GW – 028

Background Groundwater Investigation Report

PART 1 OF 9

September 2015

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Navajo Refining Company
Artesia Refinery

Background Groundwater Investigation Report

RCRA Permit NMD048918817
OCD Discharge Permit GW-028

September 2015

ARCADIS

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Background Groundwater Investigation Report
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Date:
September 2015

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Certification

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Scott Denton
Environmental Manager, Navajo Refining Company

List of Acronyms and Abbreviations

%	percent
bgs	Below Ground Surface
COC	Constituent of Concern
DRO	Diesel Range Organics
EP	Evaporation Pond
EPA	Environmental Protection Agency
ft	Feet
FWGMWP	Facility Wide Groundwater Monitoring Work Plan
GRO	Gasoline Range Organics
GW-028	Discharge Permit GW-028
HFC	Holly Frontier Corporation
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilograms
mg/L	milligrams per liter
NCL	North Colony Landfarm
NRC	Navajo Refining Company
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
OCD	Oil Conservation Division
ORO	Oil Range Organics
PCC Permit	Post-Closure Care Permit
PID	Photoionization Detector
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act
Refinery	Artesia Refinery
RFI	RCRA Facility Investigation
RO	Reverse Osmosis
SSL	Soil Screening Level
SVOC	Semivolatile Organic Compounds
SWMU	Solid Waste Management Unit
TDS	Total Dissolved Solids
TEL	Tetra-Ethyl Lead
TMD	Three Mile Ditch
TPH	Total Petroleum Hydrocarbons
UTL	Upper Tolerance Limit

VOC	Volatile Organic Compounds
Work plan	Background Groundwater Evaluation Work Plan
WQCC	Water Quality Control Commission

Executive Summary

The Navajo Refining Company, L.L.C. (NRC) is a subsidiary of the Holly Frontier Corporation (HFC). HFC is an independent energy company engaged in crude oil refining and wholesale marketing of refined petroleum products. NRC owns and operates the Artesia Refinery (Refinery), which is located in Artesia, New Mexico.

As described below, NRC has two primary waste-related permits: (1) a discharge permit issued by the New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD) and (2) a Post-Closure Care Permit (PCC Permit) issued by the New Mexico Environment Department (NMED). While this report was initiated in response to an investigation into the background quality of groundwater for the portions of the discharge permit relating to land application of Reverse Osmosis (RO) reject fluids, the results and recommendations are relevant to the facility-wide groundwater monitoring program conducted under the both permits.

In October 2003, the Secretary of the NMED issued a Resource Conservation and Recovery Act (RCRA) PCC Permit for the Artesia Refinery, which has United States Environmental Protection Agency (EPA) ID Number NMD048918817 (NMED 2003). The PCC Permit was modified in December 2010 (NMED 2010). Among other action items, the PCC Permit authorizes and requires NRC (the Permittee) to conduct facility wide groundwater monitoring related to corrective action for releases from RCRA-regulated units and solid waste management units (SWMUs), with groundwater cleanup targets as Maximum Contaminant Levels (MCLs), the Water Quality Control Commission (WQCC) standards included in 20.6.2.3103 New Mexico Administrative Code (NMAC), and NMED-approved levels for WQCC-identified toxic pollutants.

Additionally, the OCD issued a renewal to Discharge Permit GW-028 (GW-028) to NRC dated August 22, 2012 (OCD 2012). GW-028 requires facility wide groundwater monitoring, submittal of an annual report summarizing all discharges and the results of the facility-wide groundwater monitoring, as well as abatement to background and/or the WQCC standards and the absence of toxic pollutants (Condition 5).

NRC operates three reverse osmosis units that process fresh water as a means to remove contaminants such as minerals and salts. The fresh water influent to the RO units is a blend of fresh groundwater and publicly supplied water from the City of Artesia. The RO process is a pretreatment step in the production of cooling tower makeup water and boiler grade feedwater. The RO units produce two effluent streams: the RO permeate stream, which is the purified water used in the refining process, and

the RO reject water stream, which contains the concentrated salts and minerals that cannot pass through the RO membranes. The RO reject water stream is discharged to the surface of one of two vacant fields located northeast of the Refinery operations areas to water native grass in those fields. This discharge occurs in accordance with the approved GW-028 permit issued by the OCD (OCD 2012).

Section 6.D of the 2012 renewal of GW-028 required NRC to perform a site investigation of the two RO reject water discharge fields. The *Reverse Osmosis Reject Water Discharge Fields Site Investigation Work Plan* (work plan) was initially submitted to OCD on November 20, 2012 and was revised December 20, 2012 in response to comments received from OCD via email (ARCADIS 2012). The investigation was conducted according to the work plan throughout 2013. A summary report of the investigation was submitted to OCD and NMED in February 2014 (ARCADIS 2014a), in accordance with Section 6.D.3 of GW-028.

As described in the *Reverse Osmosis Reject Water Discharge Fields Investigation Final Report* (ARCADIS 2014a), three monitoring wells were installed in the South RO discharge field and three monitoring wells were installed in the North RO discharge field. Groundwater samples were collected quarterly and analyzed for water quality parameters listed in the WQCC regulations found in 20.6.2.3103 NMAC. Soil samples were screened using the NMED soil screening levels (SSLs) while groundwater samples were screened using the lower of the WQCC standards or the EPA maximum contaminant levels (MCLs). The conclusions stated in the investigation report (ARCADIS 2014a) were as follows:

- The data obtained throughout the 2013 investigation indicate that groundwater mounding occurs beneath the South RO discharge field, which receives the majority of the discharge. Slight mounding was noted in the North RO discharge field; however, it was not as significant.

- The reported concentrations of organic constituents of concern (COCs) in soil and groundwater samples collected in 2013 were below reporting limits or screening levels, confirming that no impacts from hydrocarbons have occurred as a result of discharge of the RO reject stream to the two fields.

- The reported concentrations of the following COCs in soil and groundwater samples collected in 2013 indicated that the RO reject water discharge is not a significant source of these compounds in groundwater:

  - Arsenic
  - Boron
  - Chloride
  - Manganese
  - Sulfate
  - Uranium
- Due to the concentration of fluoride in the groundwater samples collected in 2013 relative to the concentrations found in the RO reject water discharge samples, it was inconclusive whether the discharge constitutes a significant source for this contaminant.

The 2014 report included recommendations to continue monitoring of the six wells installed in the RO reject fields and that an additional upgradient monitoring well be installed west of Highway 285 to assist in evaluation of background groundwater quality.

After discussion with NRC and NMED, the OCD responded to the RO reject fields investigation report (ARCADIS 2014a) with a request that a formal background evaluation be performed to assist in determining if elevated concentrations of specific COCs in the groundwater beneath the RO reject fields are a result of the discharge activities or are within expected background concentration ranges. A work plan was developed that outlined procedures to be performed to complete a formal evaluation of background groundwater concentrations, and to potentially establish alternative standards for select COCs, as appropriate. The *Background Groundwater Evaluation Work Plan* (work plan) was submitted to NMED and OCD on July 3, 2014 (ARCADIS 2014b). Both OCD and NMED approved the work plan with modifications on July 25, 2014 (OCD 2014 and NMED 2014a).

The approved work plan included installation of two additional monitoring wells and collection of groundwater samples from a total of 11 monitoring wells monthly over a 12 month period. The 11 monitoring wells included the two new monitoring wells and nine existing monitoring wells, all located in areas either hydraulically upgradient or crossgradient to Refinery operations (including the active Refinery process area, the RO reject fields, and the former evaporation ponds), in areas where impacts from Refinery operations are not expected.

Following completion of the 12 month background groundwater monitoring period, a statistical evaluation was planned to determine the expected concentrations in

unimpacted groundwater, or “background” and to determine if alternate screening standards for select COCs would be appropriate or applicable. The intent of the evaluation was to address those COCs that appear to be elevated in groundwater beneath the RO reject fields as well as other COCs associated with the facility-wide groundwater monitoring program. Thus, the scope of the investigation was designed to assess background conditions for the Refinery, the RO reject fields, and the evaporation ponds.

The background groundwater investigation was completed according to the approved monitoring work plan, with a few deviations. The specific steps of the statistical evaluation of the resulting data included determination of the following:

- Analytes to be included in the evaluation
- Appropriate handling of the qualified data
- If the data set constitutes one or more populations, including determination of the statistical distribution for each data set and evaluation of outliers
- Method for handling not detected results, including whether to use substitution or some other method to replace not detected results and if parametric or non-parametric methods should be applied

After each of the above steps was completed, the upper tolerance limit (UTL) for each analyte retained in the evaluation was calculated at 95 percent (%) confidence and 95% coverage. The EPA guidance document *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (EPA 2009) was followed for each step of the statistical evaluation and to calculate the UTLs.

The statistical evaluation of the data indicated that groundwater from 10 of the 11 monitoring wells could be evaluated as a single population. The data from one of the wells located west of Highway 285 (UG-3R) was removed from the statistical evaluation as an outlier. However, the data from the remaining wells indicated that the groundwater in the shallow water-bearing zone from the area immediately west of Highway 285 (hydraulically upgradient of the Refinery) to the area immediately west and north of the evaporation ponds is similar in nature and the background data could be handled as one statistical population.

The UTLs calculated for each COC were compared to the critical groundwater screening level (CGWSL), which is the lower value of the WQCC standards, EPA MCLs, or tap water screening value. The UTLs for boron, chloride, fluoride, manganese, mercury, nitrate/nitrite, sulfate, total dissolved solids and uranium were found to be above the respective WQCC standards, by factors ranging from 1.5 to 33. Although WQCC standards do not exist for calcium, potassium, and sodium, UTLs were calculated for these naturally occurring compounds that are commonly used to evaluate water quality.

This background groundwater investigation report concludes that, for the purpose of evaluating the potential need for abatement of groundwater beneath the RO reject fields beyond the Stage 1 investigation, the abatement standard comparison criteria should consist of the background UTLs for specific constituents of concern (COCs) (provided in Section 8 - Recommendations) derived through this background groundwater investigation. The abatement standard comparison criteria for the remaining COCs should consist of the WQCC standards in 20.6.2.3103 NMAC. These proposed abatement standards are consistent with 20.6.2.4101B NMAC (abatement to background), 20.6.2.4103B. NMAC (incorporating the WQCC standards), and Condition 6.D.3 of GW-028. This report further concludes that the discharge of RO reject fluids is not detrimental to the water quality beneath or downgradient of the RO reject fields.

It should also be noted that the introduction to Section 3103 recognizes that “existing conditions” may reflect an exceedance of the WQCC standards. Notwithstanding NRC’s demonstration that the groundwater quality data collected at the RO reject fields reflect background concentrations, the regulation does authorize the “existing concentration(s)” as the “allowable limit,” provided that the existing concentration(s) will not result in exceedances of the standards at places where groundwater is withdrawn for present and reasonably foreseeable future uses. As owner of the RO reject fields land, NRC can prohibit the withdrawal of groundwater for present and reasonably foreseeable future uses.

It is also recommended that the UTLs calculated using the data obtained for this investigation, which are greater than the WQCC standards or MCLs, be used as alternative screening standards for future groundwater monitoring associated with the Refinery’s corrective action program per the PCC Permit.

1. Introduction

The Navajo Refining Company, L.L.C. (NRC) is a subsidiary of the Holly Frontier Corporation. HFC is an independent energy company engaged in crude oil refining and wholesale marketing of refined petroleum products. NRC owns and operates the Artesia Refinery (Refinery), which is located in Artesia, New Mexico.

In October 2003, the Secretary of the New Mexico Environment Department (NMED) issued a Resource Conservation and Recovery Act (RCRA) Post-Closure Care Permit (PCC Permit) for the Artesia Refinery, which has United States Environmental Protection Agency (EPA) ID Number NMD048918817 (NMED 2003). The PCC Permit was modified in December 2010 (NMED 2010). Among other action items, the PCC Permit authorizes and requires NRC (the Permittee) to conduct facility wide groundwater monitoring, related to corrective action for releases from RCRA-regulated units and solid waste management units (SWMUs), with groundwater cleanup targets as Maximum Contaminant Levels (MCLs), the Water Quality Control Commission (WQCC) standards included in 20.6.2.3103 NMAC, and NMED-approved levels for WQCC-identified toxic pollutants.

Additionally, the New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD) issued a renewal to Discharge Permit GW-028 (GW-028) dated August 22, 2012 (OCD 2012). GW-028 also requires facility wide groundwater monitoring, submittal of an annual report summarizing the groundwater monitoring, and abatement to background and/or the WQCC standards and the absence of toxic pollutants (Condition 5).

The facility wide groundwater monitoring program established in the PCC Permit requires that groundwater data be reviewed and screened using the standards provided in the WQCC regulations (20.6.2.3103 NMAC) or the EPA maximum concentration levels (MCLs). If more than one value is published for a constituent of concern (COC) in the WQCC standards, EPA MCLs, or EPA secondary MCLs, the lower value is required to be used for the screening value, according to the PCC Permit. In the event that neither a WQCC standard or EPA MCL is available for a carcinogenic or noncarcinogenic hazardous waste or hazardous constituent, then the PCC Permit provides that the NMED tap water value is used as the screening value, where available.

NRC operates three reverse osmosis (RO) units that process fresh water as a means to remove contaminants such as minerals and salts. The fresh water influent to the RO

units is a blend of fresh groundwater and publicly supplied water from the City of Artesia. The RO process is a pretreatment step in the production of cooling tower makeup water and boiler grade feedwater. The RO units produce two effluent streams: the RO permeate stream, which is the purified water used in the refining process, and the RO reject water stream, which contains the concentrated salts and minerals that cannot pass through the RO membranes. The RO reject water stream is discharged to the surface of one of two vacant fields located northeast of the Refinery operations areas to water native grass in those fields. This discharge occurs in accordance with the approved OCD permit GW-028 (OCD 2012).

Section 6.D of the 2012 renewal of GW-028 required NRC to perform a site investigation of the two RO reject water discharge fields. The *Reverse Osmosis Reject Water Discharge Fields Site Investigation Work Plan* (work plan) was initially submitted to OCD on November 20, 2012 and was revised December 20, 2012 in response to comments received from OCD via email (ARCADIS 2012). The investigation was conducted according to the work plan throughout 2013. A summary report of the investigation was submitted to OCD and NMED in February 2014 (ARCADIS 2014a), in accordance with Section 6.D.3 of GW-028.

As described in the most recent (2014) annual groundwater monitoring report (ARCADIS 2015a) and the final report summarizing the investigation of the RO reject fields (ARCADIS 2014a), groundwater beneath and near the Refinery contains both organic and inorganic compounds at concentrations above the respective WQCC standards or MCLs. As discussed in those reports, the concentrations of select COCs are elevated in samples collected from monitoring wells not impacted by refinery-related COCs. The WQCC regulations (20.6.2.4101.B NMAC) provide that the abatement standard for a COC is the background concentration of that COC when background concentrations exceed the numeric standard published in 20.6.2.4103 NMAC (which cross-references 20.6.2.3103 NMAC). However, no site-specific background concentrations have been determined.

After discussion with NRC and NMED, the OCD responded to the RO reject fields investigation report (ARCADIS 2014a) with a request that a formal background evaluation be performed to assist in determining if elevated concentrations of specific COCs in the groundwater beneath the RO reject fields are a result of the discharge activities or are within expected background concentration ranges. A work plan was developed that outlined procedures to be performed to complete a formal evaluation of background groundwater concentrations, and to potentially establish alternative standards for select COCs, as appropriate. The *Background Groundwater Evaluation*

Work Plan (work plan) was submitted to NMED and OCD on July 3, 2014 (ARCADIS 2014b). Both OCD and NMED approved the work plan with modifications on July 25, 2014 (OCD 2014 and NMED 2014a).

The investigation was initiated in late July 2014 and continued with monthly sampling through June 2015, according to the approved work plan. This report provides a summary of the work performed and the statistical evaluation of the groundwater monitoring data. This report generally follows the format for an investigation report submitted to supplement the Stage 1 Abatement Plan per 20.6.2.4106C.(7) and as defined in the PCC Permit, Appendix E.3.

2. Facility Background

NRC operates a petroleum refinery located at 501 East Main Street in the city of Artesia, Eddy County, New Mexico. The facility has been in operation since the 1920's and processes crude oil into asphalt, fuel oil, gasoline, diesel, jet fuel, and liquefied petroleum gas. Figure 1 depicts the general location of the Refinery and associated features, while Figure 2 shows the locations of wells included in the facility wide groundwater monitoring program, with emphasis on the wells used for this background groundwater evaluation.

2.1 Post-Closure Care Permit Background

In 1989, EPA and NMED required NRC to identify all historical and current nonhazardous SWMUs and investigate those that had the potential to pose a threat to human health or the environment. SWMUs which pose a potential threat must undergo additional investigation (a RCRA Facility Investigation [RFI] and possibly Corrective Measures Implementation) to minimize the threat.

Following completion of the Phase I RFI in December, 1990 (Mariah Associates, Inc. 1990), it was agreed by EPA and NMED that additional investigations were required for Three Mile Ditch (TMD) and the evaporation ponds (EPs) located east of the refinery. The second phase of investigation of those areas was conducted from 1991 through 1993, resulting in the RFI Phase II Report finalized in November 1993 (K.W. Brown Environmental Services 1993). A final Phase III Investigation Report addressing comments from the EPA and NMED was submitted in January 1996 along with a proposed work plan for removal of waste soils from TMD (K.W. Brown Environmental Services 1996). In December 1997, a consolidated report was submitted to NMED that summarized the various investigations performed up to that time along with recommendations for corrective actions in the TMD and the EP areas (Foster Wheeler Environmental Corporation 1997).

At the request of NMED, NRC submitted a Post-Closure Permit Application in June 1998. The original intent of this application, to address only closure and post-closure activities at the EPs and TMD, was expanded to include a complete RCRA Permit renewal application. The Secretary of the NMED issued a PCC Permit to NRC, the operator of the Artesia Refinery Facility (EPA ID number NMD 048918817) effective October 5, 2003 (NMED 2003). The PCC Permit was modified in December 2010 (NMED 2010). The PCC Permit authorizes and requires the Permittee to monitor the groundwater, maintain all groundwater monitoring wells and comply with applicable

regulations of 20.4.1.500 NMAC during the post-closure period. Specific groundwater monitoring requirements are included in the PCC Permit for the areas of the Tetra-Ethyl Lead impoundment (TEL), the North Colony Landfarm (NCL), the EP area, and other areas identified through implementation of the investigations of various SWMUs and Areas of Concern.

2.2 Discharge Permit Background

In October 1991, OCD issued Discharge Permit GW-028 to NRC. In April 1993, OCD approved a modification to GW-028 to allow discharge of the RO reject stream to an agricultural field, currently referred to as the South RO reject field. In 1999, NRC requested a modification to GW-028 to allow discharge of the RO reject stream to additional fields located north of Eagle Creek. Discharge of the RO reject stream is directed to either the South or North RO reject fields. Figure 3 depicts the locations the discharge fields in relation to the Refinery and Eagle Creek.

The most recent renewal of GW-028 was issued August 22, 2012 (OCD 2012). GW-028 authorizes and requires the Permittee to maintain phase-separated hydrocarbon recovery systems and to conduct semiannual groundwater monitoring. GW-028 requires submittal of an annual report summarizing the results of the monitoring and recovery programs and all discharges. Furthermore, the 2012 renewal of GW-028 required investigation of the RO reject fields to evaluate whether discharge to those fields has caused any impact to groundwater.

The investigation of the RO reject fields was conducted throughout 2013 and the final report of the investigation was submitted to OCD in February 2014 (ARCADIS 2014a) to meet the requirements of Section 6.D of GW-028. Three monitoring wells were installed in the South RO reject field and three monitoring wells were installed in the North RO reject field. Groundwater samples were collected quarterly and analyzed for water quality parameters listed in the WQCC regulations (20.6.2.3103 NMAC). Soil samples were screened using the NMED soil screening levels (SSLs) while groundwater samples were screened using the lower of the WQCC standards or the EPA MCLs. The conclusions stated in the investigation report (ARCADIS 2014a) were as follows:

- The data obtained throughout the 2013 investigation indicate that groundwater mounding occurs beneath the southern RO reject water discharge field, which receives the majority of the discharge. Slight mounding was noted in the northern RO reject water discharge field; however, it was not as significant.

- The reported concentrations of organic constituents of concern (COCs) in soil and groundwater samples collected in 2013 were below reporting limits or screening levels, confirming that no impacts from hydrocarbons have occurred as a result of discharge of the RO reject stream to the two fields.

- The reported concentrations of the following COCs in soil and groundwater samples collected in 2013 indicated that the RO reject water discharge is not a significant source of these compounds in groundwater:

  - Arsenic
  - Boron
  - Chloride
  - Manganese
  - Sulfate
  - Uranium

- Due to the concentration of fluoride in the groundwater samples collected in 2013 relative to the concentrations found in the RO reject water discharge samples, it was inconclusive whether the discharge constitutes a significant source for this contaminant.

The 2014 report included recommendations to continue monitoring of the six wells installed in the RO reject fields and that an additional upgradient monitoring well be installed west of Highway 285 to assist in evaluation of background groundwater quality. After discussion with NRC and NMED, NRC agreed to conduct a formal background groundwater investigation report, in part to assist in further evaluation of the potential impacts to groundwater from discharge of the RO reject water to the RO reject fields.

2.3 Facility-wide Groundwater Monitoring

Facility wide groundwater monitoring is conducted according to the Facility Wide Groundwater Monitoring Work Plan (FWGMWP), which is updated annually as required by the PCC Permit and GW-028. The most recent version of the FWGMWP was submitted in June 2015 (ARCADIS 2015b). The most recent annual (calendar year 2014) groundwater report, which meets the requirements of the PCC Permit and GW-028, was submitted to NMED and OCD on February 27, 2015 (ARCADIS 2015a).

3. Scope of Services

The work plan (ARCADIS 2014b) provided a detailed description of activities to be conducted to determine the background groundwater concentrations. This section provides a summary of activities actually performed and procedures used during 2014 and 2015.

3.1 Investigation Activities Performed

The approved work plan included the following activities:

- Installation of two new monitoring wells:
  - MW-136 – located in the northwest corner of NRC property north of the North RO reject field, hydraulically cross-gradient to the Refinery and the RO reject fields
  - UG-4 – located on North 4th Street south of West Logan Avenue, west of the Refinery and north of Eagle Creek, hydraulically upgradient of the Refinery
- Collection and analysis of groundwater samples from nine existing (listed below) and two new monitoring wells on a monthly basis for a period of 12 months
  - MW-55 –hydraulically upgradient of the RO reject fields
  - NP-5 – hydraulically cross-gradient to the North RO reject field
  - UG-1 – hydraulically upgradient of the Refinery
  - UG-2 – hydraulically upgradient of the Refinery
  - UG-3R – hydraulically upgradient of the Refinery
  - MW-12 – hydraulically upgradient and across the Pecos River from the EPs
  - MW-13 – hydraulically upgradient and across the Pecos River from the EPs
  - MW-17 – hydraulically cross-gradient to upgradient of the EPs
  - MW-25 – hydraulically upgradient of the EPs
- Statistical evaluation of the analytical results obtained to determine if alternate screening standards for select COCs would be appropriate or applicable.

Monitoring well MW-136 was installed on July 28, 2014, at the desired location. Monitoring well UG-4 was installed on August 18, 2014 at the desired location, after approval was obtained from the City of Artesia. During sampling efforts at UG-4 in August 2014, it was determined that inadequate recharge was occurring; therefore the well was overdrilled on September 2, 2014 and new well screen was installed at a deeper interval, allowing for appropriate monitoring of groundwater at this location.

Detailed descriptions of the well installation and groundwater monitoring activities are provided in the subsequent sections of this report.

Figure 2 depicts the locations of the two new background monitoring wells, in addition to the existing monitoring wells included in the background groundwater investigation and other monitoring and recovery wells associated with the Refinery. Well completion logs are included in Appendix A.

Drilling and sampling equipment was decontaminated between each use to prevent cross-contamination at boring locations. Augers and drilling tools were washed in a bath of non-phosphate soap (Alconox™) and water then rinsed with distilled water.

Most of the groundwater sampling equipment (tubing and filters) was dedicated, disposable equipment; however, the non-dedicated equipment (water level meter) was decontaminated between each use. Decontamination was performed by washing the equipment in a bath of non-phosphate soap (Alconox™) and water then rinsing with distilled water.

3.2 Investigation Methods

Methods and procedures used during this investigation are described in the following subsections.

3.2.1 Soil Sample Collection and Analysis

Prior to drilling, each location for the two new monitoring wells were confirmed to be clear of subsurface utilities by use of a hand auger to a depth of 5 feet below ground surface (ft bgs). Shallow soil samples were collected from the 0 to 1 ft bgs interval at each location from the hand auger bucket during the subsurface clearance. Additional subsurface samples were collected continuously ahead of the drill rig auger flight using a split spoon sampler. Total volatile organic compound (VOC) concentrations were measured at discrete depths along the collected soil core using a photo-ionization detector (PID) and were noted in field boring logs and well completion diagrams included as Appendix A.

The borehole for MW-136 was drilled to 25 ft bgs and the screened interval extended from 10 to 25 ft bgs. As noted in the well log, the shallow soil was a sandy silt to a depth of approximately 3 ft bgs, underlain by a silty clay to 13 ft bgs. A moist clayey silt layer was encountered between 13 to 15 ft bgs and a saturated silty clay was

present from 15 to 23 ft bgs. A dry stiff clay layer was encountered from 23 to 25 ft bgs, and the boring was terminated. A 15 foot section of well screen was set from 10 to 25 ft bgs, and the well was completed as a stickup well. No VOCs were measured in any of the soil samples using the PID and no stain or odor was encountered throughout the boring.

Well UG-4 was initially drilled to 25 ft bgs and well screen was installed from 10 to 25 ft bgs. After well development, the water level did not recover adequately for sample collection. On September 2, 2014, the well material was removed, and the borehole was over-drilled to a depth of 39.5 ft bgs. As shown in the well log, sandy silt was present from the surface to a depth of 6 ft bgs, underlain by a silty clay to a depth of 15 ft bgs. A stiff, wet clay was present from 15 ft bgs to 25 ft bgs, with the moisture content decreasing with depth. Dry silty clay and clay lenses were present to a depth of approximately 37.5 ft bgs. A saturated silty sand was encountered at approximately 37.5 ft bgs and was only about 6 inches in thickness. A dry clay was present from 38 to 39.5 ft bgs, where the boring was terminated. A 20 foot section of well screen was set from 19.5 to 39.5 ft bgs, and the well was completed with a flush-mounted vault. No VOCs were measured in any of the soil samples using the PID and no stain or odor was encountered throughout the boring.

Soil samples were selected from discrete intervals at each boring location for laboratory analysis. Soil samples were collected from the following intervals:

- MW-136:
  - 0 to 1 ft bgs
  - 4 to 5 ft bgs
  - 9 to 10 ft bgs
  - 14 to 15 ft bgs
- UG-4:
  - 0 to 0.5 ft bgs
  - 9 to 10 ft bgs
  - 15 ft bgs
  - 25 bgs (during overdrill)

Soil samples selected for laboratory analyses were labeled and placed in ice-packed coolers for submittal to the analytical laboratory. Each sample was analyzed for the COCs listed in the work plan, which include:

- Gasoline Range Organics (GRO) by Method 8015 Modified
- Diesel Range Organics (DRO) by Method 8015 Modified
- Oil Range Organics (ORO) by Method 8015 Modified
- Metals (aluminum, arsenic, barium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, uranium, vanadium, and zinc) by Methods 6020 and 7470
- Anions (chloride, fluoride, sulfate, nitrate/nitrite) by Method 300

VOCs were to be analyzed by Method 8260, if GRO was reported above the laboratory detection limit; however, none of the samples contained detectable concentrations of GRO and thus no VOCs were analyzed in the soil samples.

Semivolatile organic compounds (SVOCs) were to be analyzed by Method 8270, if DRO was detected at greater than 1,000 milligrams per kilogram (mg/kg); however, only one soil sample contained detectable DRO at a low concentration (1.9 mg/kg), thus no SVOCs were analyzed in the soil samples.

Analytical reports for the soil samples are provided in Appendix B and the analytical results are discussed in Section 6 of this report.

3.2.2 Monitoring Well Construction

Following drilling operations, the boreholes were converted to permanent monitoring wells, using 2-inch polyvinyl chloride (PVC) well casings. As described in the previous section, MW-136 has 15 feet of 0.020-inch slotted PVC screen and UG-4 has 20 feet of 0.020-inch slotted PVC screen. Both wells were constructed with 8/16 Oglebay silica sand filter pack within the annular space to 2 feet above the screened interval. A 2-foot bentonite seal was placed above the sand pack, and the remaining annular space was grouted to the surface using a tremie pipe.

MW-136 was completed with a stickup riser extending approximately 3 feet above the ground surface and a steel outer protective casing with a locking lid. The protective casing was constructed with a surrounding 4-foot by 4-foot by 4-inch thick concrete pad, sloped away from the protective casing.

UG-4 was completed with a metal vault flush with the ground surface set in a 4-foot by 4-foot by 4-inch thick concrete pad. The well casing was cut to approximately 5 inches below ground surface. A locking well cap was installed in the well casing, beneath a bolted steel manhole cover set into the concrete.

Each of the two new monitoring well locations was surveyed by a registered land surveyor. Northing and easting data was reported with an accuracy of +/- 0.01 feet in the North American Datum 83 New Mexico State Plane Coordinate System, Eastern Zone. The top of casing and land surface elevations were measured with an accuracy of +/- 0.01 feet in North American Vertical Datum 88 in reference to National Geodetic Survey benchmark G-416 with a known elevation of 3368.79 feet. The survey data is reported on the well completion logs provided in Appendix A of this report.

3.2.3 Monitoring Well Development

Both wells installed as part of this investigation were developed through purging of groundwater to remove fine grained materials accumulated in the well casing until the bottom of the well casing was reached. Field parameters including conductivity, pH, and temperature were monitored throughout the development process to determine groundwater conditions. The development process was ceased at each location when parameters stabilized (i.e., less than 10% variability between readings) or at least three well casing volumes were removed. All fluids produced during development were collected and disposed on-site, in the process wastewater system, upstream of the oil-water separator.

3.2.4 Groundwater Sample Collection and Analysis

Groundwater samples were collected from monitoring wells MW-12, MW-13, MW-17, MW-25, MW-55, MW-136, NP-5, UG-1, UG-2, UG-3R, and UG-4 on a monthly basis starting in July 2014. Exceptions to the monthly sampling schedule were as follows:

- MW-12: Flooding in October 2014 prevented access to the well.
- MW-13: Flooding in October 2014 prevented access to the well.
- UG-4: No samples were collected from this well in July 2014 (not installed) or August 2014 (inadequate recharge).

These wells were sampled in all of the other months of the monitoring period; thus, 10 samples were collected from UG-4 and 11 samples were collected from MW-12 and MW-13, providing a statistical significant data set. Because samples were collected from a minimum of 10 out of 12 months, the data is believed to be adequate to characterize seasonal fluctuations.

The depth to water was measured within each well prior to sample collection. Following the initial gauging, each monitoring well was purged using low-flow procedures with a peristaltic pump and dedicated tubing. During the well purging process, water quality parameters, including pH, conductivity, temperature, and turbidity, were measured at regular intervals using an YSI multiparameter water quality meter with a flow-through cell. Purging continued until water quality parameters stabilized for at least four consecutive readings, indicating that collected water was characteristic of the surrounding formation. Final water quality measurements and water level measurements are provided in Table 1 for each well for each monitoring event.

After purging was completed, samples were collected by directing the groundwater stream into clean sample containers provided by the laboratory. After all other groundwater sample containers were filled, a disposable 0.45 micron in-line filter was placed onto the tubing and the dissolved metals sample container was filled. Sample containers were labeled with the time and date of collection, sampler's initials, required analyses and preservative information. The labeled containers were placed in padded packing sleeves to prevent breakage and packed with ice in shipping containers. Samples were submitted to ESC Laboratory in Mount Juliet, Tennessee with chain-of-custody documentation. Copies of the chain-of-custody forms are included in Appendix B with the analytical data reports.

Due to an oversight by the laboratory, mercury was not analyzed in any of the samples collected in December 2014.

3.3 Quality Control Samples and Review

Field duplicates, field blanks, equipment rinsate blanks and trip blanks were planned to be obtained at a minimum at the following rates for samples submitted to the laboratory for analysis:

- Field Duplicates – 10%
- Equipment Rinsate Blanks – 5%
- Trip Blanks – one per shipping container with samples intended for VOC analyses

A total of 9 soil samples were collected and two duplicate soil samples were collected from the two new monitoring well borings. No equipment rinsate blanks were collected during the soil sampling efforts. No trip blanks were associated with the soil samples, as no VOC analyses were performed.

A total of 128 normal groundwater samples were collected throughout the 12 month investigation from 11 wells. A total of 12 duplicate groundwater samples were collected. A total of 31 trip blank samples were associated with the groundwater samples. A total of 33 equipment rinsate blanks were collected.

ARCADIS performed data validation on approximately 10 percent of the groundwater analytical results in accordance with EPA guidance (EPA 1999, 2002). Data validation reports are included with the laboratory reports in Appendix B. Data qualifier flags have been appended to laboratory results based on data evaluation and are incorporated into the respective data tables discussed later in this report.

The overall assessment of analytical results indicates that the data are acceptable and usable for the purposes intended. However, the equipment blanks contained elevated concentrations of inorganic COCs, and several of the inorganic analytical results were flagged as having potential blank contamination. The water level meter was the only non-dedicated equipment, the only equipment with the potential to introduce cross-contamination, so the water level meter probe and tape were thoroughly decontaminated after each use. Dedicated tubing was used to collect the groundwater samples from each well. Thus, the distilled water used to generate the equipment blank samples is believed to be the source of the reported concentrations in the blank samples, not cross-contamination due to sampling procedures.

3.4 Investigation Derived Waste

During the well installation sampling activities, all soil cuttings were collected temporarily in a roll-off bin for disposal pending waste characterization results. The solid waste was subsequently disposed of off-site as nonhazardous waste. Waste disposal records are maintained at the Refinery.

Gloves, paper towels and other solid waste generated during well installation and subsequent monitoring events were collected and disposed of in the Refinery trash.

All collected water from equipment decontamination, well development, and purging was collected and subsequently disposed on-site, within the Refinery process wastewater system, upstream of the oil-water separator.

4. Field Investigation Results

This section provides a description of the site conditions, updated with information obtained during the field investigation.

4.1 Surface Conditions

4.1.1 Area Land Uses

The area north, south, and east of the facility is sparsely populated and used primarily for agricultural and ranching purposes. The primary business and residential areas of the City of Artesia are located to west, southwest, and northwest of the Refinery. There are a few commercial businesses south of the Refinery along Highway 82, including an oil field pipe company located at the southeast corner of the plant. Much of the property for a half mile north to East Richey Avenue and east toward Bolton Road is owned by NRC. Much of the area east and northeast to Haldeman Road is a cultivated pecan orchard or used for other agricultural and ranching purposes.

The active Refinery and some of the surrounding property owned by NRC is fenced and guarded with only a few controlled entry points. The agricultural fields directly east and northeast of the Refinery that are owned by NRC are not fenced.

4.1.2 Topography

The Refinery facility is located on the east side of the city of Artesia in the broad Pecos River Valley of eastern New Mexico. The topography of the site and surrounding areas is shown in Figure 1. The average elevation of the city is 3,380 feet above mean sea level. The plain, on which Artesia is located, slopes eastward at about 30 feet per mile.

4.1.3 Surface Water Drainage Features

Surface drainage in the area is dominated by small ephemeral creeks and arroyos that flow eastward to the Pecos River, located three miles east of the city.

Natural surface drainage at the facility is to the north and east. The major drainage in the immediate area of the Refinery is Eagle Creek (or Eagle Draw), an ephemeral watercourse normally flowing only following rain events, that runs southwest to northeast through the process area of the Refinery and then eastward to the Pecos River. Upstream of the Refinery, Eagle Creek functions as a major stormwater

conveyance for the community. It also drains outlying areas west of the city and is periodically scoured by intense rain events.

The elevation of Eagle Creek is 3,360 feet at its entrance to the Refinery and decreases to approximately 3,305 feet at its confluence with the Pecos River. A large portion of the Refinery is within the 100-year floodplain of Eagle Creek. However, Eagle Creek has been channelized from west of Artesia to the Pecos River to help control and minimize flood events. In the vicinity of the Refinery, the Eagle Creek channel has been lined with concrete to provide further protection during flood events. A check dam was also constructed west of Artesia along Eagle Creek. At this time, most of the city and the Refinery have been effectively removed from the floodplain.

4.2 Exploratory Drilling Investigations

The methods used to complete the installation of the two monitoring wells were described in Section 3 of this report. Lithologic observations were recorded on the well completion logs contained in Appendix A. These observations are incorporated into the subsurface conditions description provided in Section 4.3.

4.3 Subsurface Conditions

Based on previous and current soil borings in and near the Refinery, permeable near-surface sediments to depths of 25 to 35 feet generally consist of thin discontinuous interbedded zones of clayey sands and gravels bounded by thicker zones of fine grained silts, clays, and indurated caliche. Groundwater flows through the sand and gravel deposits in braided channel flow. These sand and gravel channels likely create preferential groundwater flow pathways. The overlying clays and clayey silts undulate at the site, creating intermittent confined and unconfined groundwater conditions.

Lithologic observations from NRC monitoring wells installed west of the Refinery (UG-1, UG-2, UG-3R, UG-4) indicate that shallow subsurface soils are predominantly clay with gravel and sandstone at UG-2, and siltstone at UG-3R. UG-4 is the deepest boring that has been installed for NRC west of the Refinery. A silty sand was encountered at a depth of 37.5 feet bgs in UG-4, and is the groundwater bearing unit in that well. The rest of the soils in that area were generally clays and silty clays.

Subsurface soils on the Refinery and just north of the process areas of the Refinery (MW-55, MW-136, and NP-5) consist of interbedded layers of clays and silty clays. Similarly, soils encountered near the EPs at MW-25 are clays and silty clays, while

the subsurface soils encountered north of Eagle Creek at MW-17 were sands and clays. Subsurface soils nearer the Pecos River across from the EPs (MW-12 and MW-13) consist generally of sands.

4.4 Monitoring Well Construction

The monitoring well construction details for the two new monitoring wells installed as part of this investigation were provided in Section 3 of this report.

4.5 Groundwater Conditions

The principal aquifers in the Artesia area are within the San Andres Formation and the valley fill alluvium. Lithologic logs from monitor wells installed previously in the Refinery process area document a near-surface saturated zone overlying the main valley fill alluvium and containing water of variable quality in fractured caliche and sand and gravel lenses at depths of 15 to 30 feet. This water is under artesian pressure for at least some or most of the year with static water levels 3 to 5 feet above the saturated zones. The general direction of groundwater flow in the near-surface saturated zone is to the east. Figure 4 depicts the potentiometric surface for the shallow saturated zone for the Refinery and surrounding areas based on semi-annual groundwater measurements made in November 2014 (ARCADIS 2015a).

5. Regulatory Criteria

This section presents the sources of screening levels used to evaluate investigation analytical results.

5.1 New Mexico Soil Screening Levels

NRC has followed guidance provided by NMED to develop soil screening levels (SSLs) to determine the nature and extent of potential COCs. The primary source of soil screening levels is the NMED risk-based soil screening guidance document *Risk Assessment Guidance for Site Investigations and Remediation* (NMED 2014b).

SSLs used to evaluate the soil samples from the installation of two background monitoring wells were the Residential SSLs from Table A-1 of the NMED risk guidance (NMED 2014b). Total petroleum hydrocarbons (TPH) DRO and ORO were compared to the screening level values for "unknown oil" from Table 6-2 of the *Risk Assessment Guidance for Site Investigations and Remediation* (NMED 2014b).

Soil screening levels are presented in Table 2 along with soil analytical results.

5.2 New Mexico Groundwater Standards

As discussed in Section 1 of this report, the facility wide groundwater monitoring program requires that groundwater data be reviewed and screened using the standards provided in the WQCC regulations (20.6.2.3103 NMAC) or the EPA MCLs (40 CFR 141 and 143). If more than one value is published for a COC (WQCC standards, EPA MCL, or EPA secondary MCL), the lower value is used for the screening value, according to the PCC Permit. In the event that neither a WQCC standard or EPA MCL is available, then the NMED tap water value is used as the screening value, where available.

TPH Screening Guidelines for Potable Groundwater for unknown oil included in Table 6-2 of the *Risk Assessment Guidance for Site Investigations and Remediation* (NMED 2012) were used, as corrected by subsequent correspondence from the NMED since groundwater screening values are not included in the WQCC standards or in the 2014 version of Table 6-2.

The groundwater screening level for each COC, and the source of the screening level, is provided in Table 3 along with the groundwater analytical results.

6. Sampling Results and Statistical Evaluation

This section presents the sampling results for the background groundwater investigation along with the statistical evaluation of the groundwater data.

6.1 Soil Sampling Results

A summary of the soil analytical results is shown in Table 2. Reported concentrations that are above the associated SSL for each analyte are shown highlighted and in bold italic font. An electronic copy of the analytical data reports for groundwater samples is provided in Appendix B.

Concentrations of GRO, DRO, and ORO were either not detected above laboratory reporting limits or were below the SSL for all soil samples collected during well installation.

Concentrations of inorganic compounds were either not detected above laboratory reporting limits or were below the SSL for all soil samples collected during well installation, with the exception of arsenic. Arsenic was reported at concentrations above the Residential SSL in the soil samples collected from the boring for UG-4 in the 0 to 1 ft bgs interval (normal sample and field duplicate sample) and in the 39 to 39.5 ft bgs interval (normal sample only). The highest reported concentration of arsenic was 7.3 mg/kg (39 to 39.5 ft bgs sample from UG-4) and the Residential SSL is 4.25 mg/kg. Due to the location of UG-4 (west of Highway 285), the arsenic present in these soil samples cannot be attributed to Refinery operations, but are believed to be indicative of naturally occurring arsenic in native soils.

6.2 Groundwater Sampling Results

A summary of groundwater analytical results is shown in Table 3. Reported concentrations that are above the groundwater screening level for each COC are shown highlighted and in bold italic font. An electronic copy of the analytical data reports for groundwater samples is provided in Appendix B. The following subsections provide a brief summary of the groundwater analytical results.

6.2.1 Organic Compounds

6.2.1.1 Volatile Organic Compounds

All of the groundwater samples collected as part of the background groundwater investigation were analyzed for VOCs for which WQCC standards are published (20.6.2.3103 NMAC), according to the approved work plan. There were no VOCs reported for any of the samples at concentrations above the method detection limits.

As shown in Table 3, the method detection limit (0.00038 milligrams per Liter [mg/L]) for 1,2-dibromoethane (ethylene dibromide) was above the WQCC standard (0.00005 mg/L). None of the samples contained detectable amounts of 1,2-dibromoethane. It is not possible for the analytical laboratory to achieve a method detection limit equal to or below the screening standard using current equipment. The inability to achieve the low detection limits was identified in the response to comments regarding the work plan, and is not believed to affect the background groundwater evaluation.

6.2.1.2 Semivolatile Organic Compounds

All of the groundwater samples collected as part of the background groundwater investigation were analyzed for SVOCs for which WQCC standards are published (20.6.2.3103 NMAC), according to the approved work plan. The SVOCs were not detected in the majority of the samples, with two exceptions:

- Benzo(a)pyrene was reported at an estimated (J-flagged) concentration of 0.00036 mg/L in the sample collected from MW-55 in July 2014. The WQCC standard for benzo(a)pyrene is 0.0007 mg/L, while the EPA MCL is 0.0002 mg/L.

- Naphthalene was reported at an estimated (J-flagged) concentration of 0.00039 mg/L in the sample collected from UG-4 in November 2014. The WQCC standard for polycylic aromatic hydrocarbons, defined as naphthalene plus mono-methyl naphthalenes, is 0.030 mg/L.

Because the detected values of benzo(a)pyrene and naphthalene were estimated and below the WQCC standards, and because none of the other samples from the same wells contained detectable concentrations of those compounds, the reported concentrations are considered anomalous and do not affect the background groundwater evaluation.

Also shown in Table 3, the method detection limits (0.00034 to 0.00038 mg/L) for benzo(a)pyrene were above the EPA MCL of 0.0002 mg/L; however these detection limits are below the WQCC standard of 0.0007 mg/L. The inability to achieve a detection limit below the EPA MCL is not believed to affect the background groundwater evaluation.

6.2.1.3 Total Petroleum Hydrocarbons

TPH were analyzed in all of the samples collected for the background groundwater investigation. The work plan stated that all samples would be analyzed for GRO and DRO; however, many of the samples were also analyzed for ORO.

GRO was reported above the method detection limit in a total of seven of the groundwater samples; however, there is no screening value for GRO.

DRO was reported above the method detection limit in a total of 86 of the groundwater samples, 18 of which were above the screening level of 0.2 mg/L, as follows:

- MW-136 – the July 2014 sample contained 0.28 mg/L DRO
- UG-3R – the May 2015 sample contained 1.4 mg/L DRO
- MW-55 – four samples contained DRO at concentrations ranging from 0.21 mg/L to 0.32 mg/L (October 2014, April 2015, May 2015, June 2015)
- MW-25 – 12 of the 13 samples (all but the July 2014 sample) contained DRO at concentrations ranging from 0.26 to 1.1 mg/L

ORO was reported above the method detection limit in a total of 78 of the groundwater samples, 2 of which were above the screening level of 0.2 mg/L, as follows:

- MW-25 – the February 2015 sample contained 0.9 mg/L ORO
- UG-3R – the May 2015 sample contained 1.4 mg/L ORO

Based on the lack of VOCs and SVOCs reported in the background groundwater samples, it is believed that the low levels of DRO and ORO reported may be indicative of anthropogenic carbon that is measured by Method 8015.

6.2.2 Inorganic Compounds

6.2.2.1 Dissolved Metals

All of the groundwater samples were analyzed for dissolved metals for which WQCC standards are published (20.6.2.3103 NMAC), according to the approved work plan. The reported concentrations were compared to the lower of the WQCC standards or EPA MCLs, as shown in Table 3.

Dissolved metals were reported at concentrations above the detection limits in one or more samples from each of the monitoring wells included in the background groundwater investigation, with the following exceptions:

- Cadmium (dissolved) was not detected in any of the groundwater samples
- Cobalt (dissolved) was not detected in any of the groundwater samples collected from the following wells:
  - MW-17
  - MW-55
  - NP-5
  - UG-1
  - UG-3R
- Lead (dissolved) was not detected in any of the groundwater samples collected from the following wells:
  - MW-13
  - MW-55
  - UG-1
- Silver (dissolved) was not detected in any of the groundwater samples collected from the following wells:
  - MW-17
  - MW-55
  - MW-136
  - NP-5
  - UG-1

- UG-2
- UG-3R
- UG-4

The ranges of concentrations and frequency of detection of dissolved metals are discussed in more detail in Section 6.3 of this report.

6.2.2.2 Total Metals

All of the groundwater samples were analyzed for the total metals that are included in the facility-wide groundwater monitoring program, as per the approved work plan. The reported concentrations of total metals were compared to the lower of the WQCC standards or EPA MCLs, as shown in Table 3. It should be noted that the WQCC standards apply to dissolved concentrations, with the exception of mercury; however if the WQCC standard is less than the EPA MCL, the WQCC standard was used as the screening level.

Total metals were reported at concentrations above the detection limits in one or more samples from each of the monitoring wells included in the background groundwater investigation, with the exception of mercury. Mercury was not detected in any of the samples collected from the following wells:

- MW-12
- MW-17
- MW-25
- UG-2
- UG-3R
- UG-4

The ranges of concentrations and frequency of detection of dissolved metals are discussed in more detail in Section 6.3 of this report.

6.2.2.3 Water Quality Parameters

All of the groundwater samples were analyzed for general water quality parameters, including common cations and anions, and for cyanide and radium, as per the approved work plan. The concentrations of water quality and general chemistry

parameters were compared to the lower of the WQCC standards or EPA MCLs, as shown in Table 3, where those standards exist.

Water quality parameters were reported at concentrations above the detection limits in one or more samples from each of the monitoring wells included in the background groundwater investigation, with the exception of cyanide. Cyanide was detected in only one of the samples collected from each of the following wells:

- MW-13 (May 2015)
- MW-17 (November 2014)
- MW-55 (July 2014)
- UG-2 (July 2014)

The ranges of concentrations and frequency of detection of water quality parameters are discussed in more detail in Section 6.3 of this report.

6.3 Statistical Evaluation Methodology and Results

The analytical results collected as part of the background groundwater investigation were evaluated statistically, with the purpose of developing alternative standards, as appropriate. The methods utilized for the statistical evaluation and the results of the evaluation are present in the following subsections.

Statistical methods outlined in the EPA document *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (EPA 2009), referred to as the Unified Guidance, were used to perform the statistical evaluation of data obtained for this investigation. The specific steps of the evaluation included determination of the following:

- Analytes to be included in the evaluation
- Appropriate handling of the qualified data
- If the data set constitutes one or more populations, including determination of the statistical distribution for each data set and evaluation of outliers

- Method for handling results when concentrations were reported as not detected, including whether to use substitution or some other method to replace the non-numeric result and if parametric or non-parametric methods should be applied

After each of the above steps was completed, the upper tolerance limit (UTL) for each analyte retained in the evaluation was calculated at 95 percent (%) confidence and 95% coverage.

6.3.1 Analytes Included

As described in Section 6.2.1, no VOCs were detected and only two SVOCs were detected in the samples collected as part of this investigation. The TPH concentrations reported in samples collected as part of this investigation were primarily quite low and may be indicative of anthropogenic carbon that is measured by Method 8015. No statistical evaluation of the organic compounds was performed.

As described in Section 6.2.2, inorganic compounds were detected in one or more of the samples collected from the majority of the wells included in this investigation. Thus, the statistical evaluation focused on the three groups of inorganic compounds, as follows:

- Dissolved metals:
  - Aluminum
  - Arsenic
  - Barium
  - Boron
  - Cadmium
  - Chromium
  - Cobalt
  - Copper
  - Iron
  - Lead
  - Manganese
  - Molybdenum
  - Nickel
  - Selenium

  - Silver
  - Uranium
  - Vanadium
  - Zinc
- Total metals:
  - Arsenic
  - Barium
  - Chromium
  - Iron
  - Lead
  - Manganese
  - Mercury
  - Nickel
  - Selenium
  - Vanadium
- Water quality parameters:
  - Calcium
  - Chloride
  - Fluoride
  - Nitrate/nitrite
  - Potassium
  - Sodium
  - Sulfate
  - Total Dissolved Solids
- Cyanide

Thus, there were 37 analytes for which a statistical evaluation was performed.

Analytical results from field duplicate samples were not included in the statistical evaluation as this would violate the principle of statistical independence. However, the duplicate samples were used in the data validation process.

6.3.2 Handling of Data Qualifiers

Table 3 provides the analytical results obtained as part of this investigation along with laboratory and data validation qualifiers or "flags". To complete the statistical evaluation, data points must be defined as either a numeric value or as not detected. Therefore, the data qualifiers were evaluated for each of the groups of analytes being evaluated. In general, all J-flagged data were assumed to be quantitative except when in the presence of a second flag. Data with B-flags, V-flags and other less common qualifiers were treated either as not detected or as quantitative detections. For UB and JB qualifiers, the basis for handling the reported result as a quantitative value or as not detected was subjective, based on whether the data matched other quantitative or not detected results from other sampling events for the same constituent in the same monitoring well.

Tables C-1 through C-3 in Appendix C list the qualified data for the dissolved metals data set, the total metals data set, and the water quality parameters plus cyanide data set, respectively. Similar methods for handling the data qualifiers were used for all three groups of data being evaluated.

In addition to the processing of data qualifiers, several data points were removed from the statistical analysis due to apparent analytical errors. These errors included the following:

- Fluoride results for June 2015 samples – All fluoride data collected in June were a factor of 10 higher than all of the previous fluoride data. Thus, all of these data points were removed from the statistical evaluation as anomalous.

- Anomalously low data points – Other data points were anomalously low, such as the not detected results for chloride, sodium, and sulfate in samples from wells in which the typical values from other samples collected during the investigation were orders of magnitude higher than the detection limits. Leaving these data points in the analysis would distort the distributions and raise the standard deviations, leading to potentially inappropriately higher UTLs. Thus, anomalously low water quality data were removed from the statistical evaluation. All of the cases in which the non-detected results were excluded from the statistical evaluation are listed in Table C-3.

6.3.3 Evaluation of Data Populations

The monitoring wells included in the background groundwater investigation were identified in the approved work plan, and included:

- MW-12
- MW-13
- MW-17
- MW-25
- MW-55
- MW-136
- NP-5
- UG-1
- UG-2
- UG-3R
- UG-4

The locations of these wells were specifically chosen in areas that are either hydraulically upgradient or crossgradient from the Refinery or the Evaporation Ponds and in areas where groundwater has not historically shown impacts from Refinery operations. The physical locations of the wells cover an area that is approximately four miles in an east-west direction. The question of whether the concentrations of the constituents in the data set constituted a single statistical population was therefore important.

To evaluate whether the data constitutes a single statistical population, it was decided to examine selected data subsets and test them. The dissolved metals were preferred over the total metals because these data were less likely to be confounded by turbidity or other issues inherent in unfiltered groundwater samples. Data sets for which the detection rate was greater than 50% were also preferred.

The selected data sets were subjected to the following four tests to determine if a single population exists:

- Discernable distribution – Having a discernable normal distribution is evidence that a data set constitutes a single population. If a transformation the data can be normalized, this would also suggest a common population. The data for each of the selected analytes were tested using the Shapiro-Francia test for normality as recommended in Unified Guidance for data sets with greater than 50 members (EPA 2009, p.10:15). Transformations were conducted on data that failed the initial normality test following the ladder of powers (EPA 2009, p. 10:4; Box and Cox 1964). The normality test was run at a 5% level of significance. If none of the transformations led to passage of the test for normality, but one transformation allowed the test to pass at a 1% level, this condition was noted.

- Numbers of outliers – If a data set constitutes a single population, statistical outliers should be rare, as an outlier is a data point that is not from the population. The data sets were tested using Rosner's Test for Outliers (EPA 2009, p. 12:10-14; Rosner 1975) at 95% confidence. The number of statistical outliers for each data set was noted.

- Coefficient of variation – The coefficient of variation is defined as the standard deviation divided by the arithmetic mean, and is considered an indication of the spread of a data set. Having a coefficient of variation that is 1.0 or less suggests that the data are a single population.

- Linearity in a probability plot – A probability plot is a graph of the concentrations on the horizontal axis versus the normal quartiles on the vertical axis. If the data lie on a straight line, the data are considered to be normally distributed. However, this test also allows the user to visually detect multiple populations, because more than one slope and linear feature may appear. The correlation coefficient between the points and a straight line is an objective test of normality: if the correlation coefficient exceeds a critical value, one can say with 95% confidence that the data are sufficiently linear for a normal distribution. The critical value is based on the data set size, and is provided at the top of each probability plot.

If the data met three of the four of these lines of evidence for a given parameter, then that parameter supported the hypothesis that a single population exists. If not, the data set was considered not to support the hypothesis that a single population exists. If most of the test parameters supported the view of a single population, the determination of a background concentration for all of the parameters would continue. If not, the question would be examined if the background wells could be grouped geographically, such as east and west.

Using these four criteria, a determination was made for 20 of the 37 analytes. As stated previously, these tests were only run on dissolved metals and water quality parameters so as not to be affected by sampling issues such as turbidity. Furthermore these tests were only applied to data sets with a detection rate of 50% or higher so as not to be skewed by large numbers of not detected data.

The initial result of the tests for population was that the data set did not pass the criteria set forth above for many of the analytes. Further analysis revealed that the data from monitoring well UG-3R was very different from the data collected from the other 10 monitoring wells. Initially, monitoring well UG-3 was installed in an area that was determined to be a hydraulic sink (ARCADIS 2008). UG-3R was installed as a replacement well for UG-3. A review of the well completion log for UG-3R indicates that the lithology is slightly different than nearby wells (UG-1 and UG-2) and it is believed that there may be more connectivity between the shallow saturated zone and the underlying artesian aquifer at this location. Deleting the data from UG-3R from the evaluation of populations changed the initial result of the population analysis and led to the conclusion that the background data sets may constitute a single population. Therefore the data from UG-3R were set aside in the calculations of background concentrations.

Table 4 lists the results of the tests for population performed on the set of data from 10 of the 11 background monitoring wells (excluding the data from UG-3R). As can be seen in Table 4, the tests indicated that 11 of the 20 analytes exhibited at least three of the four lines of evidence of a single population, and two others probably exhibited at least three of the four lines. Since 13 of 20 analytes had properties of a single population, it was determined that the background data from 10 of the 11 monitoring wells included in the background investigation (excluding UG-3R) are representative of a single population and may be used to represent background concentrations for the Refinery.

Each of the four lines of evidence for each analyte is discussed in more detail in the following paragraphs.

Aluminum

The aluminum data set does not pass the Shapiro-Francia normality test with any transformation in the ladder of powers, but the closest fit is with a cube-root transformation. The Rosner test for outliers was applied to transformed data and no outliers are present. The coefficient of variation is 0.819. The probability plot does not exhibit linear behavior (Figure C-1) and it can be seen

in the probability plot that the not detected results interfered. Only two of the four lines of evidence of a single population are present. Therefore, the background data for aluminum does not exhibit the properties of a single population.

Arsenic

The arsenic data set passes the normality test with a logarithmic transformation, but only at a 1% level of significance. The normality test is adversely affected by the not detected data. When only detections are analyzed, the transformed data set passes the normality test at a 5% level of significance, suggesting that all of the data have a single distribution. The transformed data set has no statistical outliers. The coefficient of variation prior to transformation is 0.795, which is less than 1.0. The data form a line in the probability plot (Figure C-2), but the data are not sufficiently linear; the correlation coefficient is only 98.7%, which narrowly fails to satisfy the criterion for linearity. Three of the four lines of evidence of a single population are present; thus, there is sufficient evidence to conclude that the arsenic data are a single population.

Barium

The barium data set contains a questionable data point from the November sampling event at monitoring well UG-2. The November result was reported as 0.11 mg/L, while the reported concentrations for the other 11 samples from UG-2 ranged from 0.0024 to 0.0161 mg/L. This data point was excluded from the statistical evaluation because it is anomalously high. The remainder of the barium data pass the normality test with a cube-root transformation, but only at a 1% level of significance. Thus, the barium data probably meets the first test. The transformed data has no outliers. The coefficient of variation is 0.422, which is less than 1.0. The barium narrowly fails the linearity criterion in the probability plot (Figure C-3). Barium meets two of the three criteria, and probably meets a third one, therefore the barium data are likely a single population.

Boron

The boron data set passes the normality test with a cube-root transformation. The transformed data set has no outliers. The coefficient of variation is less than 1.0. The probability plot exhibits linearity (Figure C-4). Thus all four criteria are met and the background boron data are a single population.

Chromium

The chromium data set has 49 not detected results and a detection rate of 58%. The tests for a single population were made by examining the detections only, which have a lognormal distribution, no outliers, a coefficient of variation of 0.445, and are clearly linear (Figure C-5). Thus, all four criteria are met and the background chromium data are a single population.

Copper

The copper data set has 20 not detected results and a detection rate of 82.5%. The tests for a single population were made by examining the detections only, which have a cube-root distribution, no outliers, a coefficient of variation of 0.347, and are clearly linear (Figure C-6). Thus, all four criteria are met and the background copper data are a single population.

Manganese

The manganese data set does not pass a normality test with any transformation, although they came the closest with the logarithmic transformation. There are no outliers. The coefficient of variation exceeds 1.0. The transformed data are nonlinear (Figure C-7). Although the tests indicate signs of linearity and of lognormality, there is insufficient evidence to conclude that the manganese data are a single population.

Molybdenum

The molybdenum data set does not pass a normality test with any transformation, although they came the closest with the logarithmic transformation. There are no outliers. The coefficient of variation is less than 1.0. The transformed data are nonlinear (Figure C-8). Thus, there is insufficient evidence to conclude that the molybdenum data are a single population.

Nickel

The nickel data set passes the normality test after a transformation, but only at a 1% level of significance. There are no outliers. The coefficient of variation exceeds 1.0 and the probability plot is not linear (Figure C-9). There is insufficient evidence to conclude that the nickel data are a single population.

Selenium

The selenium data set passes the normality test with a cube-root transformation. The transformed data set has no outliers. The coefficient of

variation is less than 1.0. The probability plot exhibits linearity (Figure C-10). All four criteria are met; thus, the background selenium data are a single population.

Uranium

The uranium data set is lognormally distributed when only the detections are analyzed. There are no outliers. The coefficient of variation exceeds 1.0. The probability plot exhibits linearity (Figure C-11). Thus three of four lines of evidence are present, providing sufficient evidence to conclude that the uranium data are a single population.

Vanadium

The vanadium data set does not pass a normality test with any transformation, although the original data came the closest, that is, without any transformation. There are no outliers. The coefficient of variation is less than 1.0. The probability plot of the data is nonlinear (Figure C-12). There is insufficient evidence to conclude that the vanadium data are a single population.

Calcium

The calcium data set has a discernable cube-root normal distribution. There are no outliers, and the coefficient of variation is less than 1.0. The probability plot of the transformed data is linear (Figure C-13). All four criteria are met; thus, the background calcium data are a single population.

Chloride

The chloride data set approximates a lognormal distribution; however, the transformed data do not pass the normality test. There are no outliers. The coefficient of variation is greater than 1.0. The probability plot of the transformed data is nonlinear (Figure C-14), although there is evidence of some measure of linearity. There is insufficient evidence to conclude that the background chloride data are a single population.

Fluoride

The fluoride data set is lognormally distributed, although they only pass the normality test at a 1% level of significance. The data set contains no statistical outliers. The coefficient of variation is less than 1.0. The probability plot does not pass the correlation test, but it misses by a narrow margin (98.6% versus the 98.7% criterion) and the probability plot approximates linearity (Figure C-

15). Three of four lines of evidence are present, providing sufficient evidence to conclude that the fluoride data are a single population.

Nitrate/Nitrite

The nitrate/nitrite data set is cube-root distributed. The data set contains no statistical outliers. The coefficient of variation is greater than 1.0. The probability plot of the transformed data exhibits linearity (Figure C-16). All four criteria are met; thus the background nitrate/nitrite data are a single population.

Potassium

The potassium data set has a discernable cube-root normal distribution, with no outliers, and the coefficient of variation is less than 1.0. The probability plot of the transformed data is linear (Figure C-17). All four criteria are met; thus, the background potassium data are a single population.

Sodium

The sodium data set approximates a lognormal distribution, although the transformed data do not pass the normality test. There are no outliers. The coefficient of variation is greater than 1.0. The probability plot of the transformed data is nonlinear (Figure C-18). Thus there is insufficient evidence to conclude that the background sodium data are a single population. It is interesting that sodium and chloride both failed the same tests. This could suggest that the groundwater data overall might be a single population, but the monitoring wells might vary merely in their sodium and chloride content.

Sulfate

The sulfate data set passes the normality test with a square-root transformation, but only at a 1% level of significance. The transformed data set has no outliers. The coefficient of variation is 0.403, which is less than 1.0. The sulfate data narrowly fails the linearity criterion in the probability plot (Figure C-19). Thus, sulfate exhibits two of the lines of evidence, and approximates the other two. Thus the background sulfate data are likely a single population

Total Dissolved Solids

When transformed logarithmically, the total dissolved solids (TDS) data set narrowly misses passing the normality test. There are no outliers. The coefficient of variation is less than 1.0. It can be seen in Figure C-20 that the data show some measure of linearity, but the correlation coefficient is 98.1%,

just below the critical value. However, if MW-17 TDS data are removed, the remaining data pass the normality test with the transformation and they have a correlation coefficient of 98.8% (Figure C-21) and are more linear. MW-17 was included in computing the background concentration; it was only removed for the purpose of clarifying that the TDS data are a single population. Thus, the TDS data exhibit the four lines of evidence and are a single population.

Of the 20 COCs examined, 11 clearly exhibited that the data are a single population and two (barium and sulfate) are likely a single population. Since 13 of the 20 COCs indicate a single population, the data sets from 10 of the 11 monitoring wells were combined and treated as a single population, representative of shallow groundwater throughout the area of interest (refinery, RO reject fields, and EPs). Data from monitoring well UG-3R were not used in determining the background concentrations.

6.3.4 Handling of Not Detected Data

Unified Guidance presents the 15% and 50% Non-detect Rule (EPA 2009, p. 15:24-25). This rule states that substitution should be used if the rate of not detected results is 15% or less. If the not detected rate is greater than 15%, some other correction technique should be used, such as the Kaplan-Meier method or Cohen's Adjustment. If the rate of not detected results is greater than 50%, then non-parametric methods are recommended for evaluation of the data.

If the data set is comprised wholly of not detected results, then the Double Quantification rule is recommended (EPA 2009, p. 6:11). This rule states that if a constituent has not been detected in the background data set, then any detection is statistically elevated after it has been confirmed by resampling.

The methods of Unified Guidance were used for handling not detected results.

6.3.5 Calculation of UTLs

Having established that it is acceptable to treat the data from ten of the monitoring wells as a single population, background UTLs were calculated.

The UTL is the upper limit of a statistical interval constructed around the central tendency of a data population to contain a certain portion of the background concentrations with a specific confidence. The intervals presented in this document were constructed to capture 95% of the background population with 95% confidence.

Thus, they are referred to as "95/95 UTLs." In this report they are called UTLs with the understanding that they are 95/95 UTLs.

The UTL are computed from the sample arithmetic mean $\bar{x}$ and the standard deviation S, and a tolerance factor κ using the following parametric equation:

$$UTL = \bar{x} + S\kappa$$

Unified Guidance provides a table of values of κ, which varies with coverage, confidence, and sample size (EPA 2009, Appendix D, Table 17-3). The use of this equation is predicated on the requirement that the data be normally distributed. The data were tested for normality using the Shapiro-Francia test for normality, run at the 5% level of statistical significance. When a level of statistical significance other than 5% was used, this was indicated. If the data did not pass the normality test, then the ladder of powers (EPA 2009, p. 10:4; Box and Cox 1964) was used. In such cases, the tolerance interval was built around the transformed mean rather than the arithmetic mean, as the transformed mean more accurately represents the central tendency of such data sets. UTLs computed on transformed data sets were back-transformed (EPA 2009, p. 7:19) to allow for convenient comparison with compliance data at a later time.

In the event that a transformation could not be found, a non-parametric method was used to estimate the UTL. Non-parametric UTLs were slow computed if the detection rate was less than 50%. Non-parametric methods have the advantage that they do not require any particular underlying statistical distribution. However, they have the disadvantage that the coverage cannot be precisely chosen. For this reason, it is important that the statistician make every effort to find a way to keep a data set parametric. The non-parametric method was to select the third highest value in the data set and use that as the UTL. The reason for this choice is based upon the fact that the data sets had between 100 and 116 members.

It was shown by Guttman (1970) that the coverage of a tolerance limit follows a beta probability density with a cumulative distribution. This means that the data can be ranked and one can compute the coverage γ of the m^{th} ranked value for a data set with n members for a given confidence α. Because the beta distribution is closely related to the binomial distribution, it follows that

$$\sum_{t=m}^{n} \binom{n}{t} (1-\gamma)^t \gamma^{n-t} \geq 1 - \alpha$$

This equation was solved in Unified Guidance and the results are listed in Table 17-4 in Appendix D of EPA (2009) for α = 95% and α = 99%, for m =1 and m=2. It can be seen that if the data set has 59 members or less, the 95/95 UTL can be conservatively approximated by selecting the highest value in the data set. If there are 95 members in the data set, the second highest value would be a conservative approximation. The data sets in this document have 100 to 116 members, so the third highest value was chosen to represent the UTL.

The values of κ were obtained from Unified Guidance (EPA 2009). The normality tests, outlier tests and probability plots were run using the commercially available statistics program ChemStat, version 6.3.0.0, sold by Starpoint Software Inc. in Mason, Ohio.

UTLs were computed for the eighteen dissolved metals and are presented in Table 5. Table 5 also provides the UTL computation method (parametric or nonparametric). When parametric methods were used, the transformation used (if any) is stated by listing the distribution of the data. For reference, the detection rates have been listed in the tables (Tables 5 through 7) in order to inform the reader when non-parametric method was dictated by detection rate. Cadmium was not detected at all; thus, future compliance data for this COC should be evaluated using the double-quantification rule.

The UTLs for the total metals are presented in Table 6. Of the ten UTLs presented in this table, seven are non-parametric. It is of interest to note that eight out of nine metals had higher UTLs for the total metals analyses for the metals that were analyzed for both dissolved and total samples. This is to be expected since the dissolved metals analyses included field-filtering of the samples which would remove colloidal matter and thus would remove some of the metals measured by the laboratory in the total metals groundwater samples.

The UTLs for the water quality parameters are presented in Table 7. Unlike the metals, the majority of the water quality parameters could be examined using parametric methods.

6.3.6 Discussion of Statistical Evaluation Methodology and Use of Automated Programs

Many regulatory agencies are concerned that statistical analyses conducted by regulated entities and their consultants take into account goodness of fit, outliers, and censorship. For this reason, statistics packages such as Sanitas™ or ProUCL are often recommended, and in previous letters to NRC, NMED has commented that ProUCL should be used for statistical evaluation. However, it has been demonstrated that

statistical programs deal with these important issues (fit, outliers, censorship) in a mechanical way, and sometimes have algorithms with extreme assumptions built in. For example, ProUCL forces all interval estimators to be built around the arithmetic mean, even when that parameter is not the best representative of central tendency. ProUCL is also quickly abandons parametric methods thus sacrificing control in the coverage and confidence. Whereas these automated programs are a good tool to be certain that goodness of fit issues are being considered, they are not as accurate as a trained statistician, and are not sufficient to handle a complex problem as the background groundwater for the Refinery. For this reason, a more rigorous methodology than that of ProUCL was employed.

The UTLs presented in this evaluation were computed by hand, using a spreadsheet following the methods described throughout this section. All of the goodness of fit issues were handled using literature and regulatory guidance, applied by trained practitioners.

6.4 Comparison of Background UTLs to Groundwater Screening Standards

Table 8 provides a comparison of the calculated UTLs to the screening standards currently used to evaluate groundwater monitoring results. The sources of the current screening standards were described in Section 5 and were also provided in Table 3. In the event that the WQCC standard published in 20.6.2.3103 NMAC is equal to the EPA MCL, the WQCC source is listed in Table 8. The UTLs for the metals that were analyzed in both dissolved (field-filtered samples) and total (not filtered) phases are both shown in Table 8 and the lower of the two UTLs was compared to the groundwater screening level.

As seen in Table 8, the UTL of the background data set exceeds the screening levels for the following COCs:

- Boron
- Chloride
- Fluoride
- Manganese
- Mercury
- Nitrate/Nitrite

- Sulfate
- TDS
- Uranium

Thus, these COCs should be considered to be naturally occurring in groundwater in the vicinity of the Refinery, the RO reject fields, and the EPs.

7. Conclusions

The background groundwater investigation has been completed according to the approved work plan, with minor exceptions (discussed previously in this report). Statistical evaluation of the data according to approved EPA methods revealed the following:

- Groundwater analytical results reported for samples collected from UG-3R indicate that the groundwater present in this well is statistically different than the groundwater collected from the remaining ten wells included in the background groundwater investigation. The statistical difference of groundwater collected from UG-3R is likely due to greater hydraulic connectivity between the shallow water-bearing zone and the underlying artesian aquifer at this location. The data from UG-3R was excluded from the statistical evaluation of the background groundwater data.

- The background UTLs for the following COCs are greater than the current groundwater screening levels:
  - Boron
  - Chloride
  - Fluoride
  - Manganese
  - Mercury
  - Nitrate/Nitrite
  - Sulfate
  - TDS
  - Uranium
- There are naturally occurring concentrations in regional shallow groundwater for the following COCs with no published screening standards:
  - Calcium
  - Potassium
  - Sodium
- Because the regional shallow groundwater contains concentrations of COCs above the current groundwater screening levels, it would be appropriate to apply the UTLs calculated for each of those specific COCs as abatement standards

under the provisions of 20.6.2.4103.B NMAC and as background concentrations in the corrective action program under the PCC Permit.

- The results of the background groundwater investigation confirms that elevated concentrations of the specific COCs listed above are not attributable to discharge of the RO reject or other Refinery-related operations.

- Based on observed concentrations in groundwater from monitoring wells completed within the RO reject fields and observed concentrations in the RO reject discharge fluids, the discharge is not detrimental to the water quality beneath or downgradient of the fields. Therefore, a Stage 2 Abatement Plan per GW-028 Condition 6.D.3. is not required, and no further investigation of the discharge fields is proposed. The monitoring wells completed within the RO reject fields will continue to be included in the facility-wide groundwater monitoring program.

It should also be noted that the introduction to Section 3103 recognizes that "existing conditions" may reflect an exceedance of the WQCC standards. Notwithstanding NRC's demonstration that the groundwater quality data collected at the RO reject fields reflect background concentrations, the regulation does authorize the "existing concentration(s)" as the "allowable limit," provided that the existing concentration(s) will not result in exceedances of the standards at places where groundwater is withdrawn for present and reasonably foreseeable future uses. As owner of the RO reject fields land, NRC can prohibit the withdrawal of groundwater for present and reasonably foreseeable future uses.

8. Recommendations

Based on the evaluation of background groundwater over a one-year period, sufficient data has been obtained to establish background concentrations of various COCs that may be expected to be present in unimpacted groundwater. It is recommended that NRC request that the following standards be established for: (1) abatement purposes per the provisions of 20.6.2.4103.B NMAC and (2) as screening levels for the PCC Permit corrective action investigation and corrective measures program for groundwater:

Constituent	Proposed Standard (mg/L)
Boron	1.89
Chloride	5,930
Fluoride	2.95
Manganese	1.13
Mercury	0.00440
Nitrate / Nitrite	15.1
Sulfate	4,410
TDS	16,700
Uranium	0.248

The screening standards for all other COCs are recommended to remain the WQCC, MCL, or Tap Water screening values as specified by the PCC Permit, unless an additional assessment is made.

9. References

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ARCADIS

Tables

Table 1. Groundwater Elevations and Sampling Purge Parameters

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Well	Northing	Easting	Top of Casing (ft amsl)	Screen Interval (ft bgs)	Gauging Date	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)	Temperature (^{o}C)	Specific Conductivity (mS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turbidity (NTU)
MW-12	676952.63	541505.5	3312.73	6.5-16	7/29/2014	10.06	3302.67	20.85	8.748	0.52	6.84	58.9	8.54
					8/18/2014	9.56	3303.17	20.89	8.874	0.46	6.72	46.4	6.87
					9/10/2014	10.38	3302.35	21.2	9.4	1.89	6.87	138.8	1.79
					10/27/2014	Inaccessible due to flooding							
					11/12/2014	9.79	3302.94	17.29	6.57	1.41	7.37	-28.8	7.37
					12/17/2014	10.04	3302.69	18.1	9.98	3.36	7.68	32.5	2.16
					1/7/2015	10.6	3302.13	16	9.816	1.16	7.07	212.6	8.59
					2/4/2015	9.92	3302.81	17.51	8.904	2.03	7.54	49.2	2.54
					3/4/2015	10.04	3302.69	11.93	7.062	0.75	7.03	233.6	2.74
					4/6/2015	10.2	3302.53	17.94	7.552	0.22	6.98	-187.7	1.51
					5/4/2015	9.31	3303.42	17.25	9.371	0.37	7.19	148.1	1.97
					6/1/2015	9.16	3303.57	17.98	10.48	0.38	7.03	58.91	1.46
MW-13	674951.8	539762.62	3314.24	9.5-19	7/29/2014	11.89	3302.35	19.83	7.838	0.46	6.77	126.6	2.25
					8/18/2014	11.39	3302.85	20.63	8.494	0.47	6.66	83.3	5.57
					9/10/2014	12.27	3301.97	19.5	8.55	0.29	6.89	145.2	1.27
					10/27/2014	Inaccessible due to flooding							
					11/12/2014	10.9	3303.34	17.69	9.756	1.13	7.32	-46.3	2.9
					12/17/2014	11.31	3302.93	17.48	13.45	2.39	7.66	13.6	2.68
					1/7/2015	11.59	3302.65	16.23	11.28	1.32	7.12	212.4	4.56
					2/4/2015	11.23	3303.01	17.61	8.943	1.59	7.59	60	3.03
					3/4/2015	11.4	3302.84	11.82	7.195	1.2	7.13	221.5	1.27
					4/6/2015	10.56	3303.68	18.89	7.21	0.59	7.03	-227.8	0.52
					5/4/2015	10.84	3303.40	16.9	5.353	0.31	7.51	108.6	1.97
					6/1/2015	10.75	3303.49	18.13	6.837	0.39	7.15	18.1	0.74
MW-17	678064.09	535480.7	3322.01	17-32	7/29/2014	18.49	3303.52	20.79	2.222	6.48	7.19	90.2	1.83
					8/19/2014	18.83	3303.18	20.44	2.183	6.51	6.9	105.3	1.58
					9/11/2014	19.5	3302.51	19.4	2.75	8.56	7.36	215.9	1.01
					10/27/2014	15.15	3306.86	21.2	2.342	4.39	7.2	91	1.26
					11/11/2014	15.47	3306.54	18.82	1.932	10.57	7.74	-12.8	0.94
					12/16/2014	16.25	3305.76	18.05	2.397	0.01	8.72	38.3	1.47
					1/7/2015	16.74	3305.27	16.18	2.313	5.26	7.5	217.3	1.46
					2/3/2015	16.58	3305.43	18.61	2.108	6.91	8.05	110.3	1.14
					3/4/2015	16.69	3305.32	16.07	1.951	6.93	7.42	253.3	0.51
					4/7/2015	16.99	3305.02	20.66	2.618	7.45	7.45	76.7	1.07
					5/6/2015	17.11	3304.90	20.8	2.163	6.83	7.65	105.4	1.94
					6/2/2015	17.14	3304.87	19.9	2.437	6.83	7.47	70.1	0.27
MW-25	675386.3	537955.86	3312.29	15.8-25.3	7/29/2014	6.05	3306.24	20.46	9.6	0.78	6.67	75.9	3.79
					8/19/2014	7.49	3304.80	19.53	10.05	0.42	6.56	58.8	0.46
					9/10/2014	8.17	3304.12	20.5	14.97	0.15	6.69	146	0.81
					10/27/2014	4.92	3307.37	20.16	11.6	0.61	6.74	140.2	1.82
					11/11/2014	5.37	3306.92	18.55	10.88	0.74	7.13	-44.4	1.19
					12/17/2014	6.51	3305.78	17.03	18.3	1.37	7.42	8.4	1.68
					1/7/2015	7.15	3305.14	15.41	17.72	0.4	6.95	220.5	1.56
					2/3/2015	7.01	3305.28	16.25	17.42	0.32	7.27	172.4	1
					3/4/2015	7.03	3305.26	13.63	16.15	0.39	6.8	249.8	0.84
					4/7/2015	7.28	3305.01	18.16	14.79	0.14	6.8	102.4	1.05
					5/6/2015	7.41	3304.88	19.82	22.21	0.12	6.97	108.9	0.48
					6/2/2015	10.87	3301.42	17.99	25.93	0.2	6.84	92.8	0.37

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MW-55	674091.95	522766.46	3364.77	13.7-23.7	7/28/2014	10.28	3354.49	22.65	4.201	2.39	6.49	81.7	4.68
					8/19/2014	10.22	3354.55	23.68	4.839	0.59	6.53	59.9	4.98
					9/10/2014	10.82	3353.95	23.7	2.98	5.72	7.17	122.9	3.62
					10/28/2014	8.42	3356.35	20.67	3.425	1.49	6.81	95.6	6.52
					11/12/2014	8.27	3356.50	20.22	2.604	4.26	7.69	-27.4	6.24
					12/16/2014	8.22	3356.55	20.19	3.964	0.02	8.16	22.3	6.42
					1/6/2015	7.84	3356.93	18.05	4.48	1.36	6.81	192.5	2.56
					2/2/2015	7.23	3357.54	18.91	4.257	0.73	7.21	191.3	1.91
					3/3/2015	8.65	3356.12	15.42	3.743	0.86	6.75	248.4	2.31
					4/7/2015	9.23	3355.54	21.04	4.775	0.62	6.82	61.5	2.86
					5/6/2015	9.46	3355.31	19.92	4.411	0.52	6.93	117.6	3.35
					6/2/2015	9.68	3355.09	21.32	4.771	0.78	6.77	3.9	1.95
MW-136	675343.45	522975.4	3360.83	10-25	7/30/2014	13.68	3347.15	20.88	3.527	0.62	6.52	76	122
					8/19/2014	13.54	3347.29	20.87	4.076	0.14	6.36	58.4	83
					9/9/2014	13.86	3346.97	21.7	4.12	0.12	6.48	236.1	147
					10/27/2014	10.43	3350.40	21.19	3.918	0.45	6.48	101.9	31.6
					11/11/2014	7.41	3353.42	18.4	3.384	0.2	6.95	-30.7	14
					12/16/2014	7.91	3352.92	18.6	4.469	0.15	6.8	44.1	49.44
					1/6/2015	7.79	3353.04	18.35	4.356	0.55	6.62	197	60.2
					2/4/2015	7.22	3353.61	18.96	3.959	0.7	7.01	102.1	26.4
					3/3/2015	7.86	3352.97	16.67	3.758	0.83	6.54	248.4	57.5
					4/7/2015	9.05	3351.78	17.41	4.556	0.61	6.79	75.8	40.3
					5/6/2015	9.98	3350.85	20.08	4.204	0.73	6.77	74.9	32.4
					6/2/2015	10.87	3349.96	20.79	4.718	0.79	6.59	55.3	22.9
NP-5	675512.24	524698.19	3349.29	10.3-20	7/28/2014	14.17	3335.12	19.21	4.721	2.12	6.6	150.9	3.31
					8/19/2014	13.76	3335.53	21.38	5.194	1.21	6.62	88.4	6.56
					9/9/2014	14.45	3334.84	20.2	5.27	1.47	6.87	183.5	3
					10/27/2014	8.09	3341.20	20.08	5.033	1.03	6.88	58.5	10.36
					11/11/2014	8.06	3341.23	18.58	4.54	1.37	7.34	-130.5	9.75
					12/16/2014	8.46	3340.83	17.93	6.013	0.02	7.69	69.5	9.53
					1/5/2015	7.98	3341.31	16.9	5.652	1.56		211.6	0.21
					2/2/2015	6.61	3342.68	16.2	4.682	1.55	7.41	188.1	2
					3/3/2015	8.97	3340.32	15.42	5.199	1.29	6.91	231.1	1.99
					4/8/2015	10.34	3338.95	16.81	5.735	1.45	7.04	61.6	2.21
					5/5/2015	10.54	3338.75	18.83	5.092	1.18	7.09	111.4	3.85
					6/2/2015	10.86	3338.43	18.68	5.742	1.37	6.92	47.1	3.66
UG-1	672453.27	520746.73	3372.94	8-23	7/30/2014	17.81	3355.13	23.83	2.896	0.56	6.67	48.8	10.28
					8/20/2014	17.51	3355.43	23.81	3.041	3.3	6.58	88.4	3.22
					9/9/2014	17.32	3355.62	24.2	2.97	2.05	6.66	153.8	18.3
					10/28/2014	12.56	3360.38	23.41	2.237	1.58	6.74	95.3	4.03
					11/12/2014	12.49	3360.45	19.95	2.853	2.17	7.25	-33.3	5.73
					12/17/2014	13.17	3359.77	22.85	3.535	3.23	7.27	30.4	1.48
					1/6/2015	13.39	3359.55	21.26	3.356	2.23	6.96	203.4	3.52
					2/3/2015	13.57	3359.37	21.76	3.184	3.74	7.4	106.3	4.39
					3/3/2015	13.32	3359.62	19.38	2.932	3.7	6.94	248.5	3.86
					4/8/2015	13.59	3359.35	22.41	3.514	3.55	7.04	-10.4	4.15
					5/5/2015	13.15	3359.79	21.8	3.082	3.06	7.11	127.4	3.24
					6/3/2015	12.51	3360.43	21.58	3.507	3.81	6.97	91.6	2.64

Table 1. Groundwater Elevations and Sampling Purge Parameters

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Well	Northing	Easting	Top of Casing (ft amsl)	Screen Interval (ft bgs)	Gauging Date	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)	Temperature (^{o}C)	Specific Conductivity (mS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turbidity (NTU)
UG-2	670726.77	520942.36	3380.41	15-30	7/30/2014	21.92	3358.49	24.69	2.519	0.36	6.66	9.4	4.23
					8/20/2014	21.41	3359.00	22.56	2.366	0.45	6.42	105.9	26.9
					9/9/2014	22.56	3357.85	22.9	2.22	0.5	6.69	87.6	37.4
					10/28/2014	19.13	3361.28	22.9	2.661	0.42	6.7	75.1	6.09
					11/12/2014	18.19	3362.22	20.55	2.283	0.38	7.18	-118.2	3.56
					12/17/2014	18.41	3362.00	21.96	2.862	1.46	6.96	16	2.35
					1/6/2015	18.76	3361.65	20.62	2.572	0.71	6.82	189.9	4.01
					2/3/2015	18.53	3361.88	21.26	2.378	2.71	7.36	72.2	3.17
					3/3/2015	18.74	3361.67	18.08	2.179	1.58	6.87	246.7	1.53
					4/8/2015	18.63	3361.78	22.88	2.69	0.4	6.99	-5.3	2.05
					5/5/2015	18.43	3361.98	21.06	2.163	1.48	7.18	121.9	1.15
					6/3/2015	17.94	3362.47	22.3	2.441	2.09	7.02	57	1.68
UG-3R	671992.7	519424.77	3384.08	17-37	7/30/2014	25.62	3358.46	23.17	2.301	4.13	6.67	52.6	5.85
					8/20/2014	27.27	3356.81	21.43	2.223	5.71	6.52	127.3	19.7
					9/9/2014	27.06	3357.02	22.4	2.31	8.02	6.76	133.5	2.21
					10/28/2014	24.45	3359.63	21.4	2.269	4.55	6.83	95.8	10.85
					11/13/2014	24.49	3359.59	19.88	2.085	6.97	7.3	-39.8	41.3
					12/17/2014	24.81	3359.27	20.71	2.439	0.01	7.32	28.6	8.65
					1/6/2015	25.21	3358.87	19.89	2.52	4.27	6.9	197.2	4.87
					2/3/2015	25.38	3358.70	21.06	2.419	6.95	7.37	86.2	3.49
					3/4/2015	25.35	3358.73	18.36	1.968	6.1	6.88	242.8	1.86
					4/8/2015	25.75	3358.33	21.49	2.395	6.36	6.96	7.2	3.12
					5/5/2015	26.15	3357.93	21.45	2.305	5.93	7.07	137.2	2.87
					6/3/2015	25.75	3358.33	20.89	2.683	6.69	6.94	70.3	1.66
UG-4	674087.85	520541.74	3377.36	19.5-39.5	9/11/2014	23.36	3354.00	22.2	4.3	4.52	6.71	196.9	43
					10/28/2014	18.18	3359.18	21.2	2.858	1.68	6.68	104.5	21
					11/13/2014	18.15	3359.21	18.51	3.366	1.48	7.24	-36	75.8
					12/17/2014	17.86	3359.50	20.27	4.418	2.06	7.16	26.6	1.44
					1/6/2015	18.32	3359.04	19.15	4.222	0.74	6.77	206.5	23.2
					2/3/2015	18.58	3358.78	21.29	3.971	0.98	7.12	103.8	13.8
					3/3/2015	18.5	3358.86	18.11	3.682	1.1	6.7	251.1	15.2
					4/7/2015	18.75	3358.61	21.73	4.415	1.12	6.75	24.8	15.4
					5/5/2015	18.96	3358.40	20.67	3.85	1.16	6.89	114.4	14.9
					6/2/2015	18.62	3358.74	22.3	4.345	1.32	6.76	0.8	15.1

Notes and Definitions:

-	Depth to Water not measured
^{o}C	Degrees Celcius
DO	Dissolved Oxygen
ft asml	feet above mean sea level
ft btoc	feet below top of casing
mg/L	milligrams per liter
mS/cm	milliSiemens per centimeter
mV	millivolt
NTU	Nephelometric Turbidity Unit
ORP	Oxidation Reduction Potential
std units	standard units

Table 2. Summary of Soil Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Location:			MW-136								UG-4											
Depth Range (ft bgs):			0-1		4-5		9-10		14-15		0-1		0-1 (Dup)		9-10		15		25		39-39.5		39-39.5 (Dup)	
Date:			7/28/2014		7/28/2014		7/28/2014		7/28/2014		8/18/2014		8/18/2014		8/18/2014		8/18/2014		8/18/2014		9/2/2014		9/2/2014	
Analyte	**Units**	**Residential SSL**																						
TPH																								
GRO	mg/kg	NA	< 0.15		< 0.12		< 0.17		< 0.13		< 0.12		< 0.13		< 0.13		< 0.13		< 0.13		< 0.15		< 0.14	
DRO	mg/kg	1.00E+03	< 2.2		< 1.8		< 2.5		< 1.9		1.9	J	< 1.9		< 1.8		< 1.9		< 1.8		< 2.2		< 2.1	
ORO	mg/kg	1.00E+03	< 0.38		< 0.30		< 0.42		< 0.32		9.9		4.3	J	< 0.31		< 0.32		0.65	J	< 0.37		< 0.36	
Total Metals																								
Aluminum	mg/kg	7.80E+04	4,600		4,800	O1V	6,700		3,800		18,000	O1VJ3	22,000		15,000		23,000		21,000		5,000	BO1V	4,000	B
Arsenic	mg/kg	4.25E+00	3.8		2.8	O1J6	2.6		1.4		***4.7***	O1J6J3	***5.2***		2.7		2.2		3		***7.3***	J6	3.8	
Barium	mg/kg	1.56E+04	140		240	O1V	1,100		13		260	BO1VJ3	240	B	20	B	620	B	220	B	49	J6	37	
Boron	mg/kg	1.56E+04	15		16	O1J6	9	J	3.1	J	19	JO1J6J3	17	J	< 4.4		12	J	6.1	J	6.9	JO1J6	4.4	J
Cadmium	mg/kg	7.05E+01	0.24	J	< 0.18	O1J6	< 0.25		< 0.19		0.3	J6	0.25	J	< 0.18		0.28	J	0.38		< 0.22	J6	< 0.21	
Calcium	mg/kg	NA	110,000		160,000	VJ3	190,000		140,000		130,000	O1VJ3	180,000		260,000		210,000		200,000		100,000	O1V	100,000	
Chromium	mg/kg	9.66E+01	5.6		6.3	O1J6	9		2.9		18	O1J6J3	19		14		22		21		9.6	BJ6	7.7	B
Cobalt	mg/kg	NA	3.2		2.3	O1J6	5.6		1.9		5.6	O1J6	4.9		2.6		3.6		4.7		6.2	J6	5.2	
Copper	mg/kg	3.13E+03	7.8		2.6	O1J6	1.5		1.2		9	O1J6J3	6.3		3.5		28		8.6		16	J6	12	
Iron	mg/kg	5.48E+04	3,300		3,800	O1V	4,200		1,800		13,000	O1V	12,000		8,200		13,000		14,000		14,000	O1V	11,000	
Lead	mg/kg	4.00E+02	8.9		4.2	O1J6	8.4		6.8		14	O1J6	9.6		4.8		6		8.8		8.7	J6	6.9	
Manganese	mg/kg	1.05E+04	150		70	O1J6	140		44		280	O1V	200		73		130		210		300	O1V	280	
Mercury	mg/kg	2.38E+01	0.0096	J	0.0065	JJ6O1	0.0065	J	0.0054	J	0.0042	J	0.009	J	< 0.0032		< 0.0033		< 0.0032		--		--	
Molybdenum	mg/kg	3.91E+02	0.32	J	0.31	JO1J6	0.28	J	< 0.17		0.55	JJ6	0.52	J	0.31	J	0.5	J	1.3		--		--	
Nickel	mg/kg	1.56E+03	5.6		4.1	O1J6	7.6		3.4		12	O1J6	9.9		5.7		15		11		18	J6	14	
Potassium	mg/kg	NA	1,700		1,100	1100	1,700		770		4,700	O1VJ3	5,000		2,300	J	3,600		3,200		1,000	J6	820	
Selenium	mg/kg	3.91E+02	0.65	J	< 0.42	O1J6	0.74	J	0.84	J	1.4	J6J3	1.1	J	0.74	J	0.87	J	1.3		3.1	O1J6	3	
Silver	mg/kg	3.91E+02	< 0.35		< 0.28	O1J6J3	< 0.39		< 0.30		< 0.27	J6	< 0.30		< 0.29		< 0.29		< 0.29		< 0.34	J6	< 0.33	
Sodium	mg/kg	NA	110	J	480	J	< 95		< 73		350	JO1J3	< 360		< 350		730	J	450	J	130	J	120	J
Uranium	mg/kg	2.34E+02	0.7	J	1.3	J	0.79	J	0.41	J	0.65	JJ5	0.85	J	0.88	J	0.79	J	0.82	J	0.95	J	0.78	J
Vanadium	mg/kg	3.94E+02	13		14	O1J6	19		7.1		33	O1J6J3	48		21		26		25		12	J6	10	
Zinc	mg/kg	2.35E+04	21		10	O1J6	10		6.7		43	O1J6J3	35		22		140		210		45	J6	41	
Anions																								
Chloride	mg/kg	NA	76		240		46		50		7	J	17		23		13		23		12		85	
Fluoride	mg/kg	4.69E+03	18		34		19		17		19		16		21		7.4		3.9		12		16	
Nitrate	mg/kg	1.25E+05	1.9		0.24	J	0.4	J	0.29	J	0.41	J	1.1	J	< 0.014		< 0.014		0.36	J	0.5		0.48	J
Nitrite	mg/kg	7.82E+03	< 0.13		< 0.11		< 0.15		< 0.12		< 0.10		0.14	J	< 0.11		< 0.11		< 0.11		< 0.13		< 0.13	
Sulfate	mg/kg	NA	18,000		5,500		14,000		580		2,400		2,900		660		1,100		790		770		940	
Miscellaneous																								
Total Solids	percent	NA	71.9		90.5		64.4		83.3		93.2		83.7		86.1		85.2		86.5		73.6		75.6	

Notes and Definitions:

X Result is above the Residential SSL
-- = sample not analyzed for this parameter
< X = result is not detected with a method detection limit of X
DRO = Diesel Range Organics
Dup = field duplicate sample
ft bgs = feet below ground surface
GRO = Gasoline Range Organics
mg/kg = milligrams per kilogram
NA = SSL not available
NMED = New Mexico Environment Department
ORO = Motor Oil Range Organics
SSL = Soil Screening Level from *Risk Assessment Guidance for Site Investigations and Remediation,* NMED, December 2014
TPH = Total Petroleum Hydrocarbons

Lab Qualifier Definitions:

B = Compound was found in the blank and sample.
J = Estimated value below the lowest calibration point. Confidence correlates with concentration.
J3 = The associated batch QC was outside the established quality control range for precision.
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.
O1J6 = The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference. The sample matrix interfered with the ability to make any accurate determination; spike value is low.
O1V = The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference. The sample concentration is too high to evaluate accurate spike recoveries.
V = Additional QC Info: The sample concentration is too high to evaluate accurate spike recoveries.

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

			TPH			Cations/Anions							General Chemistry				
Analyte:			GRO	DRO	ORO	Calcium	Chloride	Fluoride	Nitrate/Nitrite	Potassium	Sodium	Sulfate	Cyanide	Radium-226	Radium-228	Radioactivity	TDS
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	pCi/l	pCi/l	pCi/l	mg/l
Screening Level:			---	0.2	0.2	---	250	1.6	10	---	---	250	0.2	--	--	5	500
Screening Level Source:			---	NMED TPH	NMED TPH	---	WQCC Dom	WQCC HH	WQCC HH	---	---	EPA MCL2	WQCC HH	--	--	EPA MCL	EPA MCL2
Location	**Sample Type**	**Date**															
MW-12	N	7/29/2014	< 0.031	0.025 J	< 0.012	750	**1800**	1.3	8.9	5	1600	**3100**	< 0.0018	0.63	0.35	0.98	**7700**
MW-12	N	8/18/2014	< 0.031	< 0.022	< 0.012	740 O1V	**1500**	1	7	4.9	1400 V	**3200**	< 0.0018	1.9	0.87	2.77	**6200**
MW-12	N	9/10/2014	< 0.031	< 0.022	< 0.012	650	**1700**	1.3	4.151	4.5	1400	**3600**	< 0.0018	1.5	0.40	1.9	**8200**
MW-12 - not accessible due to flooding																	
MW-12	N	11/12/2014	< 0.031	0.058 J	0.03 J	700	**1200**	1.3	9.3	3.9 J	1300	**2900**	< 0.0018	2.1	0.78	2.88	**6400**
MW-12	N	12/17/2014	< 0.031	< 0.022	0.024 J	680	**1700**	0.78 J6J3	6.7	5.2	1300	**3100**	< 0.0018	0.43	0.86	1.29	**6800**
MW-12	N	1/7/2015	< 0.031	< 0.022	0.021 J	730	**2100**	0.65	4.3	5.6	1400	**3300**	< 0.0018	0.86	0.23	1.09	**7300**
MW-12	N	2/4/2015	< 0.0310	< 0.0220 UB	0.022 J	797 J	**2080**	0.825	2.01	5.78	1470	**2740**	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**7840**
MW-12	N	3/4/2015	< 0.0310	< 0.0220	< 0.0120	684	**1680**	1.01	3.37	4.69	1370	**2870**	< 0.00180	0.77	-0.01	0.76	**7100**
MW-12	N	4/6/2015	0.0315 J	0.073 J	--	750	**1950**	0.83	2.11	5.18	1430	**2790**	< 0.00180	< 1.0 UB	0.47	0.47	**7590**
MW-12	FD	4/6/2015	< 0.0310	0.045 J	--	749	**1870**	0.788	2.11	4.97	1390	**2670**	< 0.00180	< 1.0 UB	0.55	0.55	**7260**
MW-12	N	5/4/2015	< 0.0310	0.056 J	0.026 J	810	**2350**	0.665	0.678 J	6.05	1400	**2720**	< 0.00180	0.63	0.99	1.62	**6420**
MW-12	N	6/1/2015	< 0.0310	0.05 J	< 0.0120	808	**2590**	**19**	0.982	5.53	1460	**2200**	< 0.00180	< 1.0	1.0	1.0	**8000**
MW-13	N	7/29/2014	< 0.031	0.045 J	0.018 J	810	**1700**	0.65	0.32	6.1	1300	**2500**	< 0.0018	0.79	1.1	1.89	**8800**
MW-13	N	8/18/2014	< 0.031	0.03 J	0.012 J	770	**1800**	0.56	< 0.023	6	1100	**2500**	< 0.0018	0.30	0.61	0.91	**5800**
MW-13	N	9/10/2014	< 0.031	< 0.022	< 0.012	700	**1800**	0.49	< 0.023	5.8	1100	**2600**	< 0.0018	0.71	0.57	1.28	**7100**
MW-13 - not accessible due to flooding																	
MW-13	N	11/12/2014	< 0.031	0.063 J	0.036 J	840	**2500**	0.82	5.3	4.3 J	1900	**3000**	< 0.0018	1.8	1.8	3.6	**8400**
MW-13	N	12/17/2014	< 0.031	< 0.022	0.025 J	750	**2700**	0.54	4.4	5.4	1800	**3800**	< 0.0018	0.49	1.6	2.09	**8500**
MW-13	N	1/7/2015	< 0.031	< 0.022	0.014 J	720	**2600**	0.48	2.4	5.3	1600	**3400**	< 0.0018	1.6	1.7	3.3	**7900**
MW-13	N	2/4/2015	< 0.0310	< 0.0220 UB	0.019 J	688 J	**1980**	0.636	1.41	5.01	1350	**2420**	< 0.00180	< 1.0 UB	0.68	0.68	**7220**
MW-13	N	3/4/2015	< 0.0310	< 0.0220	< 0.0120	662	**1930**	0.662	1.13	5.06	1280	**2530**	< 0.00180	0.44	3.6	4.04	**7170**
MW-13	N	4/6/2015	< 0.0310	0.048 J	--	706 V	**1800**	0.571	< 0.0200 UB	5.32	1250 V	**2410**	< 0.00180	< 1.0 UB	0.90	0.9	**6740**
MW-13	N	5/4/2015	< 0.0310	0.045 J	0.026 J	423 V	**979**	0.622	0.34 J	4.48	890	**1520**	< 0.00180	0.57	0.91	1.48	**4110**
MW-13	FD	5/6/2015	< 0.0310	0.059 J	0.033 J	433	**1100**	0.752	< 0.2	4.67 J	910	< 0.0770	< 0.00180	< 1.0	1.1	1.1	**4190** Q
MW-13	N	6/1/2015	< 0.0310	0.044 J	< 0.0120	446 V	**1580**	**17**	0.884	4.32	988	**1500**	< 0.00180	0.72	< 1.0	0.72	**5130**
MW-13	FD	6/2/2015	< 0.0310	0.054 J	0.034 J	490	**1530**	**17.1**	0.874	4.12 J	972	**1290**	0.0022 J	< 1.0	< 1.0	< 1.0	**5420**
MW-17	N	7/28/2014	< 0.031	< 0.022	< 0.012	440 V	170	1	1.9	2.1	77	**1200**	< 0.0018	0.204	0.806	1.01	**2100**
MW-17	FD	7/28/2014	< 0.031	0.024 J	< 0.012	420	160	1	2.3	2.2	77	**1200**	< 0.0018	< 0.208	< 0.726	< 0.726	**2100**
MW-17	N	8/19/2014	< 0.031	0.048 J	0.028 J	440	130	1	1.4	2.2	72	**1200**	< 0.0018	2.1	1.3	3.4	**2200**
MW-17	N	9/11/2014	< 0.031	0.039 J	0.018 J	360	140	1.1	1.5	2.1	60	**1300**	< 0.0018	1.8	0.75	2.55	**2000**
MW-17	N	10/27/2014	< 0.031	< 0.025	--	400	160	0.92	1.6 T8	2.1	78	**1300**	< 0.0018	2.2	1.1	3.3	**2100**
MW-17	N	11/11/2014	< 0.031	< 0.022	< 0.012	440	150	1.1	1.9	2.2	81	**1200**	0.029	2.0	0.68	2.68	**2000**
MW-17	N	12/16/2014	< 0.031	< 0.022	< 0.012	400	130	1.2	2	2.2	77	**1100**	< 0.0018	-0.07	1.4	1.33	**2000**
MW-17	N	1/7/2015	< 0.031	< 0.022	< 0.012	380	140	0.92	2.2	2	78	**1400**	< 0.0018	1.1	0.29	1.39	**1900**
MW-17	N	2/3/2015	< 0.0310	0.047 J	0.013 J	375 J	141	1.11	2.04	2.02	74.3	< 3.9 UB	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**2000**
MW-17	N	3/4/2015	< 0.0310	< 0.0220	< 0.0120	361	136	1.24	2.11	1.94	81.2	**1140**	< 0.00180	0.65	0.68	1.33	**2180**
MW-17	N	4/7/2015	< 0.0310	0.047 J	--	382	141	1.13	2.08	1.92	73.1	**1260**	< 0.00180	0.86	1.2	2.06	**2110**
MW-17	N	5/6/2015	< 0.0310	0.026 J	0.017 J	386	145	1.11	2.06	2.13 J	82	< 0.0770	< 0.00180	0.90	1.9	2.8	**2050** Q
MW-17	N	6/2/2015	< 0.0310	0.033 J	0.028 J	372	**751**	**17.6**	2.09	1.87	78.1	**915**	< 0.00180	< 1.0	1.2	1.2	**2270**

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

			TPH			Cations/Anions							General Chemistry				
Analyte:			GRO	DRO	ORO	Calcium	Chloride	Fluoride	Nitrate/Nitrite	Potassium	Sodium	Sulfate	Cyanide	Radium-226	Radium-228	Radioactivity	TDS
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	pCi/l	pCi/l	pCi/l	mg/l
Screening Level:			---	0.2	0.2	---	250	1.6	10	---	---	250	0.2	--	--	5	500
Screening Level Source:			---	NMED TPH	NMED TPH	---	WQCC Dom	WQCC HH	WQCC HH	---	---	EPA MCL2	WQCC HH	--	--	EPA MCL	EPA MCL2
Location	**Sample Type**	**Date**															
MW-25	N	7/29/2014	< 0.031	0.12	0.016 J	1200	**4200**	0.93	5.2	7.2	2600	**3100**	< 0.0018	1.7	1.6	3.3	**12000**
MW-25	N	8/19/2014	< 0.031	**0.28**	0.059 J	1200	**4500**	0.65	< 0.023	7.4	2500	**3600**	< 0.0018	1.3	0.73	2.03	**14000**
MW-25	N	9/10/2014	0.066 J	**0.37**	0.12	1000	**5000**	0.75	< 0.023	7.4	2500	**4500**	< 0.0018	2.6	0.73	3.33	**14000**
MW-25	FD	9/11/2014	0.062 J	**0.41**	0.13	970	**5000**	0.71	< 0.023	7.3	2500	**4400**	< 0.0018	1.7	0.67	2.37	**14000**
MW-25	N	10/27/2014	< 0.031	**0.28**	--	970	**3200**	0.61	< 0.023 T8	7.4	2200	**2600**	< 0.0018	1.1	1.8	2.9	**14000**
MW-25	N	11/11/2014	0.038 J	**0.27** B	0.07 JB	1200 V	**4500**	1	0.22	7.2	2600 V	**3100**	< 0.0018	-0.77	0.99	0.22	**11000**
MW-25	N	12/17/2014	< 0.031	**0.26**	0.065 J	1000	**5200**	0.5	0.42	8.3	3200	**4200**	< 0.0018	1.2	1.7	2.9	**11000**
MW-25	N	1/7/2015	< 0.031	**0.32**	0.081 J	1000	**5700**	0.43	0.47	7.4	3000	**4000**	< 0.0018	2.0	0.94	2.94	**13000**
MW-25	N	2/3/2015	< 0.0310	**1.1**	**0.9**	1050 J	**5890**	1.03	< 0.0200 UB	7.8 J	3450	< 7.7 UB	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**12500**
MW-25	N	3/4/2015	0.0422 J	**0.38** B	0.031 J	988	**5930**	1.02	0.272	7.67	3490	**4440**	< 0.00180	1.2	4.5	5.7	**16700**
MW-25	N	4/7/2015	0.0559 J	**0.6**	--	1040	**6350**	0.614	0.198	7.9	4700	**4520**	< 0.00180	-0.01	0.89	0.88	**16100**
MW-25	N	5/6/2015	< 0.0310	**0.7**	0.16	1000	< 0.0520	0.968	0.401 J	8.14	4300	**5810**	< 0.00180	1.9	< 1.0	1.9	**17600** Q
MW-25	N	6/2/2015	< 0.0310	**0.59**	0.12	1010	**7190**	**20.2**	0.119	7.96 J	4590	**5520**	< 0.00180	0.67	< 1.0	0.67	**19400**
MW-55	N	7/28/2014	< 0.031	0.17	0.074 J	630	**290**	**2**	7.5	1.4	220	**2600**	0.0021 JP1	0.298	< 0.863	0.298	**4100**
MW-55	N	8/19/2014	< 0.031	0.19	0.13	640	**320**	**1.7**	7.3	0.96 J	250	**2700**	< 0.0018	0.50	-0.71	-0.21	**5400**
MW-55	FD	8/20/2014	< 0.031	0.18	0.12	660	**380**	**1.7**	7.5	0.89 J	260	**2700**	< 0.0018	1.8	0.20	2	**4700**
MW-55	N	9/10/2014	< 0.031	0.072 J	0.03 J	540	47	**3.4**	2.8	2.7	31	**2400**	< 0.0018	0.47	0.52	0.99	**3600**
MW-55	N	10/27/2014	< 0.031	**0.21**	--	560	190	**1.7**	5.1 T8	0.87 J	140	**2500**	< 0.0018	0.33	0.46	0.79	**3800**
MW-55	N	11/12/2014	< 0.031	0.16	0.1 J	600	120	**2.8**	4.1	1.1	130	**2100**	< 0.0018	2.1	0.41	2.51	**3300**
MW-55	N	12/16/2014	< 0.031	0.15	0.065 J	580	210	**2.2**	7.2	0.91 J	180	**2500**	< 0.0018	0.56	0.50	1.06	**4200**
MW-55	N	1/6/2015	< 0.031	0.092 J	0.074 J	570	250	1.5	9.3	0.82 J	180	**3000**	< 0.0018	1.3	0.41	1.71	**4300**
MW-55	N	2/2/2015	< 0.0310	0.16	0.098 J	587 J	< 2.6 UB	**1.87**	9.94	0.874 J	185 O1V	**2570**	< 0.00180	0.65	< 1.0 UB	0.65	**3930**
MW-55	N	3/3/2015	< 0.0310	0.15 B	0.062 J	606 V	**259**	**2.55**	**12.8**	0.77 J	185 O1V	**2920**	< 0.00180	0.20	0.64	0.84	**4760**
MW-55	N	4/7/2015	< 0.0310	**0.21**	--	639	250	**1.86**	**14.2**	0.825 J	202	**2850**	< 0.00180	0.63	1.4	2.03	**4600**
MW-55	N	5/6/2015	< 0.0310	**0.27**	0.14	610	**272**	**1.83** J6	**12.7**	0.845 J	194	**2930**	< 0.00180	0.58	0.57	1.15	**5060** Q
MW-55	N	6/2/2015	< 0.0310	**0.32**	0.15	615	**790**	**18.2**	8.78	0.314 J	206	**2320**	< 0.00180	0.57	1.3	1.87	**5130**
MW-136	N	7/30/2014	< 0.031	**0.28**	0.02 J	710	**270**	1.6	0.5	3.7	84	**2300**	< 0.0018	0.64	1.0	1.64	**3400**
MW-136	N	8/19/2014	< 0.031	0.077 J	0.074 J	760	**290**	**1.8**	0.68	2.8	93	**2300**	< 0.0018	0.40	0.44	0.84	**4700**
MW-136	N	9/9/2014	0.035 J	< 0.022	< 0.012	680	240	1.6	< 0.023	2.6	85	**2700**	< 0.0018	0.90	0.62	1.52	**4200**
MW-136	N	10/27/2014	< 0.031	< 0.025	--	710	240	1.4	0.32 T8	2.8	96	**2500**	< 0.0018	1.3	0.58	1.88	**3800**
MW-136	N	11/11/2014	< 0.031	< 0.022	< 0.012	760	220	**1.7**	0.62	2.7 J	110	**2200**	< 0.0018 J6	1.7	0.67	2.37	**3900**
MW-136	N	12/16/2014	< 0.031	< 0.022	< 0.012	660	250	**1.9**	0.63	3.1	100	**2900**	< 0.0018 J6	0.44	0.51	0.95	**4100**
MW-136	FD	12/17/2014	< 0.031	< 0.022	0.016 J	670	220	1.4	0.62	3	100	**2700**	< 0.0018	--	--	--	**3900**
MW-136	N	1/6/2015	< 0.031	< 0.022	< 0.012	710	250	1.3	0.66	2.8	100	**2900**	< 0.0018	1.6	0.62	2.22	**4100**
MW-136	N	2/4/2015	< 0.0310	< 0.0220 UB	0.014 J	731 J	248	**1.69**	0.69	2.91 J	108	**2320**	< 0.00180	< 1.0 UB	0.67	0.67	**3830**
MW-136	N	3/3/2015	< 0.0310	< 0.0220	< 0.0120	672	**259**	**2.11**	0.784	2.68	109	**2470**	< 0.00180	0.32	0.70	1.02	**4450**
MW-136	N	4/7/2015	< 0.0310	0.032 J	--	739	243	**1.63**	1.49	2.67	123	**2370**	< 0.00180	0.61	0.68	1.29	**4690**
MW-136	N	5/6/2015	< 0.0310	0.049 J	0.037 J	745	**274**	**1.63**	3.81	3.2 J	130	< 0.0770	< 0.00180	< 1.0	0.53	0.53	**4490** Q
MW-136	N	6/2/2015	< 0.0310	0.036 J	0.023 J	742	**857**	**20.1**	5.31	2.21 J	135	**2180**	< 0.00180	0.56	0.98	1.54	**5180**

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

			TPH			Cations/Anions							General Chemistry				
Analyte:			GRO	DRO	ORO	Calcium	Chloride	Fluoride	Nitrate/Nitrite	Potassium	Sodium	Sulfate	Cyanide	Radium-226	Radium-228	Radioactivity	TDS
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	pCi/l	pCi/l	pCi/l	mg/l
Screening Level:			---	0.2	0.2	---	250	1.6	10	---	---	250	0.2	--	--	5	500
Screening Level Source:			---	NMED TPH	NMED TPH	---	WQCC Dom	WQCC HH	WQCC HH	---	---	EPA MCL2	WQCC HH	--	--	EPA MCL	EPA MCL2
Location	**Sample Type**	**Date**															
NP-5	N	7/28/2014	< 0.031	0.056 J	0.035 J	550	**390**	**2.4**	0.82	0.34 J	240	**3100**	< 0.0018	0.216	< 0.719	0.216	**4900**
NP-5	N	8/19/2014	< 0.031	0.04 J	0.039 J	630	**380**	**2.1**	< 0.023	0.34 J	240	**3300**	< 0.0018	0.22	0.72	0.94	**5500**
NP-5	N	9/9/2014	< 0.31	< 0.022	< 0.012	520 O1V	**390**	**2.2**	< 0.023	0.35 J	220 O1V	**3600**	< 0.0018	1.5	0.52	2.02	**5600**
NP-5	N	10/27/2014	< 0.031	< 0.025	--	540	**390**	**1.9**	0.79 T8	0.5 J	240	**3400**	< 0.0018	0	0.29	0.29	**5600**
NP-5	N	11/11/2014	< 0.031	< 0.022	< 0.012	590	**380**	**2.6**	1.2	0.46 J	250	**3100**	< 0.0018	2.3	0.67	2.97	**5100**
NP-5	N	12/16/2014	< 0.031	< 0.022	0.02 J	520	**400**	**3**	1.5	0.7 J	250	**3600**	< 0.0018	1.0	0.93	1.93	**5800**
NP-5	N	1/5/2015	< 0.031	< 0.022	0.023 J	560	**400**	**1.8**	1.3	0.36 J	250	**4200**	< 0.0018	1.1	0.21	1.31	**5300**
NP-5	N	2/2/2015	< 0.0310	0.05 J	0.027 J	503 J	< 2.6 UB	**2.62**	0.88	0.301 J	230	**3110**	< 0.00180	1.2	< 1.0 UB	1.2	**4320**
NP-5	FD	2/4/2015	< 0.0310	0.035 J	0.021 J	514 J	< 2.6 UB	**2.48**	0.896	0.299 J	224	**3020**	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**5380**
NP-5	N	3/3/2015	< 0.0310	< 0.0220	< 0.0120	517	**428**	**3.7**	2.96	1.23	299	**3900**	< 0.00180	0.16	1.2	1.36	**6760**
NP-5	N	4/8/2015	< 0.0310	0.038 J	--	517	**365**	**1.98**	1.66	0.588 J	257	**3350**	< 0.00180	0	< 1.0 UB	0	**6290**
NP-5	N	5/5/2015	< 0.0310	0.037 J	0.092 J	540	**404**	**2.37**	1.4	0.386 J	228	**3420**	< 0.00180	0.52	< 1.0 U	0.52	**5510**
NP-5	N	6/2/2015	< 0.0310	< 0.0220	0.021 J	563	**978**	**19.6**	0.877	< 0.180	259	**3270**	< 0.00180	0.27	1.6	1.87	**6510**
UG-1	N	7/30/2014	< 0.031	0.059 J	0.041 J	520	77	0.61	6.629	1.9	88	**1100**	< 0.0018	0.24	0.23	0.47	**2800**
UG-1	N	8/20/2014	< 0.031	0.052 J	< 0.012	480	100	0.81	8.3	1.5	86	**1600**	< 0.0018	1.1	0.14	1.24	**2500**
UG-1	N	9/9/2014	< 0.031	< 0.022	< 0.012	440	99	0.77	7	1.3	78	**1700**	< 0.0018	0.46	0.58	1.04	**2900**
UG-1	N	10/27/2014	< 0.031	< 0.025	--	520	88	0.65	8.9 T8	1.2	90	**1900**	< 0.0018	1.3	1.4	2.7	**3000**
UG-1	FD	10/27/2014	< 0.031	< 0.025	--	510	88	0.68	9.7 T8	1.3	92	**2000**	< 0.0018	0.98	0.67	1.65	**3200**
UG-1	N	11/13/2014	< 0.031	0.088 J	0.067 J	540	91	0.82	**13**	1.3	96	**1800**	< 0.0018	1.1	0.32	1.42	**3400**
UG-1	N	12/17/2014	< 0.031	< 0.022	0.037 J	490	95	0.71	**13**	1.4	93	**2100**	< 0.0018	0.75	0.82	1.57	**3100**
UG-1	N	1/6/2015	< 0.031	< 0.022	< 0.012	500	96	0.68	**14**	1.2	88	**1900**	< 0.0018	1.1	1.4	2.5	**3000**
UG-1	N	2/3/2015	< 0.0310	0.05 J	0.02 J	492 J	98.1	0.851	**13.6**	1.29	89.7	**1640**	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**2830**
UG-1	N	3/3/2015	< 0.0310	< 0.0220	< 0.0120	474	104	0.94	**14**	1.2	92.7	**1800**	< 0.00180	0.55	0.71	1.26	**3110**
UG-1	N	4/8/2015	< 0.0310	0.026 J	--	459	< 5.2 UB	0.648	**13**	1.09	93.2	**1500**	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**3260**
UG-1	N	5/5/2015	< 0.0310	0.042 J	0.025 J	510	104	0.805	**20.6**	1.19	91.5	**1900**	< 0.00180	0.32	< 1.0	0.32	**3210**
UG-1	N	6/3/2015	< 0.0310	0.026 J	0.016 J	532	**634**	**22.6**	**15.7**	1.2	101	**1500**	< 0.00180	0.63	0.91	1.54	**3520**
UG-2	N	7/30/2014	< 0.031	0.066 J	0.064 J	380	73	1.6	3.257	1.8	90	**1200**	0.0029 J	0.56	0.47	1.03	**2200**
UG-2	N	8/20/2014	< 0.031	0.054 J	0.013 J	460	61	1.6	4.7	1.6	76	**1000**	< 0.0018	2.0	-1.5	0.5	**2100**
UG-2	N	9/9/2014	< 0.031	< 0.022	< 0.012	310	55	1.5	4.3	1.8	69	**1100**	< 0.0018	0.42	0.63	1.05	**2000**
UG-2	N	10/27/2014	< 0.031	< 0.025	--	400	81	1.4	3.45 T8	2.2	96	**1200**	< 0.0018	0.52	0.32	0.84	**2200**
UG-2	N	11/12/2014	< 0.031	0.14	0.07 J	420	89	1.6	3.3	1.9	95	**1100**	< 0.0018	1.5	0.57	2.07	**2100**
UG-2	FD	11/13/2014	< 0.031	0.063 J	0.014 J	380	89	1.6	3.3	1.8	94	**1200**	< 0.0018	1.2	1.0	2.2	**2400**
UG-2	N	12/17/2014	< 0.031	< 0.022	< 0.012	390	100	1.5	4.2	2.1	100	**1400**	< 0.0018	0.29	0.74	1.03	**2200**
UG-2	N	1/6/2015	< 0.031	< 0.022	< 0.012	390	87	1.4	6.8	1.7	93	**1300**	< 0.0018	1.0	0.15	1.15	**2100**
UG-2	N	2/3/2015	< 0.0310	0.04 J	< 0.0120	360 J	88.6	**1.7**	5.07	1.79	92.4	**924**	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**1930**
UG-2	N	3/3/2015	< 0.0310	< 0.0220	< 0.0120	343	77.7	**1.71**	4.77	1.7	93	**1100**	< 0.00180	0.16	0.85	1.01	**2390**
UG-2	N	4/8/2015	< 0.0310	< 0.0250	--	331	72.7	1.33	4.67	1.61	88.5	< 7.7 UB	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**2070**
UG-2	N	5/5/2015	< 0.0310	0.044 J	0.02 J	341	69.9	1.6	4.6	1.75	83.9	**1130**	< 0.00180	0.47	0.93	1.4	**1980**
UG-2	N	6/3/2015	< 0.0310	0.027 J	0.013 J	0.873 J	**689**	**15.7**	4.75	< 0.0370	0.305 J	**1050**	< 0.00180	0.52	0.84	1.36	**2220**

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			TPH			Cations/Anions							General Chemistry				
Analyte:			GRO	DRO	ORO	Calcium	Chloride	Fluoride	Nitrate/Nitrite	Potassium	Sodium	Sulfate	Cyanide	Radium-226	Radium-228	Radioactivity	TDS
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	pCi/l	pCi/l	pCi/l	mg/l
Screening Level:			---	0.2	0.2	---	250	1.6	10	---	---	250	0.2	--	--	5	500
Screening Level Source:			---	NMED TPH	NMED TPH	---	WQCC Dom	WQCC HH	WQCC HH	---	---	EPA MCL2	WQCC HH	--	--	EPA MCL	EPA MCL2
Location	**Sample Type**	**Date**															
UG-3R	N	7/30/2014	< 0.031	0.058 J	0.038 J	460	44	0.66	1	1.8	47	**1400**	< 0.0018	0.98	0.57	1.55	**2200**
UG-3R	N	8/20/2014	< 0.031	0.055 J	< 0.012	430	36	0.66	0.96	1.9	41	**1200**	< 0.0018	0.33	0.35	0.68	**2100**
UG-3R	N	9/9/2014	< 0.031	< 0.022	< 0.012	390	24	0.64	0.55	1.8	46	**1500**	< 0.0018	1.8	0.22	2.02	**2400**
UG-3R	N	10/27/2014	< 0.031	< 0.025	--	380	24	0.59	0.55 T8	1.7	48	**1300**	< 0.0018	1.1	0.49	1.59	**2100**
UG-3R	N	11/13/2014	< 0.031	0.071 J	0.023 J	440	25	0.66	0.76	1.9	64	**1300**	< 0.0018	3.0	0.70	3.7	**2400**
UG-3R	N	12/17/2014	< 0.031	< 0.022	< 0.012	400	24	0.59	0.87	1.9	58	**1500**	< 0.0018	0.77	0.77	1.54	**2100**
UG-3R	N	1/6/2015	< 0.031	< 0.022	< 0.012	810	24	0.56	1	1.6	60	**1800**	< 0.0018	1.4	0.89	2.29	**2200**
UG-3R	N	2/3/2015	< 0.0310	< 0.0220	< 0.0120	400 J	27.2	0.661	1.03	1.67	62.1	**1280**	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**2030**
UG-3R	N	3/4/2015	< 0.0310	< 0.0220	< 0.0120	358	25.1	0.725	0.969	1.63	56.1	**1250**	< 0.00180	0.52	0.38	0.9	**2060**
UG-3R	FD	3/4/2015	< 0.0310	< 0.0220	< 0.0120	360	25.2	0.734	0.955	1.66	66.5	**1240**	< 0.00180	0.36	0.70	1.06	**2110**
UG-3R	N	4/8/2015	< 0.0310	< 0.0250	--	373	24.9	0.54	1.16	1.63	58.1	**1170**	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**2120**
UG-3R	N	5/5/2015	< 0.0310	**1.4**	**1.4**	403	28.1	0.688	1.11	1.68	59.9	**1500**	< 0.00180	0.33	0.81	1.14	**2130**
UG-3R	N	6/3/2015	< 0.0310	0.033 J	0.022 J	421	**662**	**17.4**	1.12	1.71	70.3	**1310**	< 0.00180	0.70	1.9	2.6	**2540**
UG-4 - well not installed during July																	
UG-4 - insufficent recharge during August																	
UG-4	N	9/11/2014	< 0.031	0.082 J	0.033 J	610	39	0.59	< 0.023	3.4	190	**2900**	< 0.0018	-0.24	2.2	1.96	**4000**
UG-4	N	10/27/2014	< 0.031	< 0.025	--	610	48	0.54	< 0.023 T8	3.3	250	**2800**	< 0.0018	1.7	0.94	2.64	**3900**
UG-4	N	11/13/2014	< 0.031	0.059 J	0.032 J	620	49	0.66	0.58	3.3	250	**2500**	< 0.0018	2.3	0.65	2.95	**4400**
UG-4	N	12/17/2014	< 0.031	< 0.022	0.051 J	590	51	0.56	0.51	3	240	< 0.077	< 0.0018	0.73	1.1	1.83	**4200**
UG-4	N	1/6/2015	< 0.031	< 0.022	0.013 J	650	50	0.5	0.46	2.6	250	**3400**	< 0.0018	2.0	0.85	2.85	**4000**
UG-4	FD	1/6/2015	< 0.031	< 0.022	< 0.012	640	51	0.7	0.5	2.7	260	**3300**	< 0.0018	0.98	0.11	1.09	**4200**
UG-4	N	2/3/2015	< 0.0310	0.052 J	0.02 J	582 J	50	0.641	< 0.0200 UB	2.59	230	**2490**	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**3710**
UG-4	N	3/3/2015	< 0.0310	< 0.0220	< 0.0120	561	52.3	0.742	0.46	2.65	251	**2660**	< 0.00180	0.56	0.43	0.99	**6310**
UG-4	N	4/7/2015	< 0.0310	0.055 J	--	562 V	49.3	0.524	< 0.0200 UBJ	2.43	249 O1V	**2880**	< 0.00180	< 1.0 UB	< 1.0 UB	< 1.0 UB	**4390**
UG-4	N	5/5/2015	< 0.0310	0.029 J	0.023 J	600	47.4	0.674	0.795 J	2.46	240	**2860**	< 0.00180	0.77	1.0	1.77	**4050**
UG-4	N	6/2/2015	< 0.0310	0.045 J	0.039 J	599	**704**	**20.2**	0.377	1.96 J	264	**2170**	< 0.00180	0.73	1.4	2.13	**4700**

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Dissolved Metals								
Analyte:			Aluminum	Arsenic	Barium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.2	0.01	1	0.75	0.005	0.05	0.05	1	0.3
Screening Level Source:			EPA MCL2	EPA MCL	WQCC HH	WQCC Irr	EPA MCL	WQCC HH	WQCC Irr	WQCC Dom	EPA MCL2
Location	**Sample Type**	**Date**									
MW-12	N	7/29/2014	< 0.0020 UB	0.0011	0.02	0.56	< 0.00016	0.0012	0.00027 J	0.002	< 0.05
MW-12	N	8/18/2014	0.014 J	0.0012	0.022	0.6	< 0.00016	< 0.00054	< 0.00026	0.0022	0.12
MW-12	N	9/10/2014	0.019 JB	0.001	0.02	0.62 J	< 0.00016	0.00071 JB	< 0.00026	0.002	< 0.05
MW-12 - not accessible due to flooding											
MW-12	N	11/12/2014	0.012 J	< 0.0012	0.018 J	0.63	< 0.00080	< 0.0027	< 0.0013	< 0.0026	< 0.25
MW-12	N	12/17/2014	0.014 J	0.0014 J	0.022	0.63	< 0.00016	0.00084 J	< 0.00026	0.0024 J	< 0.015
MW-12	N	1/7/2015	0.012 J	0.0012 J	0.022	0.57	< 0.00016	0.00087 JB	0.00065 J	0.0021 J	0.037 J
MW-12	N	2/4/2015	< 0.010 UB	< 0.00120	0.0231 J	< 0.00750 UB	< 0.000800	< 0.00270	< 0.00130	< 0.00260	0.0959 J
MW-12	N	3/4/2015	0.0116 J	0.00115 J	0.0164	0.553	< 0.000160	< 0.000540	0.000474 J	0.00161 J	0.0285 J
MW-12	N	4/6/2015	< 0.0020 UB	0.00247	0.0189	0.433 J	< 0.000160	< 0.000540	0.00104 J	0.00139 J	< 0.0150
MW-12	FD	4/6/2015	< 0.0020 UB	0.00241	0.018	0.472 J	< 0.000160	< 0.000540	0.000978 J	0.00123 J	< 0.0150
MW-12	N	5/4/2015	0.0116 J	0.00148 J	0.0235	0.414	< 0.000160	< 0.000540	0.00153 J	0.00118 J	< 0.0150
MW-12	N	6/1/2015	< 0.010	< 0.00120	0.0206 J	0.467	< 0.000800	< 0.00270	< 0.00130	< 0.00260	< 0.0750
MW-13	N	7/29/2014	< 0.0020 UB	0.001	0.023	0.62	< 0.00016	0.0011	< 0.00026	0.001	0.13
MW-13	N	8/18/2014	0.017 J	0.0012	0.027	0.63	< 0.00016	0.00078 J	< 0.00026	0.0011	0.055
MW-13	N	9/10/2014	0.012 JB	0.00091 J	0.027	0.42 J	< 0.00016	< 0.00054	< 0.00026	0.001	< 0.05
MW-13 - not accessible due to flooding											
MW-13	N	11/12/2014	< 0.01	0.0014 J	0.021 J	**0.93**	< 0.00080	< 0.0027	< 0.0013	< 0.0026	< 0.25
MW-13	N	12/17/2014	0.012 J	0.0019 J	0.024	**0.97**	< 0.00016	0.00081 J	0.00026 J	0.0026 J	< 0.015
MW-13	N	1/7/2015	0.02 J	0.0016 J	0.024	**0.79** VO1	< 0.00016	0.0011 JB	< 0.00026	0.0032 J	0.021 J
MW-13	N	2/4/2015	< 0.010 UB	0.00184 J	< 0.00180 UB	< 0.00750 UB	< 0.000800	< 0.00270	< 0.00130	< 0.00260	**0.359** J
MW-13	N	3/4/2015	0.0115 J	0.00141 J	0.0235	0.597	< 0.000160	< 0.000540	< 0.000260	0.00134 J	0.0378 J
MW-13	N	4/6/2015	< 0.0020 UB	0.00163 J	0.0235	0.446 JV	< 0.000160	< 0.000540	< 0.000260	0.000996 J	0.0282 J
MW-13	N	5/4/2015	0.0186 J	0.00128 J	0.0213	0.376 O1V	< 0.000160	< 0.000540	< 0.000260	0.00115 J	0.0226 J
MW-13	FD	5/6/2015	0.0345 J	0.00151 J	0.0222 J	0.433	< 0.000800	< 0.00270	< 0.00130	< 0.00260	< 0.0750
MW-13	N	6/1/2015	0.0117 J	0.00171 J	0.0277	0.462	< 0.000160	< 0.000540	< 0.000260	0.00142 J	< 0.0150
MW-13	FD	6/2/2015	< 0.010	< 0.00120	0.029	0.557	< 0.000800	< 0.00270	< 0.00130	< 0.00260	< 0.0750
MW-17	N	7/28/2014	0.034 J	0.00066 J	0.014	0.18	< 0.00016	0.0018	< 0.00026	0.0006 J	< 0.05
MW-17	FD	7/28/2014	0.045 J	0.00063 J	0.015	0.19	< 0.00016	0.0015	< 0.00026	< 0.00052	< 0.05
MW-17	N	8/19/2014	0.019 J	0.00078 J	0.014	0.13	< 0.00016	0.0014	< 0.00026	0.00088 J	< 0.05
MW-17	N	9/11/2014	0.015 J	0.00071 J	0.012	0.11 J	< 0.00016	0.002	< 0.00026	0.00057 J	< 0.05
MW-17	N	10/27/2014	0.012 J	0.00082 J	0.013	0.14	< 0.00016	0.0019 B	< 0.00026	< 0.00052	< 0.05
MW-17	N	11/11/2014	0.0099 J	0.00089 J	0.013	0.13	< 0.00016	0.0017 B	< 0.00026	< 0.00052	< 0.05
MW-17	N	12/16/2014	0.02 J	0.0013 J	0.014	0.19	< 0.00016	0.002	< 0.00026	0.0012 J	0.02 J
MW-17	N	1/7/2015	0.026 J	0.001 J	0.013	0.15	< 0.00016	0.0018 JB	< 0.00026	0.0016 J	< 0.015
MW-17	N	2/3/2015	< 0.0020 UB	< 0.000250 UB	0.0142	< 0.00150 UB	< 0.000160	< 0.000540 UB	< 0.000260	< 0.000520	< 0.0150
MW-17	N	3/4/2015	0.019 J	0.000849 J	0.0161	0.161	< 0.000160	0.00148 J	< 0.000260	0.000871 J	0.0169 J
MW-17	N	4/7/2015	0.0204 J	0.00108 J	0.0122	0.143 J	< 0.000160	0.00102 J	< 0.000260	0.000861 J	< 0.0150
MW-17	N	5/6/2015	0.0231 J	< 0.00120	0.0144 J	0.131	< 0.000800	< 0.00270	< 0.00130	0.00851 J	< 0.0750
MW-17	N	6/2/2015	< 0.0020	0.000754 J	0.0137	0.122	< 0.000160	0.000718 J	< 0.000260	< 0.000520	< 0.0150

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Dissolved Metals									
Analyte:			Aluminum	Arsenic	Barium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Screening Level:			0.2	0.01	1	0.75	0.005	0.05	0.05	1	0.3	
Screening Level Source:			EPA MCL2	EPA MCL	WQCC HH	WQCC Irr	EPA MCL	WQCC HH	WQCC Irr	WQCC Dom	EPA MCL2	
Location	**Sample Type**	**Date**										
MW-25	N	7/29/2014	< 0.0020 UB	0.005	0.021	0.23	< 0.00016	0.0009 J	0.00046 J	0.0011	< 0.05	
MW-25	N	8/19/2014	0.015 J	0.0052	0.023	0.22	< 0.00016	< 0.00054	0.00045 J	0.0012	< 0.05	
MW-25	N	9/10/2014	0.014 J	0.0055	0.022	< 0.15	< 0.00016	0.00055 J	0.0007 J	0.0018	< 0.05	
MW-25	FD	9/11/2014	0.022 J	0.0054	0.02	0.25	< 0.00016	0.00068 J	0.00075 J	0.001	< 0.05	
MW-25	N	10/27/2014	< 0.01	0.0048 J	0.023 J	0.3	< 0.00080	< 0.0027	0.0014 J	< 0.0026	< 0.25	J3J5
MW-25	N	11/11/2014	< 0.01	0.005 J	0.028	0.31 V	< 0.00080	< 0.0027	< 0.0013	< 0.0026	< 0.25	J6
MW-25	N	12/17/2014	0.031 J	0.0079	0.022	0.41	< 0.00016	0.00077 J	0.0015 J	0.0017 J	< 0.015	
MW-25	N	1/7/2015	0.014 J	0.0076	0.024	0.45	< 0.00016	0.00074 JB	0.00065 J	0.0024 J	0.029	J
MW-25	N	2/3/2015	< 0.020 UB	0.00834 J	0.0229 J	< 0.0150 UB	< 0.00160	< 0.00540	< 0.00260	< 0.00520	0.162	J
MW-25	N	3/4/2015	0.0164 J	0.00851	0.0222	0.427	< 0.000160	< 0.000540	0.000542 J	0.00139 J	< 0.0150	
MW-25	N	4/7/2015	0.0162 J	**0.0114**	0.0179	0.385 J	< 0.000160	< 0.000540	0.000929 J	0.00181 J	< 0.0150	
MW-25	N	5/6/2015	0.0129 J	0.00986	0.0172	0.486	< 0.000160	< 0.000540	0.00122 J	0.00172 J	< 0.0150	
MW-25	N	6/2/2015	< 0.0200	0.01 J	0.0125 J	0.586	< 0.00160	< 0.00540	< 0.00260	< 0.00520	< 0.150	
MW-55	N	7/28/2014	0.021 J	0.005	0.01	**1.4**	< 0.00016	0.0015	< 0.00026	0.0011	< 0.05	
MW-55	N	8/19/2014	0.016 J	0.005	0.0094	**1.1**	< 0.00016	0.00082 J	< 0.00026	0.0014	< 0.05	
MW-55	FD	8/20/2014	0.015 J	0.0049	0.01	**1.1**	< 0.00016	0.0006 J	< 0.00026	0.0016	< 0.05	
MW-55	N	9/10/2014	0.011 JB	0.0048	0.0091	0.73	< 0.00016	0.0034 B	< 0.00026	0.00096 J	< 0.05	
MW-55	N	10/27/2014	0.023 J	0.0046	0.01	**0.8**	< 0.00016	0.0019 B	< 0.00026	0.00089 J	< 0.05	
MW-55	N	11/12/2014	0.014 J	0.0048	0.012	**0.76**	< 0.00016	0.0017 B	< 0.00026	0.0013 J	< 0.05	
MW-55	N	12/16/2014	0.013 J	0.0055	0.011	**1.2**	< 0.00016	0.0021	< 0.00026	0.001 J	0.017	J
MW-55	N	1/6/2015	0.021 J	0.0048	0.01	**1.1**	< 0.00016	0.0022 B	< 0.00026	0.0017 J	< 0.015	
MW-55	N	2/2/2015	< 0.00200 UB	< 0.000250 UB	0.0101	**0.945**	< 0.000160	< 0.000540 UB	< 0.000260	0.00181 JB	< 0.0150	
MW-55	N	3/3/2015	0.0102 J	0.00474	0.0104	**1.25** O1V	< 0.000160	0.000996 J	< 0.000260	0.00108 J	< 0.0150	
MW-55	N	4/7/2015	0.0186 J	0.00529	0.00925	**1.13**	< 0.000160	< 0.000540	< 0.000260	0.00113 J	< 0.0150	
MW-55	N	5/6/2015	0.00957 J	0.00506	0.01	**1.17**	< 0.000160	0.000642 J	< 0.000260	0.00112 J	< 0.0150	
MW-55	N	6/2/2015	< 0.0100	0.00391 J	0.00608 J	**1.17**	< 0.000800	< 0.00270	< 0.00130	< 0.00260	< 0.0750	
MW-136	N	7/30/2014	< 0.0020 UB	0.0015	0.03	0.72 J	< 0.00016	< 0.00054	0.0022	0.0013	< 0.05	
MW-136	N	8/19/2014	0.044 J	0.002	0.012	0.57	< 0.00016	0.0013	0.00081 J	0.0014	< 0.05	
MW-136	N	9/9/2014	0.017 J	0.0021	0.011	0.54	< 0.00016	0.0009 J	0.0004 J	0.00088 J	< 0.05	
MW-136	N	10/27/2014	0.074 J	0.0023	0.012	0.55	< 0.00016	0.002 B	0.00028 J	0.0011 J	< 0.05	
MW-136	N	11/11/2014	0.057 J	0.0025 J	0.01 J	0.74	< 0.00080	< 0.0027	< 0.0013	< 0.0026	< 0.25	
MW-136	N	12/16/2014	0.04 J	0.0027	0.012	0.68	< 0.00016	0.00095 J	< 0.00026	0.0013 J	0.026	J
MW-136	FD	12/17/2014	0.024 J	0.0028	0.012	0.64	< 0.00016	0.0013	< 0.00026	0.0022 J	< 0.015	
MW-136	N	1/6/2015	0.046 J	0.0026	0.011	0.66	< 0.00016	0.0013 JB	< 0.00026	0.002 J	0.054	J
MW-136	N	2/4/2015	< 0.0100 UB	0.00244 J	< 0.00180 UB	< 0.00750 UB	< 0.000800	< 0.00270	< 0.00130	< 0.00260	< 0.0750	
MW-136	N	3/3/2015	0.0274 J	0.00244	0.0112	0.643	< 0.000160	< 0.000540	< 0.000260	0.00116 J	< 0.0150	
MW-136	N	4/7/2015	0.074 J	0.00283	0.0107	0.539 J	< 0.000160	< 0.000540	< 0.000260	0.00156 J	0.0239	J
MW-136	N	5/6/2015	0.0371 J	0.00261 J	0.0131 J	0.619	< 0.000800	< 0.00270	< 0.00130	< 0.00260	0.0759	J
MW-136	N	6/2/2015	< 0.0100	0.00181 J	0.00864 J	0.613	< 0.000800	< 0.00270	< 0.00130	< 0.00260	< 0.0750	

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Dissolved Metals								
Analyte:			Aluminum	Arsenic	Barium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.2	0.01	1	0.75	0.005	0.05	0.05	1	0.3
Screening Level Source:			EPA MCL2	EPA MCL	WQCC HH	WQCC Irr	EPA MCL	WQCC HH	WQCC Irr	WQCC Dom	EPA MCL2
Location	**Sample Type**	**Date**									
NP-5	N	7/28/2014	0.024 J	0.0033	0.0076	**2.1**	< 0.00016	0.00056 J	< 0.00026	0.0011	< 0.05
NP-5	N	8/19/2014	0.014 J	0.0032	0.0078	**1.6**	< 0.00016	< 0.00054	< 0.00026	0.0011	< 0.05
NP-5	N	9/9/2014	0.022 J	0.0032	0.0075	**1.8** O1V	< 0.00016	0.00088 J	< 0.00026	0.0024	< 0.05
NP-5	N	10/27/2014	0.01 J	0.0031	0.0076	**1.6**	< 0.00016	0.0012 B	< 0.00026	0.00099 J	< 0.05
NP-5	N	11/11/2014	0.017 J	0.0033	0.0084	**1.6**	< 0.00016	0.00076 JB	< 0.00026	0.0012 J	< 0.05
NP-5	N	12/16/2014	0.022 J	0.0036	0.009	**2.1**	< 0.00016	0.0011	< 0.00026	0.0017 J	0.036 J
NP-5	N	1/5/2015	0.033 J	0.0036	0.008	**2.1**	< 0.00016	0.0013 JB	< 0.00026	0.002 J	0.056 J
NP-5	N	2/2/2015	< 0.00200 UB	< 0.000250 UB	0.0079	**1.69**	< 0.000160	< 0.000540 UB	< 0.000260	0.00207 JB	< 0.0150
NP-5	FD	2/4/2015	< 0.00200 UB	< 0.000250 UB	0.00827	**1.75**	< 0.000160	< 0.000540	< 0.000260	< 0.000520	< 0.0150
NP-5	N	3/3/2015	0.00878 J	0.00293	0.0082	**1.96**	< 0.000160	< 0.000540	< 0.000260	0.00152 J	< 0.0150
NP-5	N	4/8/2015	< 0.00200 UB	0.00338	0.00756	**1.92**	< 0.000160	< 0.000540 UB	< 0.000260	0.00172 J	< 0.0150 UB
NP-5	N	5/5/2015	0.0113 J	0.00324	0.00821	**1.68**	< 0.000160	< 0.000540	< 0.000260	0.00135 J	< 0.0150
NP-5	N	6/2/2015	< 0.0100	0.00286 J	0.00694 J	**1.81**	< 0.000800	< 0.00270	< 0.00130	< 0.00260	< 0.0750
UG-1	N	7/30/2014	< 0.0020 UB	0.0014	0.011	0.51	< 0.00016	0.0018	< 0.00026	0.0011	< 0.05
UG-1	N	8/20/2014	0.035 J	0.0012	0.013	0.42	< 0.00016	0.00069 J	< 0.00026	0.0011	< 0.05
UG-1	N	9/9/2014	0.014 J	0.0012	0.012	0.44	< 0.00016	0.001 B	< 0.00026	0.0011	< 0.05
UG-1	N	10/27/2014	0.016 J	0.0012 J	0.013	0.49	< 0.00016	0.0016 B	< 0.00026	0.00092 J	< 0.05
UG-1	FD	10/27/2014	0.023 J	0.0012 J	0.013	0.47	< 0.00016	0.0016 B	< 0.00026	0.00067 J	< 0.05
UG-1	N	11/13/2014	0.012 J	0.0012 J	0.014	0.47	< 0.00016	0.0012 B	< 0.00026	0.00096 J	< 0.05
UG-1	N	12/17/2014	0.012 J	0.0015 J	0.015	0.56	< 0.00016	0.0018	< 0.00026	0.002 J	0.03 J
UG-1	N	1/6/2015	0.016 J	0.0012 J	0.014	0.55	< 0.00016	0.002 B	< 0.00026	0.0021 J	0.045 J
UG-1	N	2/3/2015	< 0.00200 UB	< 0.000250 UB	0.0147	< 0.00150 UB	< 0.000160	< 0.000540 UB	< 0.000260	0.00104 JB	< 0.0150
UG-1	N	3/3/2015	0.0153 J	0.00193 J	0.0133	0.519	< 0.000160	0.000913 J	< 0.000260	0.00116 J	< 0.0150
UG-1	N	4/8/2015	< 0.00200 UB	0.00135 J	0.0122	< 0.0750 UB	< 0.000160	< 0.000540 UB	< 0.000260	0.00149 J	< 0.0150 UB
UG-1	N	5/5/2015	0.0145 J	0.00125 J	0.0133	0.456	< 0.000160	0.000889 J	< 0.000260	0.00144 J	< 0.0150
UG-1	N	6/3/2015	< 0.00200	0.00112 J	0.014	0.485	< 0.000160	< 0.000540	< 0.000260	0.00103 J	< 0.0150
UG-2	N	7/30/2014	< 0.0020 UB	0.0018	0.013	0.34	< 0.00016	0.0031	0.0026	0.00073 J	< 0.05
UG-2	N	8/20/2014	0.02 J	0.0015	0.015	0.3	< 0.00016	< 0.00054	0.0012	0.00079 J	0.082
UG-2	N	9/9/2014	< 0.0020 UB	0.0017	0.015	0.3	< 0.00016	< 0.00054 UB	0.00077 J	0.0011	< 0.05
UG-2	N	10/27/2014	0.011 J	0.0019 J	0.014	0.28	< 0.00016	0.00097 JB	0.001 J	0.001 J	< 0.05
UG-2	N	11/12/2014	0.012 J	0.0022	0.11	0.29	< 0.00016	0.00064 JB	0.001 J	0.001 J	0.1
UG-2	FD	11/13/2014	0.014 J	0.0022	0.016	0.28	< 0.00016	0.00054 JB	0.00097 J	0.00067 J	< 0.05
UG-2	N	12/17/2014	0.014 J	0.0026	0.016	0.33	< 0.00016	0.00098 J	0.00094 J	0.0021 J	0.082 J
UG-2	N	1/6/2015	0.015 J	0.0021	0.015	0.36	< 0.00016	0.0011 JB	0.00054 J	0.002 J	0.047 J
UG-2	N	2/3/2015	< 0.00200 UB	< 0.000250 UB	0.0161	< 0.00150 UB	< 0.000160	< 0.000540 UB	0.00046 J	0.00225 JB	< 0.0150
UG-2	N	3/3/2015	0.0202 J	0.00275	0.0151	0.338	< 0.000160	< 0.000540	0.000357 J	0.0026 J	< 0.0150
UG-2	N	4/8/2015	< 0.00200 UB	0.00256	0.0142	< 0.0750 UB	< 0.000160	< 0.000540 UB	0.000343 J	0.00137 J	< 0.0150 UB
UG-2	N	5/5/2015	0.0105 J	0.00211	0.0151	0.275	< 0.000160	< 0.000540	< 0.000260	0.00143 J	0.0239 J
UG-2	N	6/3/2015	< 0.00200	< 0.000250	0.0024 J	0.0341	< 0.000160	< 0.000540	< 0.000260	0.00108 J	< 0.0150

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Dissolved Metals								
Analyte:			Aluminum	Arsenic	Barium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.2	0.01	1	0.75	0.005	0.05	0.05	1	0.3
Screening Level Source:			EPA MCL2	EPA MCL	WQCC HH	WQCC Irr	EPA MCL	WQCC HH	WQCC Irr	WQCC Dom	EPA MCL2
Location	**Sample Type**	**Date**									
UG-3R	N	7/30/2014	< 0.0020 UB	0.0013	0.016	0.3	< 0.00016	0.0014	< 0.00026	0.00057 J	< 0.05
UG-3R	N	8/20/2014	0.021 J	0.0012	0.017	0.27	< 0.00016	0.00076 J	< 0.00026	0.00084 J	< 0.05
UG-3R	N	9/9/2014	< 0.0020 UB	0.0013	0.017	< 0.015 UB	< 0.00016	< 0.00054 UB	< 0.00026	< 0.00052 UB	< 0.05
UG-3R	N	10/27/2014	0.016 J	0.0014 J	0.017	0.21	< 0.00016	0.0012 B	< 0.00026	0.00095 J	0.055 J
UG-3R	N	11/13/2014	0.01 J	0.0015 J	0.02	0.24	< 0.00016	0.0007 JB	< 0.00026	0.00061 J	< 0.05
UG-3R	N	12/17/2014	0.018 J	0.0017 J	0.019	0.26	< 0.00016	0.0014	< 0.00026	0.02	< 0.015
UG-3R	N	1/6/2015	0.061 J	0.0016 J	0.018	0.25	< 0.00016	0.0014 JB	< 0.00026	0.0012 J	0.033 J
UG-3R	N	2/3/2015	< 0.00200 UB	< 0.000250 UB	0.0193	< 0.00150 UB	< 0.000160	< 0.000540 UB	< 0.000260	0.00337 JB	< 0.0150
UG-3R	N	3/4/2015	0.0219 J	0.00211	0.0165	0.262	< 0.000160	< 0.000540	< 0.000260	0.000714 J	0.0214 J
UG-3R	FD	3/4/2015	0.023 J	0.00147 J	0.0168	0.243	< 0.000160	< 0.000540	< 0.000260	0.00068 J	< 0.0150
UG-3R	N	4/8/2015	< 0.00200 UB	0.00186 J	0.0177	< 0.0750 UB	< 0.000160	< 0.000540 UB	< 0.000260	0.0015 J	< 0.0150 UB
UG-3R	N	5/5/2015	0.0102 J	0.00163 J	0.0182	0.243	< 0.000160	< 0.000540	< 0.000260	0.00169 J	< 0.0150
UG-3R	N	6/3/2015	< 0.00200	0.00146 J	0.0193	0.221	< 0.000160	< 0.000540	< 0.000260	0.000868 J	< 0.0150
UG-4 - well not installed during July											
UG-4 - insufficent recharge during August											
UG-4	N	9/11/2014	0.02 J	0.00055 J	0.042	0.73	< 0.00016	0.0015	0.0013	0.0015	< 0.05
UG-4	N	10/27/2014	0.027 J	0.00068 J	0.031	**0.84**	< 0.00016	0.0014 B	0.00026 J	0.0016 J	< 0.05
UG-4	N	11/13/2014	0.1	0.00083 J	0.031	**0.95**	< 0.00016	0.001 B	0.0003 J	0.0014 J	< 0.05
UG-4	N	12/17/2014	0.016 J	0.00094 J	0.026	**1.1**	< 0.00016	0.0012	< 0.00026	0.0058	< 0.015
UG-4	N	1/6/2015	0.018 J	0.00083 J	0.025	**1.2**	< 0.00016	0.0014 JB	< 0.00026	0.0016 J	< 0.015
UG-4	FD	1/6/2015	0.037 J	0.00083 J	0.024	**1.1**	< 0.00016	0.0012 JB	< 0.00026	0.002 J	0.018 J
UG-4	N	2/3/2015	< 0.00200 UB	< 0.000250 UB	0.0229	**0.966**	< 0.000160	< 0.000540 UB	< 0.000260	0.0017 JB	< 0.0150
UG-4	N	3/3/2015	0.0187 J	0.000893 J	0.0251	**1.13**	< 0.000160	< 0.000540	< 0.000260	0.00137 J	0.0173 J
UG-4	N	4/7/2015	< 0.00200 UB	0.00114 J	0.0224	**1.1** V	< 0.000160	< 0.000540 UB	< 0.000260	0.00145 J	< 0.0150 UB
UG-4	N	5/5/2015	0.0151 J	0.001 J	0.023	**1.04**	< 0.000160	< 0.000540	< 0.000260	0.00123 J	< 0.0150
UG-4	N	6/2/2015	< 0.0100	< 0.00120	0.0216 J	**1.15**	< 0.000800	< 0.00270	< 0.00130	< 0.00260	< 0.0750

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Dissolved Metals								
Analyte:			Lead	Manganese	Molybdenum	Nickel	Selenium	Silver	Uranium	Vanadium	Zinc
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.015	0.05	1	0.2	0.05	0.05	0.03	0.0631	5
Screening Level Source:			EPA MCL	EPA MCL2	WQCC Irr	WQCC Irr	WQCC HH	WQCC HH	WQCC HH	NMED TW	EPA MCL2
Location	**Sample Type**	**Date**									
MW-12	N	7/29/2014	< 0.00024	**0.13** J	0.0051	0.0024	0.0094	< 0.00031	0.0058 J	0.0016	< 0.0026
MW-12	N	8/18/2014	< 0.00024	**0.1**	0.0045	0.0019	0.0096	< 0.00031	0.0059 J	0.0021	< 0.0026
MW-12	N	9/10/2014	< 0.012	0.031	0.0047	0.0021	0.0074	< 0.016	< 0.016	0.0021	0.0053 J
MW-12 - not accessible due to flooding											
MW-12	N	11/12/2014	< 0.0012	**0.055**	0.0052 J	< 0.0018	0.012	< 0.0016	0.0055 J	0.0022 J	< 0.013
MW-12	N	12/17/2014	0.00032 J	**0.2**	0.0049 J	0.00092 J	0.0088	< 0.00031	0.0053 J	0.002 J	< 0.0026
MW-12	N	1/7/2015	< 0.00024	**0.35**	0.0046 J	0.0018 J	0.0054	0.00031 J	0.0042 J	0.0017 J	0.024 J
MW-12	N	2/4/2015	< 0.00120	**0.264**	0.00484 J	0.00298 J	0.00281 J	< 0.00160	0.00429 J	0.00145 J	< 0.0130
MW-12	N	3/4/2015	< 0.000240	**0.647**	0.00591	0.00241	0.00648	< 0.000310	0.00618 J	0.0014 J	< 0.00260
MW-12	N	4/6/2015	0.000243 J	**0.675**	0.00465 J	0.00192 J	0.00409	< 0.000310	0.0037 J	0.00147 J	< 0.00260 UJ
MW-12	FD	4/6/2015	< 0.000240	**0.59**	0.00479 J	0.00188 J	0.00593	< 0.000310	0.00437 J	0.00154 J	< 0.00260 UJ
MW-12	N	5/4/2015	< 0.000240	**1.33**	0.00414 J	0.00236	0.00118 J	< 0.000310	0.00202 J	0.00165 J	< 0.00260
MW-12	N	6/1/2015	< 0.00120	**1.13**	< 0.000700	0.00928 J	< 0.00190	< 0.00160	0.00167 J	0.00141 J	0.0296 J
MW-13	N	7/29/2014	< 0.00024	**0.41**	0.0041	0.0013	< 0.00038 UB	< 0.00031	0.0068 J	0.004	< 0.0026
MW-13	N	8/18/2014	< 0.00024	**0.27**	0.0029	0.0017	0.00059 J	< 0.00031	0.0086 J	0.0042	< 0.0026
MW-13	N	9/10/2014	< 0.012	**0.59**	0.0036	0.0014	0.00066 J	< 0.016	< 0.016	0.0028	< 0.0026
MW-13 - not accessible due to flooding											
MW-13	N	11/12/2014	< 0.0012	**0.057**	0.0038 J	< 0.0018	0.019	< 0.0016	0.02 J	0.0051	< 0.013
MW-13	N	12/17/2014	< 0.00024	**0.052**	0.0053	0.00058 J	0.019	< 0.00031	0.021	0.0053	< 0.0026
MW-13	N	1/7/2015	< 0.00024	0.047	0.0045 J	0.0012 J	0.0098	0.00068 J	0.014	0.0044 J	0.025 JJ6
MW-13	N	2/4/2015	< 0.00120	**0.155**	0.00345 J	0.00327 J	0.00569 J	< 0.00160	0.0109 J	0.00483 J	< 0.0130
MW-13	N	3/4/2015	< 0.000240	**0.0564**	0.00362 J	0.000856 J	0.00435	< 0.000310	0.00911 J	0.00357 J	< 0.00260
MW-13	N	4/6/2015	< 0.000240	**0.0605**	0.00325 J	0.000669 J	0.00277	< 0.000310	0.00588 J	0.00307 J	0.0132 J
MW-13	N	5/4/2015	< 0.000240	**0.114**	0.00337 J	0.000898 J	0.000693 J	< 0.000310	0.00202 JO1	0.00257 J	0.00348 J
MW-13	FD	5/6/2015	< 0.00120	**0.123**	0.0035 J	< 0.00180	< 0.00190	< 0.00160	0.0022 J	0.00286 J	< 0.0130
MW-13	N	6/1/2015	< 0.000240	**0.18**	0.00431 J	0.00123 J	0.00343	< 0.000310	0.00664 J	0.0034 J	< 0.00260
MW-13	FD	6/2/2015	< 0.00120	**0.181**	< 0.000700	0.0353	< 0.00190	< 0.00160	0.00578 J	0.0029 J	< 0.0130
MW-17	N	7/28/2014	< 0.00024	0.00056 J	0.0071	0.00059 J	0.0085	< 0.00031	0.0039 J	0.0044	0.0056 J
MW-17	FD	7/28/2014	< 0.00024	0.0037	0.0068	< 0.00035	0.0084	< 0.00031	0.0039 J	0.0044	< 0.0026
MW-17	N	8/19/2014	< 0.00024	0.00069 J	0.0089	< 0.00035	0.0082	< 0.00031	0.0029 J	0.0049	< 0.0026
MW-17	N	9/11/2014	< 0.0024	0.00031 J	0.0084	0.00039 J	0.0062	< 0.0031	< 0.0033	0.0048	< 0.0026
MW-17	N	10/27/2014	< 0.00024	0.00029 J	0.0083	< 0.00035	0.0077	< 0.00031	0.0033 J	0.0062	0.0033 J
MW-17	N	11/11/2014	< 0.00024	0.00028 J	0.0097	< 0.00035	0.0074	< 0.00031	0.0031 J	0.0069	< 0.0026
MW-17	N	12/16/2014	< 0.00024	0.00032 J	0.012	< 0.00035	0.0086	< 0.00031	0.0029 J	0.0081	< 0.0026
MW-17	N	1/7/2015	< 0.00024	0.0017 J	0.011	0.00072 J	0.0078	< 0.00031	0.0026 J	0.0066	0.03
MW-17	N	2/3/2015	< 0.000240	0.00133 J	0.0108	< 0.000350	0.00782	< 0.000310	0.00293 J	0.00649	< 0.00260
MW-17	N	3/4/2015	< 0.000240	0.000401 J	0.0106	0.000361 J	0.00785	< 0.000310	0.00296 J	0.00599	0.00336 J
MW-17	N	4/7/2015	0.000402 J	0.00119 J	0.0105	0.000405 J	0.0077	< 0.000310	0.00265 J	0.00578	< 0.00260 UJ
MW-17	N	5/6/2015	< 0.00120	< 0.00120	0.0098 J	0.00259 J	0.00754 J	< 0.00160	0.00305 J	0.00628 J	< 0.0130
MW-17	N	6/2/2015	< 0.000240	< 0.000250	0.00838	< 0.000350	0.00797	< 0.000310	0.00297 J	0.00571	< 0.00260

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Dissolved Metals									
Analyte:			Lead	Manganese	Molybdenum	Nickel	Selenium	Silver	Uranium	Vanadium	Zinc	
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Screening Level:			0.015	0.05	1	0.2	0.05	0.05	0.03	0.0631	5	
Screening Level Source:			EPA MCL	EPA MCL2	WQCC Irr	WQCC Irr	WQCC HH	WQCC HH	WQCC HH	NMED TW	EPA MCL2	
Location	**Sample Type**	**Date**										
MW-25	N	7/29/2014	< 0.00024	**0.13**	0.015	0.003	< 0.00038 UB	< 0.00031	0.011	0.0099	< 0.0026	
MW-25	N	8/19/2014	< 0.00024	**0.13**	0.016	0.0028	0.01	< 0.00031	0.013	0.01	< 0.0026	
MW-25	N	9/10/2014	*< 0.024*	**0.22**	0.017	0.0032	0.012	< 0.031	*< 0.033*	0.01	< 0.0026	
MW-25	FD	9/11/2014	*< 0.024*	**0.22**	0.017	0.0031	0.011	< 0.0031	*< 0.033*	0.01	0.0043 J	
MW-25	N	10/27/2014	< 0.0012	**2.1** V	0.029	0.003 J	0.028	< 0.0016	0.014 J	0.013	< 0.013	
MW-25	N	11/11/2014	< 0.0012	**0.13** O1J6	0.012 J	0.0029 J	0.029	< 0.0016	0.016 J	0.011	0.02 JJ6	
MW-25	N	12/17/2014	< 0.00024	**0.52**	0.024	0.0044	0.029	< 0.00031	0.023	0.014	< 0.0026	
MW-25	N	1/7/2015	< 0.00024	**0.5**	0.019	0.0044	0.041	< 0.00031	0.022	0.013	0.023 J	
MW-25	N	2/3/2015	< 0.00240	**0.427**	0.0243 J	0.00711 J	0.0256	< 0.00310	0.0263 J	0.0144 J	< 0.0260	
MW-25	N	3/4/2015	< 0.000240	**0.159**	0.0216	0.00582	0.0253	< 0.000310	0.0263	0.014	0.00262 J	
MW-25	N	4/7/2015	0.000277 J	**0.191**	0.0289	0.00508	0.0157	0.00035 J	0.0287	0.0121	< 0.00260 UJ	
MW-25	N	5/6/2015	< 0.000240	**0.282**	0.0342	0.00603	0.0106	< 0.000310	**0.0326**	0.0131	< 0.00260	
MW-25	N	6/2/2015	< 0.00240	**0.304**	0.0182 J	0.0239	0.0138 J	< 0.00310	**0.0356** J	0.0146 J	< 0.0260	
MW-55	N	7/28/2014	< 0.00024	0.028	0.029	0.0038	0.02	< 0.00031	**0.04**	0.019	< 0.0026	
MW-55	N	8/19/2014	< 0.00024	**0.094**	0.026	0.0046	0.023	< 0.00031	**0.048**	0.017	< 0.0026	
MW-55	FD	8/20/2014	< 0.00024	**0.088**	0.027	0.0043	0.022	< 0.00031	**0.048**	0.016	< 0.0026	
MW-55	N	9/10/2014	< 0.0048	0.0033	0.037	0.00068 J	0.0046	< 0.0062	0.0086 J	0.022	< 0.0026	
MW-55	N	10/27/2014	< 0.00024	0.02	0.026	0.0012 J	0.012	< 0.00031	0.029	0.017	< 0.0026	
MW-55	N	11/12/2014	< 0.00024	0.013	0.028	0.0012 J	0.012	< 0.00031	0.026	0.018	< 0.0026	
MW-55	N	12/16/2014	< 0.00024	0.0086	0.025	0.00077 J	0.02	< 0.00031	**0.041**	0.018	< 0.0026	
MW-55	N	1/6/2015	< 0.00024	0.013	0.021	0.0017 J	0.02	< 0.00031	**0.042**	0.016	0.024 J	
MW-55	N	2/2/2015	< 0.000240	< 0.000250 UB	0.0208	< 0.000350 UB	0.0216	< 0.000310	**0.0489**	0.0171	< 0.00260	
MW-55	N	3/3/2015	< 0.000240	**0.111**	0.0211	0.00179 J	0.0198	< 0.000310	**0.0473**	0.0168	< 0.00260	
MW-55	N	4/7/2015	< 0.000240	0.00558	0.0217	0.00233	0.0207	< 0.000310	**0.0436**	0.0158	< 0.00260 UJ	
MW-55	N	5/6/2015	< 0.000240	0.00522	0.0224	0.00237	0.0196	< 0.000310	**0.0465**	0.0153	< 0.00260	
MW-55	N	6/2/2015	< 0.00120	0.00415 J	0.0158 J	0.0232	0.017	< 0.00160	**0.0395** J	0.0155 J	< 0.0130	
MW-136	N	7/30/2014	< 0.00024	**0.22**	0.0087	0.0032	< 0.00038 UB	< 0.00031	**0.062**	0.012	0.018	
MW-136	N	8/19/2014	< 0.00024	**0.071**	0.006	0.0016	0.0038	< 0.00031	**0.064**	0.016	0.0034 J	
MW-136	N	9/9/2014	< 0.00024	0.045	0.0061	0.0012	0.0039	< 0.0062	**0.063** J	0.016	0.0052 J	
MW-136	N	10/27/2014	< 0.00024	0.027	0.0059	0.0013 J	0.0032	< 0.00031	**0.068**	0.017	0.0052 J	
MW-136	N	11/11/2014	< 0.0012	0.021 J	0.006 J	< 0.0018	0.0042 J	< 0.0016	**0.073**	0.018	< 0.013	
MW-136	N	12/16/2014	0.00025 J	0.005	0.0068	0.00078 J	0.0044	< 0.00031 J6	**0.078**	0.019	0.003 J	
MW-136	FD	12/17/2014	0.00065 J	0.0048 J	0.0066	< 0.00035	0.0044	< 0.00031	**0.077**	0.019	< 0.0026	
MW-136	N	1/6/2015	< 0.00024	0.01	0.0063	0.0012 J	0.006	< 0.00031	**0.077**	0.017	0.024 J	
MW-136	N	2/4/2015	< 0.00120 UB	< 0.00120 UB	0.00674 J	< 0.00180	0.00407 J	< 0.00160	**0.0814**	0.0186 J	< 0.0130	
MW-136	N	3/3/2015	< 0.000240	0.00572	0.006	0.00115 J	0.00366	< 0.000310	**0.0793**	0.0171	< 0.00260	
MW-136	N	4/7/2015	< 0.000240	0.00574	0.00597	0.0011 J	0.00362	< 0.000310	**0.0736**	0.0158	< 0.00260 UJ	
MW-136	N	5/6/2015	< 0.00120	0.00818 J	0.00627 J	0.00649 J	0.00465 J	< 0.00160	**0.0807**	0.0168 J	< 0.0130	
MW-136	N	6/2/2015	< 0.00120	< 0.00120	< 0.000700	0.0177	0.00414 J	< 0.00160	**0.0776**	0.0168 J	< 0.0130	

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Dissolved Metals								
Analyte:			Lead	Manganese	Molybdenum	Nickel	Selenium	Silver	Uranium	Vanadium	Zinc
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.015	0.05	1	0.2	0.05	0.05	0.03	0.0631	5
Screening Level Source:			EPA MCL	EPA MCL2	WQCC Irr	WQCC Irr	WQCC HH	WQCC HH	WQCC HH	NMED TW	EPA MCL2
Location	**Sample Type**	**Date**									
NP-5	N	7/28/2014	< 0.00024	0.00041 J	0.032	0.0012	0.0087	< 0.00031	**0.19**	0.019	< 0.0026
NP-5	N	8/19/2014	< 0.00024	< 0.00025	0.031	0.00074 J	0.0071	< 0.00031	**0.18**	0.019	< 0.0026
NP-5	N	9/9/2014	0.0003 J	< 0.00025	0.031	0.001	0.0087	< 0.0062	**0.18** J	0.018	< 0.0026
NP-5	N	10/27/2014	< 0.00024	0.00039 J	0.033	0.0012 J	0.0074	< 0.00031	**0.19**	0.019	< 0.0026
NP-5	N	11/11/2014	< 0.00024	0.00052 J	0.034	0.001 J	0.01	< 0.00031	**0.2**	0.021	< 0.0026
NP-5	N	12/16/2014	0.0003 J	0.00058 J	0.038	0.004	0.014	< 0.00031	**0.21**	0.022	< 0.0026
NP-5	N	1/5/2015	< 0.00024	0.00049 J	0.034	0.0013 J	0.011	< 0.00031	**0.2**	0.019	0.023 J
NP-5	N	2/2/2015	< 0.000240 UB	< 0.000250	0.0331	< 0.000350 UB	0.00885	< 0.000310	**0.202**	0.0205	< 0.00260
NP-5	FD	2/4/2015	< 0.000240	< 0.000250	0.0331	< 0.000350 UB	0.00858	< 0.000310	**0.208**	0.0202	< 0.00260
NP-5	N	3/3/2015	< 0.000240	0.000251 J	0.0462	0.00161 J	0.0341	< 0.000310	**0.219**	0.0206	< 0.00260
NP-5	N	4/8/2015	< 0.000240	0.000592 J	0.0359	< 0.000350 UB	0.0178	< 0.000310	**0.208**	0.0191	< 0.00260
NP-5	N	5/5/2015	< 0.000240	0.000555 J	0.0322	0.00183 J	0.0104	< 0.000310	**0.219**	0.0184	< 0.00260
NP-5	N	6/2/2015	< 0.00120	< 0.00120	0.0253	0.00589 J	0.00869 J	< 0.00160	**0.218**	0.0188 J	< 0.0130
UG-1	N	7/30/2014	< 0.00024	0.011	0.0049	0.0012	< 0.00038 UB	< 0.00031	0.018	0.011	0.0038 J
UG-1	N	8/20/2014	< 0.00024	0.0032	0.0048	0.00085 J	0.0056	< 0.00031	0.018	0.011	< 0.0026
UG-1	N	9/9/2014	< 0.00024	0.00036 J	0.005	0.0013	0.0058	< 0.0031	0.017 J	0.011	< 0.0026
UG-1	N	10/27/2014	< 0.00024	0.00028 J	0.005 J	0.0011 J	0.0086	< 0.00031	0.022	0.013	0.0028 J
UG-1	FD	10/27/2014	< 0.00024	< 0.00025	0.0051	0.001 J	0.0076	< 0.00031	0.022	0.014	0.0039 J
UG-1	N	11/13/2014	< 0.00024	< 0.00025	0.0054	0.0011 J	0.0081	< 0.00031	0.022	0.014	< 0.0026
UG-1	N	12/17/2014	< 0.00024	0.00028 J	0.0058	< 0.00035	0.0097	< 0.00031	0.022	0.014	0.004 J
UG-1	N	1/6/2015	< 0.00024	0.00028 J	0.0054	0.0014 J	0.0088	< 0.00031	0.022	0.012	0.025
UG-1	N	2/3/2015	< 0.000240	0.000327 J	0.0057	< 0.000350 UB	0.00938	< 0.000310	0.0233	0.0121	0.00385 J
UG-1	N	3/3/2015	< 0.000240	< 0.000250	0.00556	0.00206	0.00991	< 0.000310	0.0231	0.0108	< 0.00260
UG-1	N	4/8/2015	< 0.000240	< 0.000250 UB	0.00564	< 0.000350 UB	0.0107	< 0.000310	0.0227	0.0106	< 0.00260 UB
UG-1	N	5/5/2015	< 0.000240	0.000491 J	0.00535	0.00113 J	0.0116	< 0.000310	0.024	0.011	0.00311 J
UG-1	N	6/3/2015	< 0.000240	< 0.000250	0.00371 J	0.000708 J	0.0115	< 0.000310	0.0232	0.0111	< 0.00260
UG-2	N	7/30/2014	< 0.00024	**0.17**	0.028	0.036	< 0.00038 UB	< 0.00031	0.023	0.0089	0.01 J
UG-2	N	8/20/2014	< 0.00024	**0.16**	0.014	0.016	0.0032	< 0.00031	0.014	0.0088	0.0073 J
UG-2	N	9/9/2014	< 0.0024	**0.081**	0.012	0.016	0.0028	< 0.0031	0.013 J	0.011	0.0062 J
UG-2	N	10/27/2014	< 0.00024	**0.13**	0.0094	0.0097	0.0027	< 0.00031	0.015	0.013	0.0093 J
UG-2	N	11/12/2014	< 0.00024	**0.15**	0.0074	0.0092	0.0034	< 0.00031	0.014	0.015	0.0042 J
UG-2	FD	11/13/2014	< 0.00024	**0.15**	0.0075	0.009	0.0031	< 0.00031	0.022	0.016	0.0032 J
UG-2	N	12/17/2014	0.00043 J	**0.17**	0.0093	0.011	0.003	< 0.00031	0.015	0.014	0.0045 J
UG-2	N	1/6/2015	< 0.00024	**0.097**	0.0071	0.0078	0.0032	< 0.00031	0.014	0.013	0.028
UG-2	N	2/3/2015	< 0.000240	**0.0653**	0.00764	0.00687	0.00274	< 0.000310	0.0139	0.0128	0.00382 J
UG-2	N	3/3/2015	< 0.000240	0.0446	0.00793	0.00614	0.00291	< 0.000310	0.0136	0.0126	0.00327 J
UG-2	N	4/8/2015	< 0.000240 UB	0.0421	0.00763	< 0.000350 UB	0.00382	< 0.000310	0.0134	0.0134	< 0.00260 UB
UG-2	N	5/5/2015	< 0.000240	0.0111	0.0102	0.00516	0.00304	< 0.000310	0.0139	0.0111	0.0029 J
UG-2	N	6/3/2015	< 0.000240	< 0.000250	< 0.000140	< 0.000350	< 0.000380	< 0.000310	< 0.000330	0.000249 J	< 0.00260

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Dissolved Metals								
Analyte:			Lead	Manganese	Molybdenum	Nickel	Selenium	Silver	Uranium	Vanadium	Zinc
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.015	0.05	1	0.2	0.05	0.05	0.03	0.0631	5
Screening Level Source:			EPA MCL	EPA MCL2	WQCC Irr	WQCC Irr	WQCC HH	WQCC HH	WQCC HH	NMED TW	EPA MCL2
Location	**Sample Type**	**Date**									
UG-3R	N	7/30/2014	< 0.00024	0.00034 J	0.0026	0.001	< 0.00038 UB	< 0.00031	0.015	0.0094	< 0.0026
UG-3R	N	8/20/2014	< 0.00024	0.00055 J	0.0025	0.00062 J	0.0036	< 0.00031	0.014	0.0088	< 0.0026
UG-3R	N	9/9/2014	< 0.0024	< 0.00025 UB	0.003	0.00096 J	0.0027	< 0.0031	0.01 J	0.0085	< 0.0026
UG-3R	N	10/27/2014	< 0.00024	0.0004 J	0.0032 J	0.00067 J	0.0028	< 0.00031	0.012	0.0092	< 0.0026
UG-3R	N	11/13/2014	< 0.00024	0.0095	0.0038 J	0.00073 J	0.004	< 0.00031	0.012	0.0092	0.0076 J
UG-3R	N	12/17/2014	0.0035	0.00077 J	0.0038 J	< 0.00035	0.0035	< 0.00031	0.011	0.0096	0.0092 J
UG-3R	N	1/6/2015	< 0.00024	0.0015 J	0.0036 J	0.00092 J	0.0037	< 0.00031	0.011	0.0088	0.026
UG-3R	N	2/3/2015	< 0.000240	< 0.000250 UB	0.00373 J	< 0.000350 UB	0.00365	< 0.000310	0.0109	0.00917	0.00754 J
UG-3R	N	3/4/2015	< 0.000240	0.000573 J	0.00353 J	0.00135 J	0.00329	< 0.000310	0.0111	0.009	< 0.00260
UG-3R	FD	3/4/2015	< 0.000240	0.000569 J	0.00344 J	0.00127 J	0.00291	< 0.000310	0.011	0.00898	< 0.00260
UG-3R	N	4/8/2015	< 0.000240 UB	< 0.000250 UB	0.00359 J	< 0.000350 UB	0.00349	< 0.000310	0.011	0.00921	< 0.00260 UB
UG-3R	N	5/5/2015	< 0.000240	0.000627 J	0.00357 J	0.000826 J	0.00366	< 0.000310	0.0112	0.00895	0.00318 J
UG-3R	N	6/3/2015	< 0.000240	< 0.000250	0.0022 J	0.000529 J	0.00368	< 0.000310	0.0109	0.00897	< 0.00260
UG-4 - well not installed during July											
UG-4 - insufficent recharge during August											
UG-4	N	9/11/2014	< 0.0048	**0.23**	0.004	0.0037	0.0044	< 0.0062	0.026 J	0.0025	0.027
UG-4	N	10/27/2014	< 0.00024	**0.098**	0.0054	0.0024	0.006	< 0.00031	**0.032**	0.0039	0.016 J
UG-4	N	11/13/2014	< 0.00024	**0.1**	0.0059	0.0023	0.0055	< 0.00031	**0.035**	0.0047	0.0083 J
UG-4	N	12/17/2014	0.0012 J	**0.091**	0.0055	0.0016 J	0.0072	< 0.00031	**0.035**	0.0051	0.0082 J
UG-4	N	1/6/2015	< 0.00024	**0.07**	0.0051	0.0021	0.0065	< 0.00031	**0.036**	0.005	0.032
UG-4	FD	1/6/2015	< 0.00024	**0.069**	0.0048 J	0.0023	0.0061	< 0.00031	**0.036**	0.005 J	0.029
UG-4	N	2/3/2015	< 0.000240	0.0489	0.00467 J	< 0.000350 UB	0.00618	< 0.000310	**0.0349**	0.00534	0.00672 J
UG-4	N	3/3/2015	0.000341 J	0.043	0.00481 J	0.00197 J	0.006	< 0.000310	**0.036**	0.00506	0.0123 J
UG-4	N	4/7/2015	< 0.000240 UB	0.0223	0.00443 J	< 0.000350 UB	0.00589	< 0.000310	**0.0366**	0.00594	< 0.00260 UB
UG-4	N	5/5/2015	< 0.000240	0.0119	0.00404 J	0.00216	0.00578	< 0.000310	**0.0364**	0.00537	0.00467 J
UG-4	N	6/2/2015	< 0.00120	< 0.00120	< 0.000700	0.0143	0.00438 J	< 0.00160	**0.0348** J	0.00485 J	< 0.0130

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Total Metals									
Analyte:			Arsenic	Barium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Vanadium
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.01	1	0.05	1	0.015	0.2	0.002	0.2	0.05	0.0631
Screening Level Source:			EPA MCL	WQCC HH	WQCC HH	WQCC Dom	EPA MCL	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	NMED TW
Location	**Sample Type**	**Date**										
MW-12	N	7/29/2014	0.0019	0.02	0.00068 J	0.98	< 0.00024	0.087 J	< 0.000049	0.002	< 0.00038 UB	0.0021
MW-12	N	8/18/2014	0.0019	0.023	< 0.00054	0.85	< 0.00024	0.11	< 0.000049	0.0018	0.011	0.0026
MW-12	N	9/10/2014	0.0013	0.017 J	0.00094 JB	0.24	< 0.0024	0.03	< 0.000049	0.0017	0.0062	0.0023
MW-12 - not accessible due to flooding												
MW-12	N	11/12/2014	0.0025 J	0.019 J	< 0.0027	**1.1**	< 0.0012	0.068	< 0.000049	0.002 JB	0.0086 J	0.0032 J
MW-12	N	12/17/2014	0.0016 J	0.023	0.00055 J	0.24	0.00026 J	**0.21**	--	0.0019 JB	0.0088	0.0023 J
MW-12	N	1/7/2015	0.0033	0.022	0.0012 B	**2.3**	0.00034 J	**0.42**	< 0.000049	0.002	0.0053	0.0032 J
MW-12	N	2/4/2015	0.00228	0.0221	< 0.000540	0.398	< 0.000240	**0.238**	< 0.0000490	0.00233	0.00291	0.00191 J
MW-12	N	3/4/2015	0.00121 J	0.0168	0.000557 J	0.129	< 0.000240	**0.647**	< 0.0000490	0.0029	0.00656	0.00157 J
MW-12	N	4/6/2015	0.00213	0.0199	< 0.000540	0.0775 J	< 0.000240	**0.69**	< 0.0000490	0.000711 J	0.00526	< 0.000180 UB
MW-12	FD	4/6/2015	0.00338 J	0.02 J	< 0.00540	0.0921 J	< 0.00240	**0.594**	< 0.0000490	< 0.00350	0.00417 J	< 0.00180 UB
MW-12	N	5/4/2015	0.0021	0.0225	0.000808 J	0.683	< 0.000240	**1.43**	< 0.0000490	0.00209	0.00118 J	0.00207 J
MW-12	N	6/1/2015	0.00239	0.0235	0.000834 J	0.887	< 0.000240	**1.25**	< 0.0000490	0.00257	0.00128 J	0.00248 J
MW-13	N	7/29/2014	0.0014	0.025	0.00077 J	0.23	< 0.00024	**0.56**	< 0.000049	0.0015	< 0.00038 UB	0.0045
MW-13	N	8/18/2014	0.0014	0.03	< 0.00054	0.32	< 0.00024	**0.39**	< 0.000049	0.001	0.0007 J	0.0048
MW-13	N	9/10/2014	0.0011	0.029	0.00096 JB	0.2	< 0.0024	**0.63**	< 0.000049	0.0011	< 0.00038	0.0036
MW-13 - not accessible due to flooding												
MW-13	N	11/12/2014	0.0023 J	0.027	< 0.0027	0.52	< 0.0012	**0.21**	< 0.000049	< 0.0018	0.013	0.0077 J
MW-13	N	12/17/2014	0.0026	0.029	0.00082 J	0.48	< 0.00024	0.15	--	0.0012 JB	0.021	0.0076
MW-13	N	1/7/2015	0.004	0.033	0.0011 B	**2**	0.0015 J	**0.63** J3V	0.001	0.0016 J	0.0096	0.01
MW-13	N	2/4/2015	0.00217	0.0263	0.000701 J	0.0505 J	< 0.000240	0.0491	< 0.0000490	0.00077 J	0.00605	0.0041 J
MW-13	N	3/4/2015	0.0015 J	0.025	0.00132 J	0.16	< 0.000240	0.0989	< 0.0000490	0.00341	0.00485	0.004 J
MW-13	N	4/6/2015	0.00191 J	0.0233	< 0.000540	0.13	0.000481 J	0.0676	< 0.0000490	< 0.000350	0.00272	< 0.000180 UB
MW-13	N	5/4/2015	0.00134 J	0.0195	< 0.000540	0.0608 J	< 0.000240	0.138	< 0.0000490	0.00105 J	0.000528 J	0.00277 J
MW-13	FD	5/6/2015	0.00138 J	0.0196	0.00115 J	0.0612 J	< 0.000240	0.127	< 0.0000490	0.000741 J	0.000563 J	0.00287 J
MW-13	N	6/1/2015	0.00162 J	0.0265	0.000959 J	0.0931 J	< 0.000240	**0.211**	< 0.0000490	0.0117	0.00311	0.00368 J
MW-13	FD	6/2/2015	0.00163 J	0.0272	< 0.000540	0.0654 J	< 0.000240	**0.205**	< 0.0000490	0.0036	0.00293	0.0034 J
MW-17	N	7/28/2014	0.00063 J	0.015	0.002	0.1	< 0.00024	0.0045	< 0.000049	< 0.00035	0.008	0.0046
MW-17	FD	7/28/2014	0.00066 J	0.015	0.0017	< 0.05	< 0.00024	0.0038	< 0.000049	< 0.00035	0.0084	0.0045
MW-17	N	8/19/2014	0.00078 J	0.014	0.0016	< 0.05	< 0.00024	0.0027	< 0.000049	< 0.00035	0.0076	0.005
MW-17	N	9/11/2014	0.0007 J	0.013	0.0018	< 0.05	< 0.00024	0.00072 J	< 0.000049	< 0.00035	0.0066	0.005
MW-17	N	10/27/2014	0.00087 J	0.013	0.0019 B	< 0.05	< 0.00024	0.00091 J	< 0.000049	< 0.00035	0.0069	0.0055
MW-17	N	11/11/2014	0.00088 J	0.013	0.0016	< 0.05	0.00087 J	0.002 J	< 0.000049	< 0.0018	0.0074	0.0066
MW-17	N	12/16/2014	0.0011 J	0.014	0.0017	< 0.015	0.00075 J	0.00097 J	--	0.00092 J	0.0079	0.0076
MW-17	N	1/7/2015	0.001 J	0.013	0.0019 B	< 0.015	< 0.00024	0.0021 J	< 0.000049	0.00043 J	0.0075	0.0066
MW-17	N	2/3/2015	< 0.000250 UB	0.0155	< 0.000540 UB	< 0.0150 UB	< 0.000240	< 0.000250 UB	< 0.0000490	< 0.000350 UB	0.0084	0.00681
MW-17	N	3/4/2015	0.000926 J	0.0138	0.00181 J	< 0.0150	< 0.000240	0.000479 J	< 0.0000490	0.000614 J	0.00756	0.00602
MW-17	N	4/7/2015	0.00146 J	0.0141	0.00139 J	< 0.0150	< 0.000240	0.00111 J	< 0.0000490	< 0.000350	0.00699	0.00787
MW-17	N	5/6/2015	0.000962 J	0.0134	0.00237	< 0.0150	< 0.000240	0.000789 J	< 0.0000490	< 0.000350	0.00775	0.00595
MW-17	N	6/2/2015	0.00102 J	0.0152	0.00174 J	< 0.0150	< 0.000240	0.00105 J	< 0.0000490	0.00207	0.00799	0.00584

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Total Metals									
Analyte:			Arsenic	Barium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Vanadium
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.01	1	0.05	1	0.015	0.2	0.002	0.2	0.05	0.0631
Screening Level Source:			EPA MCL	WQCC HH	WQCC HH	WQCC Dom	EPA MCL	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	NMED TW
Location	**Sample Type**	**Date**										
MW-25	N	7/29/2014	0.005	0.025	0.00066 J	< 0.05	< 0.00024	**2.9**	< 0.000049	0.0044	< 0.00038 UB	0.012
MW-25	N	8/19/2014	0.0052	0.024	< 0.00054	< 0.05	< 0.00024	0.13	< 0.000049	0.0026	0.012	0.01
MW-25	N	9/10/2014	0.0054	0.021	0.0006 J	< 0.05	< 0.0024	**0.4**	< 0.000049	0.0032	0.0095	0.011
MW-25	FD	9/11/2014	0.0055	0.022	< 0.00054	< 0.05	< 0.0024	**0.39**	< 0.000049	0.003	0.011	0.01
MW-25	N	10/27/2014	0.0057 J	0.027	< 0.0027	< 0.25	< 0.0012	**0.83** V	< 0.000049	0.0033 J	0.046	0.013 J
MW-25	N	11/11/2014	0.006 J	0.028	< 0.0027	< 0.25	< 0.0012	**0.9**	< 0.000049	0.005 JB	0.033	0.013 J
MW-25	N	12/17/2014	0.0094	0.029	0.00055 J	0.026 J	< 0.00024	**1.2**	--	0.015 B	0.037	0.018
MW-25	N	1/7/2015	0.0071	0.027	0.00072 JB	< 0.015	0.00032 J	**1.6**	< 0.000049	0.0052	0.048	0.014
MW-25	N	2/3/2015	0.00839	0.0241	< 0.000540 UB	< 0.0150	< 0.000240	**0.702**	< 0.0000490	0.00584	0.0328	0.0146
MW-25	N	3/4/2015	0.00915	0.0239	0.000744 J	< 0.0150	< 0.000240	**0.484**	< 0.0000490	0.00836	0.0314	0.0138
MW-25	N	4/7/2015	**0.0112**	0.0218 J	< 0.00270	< 0.0750	< 0.00120	**0.387**	< 0.0000490	< 0.00180	0.017	0.0198 J
MW-25	N	5/6/2015	0.00989	0.0162	0.00102 J	< 0.0150	< 0.000240	**0.414**	< 0.0000490	0.0065	0.0122	0.0142
MW-25	N	6/2/2015	**0.0122**	0.0153	0.00082 J	< 0.0150	< 0.000240	**0.504**	< 0.0000490	0.00808	0.019	0.0144
MW-55	N	7/28/2014	0.0051	0.012	0.0019	0.067	< 0.00024	0.12	< 0.000049	0.0056	0.02	0.018
MW-55	N	8/19/2014	0.0051	0.015	0.0022	0.1	0.00045 J	**0.26**	< 0.000049	0.0055	0.024	0.018
MW-55	FD	8/20/2014	0.005	0.011	0.0012	< 0.05	< 0.00024	0.13	< 0.000049	0.0048	0.023	0.017
MW-55	N	9/10/2014	0.0048	0.013	0.0038 B	0.081	< 0.0012	0.16	< 0.000049	0.0012	0.005	0.023
MW-55	N	10/27/2014	0.0047	0.013	0.0016 B	0.067 J	0.00031 J	0.09	< 0.000049	0.0014 J	0.012	0.017
MW-55	N	11/12/2014	0.0048	0.013	0.0017	0.067 J	0.00083 J	0.17	< 0.000049	0.0023 B	0.012	0.018
MW-55	N	12/16/2014	0.0056	0.014	0.0016	0.078 J	0.00062 J	0.16	--	0.03 B	0.019	0.018
MW-55	N	1/6/2015	0.0044	0.01	0.0017 B	0.018 J	< 0.00024	0.07	< 0.000049	0.0022	0.018	0.015
MW-55	N	2/2/2015	< 0.000250 UB	0.0104	< 0.000540 UB	< 0.0150 UB	< 0.000240 UB	0.0662	0.0000561 J	< 0.000350 UB	0.0212	0.0173
MW-55	N	3/3/2015	0.00482	0.0124	0.00141 J	0.0555 J	0.000295 J	0.17	< 0.0000490	0.00186 J	0.0197	0.0174
MW-55	N	4/7/2015	0.0048	0.0112	0.001 J	< 0.0150	0.000746 J	0.0423	0.0000496 J	0.0012 J	0.0193	0.0178
MW-55	N	5/6/2015	0.00532	0.00889	0.00167 J	0.018 J	< 0.000240	0.0524	< 0.0000490	0.00328	0.0189	0.0166
MW-55	N	6/2/2015	0.00512	0.00944	0.00104 J	< 0.0150	< 0.000240	0.0367	< 0.0000490	0.00358	0.0171	0.016
MW-136	N	7/30/2014	0.002	0.1	0.0052	**2.7**	0.0021	**0.34**	< 0.000049	0.0067	< 0.00038 UB	0.015
MW-136	N	8/19/2014	0.0022	0.026	0.0022	0.38	0.00072 J	0.093	< 0.000049	0.002	0.0044	0.018
MW-136	N	9/9/2014	0.0024	0.05	0.0032 BJ	0.79	< 0.0012	0.085	0.000078 J	0.0021	0.0038	0.018
MW-136	N	10/27/2014	0.0024	0.023	0.0014 B	0.36	0.0005 J	0.053	< 0.000049	0.0015 J	0.0042	0.018
MW-136	N	11/11/2014	0.0023 J	0.03	< 0.0027	0.59	< 0.0012	0.07	0.000085 J	0.0028 JB	0.0075 J	0.021 J
MW-136	N	12/16/2014	0.0028	0.027	0.0017	0.56	0.001 J	0.041	--	0.0019 JB	0.0043	0.02
MW-136	FD	12/17/2014	0.0029	0.02	0.0014	0.37	0.00055 J	0.033	--	0.0018 JB	0.0042	0.021
MW-136	N	1/6/2015	0.0024	0.012	0.0016 B	0.18	0.00061 J	0.043	< 0.000049	0.0013 J	0.0038	0.018
MW-136	N	2/4/2015	0.00362	< 0.000360 UB	0.0011 J	0.312	0.000683 J	0.0193	0.0000608 J	0.00181 J	0.00429	0.019
MW-136	N	3/3/2015	0.00344	0.0294	0.00172 J	0.624	0.000666 J	0.0248	< 0.0000490	0.00187 J	0.00405	0.019
MW-136	N	4/7/2015	0.00315	0.0168	0.000917 J	0.26	0.000468 J	0.0185	0.0000521 J	0.000645 J	0.00379	0.0185
MW-136	N	5/6/2015	0.003	0.0158	0.00222	0.443	0.000961 J	0.0366	< 0.0000490	0.0024	0.00462	0.0184
MW-136	N	6/2/2015	0.00277	0.0214	0.00109 J	0.291	0.000384 J	0.0179	< 0.0000490	0.00198 J	0.00485	0.0171

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Total Metals									
Analyte:			Arsenic	Barium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Vanadium
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.01	1	0.05	1	0.015	0.2	0.002	0.2	0.05	0.0631
Screening Level Source:			EPA MCL	WQCC HH	WQCC HH	WQCC Dom	EPA MCL	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	NMED TW
Location	**Sample Type**	**Date**										
NP-5	N	7/28/2014	0.0032	0.0085	0.00098 J	0.067	< 0.00024	0.00074 J	< 0.000049	0.0011	0.0079	0.019
NP-5	N	8/19/2014	0.0034	0.0092	0.0016	0.066	< 0.00024	0.00067 J	< 0.000049	0.00097 J	0.0083	0.02
NP-5	N	9/9/2014	0.0031	0.0075 J	0.0011 BJ	< 0.05	< 0.0012	0.00069 J	0.000052 J	0.00084 J	0.0072	0.019
NP-5	N	10/27/2014	0.0035	0.013	0.0012 B	0.22	0.00025 J	0.002 J	< 0.000049	0.0012 J	0.01	0.02
NP-5	N	11/11/2014	0.0031	0.012	0.001	0.17	0.001 J	0.0018 J	< 0.000049	0.0022 JB	0.0096	0.02
NP-5	N	12/16/2014	0.0033	0.011	0.0012	0.13	0.00038 J	0.0019 J	--	0.0019 JB	0.014	0.022
NP-5	N	1/5/2015	0.0034	0.0081	0.0009 JB	0.017 J	< 0.00024	0.0004 J	< 0.000049	0.0011 J	0.01	0.018
NP-5	N	2/2/2015	< 0.000250 UB	0.00916	< 0.000540 UB	< 0.0150 UB	< 0.000240	< 0.000250 UB	< 0.0000490	< 0.000350 UB	0.00935	0.0214
NP-5	FD	2/4/2015	< 0.000250 UB	0.0085	< 0.000540 UB	0.0398 J	< 0.000240 UB	< 0.000250 UB	< 0.0000490	< 0.000350 UB	0.00912	0.0213
NP-5	N	3/3/2015	0.00295	0.0102	0.00106 J	0.0935 J	< 0.000240	0.000898 J	< 0.0000490	0.00285	0.0347	0.021
NP-5	N	4/8/2015	0.00319	< 0.000360 UB	< 0.000540 UB	0.0276 J	< 0.000240	< 0.000250 UB	< 0.0000490 UJ	< 0.000350 UB	0.0156	0.0181
NP-5	N	5/5/2015	0.00348	0.00791	0.00131 J	0.0331 J	< 0.000240	< 0.000250	< 0.0000490	0.00115 J	0.0107	0.0194
NP-5	N	6/2/2015	0.00363	0.00882	0.000661 J	0.0481 J	< 0.000240	0.000536 J	< 0.0000490	0.00219	0.00915	0.0192
UG-1	N	7/30/2014	0.0015	0.014	0.0017	0.2	0.00043 J	0.017	< 0.000049	0.0012	< 0.00038 UB	0.011
UG-1	N	8/20/2014	0.0013	0.02	0.0018	0.074	0.00048 J	0.0066	< 0.000049	0.0013	0.0064	0.011
UG-1	N	9/9/2014	0.0013	0.013	0.0016 BJ	0.079	< 0.00024	0.0012 J	0.000059 J	0.0011	0.0044	0.012
UG-1	N	10/27/2014	0.0012 J	0.014	0.0013 B	< 0.05	< 0.00024	0.00057 J	< 0.000049	0.00091 J	0.0095	0.013
UG-1	FD	10/27/2014	0.0013 J	0.014	0.0013 B	< 0.05	< 0.00024	0.00058 J	< 0.000049	0.00084 J	0.0088	0.012
UG-1	N	11/13/2014	0.0013 J	0.015	0.0014	0.06 J	0.0016 J	0.0016 J	< 0.000049	0.002	0.0096	0.014
UG-1	N	12/17/2014	0.0015 J	0.016	0.0017	0.059 J	0.00083 J	0.0005 J	--	0.0012 JB	0.01	0.015
UG-1	N	1/6/2015	0.0012 J	0.014	0.0014 B	0.023 J	0.00027 J	0.0014 J	< 0.000049	0.0015 J	0.0088	0.011
UG-1	N	2/3/2015	< 0.000250 UB	0.0153	< 0.000540 UB	< 0.0150 UB	< 0.000240	< 0.000250 UB	< 0.0000490	< 0.000350 UB	0.0097	0.0122
UG-1	N	3/3/2015	0.00195 J	0.0152	0.00138 J	0.0788 J	0.000269 J	0.001 J	< 0.0000490	0.00122 J	0.00991	0.0113
UG-1	N	4/8/2015	0.00126 J	0.0137	< 0.000540 UB	0.0404 J	< 0.000240	< 0.000250 UB	< 0.0000490 UJ	< 0.000350 UB	0.0104	0.00994
UG-1	N	5/5/2015	0.00139 J	0.013	0.00154 J	0.0355 J	< 0.000240	0.000637 J	< 0.0000490	0.00112 J	0.0113	0.0115
UG-1	N	6/3/2015	0.00128 J	0.0143	0.000894 J	0.0429 J	< 0.000240	0.000664 J	< 0.0000490	0.00188 J	0.0113	0.0111
UG-2	N	7/30/2014	0.002	0.014	0.001	0.093	< 0.00024	0.18	< 0.000049	0.041	< 0.00038 UB	0.0086
UG-2	N	8/20/2014	0.0021	0.021	0.0034	0.31	0.00057 J	0.17	< 0.000049	0.019	0.0032	0.012
UG-2	N	9/9/2014	0.0021	0.029	**0.073** BJ	0.76	0.0008 J	0.12	< 0.000049	0.052	0.0026	0.015
UG-2	N	10/27/2014	0.0021	0.016	0.00065 JB	0.051 J	< 0.00024	0.14	< 0.000049	0.01	0.0022	0.012
UG-2	N	11/12/2014	0.0021	0.015	< 0.00054	< 0.05	0.00081 J	0.15	< 0.000049	0.0097 B	0.0024	0.014
UG-2	FD	11/13/2014	0.0022	0.015	0.00054 J	< 0.05	0.00059 J	0.15	< 0.000049	0.0096 B	0.0024	0.014
UG-2	N	12/17/2014	0.0026	0.018	0.00056 J	0.048 J	0.00024 J	0.18	--	0.012 B	0.003	0.015
UG-2	N	1/6/2015	0.0021	0.016	0.00067 JB	0.024 J	0.00025 J	0.11	< 0.000049	0.0076	0.0033	0.013
UG-2	N	2/3/2015	< 0.000250 UB	0.0171	< 0.000540	< 0.0150 UB	< 0.000240	0.0665	< 0.0000490	0.0071	0.00281	0.0125
UG-2	N	3/3/2015	0.00244	0.0195	0.00103 J	0.0266 J	0.000312 J	0.0496	< 0.0000490	0.00784	0.00287	0.0155
UG-2	N	4/8/2015	0.00237	0.0158	< 0.000540 UB	< 0.0150	< 0.000240	0.0403	< 0.0000490 UJ	< 0.000350 UB	0.00361	0.0126
UG-2	N	5/5/2015	0.0021	0.014	0.00091 J	< 0.015	< 0.00024	0.017	< 0.0000490	0.0052	0.003	0.012
UG-2	N	6/3/2015	0.00203	0.0149	< 0.000540	0.0182 J	< 0.000240	0.0146	< 0.0000490	0.00485	0.00293	0.0119

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Total Metals									
Analyte:			Arsenic	Barium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Vanadium
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.01	1	0.05	1	0.015	0.2	0.002	0.2	0.05	0.0631
Screening Level Source:			EPA MCL	WQCC HH	WQCC HH	WQCC Dom	EPA MCL	WQCC Dom	WQCC HH	WQCC Irr	WQCC HH	NMED TW
Location	**Sample Type**	**Date**										
UG-3R	N	7/30/2014	0.0014	0.017	0.0012	0.1	< 0.00024	0.004	< 0.000049	0.0009 J	< 0.00038 UB	0.0092
UG-3R	N	8/20/2014	0.0014	0.018	0.002	0.15	< 0.00024	0.0052	< 0.000049	0.001	0.0036	0.009
UG-3R	N	9/9/2014	0.0014	0.017	< 0.00054 UB	< 0.05	< 0.00024	< 0.00025 UB	< 0.000049	0.0009 J	0.0026	0.0088
UG-3R	N	10/27/2014	0.0014 J	0.02	0.0012 B	0.096 J	< 0.00024	0.0042 J	< 0.000049	0.00069 J	0.0032	0.0092
UG-3R	N	11/13/2014	0.0016 J	0.022	0.0013	0.32	0.0012 J	0.018	< 0.000049	0.0013 JB	0.0036	0.0096
UG-3R	N	12/17/2014	0.0017 J	0.02	0.0023	0.11	0.00028 J	0.0036 J	--	0.018 B	0.0036	0.01
UG-3R	N	1/6/2015	0.0014 J	0.018	0.0012 B	0.044 J	0.00025 J	0.0024 J	< 0.000049	0.00091 J	0.0034	0.0088
UG-3R	N	2/3/2015	< 0.000250 UB	0.0201	< 0.000540 UB	< 0.0150 UB	0.000319 J	0.00149 J	< 0.0000490	< 0.000350 UB	0.00381	0.00973
UG-3R	N	3/4/2015	0.00155 J	0.0171	0.00133 J	0.0236 J	< 0.000240	0.000896 J	< 0.0000490	0.002 J	0.00327	0.0094
UG-3R	FD	3/4/2015	0.00153 J	0.0163	0.0012 J	0.0572 J	< 0.000240	0.0011 J	< 0.0000490	0.00164 J	0.00312	0.00923
UG-3R	N	4/8/2015	0.00176 J	0.0172	< 0.000540 UB	< 0.0150	< 0.000240	< 0.000250 UB	< 0.0000490 UJ	< 0.000350 UB	0.00341	0.00882
UG-3R	N	5/5/2015	0.0016 J	0.018	0.0016 J	0.023 J	< 0.00024	0.0012 J	< 0.0000490	0.0009 J	0.0035	0.0092
UG-3R	N	6/3/2015	0.00169 J	0.0198	0.000672 J	0.0278 J	< 0.000240	0.000821 J	< 0.0000490	0.00107 J	0.00363	0.00913
UG-4 - well not installed during July												
UG-4 - insufficent recharge during August												
UG-4	N	9/11/2014	0.0017	0.11	0.0061	**2.9**	0.0031 J	**0.28**	< 0.000049	0.0063	0.0057	0.009
UG-4	N	10/27/2014	0.0025	0.16	0.0088 B	**4.2**	0.0056	**0.27**	< 0.000049	0.0076	0.0098	0.011
UG-4	N	11/13/2014	0.001 J	0.035	0.0021	0.63	0.0017 J	0.12	< 0.000049	0.0031 B	0.0061	0.0061
UG-4	N	12/17/2014	0.00093 J	0.029	0.00091 J	0.017 J	< 0.00024	0.1	--	0.0029 B	0.0069	0.0056
UG-4	N	1/6/2015	0.00088 J	0.027	0.0014 B	0.17	0.00065 J	0.081	< 0.000049	0.0022	0.0059	0.0054
UG-4	FD	1/6/2015	0.00093 J	0.027	0.0016 B	0.58	0.00061 J	0.083	< 0.000049	0.0024	0.0061	0.0058
UG-4	N	2/3/2015	< 0.000250 UB	0.0264	< 0.000540 UB	< 0.0150 UB	< 0.000240 UB	0.058	< 0.0000490	< 0.000350 UB	0.00658	0.00628
UG-4	N	3/3/2015	0.00105 J	0.0324	0.00169 J	0.447	0.000525 J	0.052	< 0.0000490	0.00258	0.00644	0.00603
UG-4	N	4/7/2015	0.00117 J	0.0261	< 0.000540 UB	0.283	0.000316 J	0.0283	< 0.0000490 UJ	< 0.000350 UB	0.00613	0.00576
UG-4	N	5/5/2015	0.00104 J	0.0223	0.00168 J	0.149	0.000272 J	0.019	< 0.0000490	0.00233	0.0056	0.00627
UG-4	N	6/2/2015	0.00108 J	0.0253	0.000868 J	0.259	0.000346 J	0.0139	< 0.0000490	0.00238	0.00552	0.00616

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

			Analyte Group:	Volatile Organic Compounds						
			Analyte:	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dibromoethane	1,2-Dichloroethane
			Units:	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			Screening Level:	0.06	0.01	0.005	0.025	0.005	0.00005	0.005
			Screening Level Source:	WQCC HH	WQCC HH	EPA MCL	WQCC HH	WQCC HH	EPA MCL	EPA MCL
Location	**Sample Type**	**Date**								
MW-12	N	7/29/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12	N	8/18/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12	N	9/10/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12 - not accessible due to flooding										
MW-12	N	11/12/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12	N	12/17/2014	J4	< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12	N	1/7/2015		< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12	N	2/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12	N	3/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12	N	4/6/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12	FD	4/6/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12	N	5/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-12	N	6/1/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	N	7/29/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	N	8/18/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	N	9/10/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13 - not accessible due to flooding										
MW-13	N	11/12/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	N	12/17/2014	J4	< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	N	1/7/2015		< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	N	2/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	N	3/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	N	4/6/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	N	5/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	FD	5/6/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	N	6/1/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-13	FD	6/2/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	7/28/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	FD	7/28/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	8/19/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	9/11/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	10/27/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	11/11/2014	J4	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	12/16/2014	J4	< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	1/7/2015		< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	2/3/2015	J5	< 0.000319	< 0.00013 UJ	< 0.00038 J5	< 0.00026 J5	< 0.00040 UJ	*< 0.00038* J5	< 0.00036 J5
MW-17	N	3/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	4/7/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	5/6/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-17	N	6/2/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

			Analyte Group:	Volatile Organic Compounds						
			Analyte:	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dibromoethane	1,2-Dichloroethane
			Units:	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			Screening Level:	0.06	0.01	0.005	0.025	0.005	0.00005	0.005
			Screening Level Source:	WQCC HH	WQCC HH	EPA MCL	WQCC HH	WQCC HH	EPA MCL	EPA MCL
Location	**Sample Type**	**Date**								
MW-25	N	7/29/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	8/19/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	9/10/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	FD	9/11/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	10/27/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	11/11/2014		< 0.00032 J4	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	12/17/2014		< 0.00032 J4	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	1/7/2015		< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	2/3/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	3/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	4/7/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	5/6/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-25	N	6/2/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	7/28/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040 J3	*< 0.00038*	< 0.00036
MW-55	N	8/19/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	FD	8/20/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	9/10/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	10/27/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	11/12/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	12/16/2014		< 0.00032 J4	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	1/6/2015		< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	2/2/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	3/3/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	4/7/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	5/6/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-55	N	6/2/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	7/30/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	8/19/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	9/9/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	10/27/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	11/11/2014		< 0.00032 J4	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	12/16/2014		< 0.00032 J4	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	FD	12/17/2014		< 0.00032 J4	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	1/6/2015		< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	2/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	3/3/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	4/7/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	5/6/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
MW-136	N	6/2/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Volatile Organic Compounds						
Analyte:			1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dibromoethane	1,2-Dichloroethane
Units:			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Screening Level:			0.06	0.01	0.005	0.025	0.005	0.00005	0.005
Screening Level Source:			WQCC HH	WQCC HH	EPA MCL	WQCC HH	WQCC HH	EPA MCL	EPA MCL
Location	**Sample Type**	**Date**							
NP-5	N	7/28/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	8/19/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	9/9/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	10/27/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	11/11/2014	< 0.00032 J4	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	12/16/2014	< 0.00032 J4	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	1/5/2015	< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	2/2/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	FD	2/4/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	3/3/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	4/8/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	5/5/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
NP-5	N	6/2/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	7/30/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	8/20/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	9/9/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	10/27/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	FD	10/27/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	11/13/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	12/17/2014	< 0.00032 J4	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	1/6/2015	< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	2/3/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	3/3/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	4/8/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	5/5/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-1	N	6/3/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	7/30/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	8/20/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	9/9/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	10/27/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	11/12/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	FD	11/13/2014	< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	12/17/2014	< 0.00032 J4	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	1/6/2015	< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	2/3/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	3/3/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	4/8/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	5/5/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-2	N	6/3/2015	< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

			Analyte Group:	Volatile Organic Compounds						
			Analyte:	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dibromoethane	1,2-Dichloroethane
			Units:	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			Screening Level:	0.06	0.01	0.005	0.025	0.005	0.00005	0.005
			Screening Level Source:	WQCC HH	WQCC HH	EPA MCL	WQCC HH	WQCC HH	EPA MCL	EPA MCL
Location	**Sample Type**	**Date**								
UG-3R	N	7/30/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	8/20/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	9/9/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	10/27/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	11/13/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	12/17/2014	J4	< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	1/6/2015		< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	2/3/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	3/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	FD	3/4/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	4/8/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	5/5/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-3R	N	6/3/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4 - well not installed during July										
UG-4 - insufficent recharge during August										
UG-4	N	9/11/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4	N	10/27/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4	N	11/13/2014		< 0.00032	< 0.00058	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4	N	12/17/2014	J4	< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4	N	1/6/2015		< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4	FD	1/6/2015		< 0.00032	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4	N	2/3/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4	N	3/3/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4	N	4/7/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4	N	5/5/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036
UG-4	N	6/2/2015		< 0.000319	< 0.00013	< 0.00038	< 0.00026	< 0.00040	*< 0.00038*	< 0.00036

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

			Analyte Group:	Volatile Organic Compounds								
			Analyte:	Benzene	Carbon Tetrachloride	Chloroform	Dichloromethane	Ethylbenzene	Tetrachloroethene	Toluene	Total Xylenes	Vinyl chloride
			Units:	mg/l	mg/l	mg/l	mg/l	mg/l	mg/L	mg/l	mg/l	mg/l
			Screening Level:	0.005	0.005	0.08	0.005	0.7	0.005	0.75	0.62	0.001
			Screening Level Source:	EPA MCL	EPA MCL	EPA MCL	EPA MCL	EPA MCL	EPA MCL	WQCC HH	WQCC HH	WQCC HH
Location	**Sample Type**	**Date**										
MW-12	N	7/29/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-12	N	8/18/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-12	N	9/10/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-12 - not accessible due to flooding												
MW-12	N	11/12/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-12	N	12/17/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-12	N	1/7/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-12	N	2/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-12	N	3/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-12	N	4/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-12	FD	4/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-12	N	5/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-12	N	6/1/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-13	N	7/29/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-13	N	8/18/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-13	N	9/10/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-13 - not accessible due to flooding												
MW-13	N	11/12/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-13	N	12/17/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-13	N	1/7/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-13	N	2/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-13	N	3/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-13	N	4/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-13	N	5/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-13	FD	5/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-13	N	6/1/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-13	FD	6/2/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-17	N	7/28/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-17	FD	7/28/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-17	N	8/19/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-17	N	9/11/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-17	N	10/27/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-17	N	11/11/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-17	N	12/16/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-17	N	1/7/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-17	N	2/3/2015	< 0.00033 J5	< 0.00038 J5	< 0.00032 J5	< 0.0010 J5	< 0.00038 J5	< 0.00037	< 0.00078 J5	< 0.0011 UJ	< 0.00026 UJ	
MW-17	N	3/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-17	N	4/7/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-17	N	5/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-17	N	6/2/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026

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Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

			Analyte Group:	Volatile Organic Compounds							
			Analyte:	Benzene	Carbon Tetrachloride	Chloroform	Dichloromethane	Ethylbenzene	Tetrachloroethene	Toluene	Total Xylenes	Vinyl chloride
			Units:	mg/l	mg/l	mg/l	mg/l	mg/l	mg/L	mg/l	mg/l	mg/l
			Screening Level:	0.005	0.005	0.08	0.005	0.7	0.005	0.75	0.62	0.001
			Screening Level Source:	EPA MCL	EPA MCL	EPA MCL	EPA MCL	EPA MCL	EPA MCL	WQCC HH	WQCC HH	WQCC HH
Location	**Sample Type**	**Date**										
MW-25	N	7/29/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-25	N	8/19/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-25	N	9/10/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-25	FD	9/11/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-25	N	10/27/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-25	N	11/11/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-25	N	12/17/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-25	N	1/7/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-25	N	2/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-25	N	3/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-25	N	4/7/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-25	N	5/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-25	N	6/2/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-55	N	7/28/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-55	N	8/19/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-55	FD	8/20/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-55	N	9/10/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-55	N	10/27/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-55	N	11/12/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-55	N	12/16/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-55	N	1/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-55	N	2/2/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-55	N	3/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-55	N	4/7/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-55	N	5/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-55	N	6/2/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-136	N	7/30/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-136	N	8/19/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-136	N	9/9/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-136	N	10/27/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-136	N	11/11/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-136	N	12/16/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-136	FD	12/17/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-136	N	1/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
MW-136	N	2/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-136	N	3/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-136	N	4/7/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
MW-136	N	5/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
MW-136	N	6/2/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026

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Navajo Refining Company, L.L.C., Artesia, New Mexico

			Analyte Group:	Volatile Organic Compounds								
			Analyte:	Benzene	Carbon Tetrachloride	Chloroform	Dichloromethane	Ethylbenzene	Tetrachloroethene	Toluene	Total Xylenes	Vinyl chloride
			Units:	mg/l	mg/l	mg/l	mg/l	mg/l	mg/L	mg/l	mg/l	mg/l
			Screening Level:	0.005	0.005	0.08	0.005	0.7	0.005	0.75	0.62	0.001
			Screening Level Source:	EPA MCL	EPA MCL	EPA MCL	EPA MCL	EPA MCL	EPA MCL	WQCC HH	WQCC HH	WQCC HH
Location	**Sample Type**	**Date**										
NP-5	N	7/28/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
NP-5	N	8/19/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
NP-5	N	9/9/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
NP-5	N	10/27/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
NP-5	N	11/11/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
NP-5	N	12/16/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
NP-5	N	1/5/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
NP-5	N	2/2/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
NP-5	FD	2/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
NP-5	N	3/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
NP-5	N	4/8/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
NP-5	N	5/5/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
NP-5	N	6/2/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-1	N	7/30/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-1	N	8/20/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-1	N	9/9/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-1	N	10/27/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-1	FD	10/27/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-1	N	11/13/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-1	N	12/17/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-1	N	1/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-1	N	2/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-1	N	3/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-1	N	4/8/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-1	N	5/5/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-1	N	6/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-2	N	7/30/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-2	N	8/20/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-2	N	9/9/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-2	N	10/27/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-2	N	11/12/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-2	FD	11/13/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-2	N	12/17/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-2	N	1/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-2	N	2/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-2	N	3/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-2	N	4/8/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-2	N	5/5/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-2	N	6/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

			Analyte Group:	Volatile Organic Compounds								
			Analyte:	Benzene	Carbon Tetrachloride	Chloroform	Dichloromethane	Ethylbenzene	Tetrachloroethene	Toluene	Total Xylenes	Vinyl chloride
			Units:	mg/l	mg/l	mg/l	mg/l	mg/l	mg/L	mg/l	mg/l	mg/l
			Screening Level:	0.005	0.005	0.08	0.005	0.7	0.005	0.75	0.62	0.001
			Screening Level Source:	EPA MCL	EPA MCL	EPA MCL	EPA MCL	EPA MCL	EPA MCL	WQCC HH	WQCC HH	WQCC HH
Location	**Sample Type**	**Date**										
UG-3R	N	7/30/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-3R	N	8/20/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-3R	N	9/9/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-3R	N	10/27/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-3R	N	11/13/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-3R	N	12/17/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-3R	N	1/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-3R	N	2/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-3R	N	3/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-3R	FD	3/4/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-3R	N	4/8/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-3R	N	5/5/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-3R	N	6/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-4 - well not installed during July												
UG-4 - insufficent recharge during August												
UG-4	N	9/11/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-4	N	10/27/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-4	N	11/13/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-4	N	12/17/2014		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-4	N	1/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-4	FD	1/6/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.00072	< 0.00026
UG-4	N	2/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-4	N	3/3/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-4	N	4/7/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.00037	< 0.00078	< 0.0011	< 0.00026
UG-4	N	5/5/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026
UG-4	N	6/2/2015		< 0.00033	< 0.00038	< 0.00032	< 0.0010	< 0.00038	< 0.000372	< 0.00078	< 0.0011	< 0.00026

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Semivolatile Organic Compounds					
Analyte:			1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	PAHs	Benzo(a)pyrene	
Units:			mg/l	mg/l	mg/l	mg/L	mg/l	
Screening Level:			---	---	---	0.03	0.0002	
Screening Level Source:			---	---	---	WQCC HH	EPA MCL	
Location	**Sample Type**	**Date**						
MW-12	N	7/29/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12	N	8/18/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12	N	9/10/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12 - not accessible due to flooding								
MW-12	N	11/12/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12	N	12/17/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12	N	1/7/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12	N	2/4/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12	N	3/4/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12	N	4/6/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12	FD	4/6/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12	N	5/4/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-12	N	6/1/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	N	7/29/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	N	8/18/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	N	9/10/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13 - not accessible due to flooding								
MW-13	N	11/12/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	N	12/17/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	N	1/7/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	N	2/4/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	N	3/4/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	N	4/6/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	N	5/4/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	FD	5/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	N	6/1/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-13	FD	6/2/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	7/28/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	FD	7/28/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	8/19/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	9/11/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	10/27/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	11/11/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	J3
MW-17	N	12/16/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	1/7/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	2/3/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	3/4/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	4/7/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	5/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-17	N	6/2/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Semivolatile Organic Compounds					
Analyte:			1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	PAHs	Benzo(a)pyrene	
Units:			mg/l	mg/l	mg/l	mg/L	mg/l	
Screening Level:			---	---	---	0.03	0.0002	
Screening Level Source:			---	---	---	WQCC HH	EPA MCL	
Location	**Sample Type**	**Date**						
MW-25	N	7/29/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-25	N	8/19/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-25	N	9/10/2014	< 0.00037	< 0.00034	< 0.00041	< 0.00041	< *0.00038*	
MW-25	FD	9/11/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-25	N	10/27/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-25	N	11/11/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	J3
MW-25	N	12/17/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-25	N	1/7/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-25	N	2/3/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-25	N	3/4/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-25	N	4/7/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-25	N	5/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-25	N	6/2/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	7/28/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	**0.00036**	J
MW-55	N	8/19/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	FD	8/20/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	9/10/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	10/27/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	11/12/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	12/16/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	1/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	2/2/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	3/3/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	4/7/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	5/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-55	N	6/2/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	7/30/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	8/19/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	9/9/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	10/27/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	11/11/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	J3
MW-136	N	12/16/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	FD	12/17/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	1/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	2/4/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	3/3/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	4/7/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	5/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	
MW-136	N	6/2/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	< *0.00034*	

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Semivolatile Organic Compounds					
Analyte:			1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	PAHs	Benzo(a)pyrene	
Units:			mg/l	mg/l	mg/l	mg/L	mg/l	
Screening Level:			---	---	---	0.03	0.0002	
Screening Level Source:			---	---	---	WQCC HH	EPA MCL	
Location	**Sample Type**	**Date**						
NP-5	N	7/28/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	N	8/19/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	N	9/9/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	N	10/27/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	N	11/11/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	J3
NP-5	N	12/16/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	N	1/5/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	N	2/2/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	FD	2/4/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	N	3/3/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	N	4/8/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	N	5/5/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
NP-5	N	6/2/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	7/30/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	8/20/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	9/9/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	10/27/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	11/13/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	FD	10/27/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	11/13/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	12/17/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	1/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	2/3/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	3/3/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	4/8/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	5/5/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-1	N	6/3/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	7/30/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	8/20/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	9/9/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	10/27/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	11/12/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	FD	11/13/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	12/17/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	1/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	2/3/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	3/3/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	4/8/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	5/5/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	
UG-2	N	6/3/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*	

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte Group:			Semivolatile Organic Compounds				
Analyte:			1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	PAHs	Benzo(a)pyrene
Units:			mg/l	mg/l	mg/l	mg/L	mg/l
Screening Level:			---	---	---	0.03	0.0002
Screening Level Source:			---	---	---	WQCC HH	EPA MCL
Location	**Sample Type**	**Date**					
UG-3R	N	7/30/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	8/20/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	9/9/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	10/27/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	11/13/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	12/17/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	1/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	2/3/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	3/4/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	FD	3/4/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	4/8/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	5/5/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-3R	N	6/3/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-4 - well not installed during July							
UG-4 - insufficent recharge during August							
UG-4	N	9/11/2014	< 0.00037	< 0.00034	< 0.00041	< 0.00041	*< 0.00038*
UG-4	N	10/27/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-4	N	11/13/2014	< 0.00033	< 0.00031	0.00039 J	0.00039 J	*< 0.00034*
UG-4	N	12/17/2014	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-4	N	1/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-4	FD	1/6/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-4	N	2/3/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-4	N	3/3/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-4	N	4/7/2015	< 0.00022	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-4	N	5/5/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*
UG-4	N	6/2/2015	< 0.00033	< 0.00031	< 0.00037	< 0.00037	*< 0.00034*

Table 3. Summary of Groundwater Analytical Data

Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Notes and Definitions:

--	Sample not analyzed for this parameter
---	No screening standard available
< X	Result was not detected, with Method Detection Limit of X
X	Result was reported at a concentration above the screening level
Dom	Domestic Water Supply standards (20 NMAC 6.2.3103.B)
DRO	Diesel Range Organics
EPA	Unites States Environmental Protection Agency
FD	Field duplicate sample
GRO	Gasoline Range Organics
HH	Human Health standards (20 NMAC 6.2.3103.A)
Irr	Irrigation Use standards (20 NMAC 6.2.3103.C)
mg/L	milligrams per liter
MCL	Primary Maximum Contaminant Level
MCL2	Secondary Maximum Contaminant Level
N	Normal sample
NMED	New Mexico Environment Department. NMED TPH screening level from NMED risk guidance (NMED, 2012).
ORO	Oil Range Organics
PAHs	polycyclic aromatic hydrocarbons, defined as naphthalene plus monomethylnaphthalenes by WQCC (20 NMAC 6.2.3103.a)
pCi/l	picoCuries per liter
Radioactivity	Radium-226 plus Radium-228, combined
TDS	Total Disolved Solids
TPH	Total Petroleum Hyrdocarbons
TW	Tap Water screening value from NMED risk guidance (NMED, 2014).
WQCC	Water Quality Control Commission. Screening levels from WQCC standars 20 NMAC 6.2.3103

Lab and Data Validation Qualifier Definitions

B	Compound was found in the blank and sample.
BJ	Compound was found in the blank and sample. The identification of the analyte is acceptable; the reported value is an estimate.
J	The identification of the analyte is acceptable; the reported value is an estimate.
JJ6	The identification of the analyte is acceptable; the reported value is an estimate. The sample matrix interfered with the ability to make any accurate determination; spike value is low.
J3	The associated batch QC was outside the established quality control range for precision.
J3J5	The associated batch QC was outside the established quality control range for precision. The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J3V	The associated batch QC was outside the established quality control range for precision. The sample concentration is too high to evaluate accurate spike recoveries.
J4	The identification of the analyte is acceptable; the reported value is an estimate. The sample concentration was greater than 4 times the spike value.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The identification of the analyte is acceptable; the reported value is an estimate. The sample matrix interfered with the ability to make any accurate determination; spike value is low.
J6J3	The sample matrix interfered with the ability to make any accurate determination; spike value is low. The associated batch QC was outside the established quality control range for precision.
JB	The identification of the analyte is acceptable; the reported value is an estimate. Compound was found in the blank and sample.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
JP1	The identification of the analyte is acceptable; the reported value is an estimate. RPD value not applicable for sample concentrations less than 5 times the reporting limit.
JO1	The identification of the analyte is acceptable; the reported value is an estimate. The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
O1	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
O1J6	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference. The sample matrix interfered with the ability to make any accurate determination; spike value is low.
O1V	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference. The sample concentration is too high to evaluate accurate spike recoveries.
Q	Please reference the laboratory data package for Q qualifier definition.
T8	Sample(s) received past/too close to holding time expiration.
UB	Compound considered non-detect at the listed value due to associated blank contamination.
UBJ	Compound considered non-detect at the listed value due to associated blank contamination. The identification of the analyte is acceptable; the reported value is an estimate.
UJ	Compound considered non-detect identification of the analyte is acceptable; the reported value is an estimate.
V	The sample concentration is too high to evaluate accurate spike recoveries.
VO1	The sample concentration is too high to evaluate accurate spike recoveries. The analyte failed the method required serial dilution test and/or subsequent post-spike criteria.

Table 4. Summary of Lines of Evidence of a Single Background Population for Groundwater Analytes

Background Groundwater Investigation Report

Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte	Distribution	Outliers	Coefficient of Variation	Correlation Coefficient	Probability Plot	Single Population?
Aluminum	Cube root[a]	0	0.819	95.9%	Nonlinear	No
Arsenic	Lognormal[b]	0	0.795	98.7%	Nonlinear	Yes
Barium	Cube root[c]	0	0.422	98.5%	Nonlinear	Probably
Boron	Cube root	0	0.722	99.2%	Linear	Yes
Chromium	Lognormal[b]	0	0.445	99.1%	Linear	Yes
Copper	Cube root[b]	0	0.347	98.8%	Linear	Yes
Manganese	Lognormal[a]	0	2.210	95.9%	Nonlinear	No
Molybdenum	Lognormal[a]	0	0.853	96.3%	Nonlinear	No
Nickel	Lognormal[c]	0	1.522	98.3%	Nonlinear	No
Selenium	Cube root	0	0.834	98.9%	Linear	Yes
Uranium	Lognormal[b]	0	1.319	98.7%	Linear	Yes
Vanadium	Normal[a]	0	0.567	97.3%	Nonlinear	No
Calcium	Cube root	0	0.317	98.9%	Linear	Yes
Chloride	Lognormal[a]	0	1.529	96.8%	Nonlinear	No
Fluoride	Lognormal[c]	0	0.540	98.6%	Nonlinear	Yes
Nitrate/Nitrite	Cube root	0	1.175	99.0%	Linear	Yes
Potassium	Cube root	0	0.748	99.0%	Linear	Yes
Sodium	Unknown[d]	0	1.478	93.2%	Nonlinear	No
Sulfate	Square root[c]	0	0.403	98.4%	Nonlinear	Probably
TDS	Lognormal[ae]	0	0.667	98.1%[f]	Linear[f]	Yes

Footnotes:

a. Did not pass normality test; closest fit.

b. Based upon detections only.

c. Passed normality test at 1% significance only.

d. The distribution is unknown, but the closest fit was the logarithmic transformation.

e. If MW-17 is also excluded, the TDS data pass the normality test with a logarithmic transformation at 5% significance.

f. If MW-17 is also excluded, the correlation coefficient is 98.8% and the probability plot is linear.

Table 5. Upper Tolerance Limits for Dissolved Metals
Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte	Samples	Detections	Detection Rate (%)	Maximum mg/L	Distribution	UTL Type	UTL mg/L
Aluminum	116	93	80.2%	0.1	Cube root[a]	Non-parametric	0.0740
Arsenic	116	110	94.8%	0.011	Lognormal[b]	Lognormal	0.00854
Barium	115	115	100.0%	0.11	Cube root[c]	Cube root	0.0313
Boron	116	113	97.4%	2.1	Cube root	Cube root	1.89
Cadmium	116	0	0	d	Unknown	Non-parametric	d
Chromium	116	67	57.8%	0.0034	Lognormal[b]	Non-parametric[e]	0.00220
Cobalt	116	32	27.6%	0.0026	Unknown	Non-parametric	0.00150
Copper	114	94	82.5%	0.0032	Cube root[b]	Non-parametric[e]	0.00260
Iron	116	30	25.9%	0.36	Unknown	Non-parametric	0.130
Lead	116	11	9.5%	0.0012	Unknown	Non-parametric	0.000430
Manganese	116	102	87.9%	2.1	Lognormal[a]	Non-parametric	1.13
Molybdenum	116	112	96.6%	0.0462	Lognormal[a]	Non-parametric	0.0370
Nickel	116	100	86.2%	0.036	Lognormal[c]	Lognormal	0.0160
Selenium	116	109	94.0%	0.041	Cube root	Cube root	0.0284
Silver	116	3	2.6%	0.00068	Unknown	Non-parametric	0.000310
Uranium	116	111	95.7%	0.22	Lognormal[b]	Lognormal	0.248
Vanadium	116	116	100.0%	0.022	Normal[a]	Non-parametric	0.0210
Zinc	116	44	37.9%	0.032	Unknown	Non-parametric	0.0296

Footnotes:
a. Did not pass normality test; closest fit.
b. Based upon detections only
c. Passed normality test at 1% significance only.
d. There were no detections at all, therefore the Double Quantification Rule shoud be invoked.
e. Parametric methods were not used because several non-detections had detection limits that were higher than many of the detections.

Abbreviations:
mg/L = milligrams per Liter
% = percent
UTL = 95/95 upper tolerance limit

Table 6. Upper Tolerance Limits for Total Metals
Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte	Samples	Detections	Detection Rate (%)	Maximum mg/L	Distribution	UTL Type	UTL mg/L
Arsenic	116	116	100.0%	0.0122	Lognormal	Lognormal	0.00812
Barium	116	115	99.1%	0.16	Cube root[a]	Non-parametric	0.100
Chromium	116	96	82.8%	0.073	Lognormal[a]	Non-parametric[c]	0.00610
Iron	116	87	75.0%	4.2	Lognormal[a]	Non-parametric[c]	2.70
Lead	116	47	40.5%	0.0056	Unknown	Non-parametric	0.00210
Manganese	116	112	96.6%	2.9	Lognormal[a]	Non-parametric	1.40
Mercury	100	12	12.0%	0.0064	Unknown	Non-parametric	0.00440
Nickel	116	102	87.9%	0.052	Lognormal[a]	Non-parametric	0.0300
Selenium	116	109	94.0%	0.048	Cube root[b]	Cube root	0.0304
Vanadium	116	116	100.0%	0.023	Cube root[b]	Cube root	0.0279

Footnotes:
a. Did not pass normality test; closest fit.
b. Passed normality test at 1% significance only.
c. Parametric methods were not used because several non-detections had detection limits that were higher than many of the detections.

Abbreviations:
mg/L = milligrams per Liter
% = percent
UTL = 95/95 upper tolerance limit

Table 7. Upper Tolerance Limits for Water Quality Parameters
Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte	Samples	Detections	Detection Rate (%)	Maximum mg/L	Distribution	UTL Type	UTL mg/L
Calcium	115	115	100.0%	1200	Cube root	Cube root	1,030
Chloride	111	111	100.0%	7190	Lognormal[a]	Non-parametric	5,930
Cyanide	116	3	2.6%	0.029	Unknown	Non-parametric	0.00210
Fluoride	105	105	100.0%	3.7	Lognormal[b]	Lognormal	2.95
Nitrate/Nitrite	116	105	90.5%	21	Cube root	Cube root	15.1
Potassium	116	114	98.3%	8.3	Cube root	Cube root	8.75
Sodium	115	115	100.0%	4,700	Unknown[c]	Non-parametric	4,300
Sulfate	112	112	100.0%	5,800	Normal[b]	Normal	4,410
TDS	116	116	100.0%	19,400	Lognormal[a]	Non-parametric	16,700

Footnotes:

a. Did not pass normality test; closest fit.

b. Passed normality test at 1% significance only.

c. There appear to be at least two populations.

Abbreviations:

mg/L = milligrams per Liter
% = percent
TDS = total dissolved solids
UTL = 95/95 upper tolerance limit

Table 8. Comparison of Groundwater Screening Levels to Background UTLs
Background Groundwater Investigation Report
Navajo Refining Company, L.L.C., Artesia, New Mexico

Analyte	Total or Dissolved Phase	UTL mg/L	CGWSL mg/L	Source of CGWSL	Background UTL > CGWSL?
Aluminum	Dissolved	0.074	0.2	EPA MCL2	no
Arsenic	Dissolved Total	0.00854 0.00812	0.01	EPA MCL	no
Barium	Dissolved Total	0.03126 0.10000	1	WQCC HH	no
Boron	Dissolved	1.89	0.75	WQCC Irr	YES
Cadmium	Dissolved	(a)	0.005	EPA MCL	no
Calcium	Dissolved	1,030	--	--	--
Chloride	Dissolved	5,930	250	WQCC Dom	YES
Chromium	Dissolved Total	0.00220 0.00610	0.05	WQCC HH	no
Cobalt	Dissolved	0.00150	0.05	WQCC Irr	no
Copper	Dissolved	0.00260	1	WQCC Dom	no
Cyanide	Dissolved	0.00210	0.2	WQCC HH	no
Fluoride	Dissolved	2.95	1.6	WQCC HH	YES
Iron	Dissolved Total	0.13000 2.70000	0.3	EPA MCL2	no
Lead	Dissolved Total	0.00043 0.00210	0.015	EPA MCL	no
Manganese	Dissolved Total	1.13000 1.40000	0.05	EPA MCL2	YES
Mercury	Total	0.00440	0.002	WQCC HH	YES
Molybdenum	Dissolved	0.0370	1	WQCC Irr	no
Nickel	Dissolved Total	0.01600 0.03000	0.2	WQCC Irr	no
Nitrate/Nitrite	Dissolved	15.1	10	WQCC HH	YES
Potassium	Dissolved	8.75	--	--	--
Selenium	Dissolved Total	0.02841 0.03040	0.05	WQCC HH	no
Silver	Dissolved	0.000310	0.05	WQCC HH	no
Sodium	Dissolved	4,300	--	--	--
Sulfate	Dissolved	4,410	600	EPA MCL2	YES
TDS	Dissolved	16,700	500	EPA MCL2	YES
Uranium	Dissolved	0.248	0.03	WQCC HH	YES
Vanadium	Dissolved Total	0.02100 0.02790	0.0631	NMED TW	no
Zinc	Dissolved	0.0296	5	EPA MCL2	no

Notes and Definitions:

-- = no screening standard available

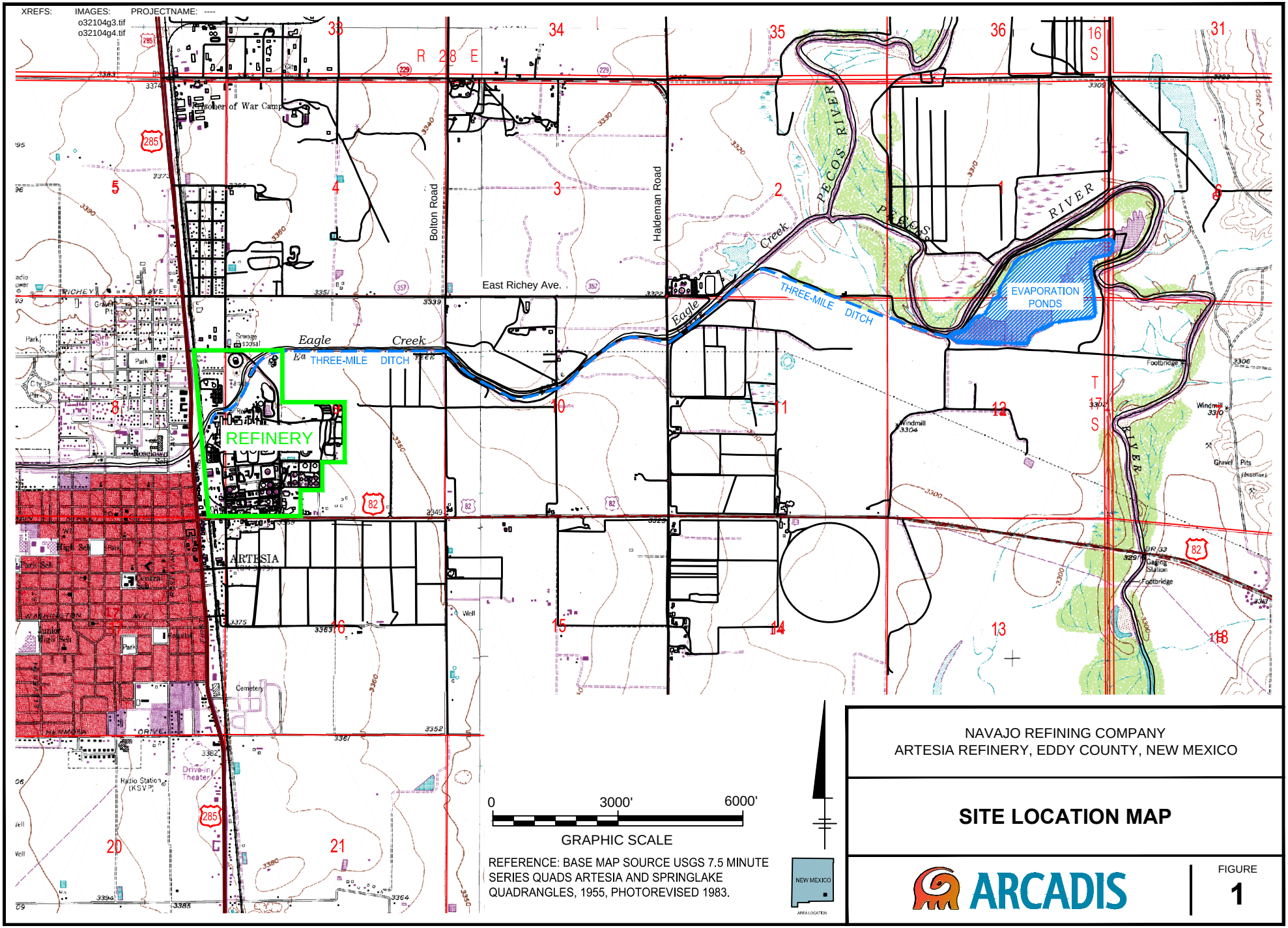
(a) = there were no detections at all, therefore the Double Quantification Rule shoud be invoked.

CGWSL = Critical Groundwater Screening Level
Dom = Domestic Water Supply (20.6.2.3103.B NMAC)
EPA = United States Environmental Protection Agency
HH = Human Health (20.6.2.3103.A NMAC)
Irr = Irrigation Use (20.6.2.3103.C NMAC)
MCL = Maximum Contaminant Level, Primary
MCL2 = Maximum Contaminant Level, Secondary
mg/L = milligrams per Liter
NMAC = New Mexico Administrative Code
NMED = New Mexico Environment Department
TW = Tap Water
UTL = 95/95 upper tolerance limit
WQCC = Water Quality Control Commission

ARCADIS

Figures

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\HOUSTON\ACT\TX000836\0003\00001\site location map.dwg LAYOUT: 1 SAVED: 2/27/2013 5:26 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 4/1/2013 9:12 AM BY: INNISS, HAYDEN
XREFS: IMAGES: PROJECTNAME: ----
o32104g3.tif
o32104g4.tif



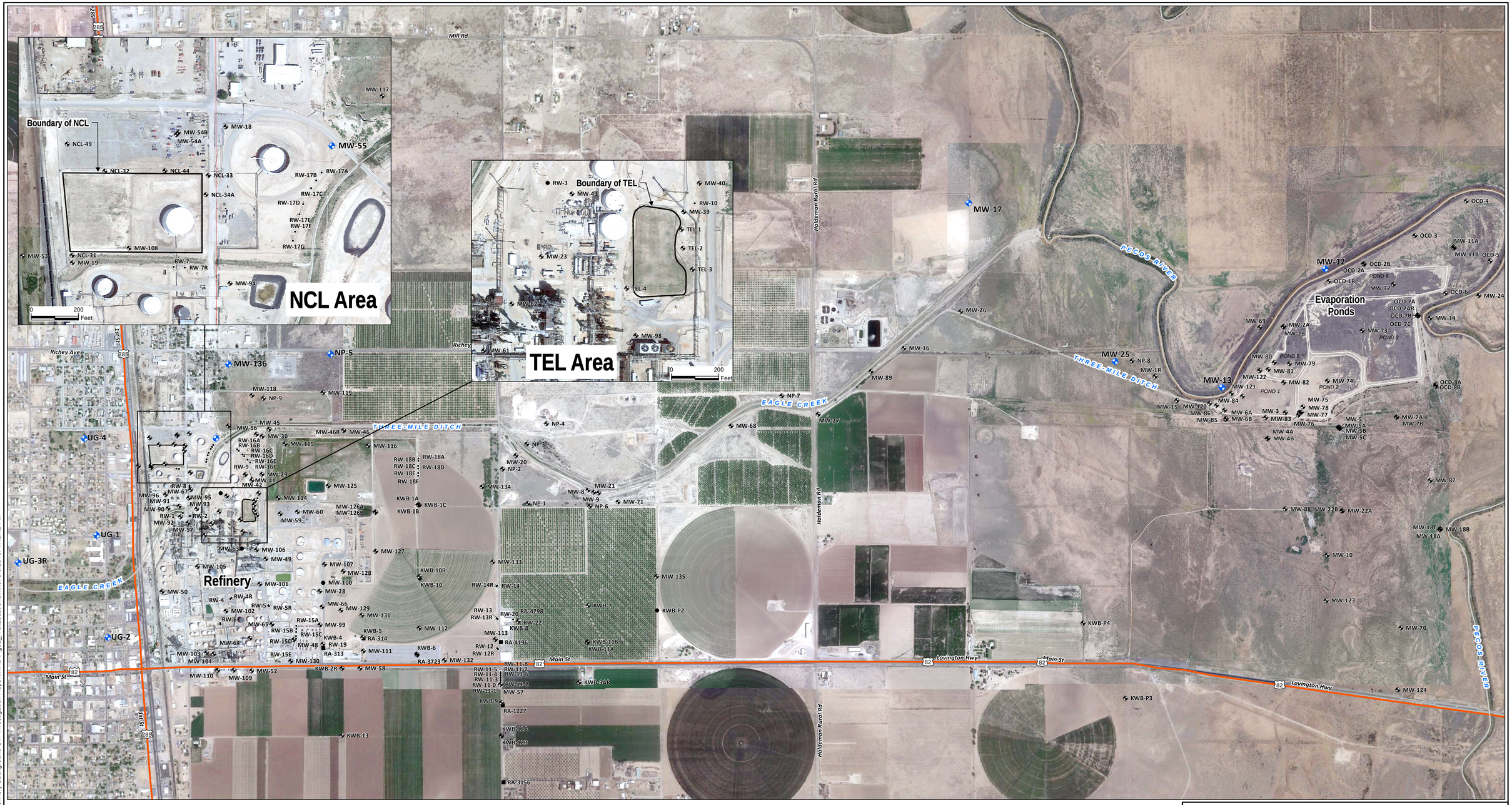
REFERENCE: BASE MAP SOURCE USGS 7.5 MINUTE SERIES QUADS ARTESIA AND SPRINGLAKE QUADRANGLES, 1955, PHOTOREVISED 1983.

NAVAJO REFINING COMPANY
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

SITE LOCATION MAP

ARCADIS

FIGURE
1



LEGEND:

- BACKGROUND MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- IRRIGATION WELL
- ABANDONED WELL

0 800 1,600 2,400 3,200 Feet

GRAPHIC SCALE

NAVAJO REFINING COMPANY
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

BACKGROUND GROUNDWATER INVESTIGATION REPORT

WELL LOCATIONS

ARCADIS

FIGURE 2

CITY: SF DIV/GROUP: ENV/IM DB: K ERNST LD: K SCHNEBELE PIC: PM: P KRUEGER TM: TR:
Project (Project #) TX000836.0004.0004
Path: Z:\GISPROJECTS_ENV\NavajoRefining\ArtesiaRefinery\Background GW Investigation Report\MXD\Fig02_WellLocations.mxd: 8/3/2015: 1:42:12 PM