	0.0397				0.00149 JB	0.598	0.000686 J	0.0324			0.0368		
	MW-135	Apr-17		0.00324	0.0221				<0.000540	0.339	0.000499 J	0.0187			0.0361		
	MW-135	Oct-17		0.00339	0.0249				0.00166 J	0.526	0.000498 J	0.0229			0.0341		
	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		
	RA-4196	Apr-16															
	RA-4196	Oct-16															
	RA-4196	Apr-17															
	RA-4196	Oct-17															
	RA-4196	Apr-18															
	RA-4196	Oct-18															
	RA-4798	Apr-16															
	RA-4798	Oct-16															
	RA-4798	Apr-17															
	RA-4798	Oct-17															
	RA-4798	Apr-18															
	RA-4798	Oct-18															
	RW-12R	Apr-16		<0.00125	0.0512				0.0453	0.213 J	0.00204 J	**0.547**			<0.00740		
	RW-12R	Apr-17		0.0005 J	0.0409				0.0359	0.241	0.00193 J	**0.398**			<0.000380		
	RW-12R	Apr-18		0.00029 J	0.0387				0.00973	0.0459 J	0.00104 J	**0.718**			0.000554 J		
	RW-13R	Apr-16		0.00922 J	0.0165				<0.00270	0.572	<0.00120	**1.26**					
	RW-13R	Apr-18		0.00084 J	0.0475				0.00357	0.349	0.000602 J	**0.985**			0.00161 J		
	RW-18	Apr-15		0.00379	0.0105				0.000703 J	<0.0150	<0.000240	<0.000250			0.00988		
	RW-18	Apr-16		0.00400 J	0.0124 J				<0.00270	<0.0750	<0.00120	<0.00125			0.00436 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-20	Apr-15		0.00375 J	0.527				<0.00270	**1.75**	0.00354 J	**0.872**			<0.00190		
	RW-22	Apr-15		0.00248	0.816				0.00320	0.140	0.00397	**0.845**			0.00234		
North Refinery	MW-23	Apr-16		**0.0113**	**12.8**				<0.00270	0.456 J	**0.0186**	0.105			<0.00190		
	MW-23	Oct-16		0.00776	**12.0**				0.00711	**1.89**	**0.0334**	0.184			0.00190 J		
	MW-23	Apr-17		0.00608	**9.82**				0.000789 J	0.0552 J	0.00296	0.0653			0.00287		
	MW-23	Oct-17		0.00636	**10.5**				0.00108 J	0.0413 J	**0.0172**	0.0662			0.00939		
	MW-23	Apr-18		0.00511	**9.72**				0.000601 JB	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-29	Apr-16		<0.00125	0.0182 J				<0.00270	<0.0750	<0.00120	**0.485**			0.0141		
	MW-29	Oct-16		0.00165 J	0.0156				0.000619 JB	0.0168 J	0.000465 J	**0.374**			0.000713 J		
	MW-29	Apr-17		0.00052 J	0.0156				<0.000540	0.0276 J	<0.000240	**0.436** V			<0.000380		
	MW-29	Oct-17		0.00193 J	0.0161				<0.000540	0.0193 J	<0.000240	**0.382**			0.000672 J		
	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-39	Apr-16		**0.0195**	0.0209 J				0.00407 J	0.0932 J	0.00124 J	0.0161 J			0.0192		
	MW-39	Oct-16		**0.0274**	0.0145				0.00128 JB	0.0160 J	0.000867 J	0.0211			0.00146 J		
	MW-39	Apr-17		**0.0135**	0.0192				0.00275	0.101	0.00157 J	0.0113			0.00268		
	MW-39	Oct-17		**0.0148**	0.0158				0.00186 J	0.0837 J	0.000906 J	0.0169			0.00410		
	MW-39	Apr-18		**0.0110**	0.0159				0.00126 JB	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-40	Apr-15		0.00122 J	0.0336				<0.00270	0.345 J	0.00213 J	0.0398			<0.00190		
	MW-40	Apr-16		0.00154 J	0.0392				<0.00270	0.512	0.00311 J	0.0321			<0.00190		
	MW-40	Apr-17		0.00079 J	0.0249				<0.000540	0.0151 J	0.000660 J	0.0241			**0.0704**		
	MW-40	Apr-18		0.00066 J	0.0227				0.000593 JB	0.0289 J	0.000415 J	0.0161			<0.000380		
	MW-41	Apr-15		0.00591 J	0.0203 J				<0.00270	0.136 J	<0.00120	**1.01**			<0.00190		
	MW-41	Apr-16		0.00578 J	0.0210 J				<0.00270	<0.0750	<0.00120	**0.888**			<0.00190		
	MW-41	Apr-17		0.00391	0.0154				<0.000540	0.0429 J	0.000578 J	**0.737**			0.00229		
	MW-41	Apr-18		0.00729	0.0206				<0.000540	0.0230 J	0.000304 J	**1.03**			0.000470 J		
	MW-42	Apr-15		0.00935 J	0.0242 J				<0.00270	0.136 J	<0.00120	0.171			0.00393 J		
	MW-42	Apr-16		0.00814 J	0.0274				<0.00270	0.182 J	<0.00120	0.197			<0.00190		
	MW-42	Apr-17		0.00486	0.0182				<0.000540	<0.0150	0.000252 J	0.177			0.00222		
	MW-42	Apr-18		0.00477	0.0206				<0.000540	0.0216 J	0.000406 J	0.123			<0.000380		
	MW-43	Apr-16		**0.0106**	0.251	**1.78**	<0.000800	<0.00130	<0.00270	0.163 J	0.00151 J	**0.274**	<0.0000490	0.00625 J	**0.205**	<0.00165	0.00455 J
	MW-43	Oct-16		0.00946	0.0772	**1.36**	<0.000160	<0.000260	0.00121 JB	0.0890 J	0.000510 J	0.196	<0.0000490 J3	0.00666	0.0211	0.000344 J	0.00328 J
	MW-43	Apr-17		0.00987	0.100	**1.21**	<0.000160	<0.000260	<0.000540	<0.0150	<0.000240	0.175	<0.0000490	0.00534	0.00413 B	<0.000330	0.00200 J
	MW-43	Oct-17		0.00616	0.130	**1.43**	<0.000160	<0.000260	0.000981 J	0.0345 J	0.000387 J	0.142	<0.0000490	0.00700	0.0447	<0.000330	0.00261 J
	MW-43	Apr-18		**0.0124**	0.186	**1.32**	<0.000160	<0.000260	0.00246	0.0572 JB	0.000412 JB	0.154	<0.0000490	0.00839	0.00143 JB	<0.000330	0.00181 J
	MW-43	Oct-18		0.00997	0.137	**1.22**	<0.000160	<0.000260	<0.000540	0.0287 J	0.000253 J	0.151	<0.0000490	0.00608	0.000723 J	<0.000330	0.00207 J
	MW-59	Apr-15		**0.0172**	0.0163				<0.000540	0.163	0.000394 J	**0.465**			0.00573 J		
	MW-59	Apr-16		**0.0763**	0.113				<0.00270	0.976	<0.00120	**2.34**			<0.00190		
	MW-59	Apr-17		**0.0234**	0.0202				<0.000540	0.123	<0.000240	**0.440**			<0.000380		
	MW-59	Apr-18		**0.0240**	0.0236				<0.000540	0.102 B	<0.000240	**0.448**			<0.000380		
	MW-60	Apr-16		**0.0111**	0.0203 J	0.438	<0.00500	<0.00130	<0.00270	0.105 J	<0.00120	**0.364**	<0.0000490	<0.00175	<0.00190	0.00235 J	0.000910 J
	MW-60	Apr-16	FD	**0.0121**	0.0193 J	0.449	<0.00500	<0.00130	<0.00270	0.165 J	<0.00120	**0.377**	<0.0000490	<0.00175	<0.00190	0.00254 J	0.00110 J
	MW-60	Oct-16		0.00457	0.0154	0.347	<0.000160	0.000490 J	0.00133 JB	0.151 B	0.000403 J	**0.336**	<0.0000490	0.00178 JB	<0.000380	0.00252 J	0.000358 J
	MW-60	Oct-16	FD	0.00478	0.0147	0.332	<0.000160	0.000589 J	0.00129 JB	0.148 B	0.000342 J	**0.339**	<0.0000490	0.00135 JB	<0.000380	0.00251 J	0.000307 J
	MW-60	Apr-17		0.00595	0.0167	0.376	<0.000160	<0.000260	<0.000540	0.0568 J	<0.000240	**0.294**	<0.0000490	0.000791 J	<0.000380	0.00223 J	0.000578 JB
	MW-60	Apr-17	FD	0.00605	0.0167	0.376	<0.000160	<0.000260	<0.000540	0.0692 J	<0.000240	**0.290**	<0.0000490	0.000704 J	<0.000380	0.00222 J	0.000605 JB
	MW-60	Oct-17		0.00682	0.0185	0.567	<0.000160	0.000302 J	<0.000540	0.0449 J	0.000355 J	**0.258**	<0.0000490	0.00205	0.00188 J	0.00149 J	0.000363 J
	MW-60	Oct-17	FD	0.00299	0.0186	0.613	<0.000160	<0.000260	<0.000540	0.0330 J	0.000245 J	**0.259**	<0.0000490	0.00420	<0.000380	0.00144 J	0.000347 J
	MW-60	Apr-18		0.00895	0.0188	0.537	<0.000160	0.000365 J	<0.000540	0.0975 JB	0.000342 JB	**0.291**	<0.0000490	0.000820 J	<0.000380	0.00208 J	0.000298 J
	MW-60	Apr-18	FD	0.00863	0.0188	0.531	<0.000160	<0.000260	<0.000540	0.0606 J	0.000350 J	**0.279**	<0.0000490	0.00260	<0.000380	0.00211 J	0.000362 J
	MW-60	Oct-18		0.00751	0.0193	0.690	<0.000160	0.000515 J	<0.000540	0.204	0.000520 J	**0.270**	<0.0000490	0.000952 J	<0.000380	0.00140 J	0.000370 J
	MW-60	Oct-18	FD	0.00684	0.0172	0.677	<0.000160	0.000409 J	<0.000540	0.190	0.000289 J	**0.268**	<0.0000490	0.000846 J	<0.000380	0.00143 J	0.000313 J

Table 4B - Summary of Groundwater Analytical Data - Total Metals

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Total Metals													
				Analyte:	Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
					7440-38-2	7440-39-3	7440-42-8		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
				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:	0.010	2.00	0.75	0.005	0.050	0.050	1.00	0.015	0.200	0.002	0.200	0.050	0.030	0.0631
				CGWSL Source:	WQCC HH	WQCC HH	WQCC Irr	WQCC HH	WQCC Irr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	WQCC HH	NMED TW
Area	**Well ID**	**Date**	**Dup**															
North Refinery	MW-61	Apr-16			<0.00125	0.0192 J				<0.00270	<0.0750	<0.00120	0.0664			0.0101		
	MW-61	Oct-16			0.00083 J	0.0223				0.00145 JB	0.0204 J	0.000914 J	0.0746			<0.000380		
	MW-61	Apr-17			0.00098 J	0.0218				0.000618 J	0.0299 J	0.000959 J	0.0352			0.00551		
	MW-61	Oct-17			0.00125 J	0.0330				0.00316	0.0342 J	0.00128 J	0.0320			**0.0519**		
	MW-61	Apr-18			0.00249	0.0288				0.000703 J	0.0382 JB	0.00174 JB	0.0184			0.000498 JB		
	MW-61	Oct-18			0.00157 J	0.0316				<0.00270	<0.0750	0.00145 J	0.0190 JB			<0.00190		
	MW-62	Apr-16			0.00321 J	0.0390				<0.00270	<0.0750	<0.00120	<0.00125			0.00935 J		
	MW-62	Oct-16			**0.0115**	0.0252				0.000596 JB	0.0385 J	0.000715 J	0.00213 J			<0.000380		
	MW-62	Apr-17			0.00450	0.0285				<0.000540	<0.0150	0.000317 J	0.00311 J			0.00328		
	MW-62	Oct-17			0.00366	0.0312				<0.000540	0.0375 J	0.000415 J	0.000930 J			**0.0554**		
	MW-62	Apr-18			0.00849	0.0467				0.000842 J	<0.0150	0.000380 JB	0.00452 J			<0.000380		
	MW-62	Oct-18			0.00419 J	0.0529				<0.00270	0.0752 J	<0.00120	0.00287 JB			<0.00190		
	MW-67	Apr-16			**0.0101**	0.229	0.471	<0.00500	<0.00130	<0.00270	<0.0750	0.00135 J	0.117	<0.0000490	<0.00175	<0.00190	<0.00165	0.00139 J
	MW-67	Oct-16			**0.0103**	0.161	0.451	<0.000160	<0.000260	0.000671 JB	0.0242 J	0.00127 J	0.104	<0.0000490	0.000689 J	0.000479 J	<0.000330	0.000595 J
	MW-67	Apr-17			**0.0147**	0.137	0.435	<0.000160	<0.000260	0.000612 J	0.0312 J	0.00155 J	0.0878	<0.0000490	0.000780 J	0.00230	<0.000330	0.00124 JB
	MW-67	Oct-17			**0.0103**	0.0906	0.464	<0.000160	<0.000260	0.000639 J	0.0172 J	0.00112 J	0.0986	<0.0000490	0.000648 J	<0.000380	<0.000330	0.000547 J
	MW-67	Apr-18			**0.0107**	0.120	0.456	<0.000160	<0.000260	0.000927 JJ3J4	0.0743 J	0.00171 J	0.0943	<0.0000490	0.000828 J	0.000518 J	<0.000330	0.000584 J
	MW-67	Oct-18			0.00516	0.0745	0.401	0.000220 JB	<0.000260	0.000568 J	0.0289 J	0.00192 JB	0.126	0.000120 J	0.000595 J	<0.000380	<0.000330	0.000634 J
	MW-90	Apr-16			**0.0111**	0.0140 J				<0.00270	**1.34**	<0.00120	0.166			0.00262 J		
	MW-90	Oct-16			**0.0103**	0.00945				<0.000540	0.201	0.000244 J	0.0186			**0.0663**		
	MW-90	Apr-17			0.00894	0.0159				<0.000540	**1.53**	<0.000240	0.144			0.00359 B		
	MW-90	Oct-17			0.00392	0.0152				0.000863 J	0.223	<0.000240	0.0711			0.00150 J		
	MW-90	Apr-18			0.00307	0.0170				<0.000540 J3J4	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-91	Apr-16			0.00660 J	0.0716				<0.00270	<0.0750	0.00376 J	0.00267 J			<0.00740		
	MW-91	Oct-16			0.00880	0.0554				<0.000540	<0.0150	0.00340	0.00304 JB			0.000630 J		
	MW-91	Apr-17			0.00780	0.0532				<0.000540	0.0336 J	0.00352	0.00138 J			0.00138 JB		
	MW-91	Oct-17			0.00586	0.0512				0.000787 J	0.0900 J	0.00312	0.00640			0.00111 J		
	MW-91	Apr-18			0.00800	0.0454				<0.000540 J3J4	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-92	Apr-16			0.00316 J	**3.44** O1V				<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-16			**0.0137**	0.0231 J				0.00907 J	0.858	<0.00120	0.0663			0.0242		
	MW-93	Oct-16			0.00195 JJ3J6	0.0263				0.00337 B	**1.19**	0.00112 J	**0.335**			0.0119 J3J6		
	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-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-15			0.00133 J	0.0762				<0.000540	0.0357 J	0.000477 J	0.0247			0.000381 J		
	MW-95	Apr-16			0.00175 J	0.0736				<0.00270	<0.0750	<0.00120	0.0214 J			<0.00190		
	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-96	Apr-16			0.00463 J	0.155				<0.00270	<0.0750	<0.00120	0.00174 J			0.00330 J		
	MW-96	Oct-16			0.00238	0.106				<0.000540	0.0573 J	<0.000240	0.00700			0.000695 J		
	MW-96	Apr-17			0.00314	0.124				<0.000540	<0.0150	<0.000240	0.000699 J			0.00148 JB		
	MW-96	Oct-17			0.00241	0.0709				<0.000540	0.117	<0.000240	0.00173 J			0.000629 J		
	MW-96	Apr-18			0.00321	0.124				0.000908 JJ3J4	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-98	Apr-16			0.00199 J	0.0204 J				<0.00270	<0.0750	0.00934 J	0.0312			<0.00190		
	MW-98	Oct-16			0.00110 J	0.0150				0.000797 JB	0.0160 J	0.00734	0.0233			0.000906 J		
	MW-98	Apr-17			0.00109 J	0.0163				<0.000540	<0.0150	0.00875	0.0261			0.00227 B		
	MW-98	Oct-17			0.00082 J	0.0159				0.000791 J	0.126	0.00929	0.0280			0.000620 J		
	MW-98	Apr-18			0.00120 J	0.0156				0.000670 JJ3J4	<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-137	Apr-16			**0.0893**	0.0567	**0.982**	<0.00500	<0.00130	<0.00270	0.0953 J	0.00601 J	0.144	<0.0000490	0.0101	0.00327 J	<0.00165	0.00840 J
	MW-137	Oct-16			**0.0345**	0.0453	**0.799**	<0.000160	<0.000260	0.000628 JB	0.0169 J	0.00436	0.120	<0.0000490	0.00652	0.00368	<0.000330	0.00529
	MW-137	Apr-17			**0.0496**	0.0564	**0.752**	<0.000160	<0.000260	<0.000540	<0.0150	0.00408	0.113	<0.0000490	0.00689	0.00397 B	<0.000330	0.00580
	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-138	Apr-16			0.00777 J	0.220	**1.56**	<0.00500	<0.00130	<0.00270	0.221 J	<0.00120	0.164	<0.0000490	0.00598 J	<0.00190	<0.00165	0.00531 J
	MW-138	Oct-16			0.00609	0.0947	**1.01**	<0.000160	<0.000260	0.000775 JB	0.0178 J	0.000407 J	0.143	<0.0000490	0.00284	<0.000330	0.00306 J	
	MW-138	Apr-17			0.00569	0.130	**1.01**	<0.000160	<0.000260	<0.000540	<0.0150	<0.000240	0.111	<0.0000490	0.00546	0.00267 B	<0.000330	0.00269 J
	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
	RW-1	Apr-15			0.00607	0.0305				0.00290	0.216	0.000495 J	0.126			0.00302 J		
	RW-1R	Apr-16			0.00695 J	0.0414				<0.00270	**17.1**	0.00149 J	**0.317**			0.00246 J		
	RW-1	Apr-17			**0.0359**	0.0243				0.00254	**4.88**	0.00492	**0.240**			0.00573 B		
	RW-1	Apr-18			**0.0204**	0.0328				0.000826 JJ3J4	**1.50**	0.00156 J	0.0237			0.00213		
	RW-2	Apr-15			**0.0264**	0.0245 J				0.00553 J	0.381 J	0.00233 J	**0.313**			**0.0705**		
	RW-2R	Apr-16			0.00552 J	0.171				0.00750 J	**2.25**	**0.0153**	0.0705			**0.422**		
	RW-2	Apr-17			0.00504	0.0566				0.00173 J	0.264	0.000960 J	0.0161			0.0100		
	RW-2	Apr-18			0.00374	0.139				0.00362	0.123 B	0.00163 JB	0.0215			0.00128 JB		
	RW-7	Apr-15			0.00239 J	0.508				<0.00270	0.0976 J	<0.00120	0.0280			<0.00190		
	RW-7R	Apr-16			**0.0154**	0.0293				<0.00270	**1.09**	<0.00120	**1.22**			<0.00190		
	RW-7	Apr-17			0.00332	0.0198				<0.000540	0.183	<0.000240	**1.13**			<0.000380		
	RW-7	Apr-18			**0.0174**	0.144				0.00434 B	**2.92**	0.000599 J	0.106			<0.000380		
	RW-8	Apr-15			0.00556 J	0.0889				<0.00270	0.427 J	<0.00120	0.0556			0.00200 J		
	RW-8	Apr-17			**0.0343**	0.0593				0.00135 J	**9.50**	0.00169 J	**1.12**			<0.000380		
	RW-9	Apr-15			0.00392	0.0397				0.00102 J	0.257	0.000449 J	**0.460**			0.0144		
	RW-9	Apr-16			0.00476 J	0.0550				<0.00270	0.169 J	<0.00120	**0.441**			0.00735 J		
	RW-9	Apr-17			0.00338	0.0378				<0.000540	<0.0150	<0.00120	**0.784**			0.0217		
	RW-9	Apr-18			0.00404	0.0462				<0.000540	0.0199 J	0.00111 J	**0.545**			0.000498 J		
	RW-10	Apr-15			0.00171 J	0.0258				0.000561 J	0.454	<0.000240	**0.237**			0.00517		
	RW-10	Apr-16			0.00175 J	0.0372				<0.00270	**1.27**	<0.00120	**0.266**			0.0404		
	RW-10	Apr-17			0.00167 J	0.0184				<0.000540	0.0250 J	0.000433 J	0.173			<0.000380		
	RW-10	Apr-18			0.00234	0.0224				<0.000540	<0.0150	0.000469 J	0.189			<0.000380		
	RW-16	Apr-15			**0.0171**	0.0138 J				<0.00270	<0.0750	<0.00120	**0.421**			<0.00190		
	RW-16	Apr-16			**0.0115**	0.0138 J				<0.00270	<0.0750	<0.00120	**0.406**			0.0223		
	RW-16	Apr-17			**0.0129**	0.0126				0.00108 J	0.0227 J	0.00125 J	**0.263**			0.00658		
	RW-16	Apr-18			0.00922	0.0130				0.000754 JB	0.0239 J	0.000343 J	**0.201**			0.00643		
	RW-17	Apr-15			**0.0111**	0.0274				<0.00270	0.0850 J	0.00425 J	0.121			0.0361		
	RW-17	Apr-16			**0.0522**	0.119				<0.00270	0.197 J	**0.0385**	**3.55**			**0.0714**		
	RW-17	Apr-17			**0.0113**	0.0223				0.000584 J	0.0569 J	0.0106	**0.719**			0.0106		
	RW-17	Apr-18			**0.0106**	0.0232				<0.000540 J3J4	0.0346 J	0.00975	**0.767**			0.00322		

Table 4B - Summary of Groundwater Analytical Data - Total Metals

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Total Metals													
				Analyte:	Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
					7440-38-2	7440-39-3	7440-42-8		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
				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:	0.010	2.00	0.75	0.005	0.050	0.050	1.00	0.015	0.200	0.002	0.200	0.050	0.030	0.0631
				CGWSL Source:	WQCC HH	WQCC HH	WQCC Irr	WQCC HH	WQCC Irr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	WQCC HH	NMED TW
Area	**Well ID**	**Date**	**Dup**															
North RO Reject Field	MW-117	Apr-16			0.00266 J	0.0186 J				<0.00270	0.684	<0.00120	0.0103 J			0.00857 J		
	MW-117	Oct-16			0.00312	0.0249				0.00417 B	**1.57**	0.00137 J	0.0171			0.00403		
	MW-117	Apr-17			0.00255	0.0197				0.00209	**1.11**	0.000901 J	0.0147			0.00349 B		
	MW-117	Oct-17			0.00238	0.0177				0.00279	**1.15**	0.000777 J	0.0110			0.00982		
	MW-117	Apr-18			0.00236	0.0110				0.000952 J	0.200	0.000293 J	0.00405 J			0.0126		
	MW-117	Oct-18			0.00224	0.00996				<0.000540	0.0302 J	<0.000240	0.000557 J			0.0121		
	MW-118	Apr-16			**0.0108**	0.0139 J				<0.00270	0.426 J	<0.00120	0.00480 J			0.00645 J		
	MW-118	Oct-16			**0.0117**	0.0111				0.000649 JB	0.0658 J	<0.000240	0.000302 J			0.0156		
	MW-118	Apr-17			**0.0105**	0.00910				<0.000540	0.0337 J	<0.000240	0.000670 J			0.0222		
	MW-118	Oct-17			**0.0109**	0.00884				0.000983 J	<0.0150	<0.000240	<0.000250			0.0196		
	MW-118	Apr-18			0.00991	0.00943				<0.000540	0.0223 J	0.000430 J	0.000501 J			0.00851		
	MW-118	Oct-18			**0.0103**	0.00867				0.000593 J	0.0156 J	<0.000240	0.000403 J			0.00774		
	MW-119	Apr-16			0.00315 J	0.00645 J				<0.00270	<0.0750	<0.00120	<0.00125			0.00259 J		
	MW-119	Oct-16			0.00404	0.00979				<0.000540	0.0660 J	<0.000240	0.00190 J			0.00334		
	MW-119	Apr-17			0.00376	0.00966				<0.000540	0.0438 J	<0.000240	0.00331 J			0.00442		
	MW-119	Oct-17			0.00513	0.0108				0.000757 J	0.0324 J	<0.000240	0.00324 J			0.00145 J		
	MW-119	Apr-18			0.00392	0.00951				<0.000540	0.0347 J	0.000502 J	0.00250 J			0.00324		
	MW-119	Oct-18			0.00462	0.0110				<0.000540	<0.0150	<0.000240	0.00375 J			0.00112 J		
NCL	MW-18	Apr-15			0.00321	0.0167				0.00108 J	<0.0150	<0.000240	0.00671	<0.0000490	0.00120 J	0.00947		0.0147
	MW-18	Apr-16			0.00395 J	0.0207 J	**1.36**	<0.00500	<0.00130	<0.00270	<0.0750	<0.00120	0.0157 J	<0.0000490	<0.00350	0.0153	**0.0480 J**	0.0200 J
	MW-18	Apr-17			0.00365	0.0183	**1.71**		0.000321 J	0.00222	<0.0150	<0.000240	0.00474 JB	<0.0000490	0.00120 J	0.0151	0.0250	0.0195
	MW-18	Apr-18			0.00413	0.0130	**1.40**	<0.000160	<0.000260	0.000973 J	<0.0150	0.000243 J	0.0125	<0.0000490	0.00198 J	0.0148	**0.0378**	0.0178
	MW-45	Apr-16			0.00752 J	0.0191 J	0.671	<0.00500	<0.00130	<0.00270	**4.14**	0.00443 J	**0.633**	<0.0000490	0.00631 J	<0.00190	<0.00165	0.00188 J
	MW-45	Oct-16			0.00346	0.0182	0.636	<0.000160	<0.000260	<0.000540	0.942	0.000647 J	**0.576**	<0.0000490	0.00513 B	<0.000380	0.000909 J	0.000251 J
	MW-45	Apr-17			0.00404	0.0162	0.514	<0.000160	<0.000260	<0.000540	**1.29**	<0.000240	**0.582**	<0.0000490	0.00558	<0.000380	0.00109 J	0.000466 J
	MW-45	Oct-17			0.00460	0.0154	0.675	<0.000160	<0.000260	<0.000540	**2.27**	0.00143 J	**0.583**	<0.0000490	0.00569	<0.000380	0.000671 J	0.000377 J
	MW-45	Apr-18			0.00591	0.0141	0.611	<0.000160	<0.000260	<0.000540	**1.33**	0.00179 J	**0.457**	<0.0000490	0.00452	<0.000380	0.000779 J	0.000586 J
	MW-45	Oct-18			0.00327	0.0156 B	0.670	0.000394 JB	<0.000260	<0.000540	**1.58**	0.00109 JB	**0.599**	<0.0000490	0.00378	<0.000380	0.000654 J	0.000278 J
	MW-53	Apr-15			0.00179 J	0.0256				<0.000540	0.0338 J	0.000252 J	**1.20**			0.00566		
	MW-53	Apr-16			0.00193 J	0.0308				<0.00270	<0.0750	<0.00120	**1.07**			0.00617 J		
	MW-53	Apr-17			0.00166 J	0.0201				<0.000540	<0.0150	<0.000240	**1.60**			0.00281		
	MW-53	Apr-18			0.00259	0.0423				0.000742 JJ3J4	0.0922 J	0.000794 J	**2.34**			0.000729 J		
	MW-54A	Apr-16			0.00343 J	0.0189 J				<0.00270	<0.0750	<0.00120	**0.512**			<0.00190		
	MW-54A	Oct-16			0.00236	0.0158				<0.000540	<0.0150	<0.000240	**0.437**			0.000709 J		
	MW-54A	Apr-17			0.00464	0.0147				<0.000540	0.227	<0.000240	**0.456**			<0.000380		
	MW-54A	Oct-17			0.00375	0.0184				<0.000540	0.0535 J	<0.000240	**0.506**			0.000562 J		
	MW-54A	Apr-18			0.00456	0.0161				<0.000540 J3J4	0.0500 J	0.000449 J	**0.531**			0.000467 J		
	MW-54A	Oct-18			0.00410	0.0165				<0.000540	0.0601 J	<0.000240	**0.541**			<0.000380		
	MW-54B	Apr-13			<0.00500	0.0183				<0.00500	<0.200	<0.00500	0.145			<0.00500		
	MW-54B	Apr-15			0.00220	0.0165				<0.000540	0.0520 J	<0.000240	0.165			0.000400 J		
	MW-54B	Apr-17			0.00181 J	0.0158				<0.000540	<0.0150	<0.000240	**0.253**			0.000720 J		
	MW-55	Apr-16			0.00933 J	0.0157 J	**1.31**	0.000891 J	0.00141 J	<0.00270	0.128 J	0.00168 J	0.151	0.0000514 J	<0.00350	0.00896 J	**0.0460 J**	0.0244 J
	MW-55	Oct-16			0.00543	0.0140	**1.21**	<0.000160	0.000680 J	0.00168 J	0.0587 JB	0.000582 J	0.113	0.0000531 J	0.00314 B	0.00746	**0.0335**	0.0170
	MW-55	Apr-17			0.00565	0.0128	**0.829**	<0.000160	0.000407 J	<0.000540	0.0222 J	<0.000240	0.0682	<0.0000490	0.00552	0.00436	**0.0406**	0.0192
	MW-55	Oct-17			0.00566	0.0123	**1.52**	<0.000160	0.000827 J	0.00121 J	0.0843 J	<0.000240	0.167	<0.0000490	0.00562	0.00703	**0.0466**	0.0204
	MW-55	Apr-18			0.00661	0.0128	**1.50**	<0.000160	0.000359 J	0.000955 J	0.0331 J	0.000370 J	0.139	0.000151 J	0.00581	0.00444	**0.0503**	0.0190
	MW-55	Oct-18			0.00584	0.0109 B	**1.45**	0.000388 JB	<0.000260	0.000540 J	0.0292 J	0.000240 JB	0.114	<0.0000490	0.00678	0.00570	**0.0504**	0.0186
	MW-56	Apr-16			0.00777 J	0.0203 J				<0.00270	<0.0750	<0.00120	**0.373**			0.00381 J		
	MW-56	Oct-16			0.00721	0.0138				<0.000540	<0.0150	0.000540 J	**0.282**			0.00125 J		
	MW-56	Apr-17			0.00642	0.0157				<0.000540	<0.0150	0.000467 J	**0.320**			0.00325		
	MW-56	Apr-18			0.00731	0.0119				0.0102	0.0355 J	0.000487 J	**0.307**			0.000796 J		
	MW-108	Apr-16			0.00454 J	0.481				<0.00270	0.206 J	0.00209 J	0.0501			<0.00190		
	MW-108	Oct-16			**0.0102**	0.0462				0.00732	**3.13**	0.0101	0.182			0.00126 J		
	MW-108	Apr-17			0.00252	0.0366				0.00124 J	0.0538 J	0.00145 J	0.0412			<0.000380		
	MW-108	Oct-17			0.00251	0.0495				0.00210	0.441	0.00199 J	0.0395			0.00201		
	MW-108	Apr-18			0.00398	0.0468				0.00323	0.174	0.00243	0.0342			0.000702 J		
	MW-108	Oct-18			0.00274	0.0384				0.00310	**4.57**	0.00279 B	0.0540			<0.000380		
	NCL-31	Apr-16			0.00495 J	0.0241 J				<0.00270	0.838	<0.00120	**1.85**			<0.00190		
	NCL-31	Oct-16			**0.0428**	0.0220				0.000711 JB	**1.04**	0.000493 J	**2.48**			<0.000380		
	NCL-31	Apr-17			0.00975	0.0152				<0.000540	0.446	0.000330 J	**2.19**			0.000525 J		
	NCL-31	Oct-17			**0.0122**	0.0140				<0.000540	0.978	<0.000240	**2.26**			<0.000380		
	NCL-31	Apr-18			**0.0129**	0.0150				0.00375	0.998	0.000361 J	**2.05**			<0.000380		
	NCL-31	Oct-18			**0.0241**	0.0172 B				<0.000540	**1.03**	0.000447 JB	**2.02**			<0.000380		
	NCL-32	Apr-16			**0.0108**	0.227				**0.0660**	**9.75**	**0.0681**	**1.77**			<0.00190		
	NCL-32	Oct-16			0.00428	0.0254				0.00312	0.407 B	0.00296	**1.06**			0.00138 J		
	NCL-32	Apr-17			0.00358	0.0195				0.00114 J	0.116	0.00127 J	**0.988**			0.00124 J		
	NCL-32	Oct-17			0.00304	0.0166				<0.000540	0.0488 J	0.000454 J	**1.11**			0.00207		
	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-33	Apr-16			0.00444 J	0.0246 J				<0.00270	0.770	<0.00120	0.188			<0.00190		
	NCL-33	Oct-16			0.00593	0.0224				0.00187 J	**1.93**	0.000459 J	0.128			0.00217		
	NCL-33	Apr-17			0.00302	0.0194				<0.000540	**1.12**	0.000288 J	0.135			0.000546 J		
	NCL-33	Oct-17			0.00325	0.0201				0.000552 J	**1.67**	<0.000240	0.138			0.000672 J		
	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-34A	Apr-16			0.00184 J	0.854				<0.00270	<0.0750	<0.00120	0.0185 J			<0.00190		
	NCL-34A	Oct-16			0.00075 J	0.370				<0.000540	<0.0150	<0.000240	0.0279			0.0142		
	NCL-34A	Apr-17			0.00083 J	0.458				<0.000540	<0.0150	<0.000240	0.0146			<0.000380		
	NCL-34A	Oct-17			0.00056 J	0.338				0.00104 J	0.0445 J	0.00105 J	0.0224			<0.000380		
	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			0.00069 J	0.376				<0.000540	<0.0150	<0.000240	0.0191			0.000423 J		
	NCL-44	Apr-16			**0.0459**	0.0371				<0.00270	**1.82**	<0.00120	**1.11**			<0.00190		
	NCL-44	Oct-16			**0.0490**	0.0276				0.00165 JB	**1.78**	0.000521 J	**0.896**			0.000394 J		
	NCL-44	Apr-17			**0.0348**	0.0269				0.00235	0.953	0.00102 J	**0.860**			<0.000380		
	NCL-44	Oct-17			**0.0479**	0.0252				0.00122 J	**1.61**	0.000413 J	**0.896**			0.000416 J		
	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 JB	**0.879**			<0.000380		
	NCL-49	Apr-16			0.00188 J	0.0150 J				<0.00270	<0.0750	<0.00120	<0.00125			0.00518 J		
	NCL-49	Apr-16	FD		0.00178 J	0.0134 J				<0.00270	<0.0750	<0.00120	<0.00125			0.00483 J		
	NCL-49	Oct-16			0.00156 J	0.0116				<0.000540	<0.0150	<0.000240	0.000460 JB			0.00551		
	NCL-49	Oct-16	FD		0.00137 J	0.0117				<0.000540	<0.0150	<0.000240	0.000493 JB			0.00549		
	NCL-49	Apr-17			0.00151 J	0.0118				<0.000540	<0.0150	<0.000240	0.000320 J			0.00871		
	NCL-49	Apr-17	FD		0.00149 J	0.0115				<0.000540	<0.0150	<0.000240	0.000263 J			0.00924		
	NCL-49	Oct-17			0.00142 J	0.0113				0.000635 J	0.0590 J	<0.000240	<0.000250			0.0111		
	NCL-49	Oct-17	FD		0.00163 J	0.0121				0.000649 J	0.0255 J	<0.000240	<0.000250			0.0110		
	NCL-49	Apr-18			0.00283	0.0138				0.000688 JJ3J4	<0.0150	0.000258 J	0.00310 J			0.0111		
	NCL-49	Apr-18	FD		0.00254	0.0136				<0.000540 J3J4	<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		

Table 4B - Summary of Groundwater Analytical Data - Total Metals

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Total Metals													
				Analyte:	Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
					7440-38-2	7440-39-3	7440-42-8		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
				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:	0.010	2.00	0.75	0.005	0.050	0.050	1.00	0.015	0.200	0.002	0.200	0.050	0.030	0.0631
				CGWSL Source:	WQCC HH	WQCC HH	WQCC Irr	WQCC HH	WQCC Irr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	WQCC HH	NMED TW
Area	**Well ID**	**Date**	**Dup**															
South Refinery	KWB-2R	Apr-16			0.00401 J	0.0326				<0.00270	0.883	<0.00120	**0.898**			0.00551 J		
	KWB-2R	Oct-16			0.00325	0.0343				0.00113 JB	0.465	0.000548 J	**0.609**			<0.000380		
	KWB-2R	Apr-17			0.00152 J	0.0271				<0.000540	0.0346 J	0.000273 J	**0.564**			<0.000380		
	KWB-2R	Oct-17			0.00258	0.324				<0.000540	0.0522 J	0.00130 J	0.0596			<0.000380		
	KWB-5	Apr-16			**0.0252**	**3.63**				<0.00270	**4.28**	<0.00120	**1.82**			<0.00190		
	KWB-5	Oct-16			**0.0212**	**3.82**				<0.000540	**3.13**	<0.000240	**1.60**			<0.000380		
	KWB-5	Apr-17			**0.0219**	**3.49**				<0.000540	**4.43**	<0.000240	**1.81**			0.000511 JB		
	KWB-5	Oct-17			**0.0202**	**5.06**				<0.000540	**2.11**	0.000287 J	**1.64**			<0.000380		
	KWB-5	Apr-18			**0.0201**	**5.09**				<0.000540	**1.21**	0.000758 JB	**1.29**			<0.000380		
	KWB-5	Oct-18			**0.0166**	**3.75**				<0.00270	**2.13**	<0.00120	**1.55**			<0.00190		
	KWB-6	Apr-16			0.00703 J	0.327				<0.00270	0.546	0.00143 J	**2.55**			<0.00190		
	KWB-6	Oct-16			0.00915	0.0891				0.000950 JB	0.303	0.00103 J	**1.87**			<0.000380		
	KWB-6	Apr-17			0.00406	0.152				<0.000540	0.152	0.000533 J	**1.91**			<0.000380		
	KWB-6	Oct-17			0.00898	0.0998				<0.000540	0.250	0.000661 J	**2.15**			<0.000380		
	KWB-6	Apr-18			**0.0251**	0.120				0.00170 J	**4.68**	0.00564	**2.03**			<0.000380		
	KWB-6	Oct-18			0.00813	0.0699				<0.000540	0.149	<0.000240	**1.91**			0.000421 J		
	MW-28	Apr-16			**0.0610**	0.331	**1.23**	<0.00500	<0.00130	0.00274 J	0.342 J	**0.0520**	0.164	<0.0000490	0.0226	0.00220 J	<0.00165	0.0158 J
	MW-28	Oct-16			**0.0154**	0.0424	**1.27**	<0.000160	0.000289 J	0.00213 B	0.0951 JB	**0.0168**	0.0375	<0.0000490	0.00387 B	0.000605 J	<0.000330	0.00701
	MW-28	Apr-17			0.00674	0.0462	**1.21**	<0.000160	<0.000260	0.000618 J	0.0779 J	0.0130	0.0624	<0.0000490	0.0484	0.0491	0.000382 J	0.00329 J
	MW-28	Oct-17			0.00777	0.0492	**1.39**	<0.000160	<0.000260	0.00947	0.0870 J	0.00855	0.0417	<0.0000490	0.00719	<0.000380	<0.000330	0.00227 J
	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-48	Apr-16			**0.0125**	**2.77**				<0.00270	0.177 J	0.00371 J	**0.390**			<0.00190		
	MW-48	Oct-16			**0.0107**	1.18				0.00119 JB	0.166	0.00173 J	**0.565**			0.000520 J		
	MW-48	Apr-17			0.00786	**2.54**				<0.000540	0.0884 J	0.00150 J	**0.210**			0.000838 JB		
	MW-48	Oct-17			0.00558	1.81				0.000835 J	0.141	0.00166 J	**0.286**			**0.0669**		
	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-50	Apr-16			0.00234 J	0.0141 JB				<0.00270	0.0916 J	<0.00120	**0.214**			**0.0994**		
	MW-50	Oct-16			0.00434	0.0207				<0.000540	0.160	0.000413 J	**0.295**			**0.0704**		
	MW-50	Apr-17			0.00210	0.0137				<0.000540	0.0253 J	<0.000240	**0.433**			0.0485		
	MW-50	Oct-17			0.00250	0.0142				<0.000540	0.0340 J	<0.000240	**0.494**			0.0436		
	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-52	Apr-16			**0.0193**	0.0436	0.736	<0.00500	0.00155 J	<0.00270	0.158 J	<0.00120	**0.230**	<0.0000490	0.0263	0.00545 J	**0.0438 J**	**0.123**
	MW-52	Oct-16			0.00343	0.0104	0.718	<0.000160	0.000423 J	0.000547 JB	<0.0150	<0.000240	0.0484	<0.0000490 J3	0.00810	0.00179 J	0.0105	0.0243
	MW-52	Apr-17			0.00368	0.0101	0.702	<0.000160	0.000503 J	<0.000540	0.0447 J	<0.000240	0.0659	<0.0000490	0.00798	0.00178 J	0.00976 J	0.0269
	MW-52	Oct-17			0.00363	0.0113	**0.852**	<0.000160	0.000429 J	<0.000540	0.0245 J	<0.000240	0.0774	<0.0000490	0.00817	0.00607	0.0124	0.0246
	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-64	Apr-16			**0.0333**	**2.26**				<0.00270	<0.0750	0.00187 J	0.0599			<0.00190		
	MW-64	Oct-16			**0.0302**	**2.41**				0.000897 JB	0.0566 JB	0.00105 J	0.0480			0.000493 J		
	MW-64	Apr-17			**0.0346**	2.00				<0.000540	0.151	0.000997 J	0.0515			0.000642 J		
	MW-64	Oct-17			**0.0317**	**2.10**				<0.000540	0.139	0.00101 J	0.0571			0.000523 J		
	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-65	Apr-16			**0.0142**	**3.42 V**				<0.00270	**2.09**	0.00124 J	**0.748 V**			<0.00190		
	MW-65	Oct-16			**0.0120**	**2.97**				0.00121 JB	**1.66**	0.00103 J	**0.605**			<0.000380		
	MW-65	Apr-17			**0.0108**	**3.01**				<0.000540	**1.58**	0.000874 J	**0.593**			<0.000380		
	MW-65	Oct-17			**0.0113**	**3.03**				<0.000540	**2.16**	0.00128 J	**0.568**			<0.000380		
	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-66	Apr-16			**0.0148**	**12.7**	0.378	<0.00500	<0.00130	0.00289 J	**4.74**	0.00659 J	**1.13**	<0.0000490	0.121	<0.00190	<0.00165	0.00670 J
	MW-66	Oct-16			0.00269	1.88	0.283	<0.000160	<0.000260	0.000733 JB	0.717	0.000342 J	**0.216**	<0.0000490 J3	0.00497	<0.000380	<0.000330	0.000342 J
	MW-66	Apr-17			0.00255	**2.22**	0.263	<0.000160	<0.000260	<0.000540	0.773	0.000592 J	0.193	<0.0000490	0.00829	0.0134	<0.000330	0.000535 JB
	MW-66	Oct-17			0.00282	1.81	0.314	<0.000160	<0.000260	0.00128 J	**1.02**	0.00453	**0.288**	<0.0000490	0.00602	<0.000380	<0.000330	0.00169 J
	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-99	Apr-16			**0.0491**	**5.05**				0.00682 J	**4.55**	**0.0193**	**1.20**			<0.00190		
	MW-99	Oct-16			0.00635	1.14				0.00128 JB	0.208	0.00150 J	**0.354**			<0.000380		
	MW-99	Apr-17			0.00772	0.297				<0.000540	0.204	0.00116 J	**0.243**			**0.0857**		
	MW-99	Oct-17			0.00865	0.221				<0.000540	0.0585 J	0.000379 J	**0.232**			<0.000380		
	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-101	Apr-16			**0.0293**	0.0898				<0.00270	**1.38**	<0.00120	**1.34**			<0.00190		
	MW-101	Oct-16			**0.0783**	0.0366				0.00145 JB	**2.56**	0.000266 J	**1.06**			<0.000380		
	MW-101	Apr-17			**0.0659**	0.0732				<0.000540	**1.18**	<0.000240	**1.18**			<0.000380		
	MW-101	Oct-17			**0.0824**	0.0472				0.0137	**2.99**	0.000670 J	**1.21**			0.00139 J		
	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	**1.12**			<0.000380		
	MW-102	Apr-16			**0.0117**	**7.71**				<0.00270	0.222 J	0.00339 J	0.0308			<0.00190		
	MW-102	Oct-16			**0.0132**	0.427				0.00200 B	0.0940 JB	0.00223	0.0214			<0.000380		
	MW-102	Apr-17			**0.0123**	**5.06**				<0.000540	0.201	0.00242	0.0231			0.000673 JB		
	MW-102	Oct-17			**0.0135**	**5.52**				0.00110 J	**1.12**	0.00254	0.0176			0.000450 J		
	MW-102	Apr-18			**0.0181**	**7.83**				0.00358 B	**6.74**	0.0111	0.0651			0.000601 J		
	MW-102	Oct-18			**0.0130**	**7.92**				<0.00270	0.103 J	0.00376 J	0.0381			<0.00190		
	MW-103	Apr-15			0.00617 J	**9.36**				<0.0110	<0.300	<0.00480	0.0125 J			**0.0607 J**		
	MW-103	Apr-16			0.00594 J	**26.8**				<0.00270	<0.0750	0.00148 J	0.0262			<0.00190		
	MW-103	Apr-17			0.00848 J	**8.12**				<0.0108	<0.300	<0.00480	0.00689 J			<0.00760		
	MW-103	Apr-18			0.00699	**3.44**				<0.000540	0.0617 JB	<0.00240	0.00151 J			0.00106 J		
	MW-104	Apr-16			0.00165 J	0.0343 O1				<0.00270	<0.0750	<0.00120	0.0113 J			<0.00190 J3J6		
	MW-104	Apr-16	FD		0.00195 J	0.0319				<0.00270	<0.0750	<0.00120	0.00995 J			<0.00190		
	MW-104	Oct-16			**0.0164**	0.0293				0.00128 JB	0.0150 JB	<0.000240	0.00278 J			<0.000380		
	MW-104	Oct-16	FD		**0.0194**	0.0290				0.00132 JB	0.0190 JB	<0.000240	0.00277 J			<0.000380		
	MW-104	Apr-17			**0.0551**	0.0438				<0.000540	0.0283 J	<0.000240	0.00109 J			<0.000380		
	MW-104	Apr-17	FD		**0.0570**	0.0451 O1				<0.000540	<0.0150	<0.000240	0.00134 J			0.00166 JB		
	MW-104	Oct-17			**0.0584**	0.0430				<0.000540	0.0218 J	<0.000240	0.00326 J			<0.000380		
	MW-104	Oct-17	FD		**0.0602**	0.0446				0.000624 J	0.0247 J	<0.000240	0.00416 J			<0.000380		
	MW-104	Apr-18			**0.0200**	0.0371				0.00170 JB	0.241 B	<0.000240	0.00414 J			<0.000380		
	MW-104	Apr-18	FD		**0.0213**	0.0346				0.00103 JB	0.231	<0.000240	0.00567			0.000732 J		
	MW-104	Oct-18			**0.0159**	0.0306				<0.00270	<0.0750	<0.00120	0.0152 JB			<0.00190		
	MW-104	Oct-18	FD		**0.0185**	0.0353				0.000631 J	<0.0150	0.000503 JB	0.0157			<0.000380		
	MW-105	Apr-16			**0.0197**	1.31				<0.00270	0.286 J	0.00176 J	0.195			0.00947 J		
	MW-105	Oct-16			**0.0121**	1.15				0.00154 JB	0.265	0.00118 J	0.117			<0.000380		
	MW-105	Apr-17			**0.0123**	**2.63**				0.00150 J	0.151	0.00143 J	0.0622			0.0357		
	MW-105	Oct-17			**0.0237**	1.23				0.00900	0.492	0.00112 J	0.0657			0.000624 J		
	MW-105	Apr-18			**0.0220**	**4.29**				0.0165	**10.1**	**0.0326**	**0.285**			0.00123 JB		
	MW-105	Oct-18			0.00742	0.283				0.00246	0.848	0.000804 J	**0.216**			0.000508 J		
	MW-106	Apr-16			**0.0150**	0.0379				<0.00270	<0.0750	0.00274 J	0.0113 J			<0.00190		
	MW-106	Oct-16			**0.0152**	0.0232				0.00143 JB	0.0422 JB	0.00305 B	0.00515 B			0.000476 J		
	MW-106	Apr-17			**0.0114**	0.0259				<0.000540	<0.0150	0.00133 J	0.00658			0.00216 B		
	MW-106	Oct-17			**0.0105**	0.0263				0.0111	0.119	0.00271	0.00542			0.00731		
	MW-106	Apr-18			**0.0152**	0.0277				0.00136 JJ3J4	0.0688 J	0.00240	0.00677			0.000564 J		
	MW-106	Oct-18			**0.0165**	0.0397				0.00134 J	0.102	0.00291	0.00317 J			0.000436 J		
	MW-107	Apr-16			0.0100	**10.2**				0.00340 J	**1.78**	0.00200 J	**0.454**			<0.00190		
	MW-107	Oct-16			0.00388	1.30				0.000930 JB	0.158	0.000595 J	0.0896			<0.000380		
	MW-107	Apr-17			0.00143 J	1.99				<0.000540	**5.17**	0.000437 J	0.105			0.0145		
	MW-107	Apr-18			0.00157 J	**2.32**				<0.000540	**4.54**	0.000427 JB	0.146			<0.000380		

Table 4B - Summary of Groundwater Analytical Data - Total Metals

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Total Metals													
				Analyte:	Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
					7440-38-2	7440-39-3	7440-42-8		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
				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:	0.010	2.00	0.75	0.005	0.050	0.050	1.00	0.015	0.200	0.002	0.200	0.050	0.030	0.0631
				CGWSL Source:	WQCC HH	WQCC HH	WQCC Irr	WQCC HH	WQCC Irr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	WQCC HH	NMED TW
Area	**Well ID**	**Date**	**Dup**															
South Refinery	MW-109	Apr-16		**0.0331**	0.299				<0.00270	0.677	0.00147 J	**0.624**			<0.00190		
	MW-109	Oct-16		0.00269	0.0617				<0.000540	0.0900 J	<0.000240	0.0821			<0.000380		
	MW-109	Apr-17		0.00176 J	0.0479				<0.000540	0.0422 J	<0.000240	0.0425			<0.000380		
	MW-109	Oct-17		0.00146 J	0.0605				0.000611 J	0.0514 J	<0.000240	0.0413			0.000784 J		
	MW-109	Apr-18		0.00144 J	0.0441				<0.000540	0.0641 J	<0.000240	0.0265			0.00300		
	MW-109	Oct-18		0.00162 J	0.0472				<0.000540	0.0416 J	<0.000240	0.0340			0.000401 J		
	MW-110	Apr-16		**0.0854**	0.300				0.00399 J	**2.77**	0.00565 J	**6.26**			<0.00190		
	MW-110	Oct-16		**0.0344**	0.0480				<0.000540	0.730	0.000412 J	**1.67**			<0.000380		
	MW-110	Apr-17		0.00529	0.0571				<0.000540	0.229	<0.000240	**0.510**			<0.000380		
	MW-110	Oct-17		**0.0384**	0.0483				<0.000540	0.913	<0.000240	**1.78**			<0.000380		
	MW-110	Apr-18		0.00965	0.0887				0.00152 J	**1.26**	0.00123 J	**0.451**			<0.000380		
	MW-110	Oct-18		**0.0231**	0.0674				0.00155 J	**1.32**	0.00118 J	**1.60**			<0.000380		
	RA-313	Apr-15															
	RA-313	Apr-16															
	RA-313	Apr-17															
	RA-313	Apr-18															
	RW-4	Apr-15		0.00183 J	0.0521				<0.000540	0.0744 J	0.000665 J	0.104			<0.000380		
	RW-4R	Apr-16		0.00440 J	0.0623				<0.00270	0.181 J	<0.00120	0.0728			<0.00190		
	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-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-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		
South RO Reject Field	MW-114	Apr-16		0.00344 J	0.0155 J				<0.00270	<0.0750	<0.00120	**1.15**			<0.00190		
	MW-114	Oct-16		0.00327	0.0119				0.00115 JB	<0.0150	0.000617 J	**0.899**			0.00839		
	MW-114	Apr-17		0.00262	0.0138				<0.000540	<0.0150	<0.000240	**0.944**			0.00129 J		
	MW-114	Oct-17		0.00262	0.0129				<0.000540	0.0208 J	<0.000240	**0.873**			0.0179		
	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-115	Apr-16		**0.0230**	0.0415				<0.00270	0.134 J	0.00135 J	**0.308**			0.00217 J		
	MW-115	Oct-16		0.00838	0.00908				0.000944 JB	0.116 B	0.000381 J	0.146			<0.000380		
	MW-115	Apr-17		0.00336	0.00809				<0.000540	0.0381 J	<0.000240	0.0455			<0.000380		
	MW-115	Oct-17		0.00342	0.00796				<0.000540	0.0264 J	<0.000240	0.0553			0.000723 J		
	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-116	Apr-16		0.00422 J	0.0231 J				<0.00270	0.800	<0.00120	0.0396			<0.00190		
	MW-116	Oct-16		0.00720	0.0118				0.000922 JB	0.119	0.000397 J	0.0506			0.000738 J		
	MW-116	Apr-17		0.00357	0.0121				0.000560 J	0.224	0.000542 J	0.0545			0.00488		
	MW-116	Oct-17		0.00521	0.0178				0.00151 J	0.598	0.000647 J	0.0402			0.00741		
	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		
TEL	MW-49	Apr-16		0.00489 J	0.0439	0.695	<0.00500	<0.00130	<0.00270	0.0770 J	<0.00120	**0.269**	<0.0000490	0.00686 J	<0.00190	<0.00165	0.00245 J
	MW-49	Oct-16		0.00505	0.0449	0.642	<0.000160	<0.000260	0.000766 JB	0.127	0.000423 J	**0.223**	<0.0000490 J6	0.00867	<0.000380	<0.000330	0.000357 J
	MW-49	Apr-17		0.00426	0.0461	0.733	<0.000160	<0.000260	<0.000540	0.100	0.000499 J	**0.250**	<0.0000490	0.00809	<0.000380	<0.000330	0.000515 J
	MW-49	Oct-17		0.00467	0.0480	0.747	<0.000160	<0.000260	0.000609 J	0.128	0.000563 J	0.146	<0.0000490	0.0152	<0.000380	<0.000330	0.000321 J
	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
	TEL-1	Apr-16		0.00407 J	0.0126 J				0.0269	0.104 J	<0.00120	0.199			<0.00190		
	TEL-1	Oct-16		0.00256	0.00987				0.00911 B	0.0829 J	0.000300 J	**0.216**			<0.000380		
	TEL-1	Apr-17		0.00520	0.0116				0.0260	0.382	<0.000240	0.117			<0.000380		
	TEL-1	Oct-17		**0.0139**	0.0121				0.0196	0.258	0.000341 J	0.070			<0.000380		
	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-2	Apr-16		**0.0101**	0.127				0.00303 J	<0.0750	0.00131 J	0.0212 J			<0.00190		
	TEL-2	Oct-16		**0.0147**	0.0773				0.00209 B	0.0279 J	0.00145 J	0.0144			0.000618 J		
	TEL-2	Apr-17		**0.0123**	0.162				0.00307	0.0749 J	0.00143 J	0.0149			0.000558 J		
	TEL-2	Oct-17		**0.0140**	0.0942				0.00457	0.0896 J	0.00111 J	0.0166			0.000473 J		
	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-3	Apr-16		0.00876 J	0.0208 J				0.0269	0.171 J	<0.00120	0.00661 J			<0.00190		
	TEL-3	Oct-16		0.00126 J	0.0156				**0.138**	0.456	0.000368 J	0.0133			<0.000380		
	TEL-3	Apr-17		0.00204	0.0161				**0.156**	0.473	0.000250 J	0.0121			<0.000380		
	TEL-3	Apr-18		**0.0109**	0.0248				**0.334**	**1.47**	0.000726 J	0.0114			<0.000380		
	TEL-4	Apr-16		0.00710 J	0.0247 J				**0.282**	0.331 J	0.00330 J	**0.751**			<0.00190		
	TEL-4	Apr-16	FD	0.00736 J	0.0245 J				**0.306**	0.628	0.00316 J	**0.750**			<0.00190		
	TEL-4	Oct-16		0.00784	0.0190				**0.688**	**1.93**	0.00263	**0.508**			0.000883 J		
	TEL-4	Oct-16	FD	0.00700	0.0199				**0.389**	**1.07**	0.00241	**0.501**			<0.000380		
	TEL-4	Apr-17		0.00723	0.0185				**0.790**	**1.45**	0.00173 J	**0.973**			0.000535 J		
	TEL-4	Apr-17	FD	0.00707	0.0180				**0.443**	0.105	0.00110 J	**0.963**			<0.000380		
	TEL-4	Oct-17		0.00750	0.0178				**0.236**	0.952	0.00118 J	**1.05**			0.000561 J		
	TEL-4	Oct-17	FD	0.00731	0.0172				**0.273**	**1.03**	0.00125 J	**1.04**			0.000454 J		
	TEL-4	Apr-18		0.00733	0.0224				**0.593**	0.796	0.000795 J	**1.48**			<0.000380		
	TEL-4	Apr-18	FD	0.00695	0.0208				**0.741**	0.950	0.000918 J	**1.45**			0.000409 J		
	TEL-4	Oct-18		0.00130 J	0.0123				**0.274**	0.370	0.000418 J	**0.827**			<0.000380		
	TEL-4	Oct-18	FD	0.00160 J	0.0119				**0.293**	0.286	0.000413 J	**0.822**			<0.000380		
TMD	MW-8	Apr-15		**0.0108**	0.0107				**0.234**	0.779	0.000470 J	**0.507**			0.0188		
	MW-8	Apr-16		0.00885 J	0.0117 J				**0.107**	0.397 J	<0.00120	**0.538**			0.00622 J		
	MW-8	Apr-17		0.00678	0.0102				0.0259	0.111	<0.000240	**0.467**			0.00647		
	MW-8	Apr-18		0.00948	0.0110				**0.0627**	0.462	0.000387 J	**0.702**			0.0181		
	MW-16	Apr-14		0.00470 J	0.0151				<0.00200	<0.100	<0.00140	**0.244**			0.00322 J		
	MW-16	Apr-15		0.00500 J	0.0174 J				<0.00270	<0.0750	<0.00120	0.0950 J			0.00213 J		
	MW-16	Apr-17		0.00498	0.0127				<0.000540	<0.0150	<0.000240	0.00510			0.0106		
	MW-16	Apr-18		0.00612	0.0157				<0.000540 J3J4	0.0436 J	<0.000240	**0.322**			0.00394		
	MW-20	Apr-15		0.00621	0.0104				<0.000540	0.0746 J	<0.000240	0.00743			0.0289		
	MW-20	Apr-16		0.00628 J	0.0113 J				<0.00270	<0.0750	<0.00120	0.00814 J			0.0305		
	MW-20	Apr-17		0.00575	0.00980				<0.000540	<0.0150	<0.000240	0.00756			0.0188		
	MW-20	Apr-18		0.00700	0.0104				<0.000540	<0.0150	<0.000240	0.0197			0.0147		
	MW-21	Apr-16		0.00607 J	0.0100 J				<0.00270	<0.0750	<0.00120	**0.354**			0.0327		
	MW-21	Oct-16		0.00613	0.00790				<0.000540	<0.0150	<0.000240	**0.616**			0.0287		
	MW-21	Apr-17		0.00530	0.00817				<0.000540	<0.0150	<0.000240	**0.204**			0.0258		
	MW-21	Oct-17		0.00545	0.00860				0.000607 J	0.0290 J	<0.000240	**0.607**			0.0314		
	MW-21	Apr-18		0.00656	0.00782				<0.000540	<0.0150	<0.000240	**0.290**			0.0284		
	MW-21	Oct-18		0.00537	0.0101				<0.000540	<0.0150	<0.000240	**0.738** O1V			0.0331		
	MW-25	Apr-15		0.00984 J	0.0187 J				<0.00270	<0.0750	<0.00120	**0.582 J**			0.0204		
	MW-25	Apr-16		0.00582 J	0.0148 J				0.00332 J	<0.0750	<0.00120	**0.889**			<0.00190		
	MW-25	Apr-17		0.00300	0.0121				0.000842 J	0.0157 J	<0.000240	**0.507 V**			0.00254		
	MW-25	Apr-18		0.00338	0.0128				0.000687 J	0.0314 J	0.000330 J	**0.676 J3V**			0.00337		
	MW-26	Apr-15		0.00351	0.00944				<0.000540	0.0811 J	<0.000240	**0.613**			0.0197		
	MW-26	Apr-16		0.00384 J	0.0101 J				<0.00270	<0.0750	<0.00120	**0.847**			0.0194		
	MW-26	Apr-17		0.00335	0.00916				<0.000540	<0.0150	<0.000240	**0.560**			0.0232		
	MW-26	Apr-18		0.00426	0.00944				<0.000540 J3J4	<0.0150	0.000351 J	**0.513**			0.0238		

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:	Arsenic	Barium	Boron	Cadmium	Cobalt	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Uranium	Vanadium
					7440-38-2	7440-39-3	7440-42-8		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
				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:	0.010	2.00	0.75	0.005	0.050	0.050	1.00	0.015	0.200	0.002	0.200	0.050	0.030	0.0631
				CGWSL Source:	WQCC HH	WQCC HH	WQCC Irr	WQCC HH	WQCC Irr	WQCC HH	WQCC Dom	WQCC HH	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	WQCC HH	NMED TW
Area	**Well ID**	**Date**	**Dup**															
TMD	MW-27	Apr-15			0.00239	0.0235				<0.000540	<0.0150	<0.000240	0.0318			0.0180		
	MW-27	Apr-16			0.00228 J	0.0179 J				<0.00270	<0.0750	<0.00120	0.0186 J			0.0127		
	MW-27	Apr-17			0.00216	0.0153				<0.000540	<0.0150	<0.000240	0.0158			0.00706		
	MW-27	Apr-18			0.00335	0.0150				0.000709 JB	0.183	0.000265 J	0.0539			0.0124		
	MW-46R	Apr-16			0.00317 J	0.0140 J				<0.00270	0.159 J	<0.00120	0.125			<0.00190		
	MW-46R	Oct-16			0.00314	0.0150				0.000894 JB	0.196	0.000459 J	0.137			0.00154 J		
	MW-46R	Apr-17			0.00266	0.0134				<0.000540	0.167	0.000538 J	0.162			0.00199 J		
	MW-46R	Oct-17			0.00262	0.0130				<0.000540	0.0344 J	0.000354 J	0.124			0.00135 J		
	MW-46R	Apr-18			0.00428	0.0125				<0.000540	0.0570 J	0.000480 J	0.170			0.000882 J		
	MW-46R	Oct-18			0.00264	0.0119				0.000793 J	0.0221 J	<0.000240	0.107			0.00132 J		
	MW-68	Apr-15			0.00292	0.0159				<0.000540	0.0594 J	0.000524 J	0.00131 J			0.0123		
	MW-68	Apr-16			0.00314 J	0.0133 J				<0.00270	<0.0750	<0.00120	0.0393			0.00339 J		
	MW-68	Apr-17			0.00244	0.0107				<0.000540	<0.0150	<0.000240	0.0824			0.00275		
	MW-68	Apr-18			0.00326	0.0119				0.00211 B	0.141	0.000658 J	0.0543			0.00780		
	MW-71	Apr-15			0.00411	0.00897				0.000581 J	0.0373 J	<0.000240	0.000898 J	<0.0000490	0.00134 J	0.0349		0.0229
	MW-71	Apr-16			0.00436 J	0.0103 J	0.689 V	<0.00500	<0.00130	<0.00270	<0.0750	<0.00120	<0.00125	<0.0000490	<0.00175	0.0370	**0.0605**	0.0257
	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-89	Apr-15			0.00900 J	0.0144 J				<0.00270	0.120 J	<0.00120	0.0710 J			0.0275		
	MW-89	Apr-16			0.00839 J	0.0155 J				<0.00270	0.228 J	<0.00120	0.0788			0.0311	<0.00100	
	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		
	NP-1	Apr-16																
	NP-1	Oct-16																
	NP-1	Apr-17																
	NP-1	Oct-17																
	NP-1	Apr-18																
	NP-1	Oct-18																
	NP-2	Apr-13																
	NP-6	Apr-13																
	NP-6	Apr-15																
	NP-6	Apr-17																
Upgradient	UG-1	Apr-15			0.00113 J	0.0137				0.00242	0.0262 J	<0.000240	0.000764 J	<0.0000490	<0.000350 B	0.0103		0.0105
	UG-1	Apr-16			<0.00125	0.0136 J	0.574	<0.00500	<0.00130	<0.00270	<0.0750	<0.00120	<0.00125	<0.0000490	<0.00175	0.0140	0.0252 J	0.0107 J
	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-2	Apr-15			0.00205	0.0153				<0.000540	<0.0150	<0.000240	0.0110	<0.0000490	0.00527	<0.000380 B		0.0115
	UG-2	Apr-16			0.00202 J	0.0150 J	0.343	<0.00500	<0.00130	<0.00270	<0.0750	<0.00120	0.0147	<0.0000490	0.00905	0.00321 J	0.0156 J	0.0123 J
	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-3R	Apr-15			0.00258	0.0595				0.00368	**2.05**	0.000626 J	0.0725	<0.0000490	<0.000350 B	<0.000380 B		0.0135
	UG-3R	Apr-16			0.00182 J	0.0198 J	0.295	<0.00500	<0.00130	<0.00270	<0.0750	<0.00120	0.00141 J	<0.0000490	0.00188 J	0.00386 J	0.0122 J	0.0104 J
	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-4	Apr-16			<0.00125	0.0184 J	**1.19**	<0.00500	<0.00130	<0.00270	<0.0750	<0.00120	0.00752 J	<0.0000490	0.00203 J	0.00634 J	**0.0364 J**	0.00749 J
	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

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, March 2017, Table A-1, Tap Water Screening Level
WQCC Dom	NMED Groundwater standard for domestic exposure taken from 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 Parameters and Cyanide

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

				Analyte Group:	Water Quality Parameters									Cyanide
				Analyte:	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Nitrate-N	Cyanide
					7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	ARC-TDS	ARC-NO_3NO_2N	14797-55-8	57-12-5
				Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L
				CGWSL:	---	250	1.60	---	---	600	1,000	10.0	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-15		474	**788**	0.704	6.65	148	**1970**	**3060**	**15.3**		<0.00180	
	KWB-13	Apr-16		626	148	0.630	2.26 J	258	**2500**	**3720**	**13.7**		<0.00120	
	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	
	MW-17	Apr-14		395	174	1.19	2.31	72.2	**1200**	**2340**	2.19			
	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 J	209	**3030**	**6060 J**	1.38			
	NP-5	Apr-17		514	**444**	**1.63**	0.422 J	212	**3770**	**4810**	2.22			
	RA-3156	Apr-14		<0.500	**278**	0.299	2.67		**1800**	**3280**	7.89			
	RA-3156	Apr-16		370	**1140**	0.478	3.67 J	695	**1070**	**3050**	<0.197			
	RA-3156	Apr-17		337	**568**	0.668	2.41	292	**1080**	**2400**	0.330 J			
	RA-3156	Apr-18		341	**813**	0.470	2.63	444	**1020**	**2580**	<0.0197 J6			
	MW-136	Apr-16		699	**336**	1.23	2.95 J	149	**2870**	**4250**	9.76		<0.00120	
	MW-136	Oct-16		651	**355**	**1.66**	2.81	140	**2530**	**4400**	**12.4**		0.00188 J	
	MW-136	Apr-17		643	**401**	**1.81**	2.81	140	**2370**	**4360**	**17.1**		<0.00180	
	MW-136	Oct-17		671	**357**	1.50	2.61	148	**2470**	**3850**	**10.5**		<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	
Evaporation Ponds	MW-1R	Apr-15		765 J	**1970**	0.821	4.52 J	1080 J	**2400**	**5020**	<0.0200	<0.000380		
	MW-1R	Apr-16		1030	**3330**	0.603 J6	6.54	2090	**3320**	**10100**	<0.197	<0.000380		
	MW-1R	Apr-17		763	**2880**	0.736	5.11	1830	**3010**	**9180**	0.402 J			
	MW-1R	Apr-18		623 V	**2200**	0.679	4.56	1520 V	**2740**	**6900**	0.0640 J			
	MW-2A	Apr-16		933	**8400**	1.53	7.35	5280	**7640**	**20700**	0.501 J			
	MW-2A	Oct-16		598	**3290**	**3.43**	4.91	2270	**3450**	**9660**	0.122			
	MW-2A	Apr-17		720	**6650**	**2.19**	6.21	4310	**6010**	**19000**	0.0220 J			
	MW-2A	Oct-17		323	**1980**	**3.25**	3.65	1350	**2500**	**6060**	0.0340 J			
	MW-2A	Apr-18		702	**6270**	1.35	5.75	4870	**5800**	**18800**	0.0470 J			
	MW-2A	Oct-18		512	**4270**	**1.89**	5.36	3110	**4430**	**13300 J4**	0.0330 J			
	MW-3	Apr-16		728	**1360**	**1.87**	5.64	1160	**2640**	**6260**	0.404 J			
	MW-3	Apr-16	FD	690	**1290**	**1.87**	5.47	1140	**2530**	**6240**	0.231 J			
	MW-3	Oct-16		574	**1290**	**2.21**	5.69	865	**2380**	**5180**	0.0520 J			
	MW-3	Oct-16	FD	591	**1270**	**2.20**	5.85	854	**2380**	**5040**	0.0490 J			
	MW-3	Apr-17		603	**1330**	**1.94**	4.57	944	**2480**	**5080**	<0.197			
	MW-3	Apr-17	FD	599	**1330**	**1.98**	4.57	876	**2380**	**5190**	<0.0197			
	MW-3	Oct-17		549	**1340**	**2.39**	6.28	829	**2470**	**4640**	<0.0197			
	MW-3	Oct-17	FD	578	**1290**	**1.99**	6.35	803	**2430**	**4660**	<0.0197			
	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 Q**	0.481			
	MW-4A	Apr-16		507	**1860**	**1.78**	4.03 J	1060	**2990**	**5090**	<0.197			
	MW-4A	Oct-16		393	**1510**	**2.06**	4.06	890	**1970**	**4610**	0.0640 J			
	MW-4A	Apr-17		417	**1480**	**1.93**	3.51	919	**2070**	**4550**	<0.0197			
	MW-4A	Oct-17		434	**1470**	**1.85**	5.42	913	**2050**	**4500**	<0.0197			
	MW-4A	Apr-18		428	**1350**	**1.99**	5.05	899	**1820**	**4170**	0.0240 J			
	MW-4A	Oct-18		415	**1300**	**1.65**	4.58	988	**1800**	**3880**	<0.0197 J6			
	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 J**	<0.0200	<0.000380		
	MW-4B	Apr-17		360	**1330**	0.985	2.55	758	**1410**	**3690**	<0.0197			
	MW-5A	Apr-16		472	**3010**	**3.11**	7.39	2990	**5610**	**13700**	1.72			
	MW-5A	Oct-16		500	**3500**	**3.43**	6.34	3880	**7950**	**16300**	0.0440 JJ6			
	MW-5A	Apr-17		439	**3010**	**2.92**	7.27	3360	**5840**	**12500**	0.212			
	MW-5A	Oct-17		436	**2580**	**2.83**	8.93	2440	**4960**	**9500**	<0.0197			
	MW-5A	Apr-18		478	**3040**	**2.83**	7.82	2890	**6030**	**13700**	0.0530 J			
	MW-5A	Oct-18		415	**2800**	**1.80**	7.38	2620	**5720**	**11400**	<0.0197			
	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 J			
	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 J	485	**2020**	**3290**	<0.0200			
	MW-5C	Apr-17		383	**576**	0.971	3.90	500	**1740**	**3110**	<0.0197			
	MW-6A	Apr-15		809	**2010**	**1.85**	2.14 J	1090	**2240**	**6500**	0.875	<0.000380		
	MW-6A	Apr-16		449	**1300**	1.52	1.74 J	835	**2360**	**4290**	0.461 J			
	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 J			
	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 J	5.09	873	**2280**	**4760**	<0.0200	<0.000380		
	MW-6B	Apr-17		418	**1250**	0.694	3.97	738	**1730**	**4150**	<0.197			
	MW-7A	Apr-16		459	**2500**	1.24	4.18 J	1810	**3360**	**7620**	<0.197			
	MW-7A	Apr-16	FD	423	**2550**	1.24	3.94 J	1690	**3710**	**7540**	<0.197 J6			
	MW-7A	Oct-16		406	**2790**	1.49	4.22	1600	**3420**	**7460**	0.0260 J			
	MW-7A	Oct-16	FD	395	**2240**	1.45	4.01	1550 O1V	**2790**	**7340**	0.0470 J			
	MW-7A	Apr-17		371	**2240**	1.31	3.79	2000	**2700**	**6690**	0.0360 J			
	MW-7A	Apr-17	FD	434	**2230**	1.07	3.89 O1	1780	**2930**	**7810**	<0.0197			
	MW-7A	Oct-17		366	**2300**	1.23	3.97	1550	**2990**	**7100**	<0.0197			
	MW-7A	Oct-17	FD	386	**2520**	1.24	3.94	1650	**3290**	**6820**	<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 J			
	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 Q**	<0.0197			
	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 J			
	MW-10	Apr-16		523	**1530**	0.826	3.83 J	1110	**2220**	**5120**	<0.197			
	MW-10	Oct-16		647	**2100**	1.18	3.54	1180	**3740**	**6550**	0.0970 J			
	MW-10	Apr-17		460	**1460**	0.825	3.41	996	**2030**	**4850**	**593**			
	MW-10	Oct-17		475	**1370**	0.808	3.34	973	**2060**	**4830**	<0.0197			
	MW-10	Apr-18		472	**1300**	0.857	3.75	977	**1920**	**3380**	0.0550 J			
	MW-10	Oct-18		454	**1300**	0.854	3.35	1060	**2100**	**3800**	<0.0197			
	MW-11A	Apr-16		1280 V	**9440**	0.414 J6	19.0	5150	**3510**	**18600**	0.715 JJ6			
	MW-11A	Oct-16		1230	**9180**	0.752	20.8	4850	**3250**	**16600**	0.0480 JB			
	MW-11A	Apr-17		1280	**10200**	0.683	20.1	5130	**3290**	**19500**	0.305 J			
	MW-11A	Oct-17		1130	**9650**	0.340	19.8	4460	**3510**	**17900**	<0.0197			
	MW-11A	Apr-18		1250	**9560**	0.601	20.1	5210	**3570**	**14900**	0.562			
	MW-11A	Oct-18		1110	**11000**	**3.15 J**	20.7	4520	**3140**	**17400**	<0.0197			
	MW-11B	Mar-13		855	**6560**	<0.500	35.2	3340	**3030**	**15100**	<1.00			
	MW-11B	Apr-15		1070	**6000**	0.562	36.6	4040	**3860**	**12700**	<0.0200	<0.000380		
	MW-11B	Apr-17		979	**6050**	0.825	35.2	3660	**2890**	**14000**	<0.197			
	MW-12	Apr-14		728	**2460**	0.685	5.57	1280	**2490**	**7960**	4.1			
	MW-13	Apr-14		682	**1780**	0.354	5.56	914	**2180**	**6520**	0.463 J			
	MW-15	Apr-15		565	**2150**	**2.12**	5.01	1300	**2000**	**5470**	**16.0**	<0.000380		
	MW-15	Apr-16		487	**611**	**2.01**	5.53	795	**1240**	**4720**	3.99			
	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			

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

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Water Quality Parameters									Cyanide
				Analyte:	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Nitrate-N	Cyanide
					7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	ARC-TDS	ARC-NO_3NO_2N	14797-55-8	57-12-5
				Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L
				CGWSL:	---	250	1.60	---	---	600	1,000	10.0	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-18A	Apr-16		704	**6820**	**2.83**	46.6	4730	**6360**	**20500**	0.371 J		<0.00180
	MW-18A	Oct-16		662	**7270**	**3.22**	42.4	4740	**6870**	**20200**	0.0300 J		<0.00180
	MW-18A	Apr-17		623	**5790**	1.46	38.8	3940	**6330**	**17100**	0.0220 J		<0.00180
	MW-18A	Oct-17		713	**7090**	1.60	40.7	4020	**7410**	**15100**	<0.0197		<0.00180
	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-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-22A	Apr-16		548	**1890**	0.645	4.08 J	1440	**2340**	**6190**	<0.197		
	MW-22A	Apr-16	FD	541	**1900**	0.660	4.04 J	1440	**2560**	**6160**	<0.197		
	MW-22A	Oct-16		570	**1940**	0.752	3.96	1490	**2380**	**6970**	0.219 B		
	MW-22A	Oct-16	FD	563	**2030**	0.733	3.88	1450	**2400**	**7220**	0.0490 JB		
	MW-22A	Apr-17		493	**2090**	0.632	3.71	1350	**2530**	**6630**	<0.197		
	MW-22A	Apr-17	FD	503	**1860**	0.743	3.73	1340	**2160**	**4210**	<0.0197		
	MW-22A	Oct-17		491	**1990**	0.614	3.49	1380	**2450**	**6010**	<0.0197		
	MW-22A	Oct-17	FD	505	**2210**	0.655	3.43	1340	**2610**	**5910**	<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-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-70	Apr-16		720	**1370**	0.775	5.46	908	**2240**	**5730**	0.416 J		
	MW-70	Oct-16											
	MW-70	Apr-17		673	**1290**	0.626	4.87	852	**2460**	**4660**	<0.0197		
	MW-70	Oct-17											
	MW-70	Apr-18		766	**1490**	0.694	5.51	825	**2720**	**5810**	0.0660 J		
	MW-70	Oct-18											
	MW-72	Apr-15		896	**5240**	**3.91**	13.3	3030	**3800**	**12900**	6.37		
	MW-72	Apr-16		700	**3310**	**5.88**	8.82	2060	**3400**	**9140**	1.88		
	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-73	Apr-15		659	**2480**	**1.94**	3.12 J	2200	**4560**	**9360**	0.757		
	MW-73	Apr-16		597	**2790**	**1.96**	2.32 J	2240	**5090**	**9360**	0.501 J		
	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-74	Apr-16		632	**1640**	**7.44**	35.6	2080	**3100**	**8280**	0.796 J		
	MW-74	Oct-16		566	**1900**	**8.61**	44.9	3120	**4880**	**10200**	**211**		
	MW-74	Apr-17		557	**2030**	**7.23**	39.9	2690	**4490**	**9080**	**55.7**		
	MW-74	Oct-17		576	**2050**	**7.68**	41.1	2170	**4470**	**9220**	**44.7**		
	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-75	Apr-16		374	**1530**	**7.62**	21.5	1640	**1940**	**5940**	<0.197		
	MW-75	Oct-16		351	**1400**	**7.88**	17.5	1480	**2080**	**6000**	0.0490 JB		
	MW-75	Apr-17		333	**1550**	**7.16**	17.5	1510	**2520**	**6100**	3.35		
	MW-75	Oct-17		358	**1490**	**7.81**	18.2	1350	**2240**	**5020**	<0.0197		
	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-76	Apr-16		531	**1180**	**2.96**	29.4	1110	**2250**	**5220**	<0.197		
	MW-76	Oct-16		553	**1200**	**3.26**	28.6	1130	**2490**	**6010**	0.0470 JB		
	MW-76	Apr-17		485	**1380**	**2.54**	25.9	969	**2850**	**5750**	<0.197		
	MW-76	Oct-17		479	**1300**	**3.06**	26.5	993	**2440**	**4630**	<0.0197		
	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-77	Apr-16		589	**378**	**3.03**	82.9	1610	**4010**	**7110**	0.406 J		
	MW-77	Oct-16		579	**294**	**3.14**	82.1	1380	**4000**	**7850**	0.0470 JB		
	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-78	Apr-15		576	63.2	0.0979 J	18.9	320	19.6 J	**2560**	4.24		
	MW-78	Apr-16		659	72.5	**9.96**	22.9	540	**2690**	**5270**	<0.197		
	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-79	Apr-16		603	**1390**	**7.08**	8.43	1140	**2040**	**5320**	1.87		
	MW-79	Oct-16		525 V	**1380**	**7.01**	7.28	869 V	**2000**	**5180**	0.070 JB		
	MW-79	Apr-17		527 V	**1590**	**7.33**	7.58	987	**2330**	**5040**	2.26		
	MW-79	Oct-17		598	**1700**	**6.17**	6.86	871	**2320**	**5190**	0.188		
	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-80	Apr-15		693	**1600**	**3.15**	3.08 J	1210	**2700**	**5600**	0.519		
	MW-80	Apr-16		875	**1970**	**3.30**	4.07 J	1240	**2270**	**6340**	0.523 J		
	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-81	Apr-15		583	**1110**	**6.20**	9.40	1380	**2800**	**6260**	**99.5**		
	MW-81	Apr-16		687	**1120**	**5.93**	12.2	1690	**2790**	**6730**	**105**		
	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-82	Apr-15		284	**1110**	**10.7**	9.28	1700	**2200**	**5770**	<0.0200		
	MW-82	Apr-16		350	**1360**	**12.1**	9.87	1790	**2350**	**5410**	0.262 J		
	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-83	Apr-16		483	**769**	**4.80**	36.7	563	**3770**	**4980**	<0.197		
	MW-83	Oct-16		417	11.0	**6.99**	45.9	139	**3300**	**4610**	0.101		
	MW-83	Apr-17		483	45.4	**4.80**	49.4	256	**3840**	**5900**	<0.197		
	MW-83	Oct-17		462	**291**	**4.74**	48.2	293	**3590**	**5240**	<0.0197		
	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-84	Apr-16		643	**1410**	**5.54**	10.2	1840	**4550**	**9480**	<0.197		
	MW-84	Oct-16		561	**1230**	**5.96**	12.2	1460	**5280**	**9560**	0.0480 J		
	MW-84	Apr-17		573	**1850**	**5.68**	8.06	1430	**4690**	**9360**	<0.197		
	MW-84	Oct-17		589	**1860**	**5.22**	6.56	1520	**4670**	**8460**	0.0570 J		
	MW-84	Apr-18		595	**1710**	**4.49**	7.29	1630	**4220**	**9640**	0.0630 J		
	MW-84	Oct-18		574	**1750**	**4.62**	6.34	1560	**4420**	**9300**	<0.0197		
	MW-87	Apr-16		728 V	**4180**	1.40	27.9 V	3230 V	**4310**	**12000**	<0.197		
	MW-87	Oct-16											
	MW-87	Apr-17		648	**4340**	1.02	24.3	3560	**5020**	**13500**	<0.0197		
	MW-87	Oct-17											
	MW-87	Apr-18		677	**4150**	1.48	24.2	2930	**4570**	**11600**	0.0610 J		
	MW-87	Oct-18											
	MW-88	Apr-16		417	**1610**	1.22	3.10 J	1220	**2600**	**5800**	<0.197		
	MW-88	Oct-16											
	MW-88	Apr-17		406	**1710**	1.04	3.00	1100	**2410**	**6300**	<0.197		
	MW-88	Oct-17											
	MW-88	Apr-18		421 V	**1650**	1.15	3.09	1110	**2360**	**4640**	0.0750 J		
	MW-88	Oct-18											

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

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Water Quality Parameters									Cyanide
				Analyte:	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Nitrate-N	Cyanide
					7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	ARC-TDS	ARC-NO_3NO_2N	14797-55-8	57-12-5
				Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L
				CGWSL:	---	250	1.60	---	---	600	1,000	10.0	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-120	Apr-16		939	**3690**	**2.56**	4.25 J	1910	**2510**	**9100**	<0.197			
	MW-120	Oct-16		919	**3830**	**2.68**	3.71	1520	**2410**	**9080**	0.0470 JJ6			
	MW-120	Apr-17		728	**3070**	**3.15**	3.11	1600	**2730**	**8460**	<0.197			
	MW-120	Oct-17		671	**2970**	**3.24**	3.33	1240	**3580**	**7120**	<0.0197			
	MW-120	Apr-18		556	**1760**	**2.79**	6.26	1310	**2670**	**6480**	0.0720 J			
	MW-120	Oct-18		583 O1V	**1670**	**3.66**	2.60	1320	**3320**	**5380**	0.168			
	MW-121	Apr-16		718	**1520**	**4.34**	3.39 J	968	**3790**	**5550**	2.13			
	MW-121	Oct-16		588	**1150**	**5.24**	3.18	834	**3070**	**5470**	1.69			
	MW-121	Apr-17		597	**1210**	**4.69**	2.87	862	**2840**	**5100**	1.19			
	MW-121	Oct-17		610	**1050**	**5.14**	3.19	780	**3070**	**5440**	1.39			
	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-122	Apr-16		549	**1920**	**3.57**	4.78 J	1350	**3430**	**6700**	0.499 J			
	MW-122	Oct-16		491	**1760**	**3.29**	4.31	1160	**2270**	**5730**	0.0280 J			
	MW-122	Apr-17		632	**2700**	**3.71**	5.19	1770	**3900**	**9060**	<0.197			
	MW-122	Oct-17		397	**1610**	**3.02**	3.93	950	**2640**	**4580**	<0.0197			
	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-123	Apr-16		570	**1880**	1.09	3.73 J	1320	**2410**	**5850**	<0.197			
	MW-123	Oct-16		510	**1600**	1.200	3.59	1090	**2420**	**4990**	0.0470 J			
	MW-123	Apr-17		514 V	**1730**	1.22	3.72	1240 V	**2190**	**6200**	0.0540 JP1			
	MW-123	Oct-17		516	**1580**	1.08	3.46	1030	**2360**	**5000**	<0.0197			
	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-124	Apr-16		929	**1490**	1.20	8.45	2150	**1720**	**9800**	0.415 J			
	MW-124	Oct-16		719	**3270**	1.31	6.37	1670	**3930**	**9340**	0.0470 J			
	MW-124	Apr-17		715	**3110**	0.739	6.44	2140	**3950**	**9780**	<0.0197			
	MW-124	Oct-17		781	**3510**	0.871	6.24	1830	**4440**	**8860**	<0.0197			
	MW-124	Apr-18		786	**3110**	1.02	6.67	1820	**3700**	**8980**	<0.0197			
	MW-124	Oct-18		798 V	**3700**	0.848	7.16	1730	**4440**	**9520**	<0.0197			
	OCD-1R	Apr-16		641	**2570**	**2.9**	4.54 J	2220	**3550**	**8960**	0.928 J			
	OCD-1R	Oct-16		701	**2560**	**3.36**	4.76	1800	**3060**	**8900**	0.0530 JB			
	OCD-1R	Apr-17		570	**2490**	**3.60**	4.22	1960	**3020**	**8460**	0.213 J			
	OCD-1R	Oct-17		607	**2280**	**3.08**	4.07	1570	**3110**	**7220**	0.0720 J			
	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-2A	Apr-16		678	**1800**	0.705	5.98	1340	**2750**	**5870**	0.417 J			
	OCD-2A	Oct-16												
	OCD-2A	Apr-17		655	**1840**	0.800	5.49	995	**1860**	**5850**	<0.197			
	OCD-2A	Oct-17												
	OCD-2A	Apr-18		530	**1160**	0.813	4.88	825	**1990**	**4530**	0.187			
	OCD-2A	Oct-18												
	OCD-3	Apr-16		746	**1640**	0.899	14.5	1100	**3080**	**5890**	<0.197			
	OCD-3	Oct-16												
	OCD-3	Apr-17		733	**2030**	0.998	14.4	1120	**2160**	**6440**	<0.197			
	OCD-3	Oct-17												
	OCD-3	Apr-18		842	**2110**	0.845	14.7	1070	**2750**	**6220**	0.194			
	OCD-3	Oct-18												
	OCD-4	Apr-16		927	**5320**	0.608	36.2	3400	**3610**	**12700**	0.446 J			
	OCD-4	Oct-16												
	OCD-4	Apr-17		809	**4110**	0.908	33.7	2330	**2850**	**11000**	0.0390 JP1			
	OCD-4	Oct-17												
	OCD-4	Apr-18		847	**4550**	0.759	34.0	2540	**3430**	**9500**	0.101			
	OCD-4	Oct-18												
	OCD-5	Apr-16		900	**5030**	0.774 J3J6	41.2	2960	**3780**	**9960**	0.222 J			
	OCD-5	Oct-16		851	**4700**	0.892	39.0	2830	**3080**	**12700**	0.0520 JBJ6			
	OCD-5	Apr-17		829	**4720**	0.872	40.0	2780	**2990**	**12100**	<0.197			
	OCD-5	Oct-17		906	**7230**	0.669	35.5	2710	**5020**	**11200**	<0.0197			
	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-6	Apr-16		866	**4440**	**2.47**	17.0	2700	**3410**	**10600**	1.22			
	OCD-6	Oct-16		790	**4110**	**2.79**	14.1	2600	**2850**	**10200**	0.0920 J			
	OCD-6	Apr-17		834	**4030**	**2.39**	15.8	2870	**2570**	**11000**	1.02			
	OCD-6	Oct-17		855	**4770**	**2.66**	15.4	2580	**3190**	**11600**	<0.0197			
	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 J4**	<0.0197			
	OCD-7AR	Apr-16		694	**2550**	**2.78**	6.27	2580	**4740**	**8480**	1.03			
	OCD-7AR	Oct-16		596	**3020**	**3.50**	5.78	2410	**4870**	**8860**	0.0430 J			
	OCD-7AR	Apr-17		600	**2550**	**2.72**	5.59	2870	**3970**	**8960**	0.0420 J			
	OCD-7AR	Oct-17		618	**2700**	**3.02**	5.71	2450	**4190**	**9920**	<0.0197			
	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 J4**	<0.0197			
	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-8A	Apr-16		762	**3480**	**1.88**	9.09	2410	**3630**	**11000**	<0.197			<0.00180
	OCD-8A	Oct-16		680	**3270**	**2.39**	9.22	2380	**3660**	**9600**	0.0870 J			0.00182 J
	OCD-8A	Apr-17		658	**2870**	**2.16**	8.50	2510	**3410**	**8960**	0.0300 J			<0.00180
	OCD-8A	Oct-17		696	**2960**	**2.27**	8.54	2030	**4140**	**9000**	<0.0197			<0.00180
	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-8B	Apr-13		716	**2180**	0.980	8.75	1330	**2880**	**7400**	<1.00			
	OCD-8B	Apr-15		680	**2020**	0.934	9.51	1520	**2910**	**7110**	0.0233 J			
	OCD-8B	Apr-17		660	**2030**	0.925	9.07	1800	**2620**	**7390**	0.0320 J			
Field East of Refinery	KWB-1A	Apr-16		619	**575**	1.26	1.37 J	271	**3080**	**4990**	4.61			<0.00120
	KWB-1A	Oct-16		553	**553**	1.21	1.21	274	**2950**	**4600**	0.514 B			<0.00180
	KWB-1A	Apr-17		566	**530**	1.39	1.19	269	**2940**	**4930**	1.09			<0.00180
	KWB-1A	Oct-17		514	**387**	1.12	0.966 J	266	**2990**	**4520**	0.409			<0.00180
	KWB-1A	Apr-18		511	**354**	1.21	1.00	272	**2930**	**4690**	0.341			<0.00180
	KWB-1A	Oct-18		457	**339**	1.48	1.53 JB	251	**2670**	**4060**	0.219			<0.00180
	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-7	Apr-15		279	**301**	0.754	0.209 J	238	**886**	**2100**	<0.200			<0.00180 J
	KWB-7	Oct-15		320	**358**	0.813	0.152 J	252	**1120**	**2570**	0.202 J			<0.00180
	KWB-7	Apr-16		325	**281**	0.917	0.236 J	248	**953**	**2830**	<0.197			0.00500 J
	KWB-7	Oct-16		355	**420**	0.933	0.194 J	281	**1160**	**3030**	0.0580 JB			<0.00180
	KWB-7	Apr-17		306	**305**	0.822	0.225 J	230	**1070**	**2540**	0.0600 J			<0.00180
	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-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

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

2018 Annual Groundwater Monitoring Report

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

		Analyte Group:		Water Quality Parameters									Cyanide
		Analyte:		Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Nitrate-N	Cyanide
				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	ARC-TDS	ARC-NO_3NO_2N	14797-55-8	57-12-5
		Units:		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L
		CGWSL:		---	250	1.60	---	---	600	1,000	10.0	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-10R	Apr-16		149	190	1.42	0.573 J	153	<0.0774	**1090**	<0.197		
	KWB-10R	Oct-16		148	189	1.28	0.548 J	135	110	**1160**	0.364 B		
	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-16		710	**1600**	0.642	0.797 J	426	**1570**	**5840**	**42.4**		0.0230
	KWB-11A	Oct-16		647	**1460**	0.742	0.719 J	450	**1590**	**5940**	**30.9**		<0.00180
	KWB-11A	Apr-17		607	**1310**	0.487	0.903 J	372	**1540**	**4960**	**33.9**		<0.00180
	KWB-11A	Oct-17		406	**788**	0.474	0.566 J	379	**979**	**3550**	1.95		<0.00180
	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-11B	Apr-16		438	218	0.441	2.11 JO1	81.3 V	**1200**	**2160**	2.43		<0.00120
	KWB-11B	Oct-16		408	239	0.479	2.00	81.0	**1290**	**2410**	2.17		<0.00180
	KWB-11B	Apr-17		479	**291**	0.369	2.37	89.5	**1660**	**2710**	3.48		<0.00180
	KWB-11B	Oct-17		476	230	0.280	2.13	87.5	**1300**	**2590**	3.54		<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-12A	Apr-15		528	**668**	**18.5**	0.723 J	128	**2380**	**3660**	4.31		<0.00180
	KWB-12A	Apr-15	FD	493	133	0.605	0.630 J	123	**2110**	**3630**	4.34		<0.00180
	KWB-12A	Oct-15		560	138	0.618	0.963 J	155	**2730**	**3490**	4.55		<0.00180
	KWB-12A	Apr-16		579	**539**	0.879	0.811 J	155	**2360**	**3670**	6.18		<0.00180
	KWB-12A	Oct-16		549	163	0.757	1.15	161	**2400**	**3930**	7.34		<0.00180
	KWB-12A	Apr-17		541	136	0.446	0.786 J	131	**2280**	**4260**	7.12		<0.00180
	KWB-12A	Oct-17		511	133	0.512	0.999 J	127	**2230**	**3640**	8.21		<0.00180
	KWB-12A	Oct-18		475	92.4	0.439	0.696 J	120	**1890**	**2850**	9.14		<0.00180
	KWB-12B	Apr-16		528	121	0.438	0.466 J	132	**2520**	**3600**	6.42		<0.00120
	KWB-12B	Apr-16	FD	500	108	0.459	0.445 J	123	**1930**	**3930**	4.30		<0.00120
	KWB-12B	Oct-16		497	129	0.500	0.565 J	128	**2210**	**3620**	5.44		<0.00180
	KWB-12B	Oct-16	FD	505	116	0.474	0.584 J	129	**2190**	**3740**	5.56		<0.00180
	KWB-12B	Apr-17		554	144	0.419	0.641 J	135	**2410**	**3880**	6.87		<0.00180
	KWB-12B	Apr-17	FD	556	146	0.310	0.720 J	149	**2980**	**3520**	7.57		<0.00180
	KWB-12B	Oct-17		542	136	0.353	0.603 J	139	**2370**	**3730**	7.26		<0.00180
	KWB-12B	Oct-17	FD	526	115	0.332	0.584 J	134	**2310**	**3910**	6.71		<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-P4	Apr-13											
	KWB-P4	Apr-15											
	KWB-P4	Apr-17											
	MW-57	Apr-16		593	**386**	**2.02**	1.59 J	368	**2350**	**3660**	**11.0**		
	MW-57	Oct-16		538	210	**2.99**	2.00	387	**2710**	**4730**	**33.3**		
	MW-57	Apr-17		538	**336**	**2.38**	1.62	342	**2630**	**4530**	**13.8**		
	MW-57	Oct-17		570	179	**2.39**	1.81	402	**3110**	**5100**	**33.3**		
	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-58	Apr-16		262	**278** J	1.24	0.421 J	123	134	**1510**	0.518 J		<0.00120
	MW-58	Oct-16		210	174	1.57	0.392 J	94.2	3.77 J	**1140**	0.0620 JB		<0.00180
	MW-58	Apr-17		229	**280**	1.40	0.370 J	123	106	**1550**	0.0380 J		<0.00180
	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-111	Apr-16		248	**402**	1.33	<0.185	229	355	**2130**	0.0640 J		
	MW-111	Oct-16		224	**426**	1.39	0.222 JB	192	390	**1820**	0.0880 JB		
	MW-111	Apr-17		232	**456** J3	1.28	0.203 J	211	366 P1	**2250**	0.266 J		
	MW-111	Oct-17		217	**392**	1.31	0.102 J	234	317	**1880**	<0.0197		
	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-113	Apr-16		314	199	0.294 J3	0.611 J	154	**1090**	**2370**	0.393 J		
	MW-113	Apr-16	FD	327	207	0.389	0.612 J	167	**1080**	**2400**	0.0480 J		
	MW-113	Oct-16		298 V	182	0.488	0.429 J	156	**925**	**2150**	0.0470 JB		
	MW-113	Oct-16	FD	299	195	0.594	0.408 J	160	**945**	**2240**	0.0510 JB		
	MW-113	Apr-17		304	193	0.459	0.525 J	158	**1070**	**2140**	<0.197		
	MW-113	Apr-17	FD	296	208	0.525	0.514 J	151	**940**	**2420**	<0.197		
	MW-113	Oct-17		294	148	0.331	0.405 J	150	**848**	**2430**	0.442		
	MW-113	Oct-17	FD	301	184	0.510	0.414 J	151	**1040**	**2240**	<0.0197		
	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-125	Apr-16		577	**342**	1.18	1.39 J	245	**2900**	**4440**	0.537 J		
	MW-125	Oct-16		530	**294**	1.25	1.33	220	**2660**	**4370**	0.247 B		
	MW-125	Apr-17		495	**310**	1.33	1.27	218	**2810**	**4600**	0.751 J		
	MW-125	Oct-17		573	**313**	1.39	1.78	236	**3000**	**5200**	0.216		
	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-126A	Apr-16		342	245	1.02	0.465 J	124	**1270**	**2360**	0.258 J		
	MW-126A	Oct-16		192	78.9	1.28	0.379 J	132	**875**	**1860**	0.139 B		
	MW-126A	Apr-17		369	**271**	0.804	0.584 J	193	**1780**	**2850**	0.509 J		
	MW-126A	Oct-17		294	150	0.957	0.418 J	146	**1300**	**2410**	<0.0197		
	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-126B	Apr-16		574	**314**	0.837	2.54 J	214	**2700**	**3590**	0.737 JB		
	MW-126B	Oct-16		542	**286**	0.862	2.19	220	**2210**	**3650**	0.295 B		
	MW-126B	Apr-17		524	**308**	0.649	2.27	206	**2550**	**3890**	0.342 J		
	MW-126B	Oct-17		524	**290**	0.729	2.17	197	**2410**	**3740**	0.419		
	MW-126B	Apr-18		534	**266**	0.764	2.36	202	**2310**	**3680**	0.436		
	MW-126B	Oct-18		561	**264**	0.930	3.07	213	**2290**	**3610**	0.639		
	MW-127	Apr-16		244	245	1.10	0.335 J	153	552	**1910**	<0.197		
	MW-127	Oct-16		248	237	1.14	0.282 J	146	**713**	**3840**	0.0490 JB		
	MW-127	Apr-17		242	**251**	0.949	0.264 J	146	**799**	**2140**	<0.197		
	MW-127	Oct-17		262	231	0.993	1.46	142	**776**	**1970**	0.146		
	MW-127	Apr-18		245	225	0.997	0.279 J	148	**677**	**2010**	<0.0985		
	MW-127	Oct-18		240	219	0.979	1.29 JB	135	**670**	**1940**	<0.0197		
	MW-128	Apr-16		1010	**266**	1.22	1.92 J	560	286	**1580**	1.28		
	MW-128	Oct-16		203	249	1.28	0.586 J	108	280	**1470**	0.0460 JB		
	MW-128	Apr-17		182	**264**	1.27	0.536 J	106	273	**1580**	0.0340 J		
	MW-128	Oct-17		186	200	1.29	0.354 J	107	248	**1370**	<0.0197		
	MW-128	Apr-18		181	175	1.23	0.764 J	115	207	**1280**	<0.0197		
	MW-128	Oct-18		161 V	170	1.13	0.412 J	97.3 O1V	147	**1650**	0.0230 JJ6		
	MW-129	Apr-16		170	**300**	1.10	0.331 J	210	44.1	**1520**	<0.197		
	MW-129	Oct-16		162	**293**	1.13	0.270 J	198	44.1	**1340**	0.0770 JB		
	MW-129	Apr-17		163	**300**	1.02	0.334 J	199	44.1	**1250**	<0.197 J5		
	MW-129	Apr-18		162	**282**	1.04	0.251 J	201	52.6	**1270**	<0.0197		

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

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Water Quality Parameters									Cyanide
				Analyte:	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Nitrate-N	Cyanide
					7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	ARC-TDS	ARC-NO_3NO_2N	14797-55-8	57-12-5
				Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L
				CGWSL:	---	250	1.60	---	---	600	1,000	10.0	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	MW-130	Apr-16		281	**293**	0.907	0.870 J	324	**1030**	**2570**	3.82 J6		
	MW-130	Oct-16		260	**253**	0.914	0.695 J	285	**1110**	**2600**	0.631		
	MW-130	Apr-17		263 V	**266**	0.778	0.676 J	290 V	**1020**	**2510**	3.26		
	MW-130	Oct-17		252	218	0.533	0.625 J	281	**880**	**2520**	2.75		
	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-131	Apr-15		168	**271**	0.683	0.328 J	157	9.57	**1980**	<0.0200		
	MW-131	Oct-15		197	**295**	0.787	0.622 J	161	16.1	**1180**	0.0380 J		
	MW-131	Apr-16		158	**288**	0.774	0.238 J	167	9.49	**1250**	<0.197		
	MW-131	Oct-16		158	**291**	0.868	0.250 J	158	9.61	**1270**	0.0530 JB		
	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-133	Nov-14		200	170	1.10	0.460 J	140 V	140	**1300**	<0.0200		
	MW-133	Apr-15		163	174	1.19	0.323 J	122	116	**1190**	<0.200		
	MW-134	Apr-16		576 V	**498**	1.24	1.70 J	311 V	**2800**	**4560**	2.79		
	MW-134	Apr-16	FD	565	**497**	1.24	1.69 J	303	**2780**	**4910**	2.73		
	MW-134	Oct-16		518	**460**	1.23	1.60	288	**2980**	**5020**	2.10		
	MW-134	Oct-16	FD	512	**473**	1.18	1.58	286	**2910**	**4860**	2.28		
	MW-134	Apr-17		528	**499**	0.944	1.56	247	**2880**	**4140**	3.37		
	MW-134	Apr-17	FD	527	**470**	0.902	1.61	269	**3170**	**4120**	4.03		
	MW-134	Oct-17		502	**373**	0.730	1.50	246	**2620**	**4480**	3.80		
	MW-134	Oct-17	FD	525	**425**	1.02	1.58	249	**2700**	**4960**	3.59		
	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-135	Apr-16		2780	**1010**	0.993	5.74	2640	**2470**	**5320**	**34.7**		
	MW-135	Oct-16		590	**1310**	1.18	0.993 J	624	**2500**	**5980**	**58.9**		
	MW-135	Apr-17		608	**1200**	1.23	0.979 J	626	**2900**	**5050**	**63.3**		
	MW-135	Oct-17		569	**1100**	0.644	0.923 J	633	**2810**	**5650**	**54.5**		
	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**		
	RA-4196	Apr-16		422	122	0.344	2.36 J	103	**1150**	**2800**	0.070 J		
	RA-4196	Oct-16		382	151	0.299	2.11	103	**1310**	**2410**	0.0490 JBJ6		
	RA-4196	Apr-17		378	142	0.309	2.19	91.1	**1250**	**2220**	<0.197		
	RA-4196	Oct-17		376	109	0.242	2.10	99.4	**1100**	**2360**	<0.0197		
	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-4798	Apr-16		449	142	0.347	2.40 J	117	**1290**	**2290**	1.28		
	RA-4798	Oct-16		437	174	0.359	2.27	129	**1560**	**2880**	0.930		
	RA-4798	Apr-17		305	95.1	0.359	2.03	64.6	**1010**	**1820**	1.55		
	RA-4798	Oct-17		378	127	0.215	2.06	99.5	**1300**	**2220**	1.82		
	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		
	RW-12R	Apr-16		448	174	0.334	0.437 J	181	**1610**	**3130**	0.326 J		
	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-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-18	Apr-15		482	232	**2.46**	1.30	230	**3670**	**4440**	6.55		
	RW-18	Apr-16		542	193	**2.85**	1.13 J	186	**3800**	**4640**	2.79		<0.00120
	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-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		
North Refinery	MW-23	Apr-16		110	**500**	**1.81**	2.14 J	561	1.84 J	**1990**	<0.197		
	MW-23	Oct-16		259	**445**	1.58	2.16	430	0.536 J	**2140**	<0.197		
	MW-23	Apr-17		102	**517**	**1.74**	1.59	446	5.27	**2040**	<0.197		
	MW-23	Oct-17		106	**438**	**1.64**	1.70	460	6.35	**1800**	<0.197		
	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-29	Apr-16		465	134	1.04	1.29 J	210	**2620**	**3830**	0.105 J6		
	MW-29	Oct-16		398	**282**	0.919	0.964 J	227	**1660**	**3210**	0.502 J		
	MW-29	Apr-17		412 V	**268**	0.642	0.745 J	178 V	**1790**	**3670**	<0.197		
	MW-29	Oct-17		407	**278**	0.949	1.14	261	**1600**	**3370**	<0.0985		
	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-39	Apr-16		113	**305**	**2.68**	0.459 J	1290	**951**	**4010**	0.530 J		
	MW-39	Oct-16		189	**334**	**2.35**	0.546 J	1510	**2360**	**5950**	<0.197		
	MW-39	Apr-17		84.0	**271**	**2.60**	0.347 J	1260	**957**	**3890**	<0.197		
	MW-39	Oct-17		73.3	148	**3.06**	0.303 J	989	**953**	**3040**	<0.0197		
	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-40	Apr-15		571	**298**	**1.66**	1.89 J	134	**1380**	**2640**	<0.200		
	MW-40	Apr-16		504	146	**1.70**	1.76 J	127	**1680**	**2670**	<0.197		
	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-41	Apr-15		313	**290**	1.07	0.648 J	501	**1410**	**2710**	<0.0200		
	MW-41	Apr-16		258	**312**	1.04	0.393 J	453	**1180**	**2530**	<0.197		
	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-42	Apr-15		309	**562**	0.962	0.579 J	611	**1110**	**3440**	<0.0200		
	MW-42	Apr-16		295	**457**	0.867	0.617 J	601	**1090**	**3010**	<0.197		
	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-43	Apr-16		178	**1010**	**2.27**	0.956 J	812	**747**	**4820**	0.270 J		<0.00120
	MW-43	Oct-16		212	**855**	**2.00**	1.23	664	**619**	**4470**	<0.197		<0.0180
	MW-43	Apr-17		180	**687**	**2.10**	0.905 J	559	450 J	**3530**	<0.197		0.0802
	MW-43	Oct-17		184	**756**	**2.17**	1.01	585	472	**3200**	<0.394		<0.00180
	MW-43	Apr-18		159	**697**	**1.93**	1.11	604	357	**3110**	<0.985		<0.180
	MW-43	Oct-18		155	**636**	**1.61**	1.01	483	311	**2900**	<0.985		<0.180
	MW-59	Apr-15		489 J	178	1.23	0.489 J	139	**1760**	**3300**	0.0241 J		
	MW-59	Apr-16		2370	126	1.28	2.61 J	711	**1790**	**3300**	0.374 J		
	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-60	Apr-16		446	212	0.568	0.624 J	227	**2090**	**3980**	0.0410 J		<0.00120
	MW-60	Apr-16	FD	447	190	1.00	0.588 J	226	**2140**	**3200**	0.0650 JJ6		<0.00120
	MW-60	Oct-16		408	163	1.04	0.540 J	151	**2020**	**3610**	0.0710 JB		<0.00180
	MW-60	Oct-16	FD	410	162	1.05	0.509 J	149	**2050**	**3280**	0.0660 JBJ6		<0.00180
	MW-60	Apr-17		410	201	0.835	0.606 J	196	**2060**	**3470**	<0.197		<0.0900
	MW-60	Apr-17	FD	409	206	0.960	0.597 J	198	**1850**	**3650**	<0.197		<0.0900
	MW-60	Oct-17		422	222	1.07	0.717 J	233	**2040**	**3720**	<0.394		<0.00180
	MW-60	Oct-17	FD	412	212	0.885	0.707 J	230	**2000**	**3990**	<0.197		0.00553
	MW-60	Apr-18		444	221	0.974	0.769 J	233	**2080**	**3850**	<0.0197 J6		<0.0180
	MW-60	Apr-18	FD	447	231	0.969	0.746 J	218	**1980**	**3510**	<0.0197		<0.180
	MW-60	Oct-18		432	231	1.00	0.836 J	227	**2030**	**3020**	0.0640 JP1		0.00291 J
	MW-60	Oct-18	FD	432	230	0.978	0.750 J	223	**1730**	**4100**	0.0810 J		<0.0180

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

2018 Annual Groundwater Monitoring Report

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

		Analyte Group:		Water Quality Parameters										Cyanide	
		Analyte:		Calcium	Chloride	Fluoride	Potassium		Sodium	Sulfate	TDS	Nitrate/Nitrite	Nitrate-N	Cyanide	
				7440-70-2	16887-00-6	16984-48-8	7440-09-7		7440-23-5	14808-79-8	ARC-TDS	ARC-NO_3NO_2N	14797-55-8	57-12-5	
		Units:		mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/l	mg/L	
		CGWSL:		---	250	1.60	---		---	600	1,000	10.0	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-61	Apr-16		439	240	**2.65**	2.82	J	278	**2120**	**2680**	0.552	J		
	MW-61	Oct-16		409	115	**3.14**	3.89		226	**1400**	**2430**	<0.197			
	MW-61	Apr-17		322	225	**2.08**	1.85		248	**1100**	**2600**	<0.197			
	MW-61	Oct-17		330	**303**	**1.93**	2.61		291	**933**	**3110**	<0.394			
	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-62	Apr-16		481	**276**	**1.92**	1.42	J	456	**1850**	**3830**	0.322	J		
	MW-62	Oct-16		371	243	**1.79**	1.15		359	**1390**	**3460**	<0.197			
	MW-62	Apr-17		358	**275**	**1.78**	1.20		358	**1180**	**3210**	<0.197			
	MW-62	Oct-17		341	**265**	**2.23**	1.92		349	**1030**	**2480**	<0.394			
	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-67	Apr-16		202	**312**	0.548	0.427	J	218	281	**1790**	<0.197		0.0440	J
	MW-67	Oct-16		205	**310**	0.620	0.574	J	211	303	**1880**	<0.0197	J6	<0.0180	
	MW-67	Apr-17		199	**393**	0.570	0.565	J	229	275	**2010**	<0.197		<0.0900	
	MW-67	Oct-17		207	**305**	0.568	0.50	J	200	388	**1740**	<0.0985		<0.00180	
	MW-67	Apr-18		220	**328**	0.636	0.573	JB	245	404	**1660**	<0.197		<0.180	
	MW-67	Oct-18		240	221	0.611	0.636	J	202	493	**1580**	<0.0197		<0.00180	
	MW-90	Apr-16		411	85.9	**6.25**	1.69	J	246	**3250**	**5180**	0.377	J		
	MW-90	Oct-16		534	74.7	**8.22**	1.84		142	**3610**	**5730**	**14.7**			
	MW-90	Apr-17		363	161	**3.41**	1.61		189	**2740**	**3880**	<0.197			
	MW-90	Oct-17		322	116	**2.74**	1.34		182	**1930**	**3340**	<0.0985			
	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-91	Apr-16		379	37.1	1.37	0.464	J	36.6	**776**	**2270**	0.320	J		
	MW-91	Oct-16		366	37.4	1.45	0.525	J	35.1	**862**	**2260**	<0.0197			
	MW-91	Apr-17		362	74.8	1.18	0.463	J	33.8	**790**	**2120**	<0.197			
	MW-91	Oct-17		389	115	0.897	0.620	J	39.2	**944**	**2520**	<0.394			
	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-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-16		677	206	**3.06**	1.76	J	164	**2130**	**3270**	<0.197			
	MW-93	Oct-16		553	V	200	**2.78**	3.45	O1	167	V	**1630**	**3260**	<0.197	
	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-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-15		178	**275**	1.02	0.655	J	177	359	**1680**	<0.200			
	MW-95	Apr-16		191	**280**	0.805	0.518	J	180	326	**1670**	<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-96	Apr-16		187	159	1.18	1.1	J	234	255	**1590**	0.313	J		
	MW-96	Oct-16		210	169	1.19	1.03		225	456	**1990**	0.0230	J		
	MW-96	Apr-17		179	191	1.08	1.10		208	298	**1600**	<0.197			
	MW-96	Oct-17		173	159	0.785	0.907	J	199	535	**1680**	<0.0985			
	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-98	Apr-16		539	74.2	1.43	<0.185		89.6	**1690**	**3040**	<0.197			
	MW-98	Oct-16		450	88.0	1.52	0.241	J	72.7	**1610**	**3370**	<0.197			
	MW-98	Apr-17		516	93.5	**1.68**	0.180	J	79.2	**1850**	**3200**	<0.197			
	MW-98	Oct-17		541	105	1.30	0.176	J	87.1	**1890**	**3520**	<0.394			
	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-137	Apr-16		178	**343**	**1.87**	2.43	J	1740	**2160**	**3950**	<0.197		**0.348**	**J**
	MW-137	Oct-16		142	**445**	1.32	1.23		960	**1040**	**3550**	<0.197		<0.0450	
	MW-137	Apr-17		139	**478**	1.54	1.53		1120	**1050**	**4230**	<0.197		0.116	
	MW-137	Oct-17		141	**548**	1.11	0.979	J	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-138	Apr-16		160	**571**	1.13	2.03	J	568	164	**2180**	<0.197		0.0290	J
	MW-138	Oct-16		138	**527**	0.927	1.84		426	122	**2380**	<0.197		<0.0450	
	MW-138	Apr-17		121	**571**	1.14	1.81		424	72.3	**1930**	<0.197		<0.00180	
	MW-138	Oct-17		124	**453**	1.06	1.50		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	
	RW-1	Apr-15		358	224	1.33	3.57		210	**1330**	**2410**	<0.200			
	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-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-15		252	237	1.15	1.88	J	192	19.0	**1500**	<0.200			
	RW-7R	Apr-16		262	186	0.651	0.651	J	110	**624**	878	<0.197			
	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-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-15		315	**313**	**1.68**	1.69		318	**1310**	**3150**	<0.200			
	RW-9	Apr-16		336	**313**	**1.69**	1.96	J	356	**1440**	**3370**	1.73			
	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-10	Apr-15		494	187	**3.34**	9.04		172	**2010**	**3290**	0.639			
	RW-10	Apr-16		638	159	**4.28**	13.2		176	**2040**	**3330**	1.21			
	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-16	Apr-15		641	**534**	**4.61**	1.69	J	594	**3220**	**5430**	2.87			
	RW-16	Apr-16		604	**416**	**3.01**	1.15	J	502	**3360**	**5610**	2.45			
	RW-16	Apr-17		499	**291**	**4.90**	0.832	J	372	**2740**	**5030**	2.20			
	RW-16	Apr-18		546	43.5	**4.89**	0.788	J	259	**2660**	**4240**	0.894	J6		
	RW-17	Apr-15		683	**494**	**2.58**	9.10		631	**4180**	**5840**	**31.6**			
	RW-17	Apr-16		2840	**377**	**2.22**	28.7		1800	**3400**	**5880**	4.77			
	RW-17	Apr-17		568	**398**	**2.61**	4.02		306	**2950**	**4820**	3.33			
	RW-17	Apr-18		635	**358**	**2.31**	3.87		345	**3080**	**4430**	0.0920	J		

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

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Water Quality Parameters									Cyanide
				Analyte:	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Nitrate-N	Cyanide
					7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	ARC-TDS	ARC-NO_3NO_2N	14797-55-8	57-12-5
				Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L
				CGWSL:	---	250	1.60	---	---	600	1,000	10.0	10.0	0.200
				CGWSL Source:		WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH		WQCC HH
Area	**Well ID**	**Date**	**Dup**											
North RO Reject Field	MW-117	Apr-16		554	94.4	**3.45**	5.82	112	**2060**	**3390**	0.349			
	MW-117	Oct-16		592	**272**	**3.57**	6.90	115	**2240**	**3590**	0.137 BJ6			
	MW-117	Apr-17		548	245	**3.33**	6.50	96.7	**2090**	**3640**	0.266 J			
	MW-117	Oct-17		559	216	**2.05**	5.82	105	<0.0774	**3450**	0.196			
	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-118	Apr-16		573	189	**5.86**	4.80 J	152	**2480**	**3950**	1.57			
	MW-118	Oct-16		559	131	**6.47**	5.92	164	**2640**	**4450**	6.71			
	MW-118	Apr-17		544	175	**5.98**	5.06	139	**2630**	**3830**	8.51			
	MW-118	Oct-17		550	192	**4.20**	5.72	118	**2890**	**3780**	6.27			
	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-119	Apr-16		595	191	**2.50**	0.614 J	101	**1900**	**3330**	0.518 J			
	MW-119	Oct-16		619	**280**	**2.91**	0.991 J	132	**2010**	**3690**	0.189 B			
	MW-119	Apr-17		587	**290**	**2.86**	0.965 J	123	**2420**	**3650**	<0.197			
	MW-119	Oct-17		612	**268**	**2.77**	1.27	172	**2240**	**3750**	<0.0197			
	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			
NCL	MW-18	Apr-15		407	185	1.45	7.18	66.7	**1600**	**3110 J**	**36.1**			<0.00180
	MW-18	Apr-16		504	178	1.39	3.69 J	107	**1600**	**2920**	**42.6**			0.00200 J
	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-45	Apr-16		689	**524**	1.51	6.33	429	**2710**	**4760**	<0.197			<0.00180
	MW-45	Oct-16		640	**546**	1.48 J6	5.30	392	**2810**	**4730**	0.377 B			0.00953
	MW-45	Apr-17		625	**545**	1.27	5.69	394	**2840**	**5410**	0.0270 J			<0.00180
	MW-45	Oct-17		596	**544**	1.59	4.79	369	**2650**	**5740**	<0.0197			<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-53	Apr-15		348	**1010**	0.922	1.16	104	**1290**	**2810 J**	**34.5**			
	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-54A	Apr-16		381	176	1.12	0.303 J	69.4	**625**	**1780**	<0.197 J6			
	MW-54A	Oct-16		331	175	0.997	0.254 J	61.5	**670**	**1770**	0.134 J6B			
	MW-54A	Apr-17		330	193	0.987	0.289 J	59.8	**797**	**1800**	0.0860 J			
	MW-54A	Oct-17		359	204	1.34	0.271 J	67.2	**819**	**2060**	0.691			
	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-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-55	Apr-16		472	**442**	1.04	0.829 J	253	**2080**	**4200**	2.26			<0.00120
	MW-55	Oct-16		465	219	**2.09**	0.732 J	174	**2190**	**3810**	3.65			<0.00180
	MW-55	Apr-17		378	**446**	1.44	0.745 J	206	**1550**	**3580**	3.14			<0.00180
	MW-55	Oct-17		444	**435**	**2.02**	0.675 J	228	**2020**	**3970**	3.45			<0.00180
	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
	MW-56	Apr-16		559 V	**403**	1.10	2.32 JO1	379 V	**1970**	**3790**	2.76			
	MW-56	Oct-16		446 V	**263**	1.19	1.97	317 V	**1910**	**4110**	0.151 B			
	MW-56	Apr-17		501 V	**453**	1.00	2.10	338 V	**2070**	**4100**	3.93			
	MW-56	Apr-18		485	242	1.25	2.14	252	**2000**	**3080**	<0.0197			
	MW-108	Apr-16		333	79.6	**2.04**	1.28 J	92.6	**981**	**2120**	0.304 J			
	MW-108	Oct-16		343	112	**2.75**	3.88	116	**1340**	**2830**	0.0460 JB			
	MW-108	Apr-17		251	80.4	**1.90**	0.893 J	81.7	**717**	**1980**	0.0310 JJ6			
	MW-108	Oct-17		339	92.9	**1.88**	4.67	135	**1510**	**2660**	<0.0985			
	MW-108	Apr-18		426	71.0	**2.68**	3.17	137	**1790**	**2730 J3**	<0.394			
	MW-108	Oct-18		300	62.0	**1.64**	0.996 J	98.1	**1080**	**2260**	<0.985			
	NCL-31	Apr-16		340	78.9	1.14	0.272 J	109	**1420**	**3020**	0.385 J			
	NCL-31	Oct-16		445	67.8	1.57	0.564 J	148	**2400**	**3820**	0.0840 JB			
	NCL-31	Apr-17		369	65.7	1.19	0.434 J	111	**1890**	**3150**	0.127			
	NCL-31	Oct-17		341	53.7	1.44	0.362 J	103	**2020**	**3000**	<0.0197			
	NCL-31	Apr-18		325	53.0	1.39	0.422 J	97.4	**1600**	**2100**	0.0940 J			
	NCL-31	Oct-18		382	35.3	1.55	1.02	110	**2100**	**2860**	<0.0197			
	NCL-32	Apr-16		697	206	**2.05**	7.6	115	**1340**	**2740**	<0.197			
	NCL-32	Oct-16		390	128	1.48	3.26	102	**1220**	**2230**	1.77			
	NCL-32	Apr-17		387	155	1.54	3.19	102	**1310**	**2440**	4.90			
	NCL-32	Oct-17		398	117	1.31	2.94	109	**1490**	**2540**	6.14			
	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-33	Apr-16		622	**280**	**2.82**	7.58	113	**1370**	**3200**	0.367 J			
	NCL-33	Oct-16		462	**400**	**2.65**	5.28	109	**900**	**2790**	0.0750 JB			
	NCL-33	Apr-17		514	**412**	**2.62**	5.98	101	**1220**	**2750**	0.0320 J			
	NCL-33	Oct-17		509	**458**	**2.77**	6.09	114	**1150**	**2820**	<0.0197			
	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-34A	Apr-16		347	**416**	1.31	2.20 J	140	82.2	**1540**	0.265 J			
	NCL-34A	Oct-16		249	238	1.43	1.27	107	95.0	**1370**	0.0470 JB			
	NCL-34A	Apr-17		270	**313**	1.27	1.36	108	76.1	**1440**	0.0570 JJ6			
	NCL-34A	Oct-17		214	202	1.37	1.08	111	131	**1400**	<0.0394			
	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-44	Apr-16		414	234	1.59	2.62 J	98.3	**965**	**2120**	<0.197			
	NCL-44	Oct-16		373	222	**1.67**	2.29	94.9	**1030**	**2130**	0.0810 JB			
	NCL-44	Apr-17		360	198	**1.65**	2.31	99.7	**1070**	**2390**	0.0470 J			
	NCL-44	Oct-17		350	158	**1.69**	2.26	119	**1260**	**2480**	<0.0197			
	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-49	Apr-16		468	119	0.685	0.749 J	136	**1570**	**2820**	5.71			
	NCL-49	Apr-16	FD	470	119	0.685	0.792 J	137	**1580**	**2790**	5.63			
	NCL-49	Oct-16		425	128	0.600	0.590 J	120	**1700**	**2770**	6.08			
	NCL-49	Oct-16	FD	429	130	0.600	0.597 J	122	**1670**	**3290**	6.01			
	NCL-49	Apr-17		451	172	0.576	0.632 J	133	**2010**	**3070**	9.84			
	NCL-49	Apr-17	FD	452	159	0.575	0.633 J	133	**1970**	**2990**	9.78			
	NCL-49	Oct-17		481	173	0.698	0.594 J	132	**2080**	**3200**	8.41			
	NCL-49	Oct-17	FD	458	169	0.713	0.605 J	131	**2050**	**3140**	8.41			
	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			

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

2018 Annual Groundwater Monitoring Report

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

		Analyte Group:		Water Quality Parameters									Cyanide
		Analyte:		Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Nitrate-N	Cyanide
				7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	ARC-TDS	ARC-NO_3NO_2N	14797-55-8	57-12-5
		Units:		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L
		CGWSL:		---	250	1.60	---	---	600	1,000	10.0	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	KWB-2R	Apr-16		322	207	0.485	0.456 J	325	**1460**	**2910**	0.0340 JJ6		
	KWB-2R	Oct-16		275	215	0.901	0.433 J	282	**1150**	**2850**	0.0740 JB		
	KWB-2R	Apr-17		280	**279**	0.904	0.460 J	286	**1060**	**2550**	0.0220 J		
	KWB-2R	Oct-17		139	240	1.09	1.33	283	259	**1770**	<0.394		
	KWB-5	Apr-16		252	**5800**	0.392	1.66 J	222	235 J	**1760**	0.0400 J		
	KWB-5	Oct-16		228	**562**	0.910	1.34	220	6.46	**1560**	0.0460 JBJ6		
	KWB-5	Apr-17		224	**575**	0.936	1.48	204	14.8	**1580**	<0.197		
	KWB-5	Oct-17		220	**565**	0.877	1.41	208	21.9	**1560**	0.0530 J		
	KWB-5	Apr-18		233	**546**	0.861	1.95	215	9.96	**1730**	1.93		
	KWB-5	Oct-18		200	**546**	0.869	1.76 JB	208	11.8	**1450**	<0.0197		
	KWB-6	Apr-16		246	**313**	1.03	0.206 J	199	83.1	**1410**	<0.197		
	KWB-6	Oct-16		232	**280**	0.977	0.219 JB	109	275	**1590**	0.0770 JB		
	KWB-6	Apr-17		227	**260**	0.965	0.183 J	120	211	**1630**	0.556 J		
	KWB-6	Oct-17		256	**290**	0.842	0.162 J	131	377	**1890**	<0.394		
	KWB-6	Apr-18		248	248	0.897	0.268 J	138	272	**1600**	0.0380 J		
	KWB-6	Oct-18		223	240	0.801	0.230 J	122	324	**1680 J3**	<0.0197		
	MW-28	Apr-16		1500	135	1.42	4.06 J	450	**672**	**3040**	0.470 J		<0.00120
	MW-28	Oct-16		480	147	1.40	0.640 J	74.0	**1320**	**1900**	0.0460 JB		<0.0180
	MW-28	Apr-17		380	190	1.56	0.778 J	89.9	**1170**	**2420**	<0.197		<0.0900
	MW-28	Oct-17		376	146	1.51	1.37	90.3	**1180**	**2640**	<0.394		<0.00180
	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-48	Apr-16		234	**1110**	1.45	1.80 J	314	20.5	**2950**	<0.197		
	MW-48	Oct-16		200	**580**	1.07	1.18	339	239	**2270**	0.0300 JB		
	MW-48	Apr-17		190	**909**	1.47	1.13	255	18.2	**2210**	0.202 J		
	MW-48	Oct-17		191	**820**	1.01	0.908 J	272	19.3	**2280**	<0.0197		
	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-50	Apr-16		645	**491**	**3.96**	8.60	969	**4280**	**4580**	**150**		
	MW-50	Oct-16		546	**511**	**3.86 J6**	12.4	912	**4690**	**9320**	0.594		
	MW-50	Apr-17		566	**463**	**2.21**	5.90	646	**3710**	**6840**	**155**		
	MW-50	Oct-17		572	**431**	**2.57**	5.57	620	**3580**	**6620**	**136**		
	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-52	Apr-16		778	160	**1.79**	1.20 J	1350	**995**	**1920**	1.73		<0.00120
	MW-52	Oct-16		194	144	**1.77**	0.262 J	278	**1100**	**2370**	1.04		0.00182 J
	MW-52	Apr-17		181	154	**1.65**	0.283 J	297	**1060**	**2260**	3.27		<0.00180
	MW-52	Oct-17		238	114	1.09	0.245 J	275	**1270**	**2550**	9.42		<0.00180
	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-64	Apr-16		109	**379**	1.08	0.754 J	396	39.9	**1510**	<0.197		
	MW-64	Oct-16		109	**356**	0.855	0.689 J	361	4.08 J	**1650**	0.0790 JB		
	MW-64	Apr-17		99.7	**382**	1.03	0.774 J	367	3.93 J	**1760**	0.0400 J		
	MW-64	Oct-17		96.6	**326**	0.984	0.656 J	351	7.90	**1590**	<0.394		
	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-65	Apr-16		155 V	**394**	1.28	0.691 J	311 V	0.323 J	**1750**	0.0490 JJ6		
	MW-65	Oct-16		157	**356**	1.48	1.46	287	0.431 J	**1380**	0.219 B		
	MW-65	Apr-17		134	**354**	1.38	1.01	279	0.822 J	**1430**	0.0330 J		
	MW-65	Oct-17		132	**314**	1.44	1.03	267	0.470 J	**1320**	<0.0197		
	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-66	Apr-16		600	134	1.36	4.83 J	740	0.591 J	942	0.363 J		<0.00120
	MW-66	Oct-16		131	174	1.42	0.770 J	155	0.327 J	**1020**	0.0480 JB		<0.00180
	MW-66	Apr-17		115	184	1.55	0.830 J	143	0.360 J	976	0.0370 JP1		<0.00180
	MW-66	Oct-17		139	179	1.42	1.14	159	1.69 J	**1080**	<0.0197		<0.00180
	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-99	Apr-16		805	208	0.866	6.37	1100	153	**1410**	0.0330 JJ6		
	MW-99	Oct-16		137	192	0.656	3.60	168	39.0	**1200**	0.0350 JB		
	MW-99	Apr-17		161	**284**	0.758	0.819 J	205	169	**1370**	<0.197		
	MW-99	Oct-17		173	**256**	0.748	0.624 J	215	142	**1430**	<0.394		
	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-101	Apr-16		220	239	0.940	0.522 J	169	168	**1270**	0.197 J		
	MW-101	Oct-16		183	229	1.00	0.509 J	112	191	**1400**	0.127 B		
	MW-101	Apr-17		197	234	0.926	0.587 J	139	160	**1390**	<0.197		
	MW-101	Oct-17		197	229	0.998	0.853 J	142	171	**1360**	<0.0197		
	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-102	Apr-16		127	245	0.901	0.372 J	437	2.35 J	**1530**	0.339 J		
	MW-102	Oct-16		176	**271**	1.28	0.772 J	418	217	**1740**	0.0620 JBJ6		
	MW-102	Apr-17		120	**258**	1.09	0.504 J	379	11.3	**1550**	<0.197		
	MW-102	Oct-17		124	**259**	1.16	0.507 J	373	7.70	**1730**	<0.394		
	MW-102	Apr-18		136	26.4	0.954	0.96 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-103	Apr-15		192	**7890**	**3.44**	2.46 J	6710	19.6	**12500**	<0.0200		
	MW-103	Apr-16		193	**13700**	**5.44**	3.73 J	7960	2.24 J	**21100**	0.430 J		
	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-104	Apr-16		179 V	25.9	**2.49**	4.96 JJ5O1	43.6 V	408	819	0.455 JB		
	MW-104	Apr-16	FD	178	25.6	**2.51**	5.16	44.7	439	809	0.286 JB		
	MW-104	Oct-16		165	72.9	**1.94**	4.77	38.4	322	975	0.0640 JB		
	MW-104	Oct-16	FD	164	73.4	**1.90**	4.78	37.9	323	928	0.0820 JB		
	MW-104	Apr-17		203	209	**1.94**	5.56	50.9	217	986	0.0450 JJ6		
	MW-104	Apr-17	FD	197	230	**1.77**	5.20 O1	48.7 O1V	219	**1010**	<0.197		
	MW-104	Oct-17		213	178	1.58	5.84	60.5	258	**1070**	<0.394		
	MW-104	Oct-17	FD	213	201	1.19	5.73	59.2	281	**1140**	<0.0985		
	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-105	Apr-16		257	42.0	1.48	4.55 J	52.6	278	**1300**	0.414 J		
	MW-105	Oct-16		227	12.7	**2.06**	4.97	20.7	20.6	**1050**	0.105 B		
	MW-105	Apr-17		212	48.2	1.60	4.45	38.3	9.54	982	<0.197		
	MW-105	Oct-17		245	101	**1.62**	6.49	89.2	132	**1370**	<0.394		
	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-106	Apr-16		422	185	1.51	4.40 J	271	**1380**	**3120**	<0.197		
	MW-106	Oct-16		347	216	1.30	1.37	240	**1410**	**3080**	0.0530 JB		
	MW-106	Apr-17		313	**302**	1.28	2.44	236	**1020**	**2630**	<0.197		
	MW-106	Oct-17		313	217	0.930	1.78	265	**1210**	**3050**	<0.985		
	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-107	Apr-16		727	**277**	**1.67**	3.22 J	381	6.07	**1850**	0.376 J		
	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		

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

2018 Annual Groundwater Monitoring Report

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

				Analyte Group:	Water Quality Parameters									Cyanide
				Analyte:	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Nitrate-N	Cyanide
					7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	ARC-TDS	ARC-NO_3NO_2N	14797-55-8	57-12-5
				Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L
				CGWSL:	---	250	1.60	---	---	600	1,000	10.0	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-109	Apr-16		707	204	**1.90**	4.01 J	2200	**848**	**2190**	0.384 J		
	MW-109	Oct-16		153	226	**2.06**	0.802 J	431	**751**	**2590**	0.0360 JB		
	MW-109	Apr-17		200	195	**1.99**	1.03	394	**1040**	**2700**	<0.197		
	MW-109	Oct-17		193	166	1.41	0.913 J	374	**814**	**2710**	<0.394		
	MW-109	Apr-18		173	170	**2.25**	0.992 J	395	**864**	**2220**	0.0460 J		
	MW-109	Oct-18		147	177	**2.23**	0.906 J	373	**764**	**2160 Q**	0.108 J6		
	MW-110	Apr-16		555	99.0	1.53	1.19 J	1380	**2100**	**1360**	0.765 J		
	MW-110	Oct-16		115	97.6	1.50	0.150 J	276	555	**1430**	0.0620 JB		
	MW-110	Apr-17		120	135	1.45	0.207 J	265	387	**1330**	<0.197		
	MW-110	Oct-17		106	97.3	0.903	0.0756 J	267	419	**1430**	<0.0197		
	MW-110	Apr-18		99.2	102	1.46	0.381 J	286	138	**1170**	0.0410 J		
	MW-110	Oct-18		112	113	1.38	0.367 J	268	499	**1390**	<0.0197		
	RA-313	Apr-15		150	19.1	0.914	1.04	17.8	**605**	808	<0.0200		
	RA-313	Apr-16		175	17.6	0.893	1.02 J	17.3	501	881	0.680 J		
	RA-313	Apr-17		167	15.0	0.893	1.26	16.4	455	937	0.447 J		
	RA-313	Apr-18		181	15.3	0.888	0.954 J	18.0	467	819	0.507		
	RW-4	Apr-15		202	**258**	0.845	1.67	144	468	**1710 J**	<0.0200		
	RW-4R	Apr-16		207	**351**	1.06	2.00 J	290	470	**1810**	0.346 J		
	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-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 J		
	RW-6	Apr-18		183	**409**	0.804	0.684 J	224	45.6	**1530**	0.0460 J		
	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 Reject Field	MW-114	Apr-16		681	88.6	**1.87**	2.59 J	126	**1170**	**3710**	0.416 J		
	MW-114	Oct-16		569	231	**2.03**	2.49	89.3	**2100**	**4050**	4.69		
	MW-114	Apr-17		599	**266**	**1.78**	2.83	131	**2350**	**3480**	0.260 JJ5		
	MW-114	Oct-17		582	157	1.35	2.83	132	**1950**	**3700**	2.80		
	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-115	Apr-16		2410	153	**1.93 J6**	2.64 J	1290	**2020**	**5390**	0.375 J		
	MW-115	Oct-16		541	**382**	**2.69**	0.395 JB	144	**2750**	**4990**	0.113 B		
	MW-115	Apr-17		394	**304**	1.51	0.514 J	183	**2770**	**4190**	<0.197		
	MW-115	Oct-17		450	249	1.01	0.558 J	213	**2910**	**4480**	0.0420 J		
	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-116	Apr-16		719	**500**	1.33	1.63 J	259	**3300**	**4580**	0.473 J		
	MW-116	Oct-16		569	196	**2.91**	4.26	114	**2040**	**3500**	0.0480 JB		
	MW-116	Apr-17		501	**270**	**2.00**	2.22	154	**2060**	**3450**	0.258 J		
	MW-116	Oct-17		614	233	**2.72**	4.47	147	**2080**	**3160**	1.40		
	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		
TEL	MW-49	Apr-16		203	**368**	1.38	2.19 J	347	584	**2270**	0.0580 J			<0.00180 J3J6
	MW-49	Oct-16		206	**364**	1.50	2.45	329	**602**	**1860**	0.179 BJ6			<0.00900
	MW-49	Apr-17		194	**373**	1.35	2.19	328	531	**2390**	<0.197			<0.0900
	MW-49	Oct-17		192	**373**	1.31	2.83	331	535	**2140**	<0.0197			<0.00180
	MW-49	Apr-18		226	**379**	1.42	3.12	341	585	**1870**	<0.985			<0.0180
	MW-49	Oct-18		209	**355**	1.29	2.58	335	520	**2150**	<0.985			<0.180
	TEL-1	Apr-16		389	113	**3.00**	1.72 J	373	**1510**	**2570**	0.0380 J			
	TEL-1	Oct-16		477	51.4	**3.39**	2.22	155	**1710**	**3090**	0.0730 JB			
	TEL-1	Apr-17		284	195	**2.73**	1.32	370	**1320**	**2940**	<0.197			
	TEL-1	Oct-17		208	243	**2.12**	0.896 J	480	**986**	**2350**	<0.394			
	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-2	Apr-16		224	**344**	1.08	0.954 J	419	**825**	**2720**	0.0460 J			
	TEL-2	Oct-16		228	**294**	1.04	1.14	406	**764**	**2830**	0.0390 JB			
	TEL-2	Apr-17		224	**302**	1.11	1.04	411	**865**	**2730**	<0.197			
	TEL-2	Oct-17		246	226	0.911	1.09	442	**1160**	**3000**	<0.0197			
	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-3	Apr-16		473	**585**	**2.71**	7.31	364	**622**	**2900**	0.0420 J			
	TEL-3	Oct-16		427	25.1	**3.43**	5.27	20.6	**1020**	**1850**	0.0450 JB			
	TEL-3	Apr-17		463	55.1	**3.04**	5.21	39.8	**1070**	**1980**	0.269 J			
	TEL-3	Apr-18		302	**696**	**2.51**	6.00	308	442	**2440**	<0.0985			
	TEL-4	Apr-16		410	**524**	1.53	0.666 J	509	**2070**	**4260**	0.0440 J			
	TEL-4	Apr-16	FD	408	**519**	1.53	0.618 J	515	**1980**	**4040**	0.0400 JJ6			
	TEL-4	Oct-16		370	**336**	**1.69**	0.613 J	465	**2290**	**5350**	0.0340 JB			
	TEL-4	Oct-16	FD	370	**347**	1.58	0.608 J	454	**2240**	**5370**	0.0360 JB			
	TEL-4	Apr-17		432	**442**	1.36	0.587 J	542	**2680**	**6520**	0.404 J			
	TEL-4	Apr-17	FD	427	**436**	1.22	0.588 J	546	**2630**	**5570**	<0.197			
	TEL-4	Oct-17		343	**511**	0.862	0.512 J	468	**1660**	**4240**	<0.0985			
	TEL-4	Oct-17	FD	342	**501**	0.868	0.510 J	465	**1520**	**3600**	<0.0197			
	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			
TMD	MW-8	Apr-15		390	**321**	1.51	1.59	328	**2940**	**4210**	1.10			
	MW-8	Apr-16		377	**275**	**2.02**	1.69 J	295	**2380**	**3690**	0.503 J			
	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-16	Apr-14		531	**422**	**2.79**	8.99	388	**2170**	**4020**	0.269 J			
	MW-16	Apr-15		666	**660**	**2.32**	10.2	545	**2670**	**4890**	0.461			
	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-20	Apr-15		510	**429**	1.51	0.398 J	232	**3490**	**4790**	5.08			
	MW-20	Apr-16		594	**515**	**2.18**	0.370 J	274	**2790**	**4850**	8.09			
	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-21	Apr-16		590	**516**	**1.69**	2.31 J	440	**3150**	**5720**	**15.0**			
	MW-21	Oct-16		543	**474**	**1.74**	1.91	429	**3150**	**4240**	**12.0**			
	MW-21	Apr-17		507	**599**	**1.95**	1.88	423	**2860**	**6630**	**20.4**			
	MW-21	Oct-17		562	**574**	**1.81**	1.86	416	**3350**	**5000**	**17.1**			
	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-25	Apr-15		896	**6780**	1.03	8.34	3710	**5740**	**17000**	0.0974 J			
	MW-25	Apr-16		647	**4130**	1.13	6.61	2670	**4100**	**11800**	0.125			
	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-26	Apr-15		698	**1130**	1.15	5.42	704	**5950**	**8660**	0.268			
	MW-26	Apr-16		725	**1260**	**1.86**	5.75	695	**4520**	**8730**	0.301			
	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			

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

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

				Analyte Group:	Water Quality Parameters									Cyanide
				Analyte:	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulfate	TDS	Nitrate/Nitrite	Nitrate-N	Cyanide
					7440-70-2	16887-00-6	16984-48-8	7440-09-7	7440-23-5	14808-79-8	ARC-TDS	ARC-NO_3NO_2N	14797-55-8	57-12-5
				Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L
				CGWSL:	---	250	1.60	---	---	600	1,000	10.0	10.0	0.200
				CGWSL Source:		WQCC Dom	WQCC HH			WQCC Dom	WQCC Dom	WQCC HH		WQCC HH
Area	**Well ID**	**Date**	**Dup**											
TMD	MW-27	Apr-15		607	246	0.928	11.2	128	**2320**	**3640**	0.703		
	MW-27	Apr-16		470	234	1.19	9.36	156	**3950**	**3150**	0.687		
	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-46R	Apr-16		645	**290**	1.47	1.26 J	168	**2470**	**3980**	0.0520 JJ6		
	MW-46R	Oct-16		605 V	**339**	**1.97**	1.83	161	**2170**	**4010**	0.368		
	MW-46R	Apr-17		588	**315**	**1.70**	1.30	182	**2420**	**3930**	0.206		
	MW-46R	Oct-17		627	**275**	**1.63**	1.27	183	**2590**	**4040**	0.0920 J		
	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-68	Apr-15		552	**397**	1.15	4.65	242	**2610**	**4460**	4.52		
	MW-68	Apr-16		489	**263**	**1.75**	5.58	206	**1840**	**2980**	0.510		
	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-71	Apr-15		642	**906**	1.09	3.59	447	**3150**	**6110**	**50.6**		<0.00180
	MW-71	Apr-16		669	**907**	**1.62**	3.72 J	502	**2890**	**5450**	**45.6**		<0.00180
	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-89	Apr-15		528	**324**	**3.61**	13.5	302	**2200**	**3720**	2.34		
	MW-89	Apr-16		556	**399**	**3.58**	12.0	299	**1490**	**3640**	3.64		
	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		
	NP-1	Apr-16		470	**391**	**1.96**	3.12 J	403	**2620**	**4460**	0.494 J		
	NP-1	Oct-16											
	NP-1	Apr-17		421	**422**	**2.08**	2.73	340	**2440**	**4060**	9.95		
	NP-1	Oct-17											
	NP-1	Apr-18		421	**395**	**2.00**	4.52	342	**2210**	**3660**	5.66		
	NP-1	Oct-18											
	NP-2	Apr-13		517	**379**	**1.70**	1.63	258	**2660**	**5160**	1.74		
	NP-6	Apr-13											
	NP-6	Apr-15											
	NP-6	Apr-17											
Upgradient	UG-1	Apr-15		455 J	133	0.865	1.11	84.6	**1880**	**2920**	**14.4**		<0.00180
	UG-1	Apr-16		512	102	0.926	1.07 J	99.7	**1920**	**4050**	**17.0**		0.00432 J
	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-2	Apr-15		337 J	72.2	**1.65**	1.73	82.6	**1080**	**1170**	4.62		<0.00180
	UG-2	Apr-16		402	86.5	**1.75**	2.04 J	103	**1210**	**2240**	5.46		0.00511
	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-3R	Apr-15		420 J	27.5	0.716	2.36	59.1	**1450**	**1420**	1.03		<0.00180
	UG-3R	Apr-16		440	47.7	0.690	1.86	75.8	**1350**	**2340**	1.73		<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-4	Apr-16		590	49.2	0.668	1.99 J	224	**2480**	**4140**	0.407		<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

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 5 - Summary of Production from Recovery Trenches and Wells

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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 2018	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total 2018
RW-1R	Automated Pump	0	3,031	0	0	3,031	0	0	0	0	0
RW-2R	Automated Pump	1	8,443	625	4,652	13,721	0	0	0	0	0
RW-4R	Automated Pump	13	28	722	11,514	12,277	0	0	0	0	0
RW-5R	Automated Pump	635	1,570	0	1	2,206	8	23	0	1	32
RW-6R	Automated Pump	38,032	73,861	3,877	0	115,770	0	0	0	0	0
RW-7R	Automated Pump	0	43,015	577,152	42,393	662,560	0	0	0	0	0
RW-8R	Automated Pump	44,090	50,274	205,636	120,406	420,406	1,484	2,210	2,089	225	6,008
RW-12R	Automated Pump	0	0	0	0	0	0	0	0	0	0
RW-13R	Automated Pump	0	1,965	0	0	1,965	0	0	1,718	1,077	2,795
RW-14R	Automated Pump	0	143,243	0	0	143,243	591	480	879	639	2,589
RW-15	Automated Pump	0	0	0	0	0	0	0	0	0	0
RW-19	Automated Pump	2	671	0	3,818	4,491	1	4	0	0	5
RW-20	Automated Pump	62,681	214,542	116,408	140,393	534,024	0	61	8,677	0	8,738
RW-22	Automated Pump	80	41,856	0	0	41,936	93	1,037	728	1,176	3,034
TOTAL VOLUME RECOVERED:		145,534	582,499	904,420	323,177	**1,955,630**	2,177	3,815	14,091	3,118	**23,201**

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