AP - 111

OW-14 INVESTIGATION REPORT (2)

2019

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

November 15, 2019

John Moore
Environmental Superintendent
Western Refining, Southwest Inc., Gallup Refinery
92 Giant Crossing Road
Gallup, New Mexico 87301

RE: RESPONSE TO APPROVAL WITH MODIFICATIONS
REVISED INVESTIGATION REPORT OW-14 SOURCE AREA
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-WRG-19-002

Dear Mr. Moore:

The New Mexico Environment Department (NMED) has reviewed the *Response to Approval with Modifications Revised Investigation Report OW-14 Source Area* (Response), dated October 24, 2019 and submitted on behalf of Marathon Petroleum Company dba Western Refining Southwest Inc., Gallup Refinery (the Permittee). The Permittee must address the following comments.

Comment 1

In the response to NMED's *Approval with Modifications* Comment 7, the Permittee states, "Figures 6 and 9 are revised to extend cross section C-C' to OW-14 and a separate new cross section is enclosed that extends to STP-1." NMED's *Approval with Modifications* Comment 7 stated, "[s]ubmit a figure that depicts the likely subsurface conditions between Tank 570 to OW-14 and STP-1." Figure 9 (Cross Section C-C') depicts the subsurface conditions between RW-1 and OW-14, rather than the subsurface conditions between TK 570-1 and OW-14. In addition, the referenced separate new cross section extending to STP-1 is not included in the Response. Provide these figures.

Comment 2

In the response to NMED's *Approval with Modifications* Comment 10, the Permittee states, "[t]here is a detailed discussion on the soil types present in Section 4.3.1, which is not repeated in the Conclusions Section. This discussion is provided below and as shown both intervals consist of sand with clayey sand in the 16 feet to 18 feet bgl interval and silty sand in the 24 feet to 26 feet bgl interval." To clarify, the direction of NMED's Comment 10 was to include the discussion regarding the correlation between the level of contamination associated with organic constituents and soil types where elevated contaminant concentrations were detected and further develop a discussion of potential contaminant pathways, rather than to repeat Section 4.3.1 in the Conclusion Section. No revision required.

Comment 3

In the response to NMED's *Approval with Modifications* Comment 11, the Permittee states, "[t]he requested figure is enclosed. This is Figure 22 from the Investigation Report North Drainage Ditch and OW-29 & OW-30 Areas, which is reported on separately as previously directed by NMED." The Permittee provided a figure that depicts wells downgradient from OW-14 but the figure does not depict any wells upgradient from OW-14, which was referenced in the Permittee's statement. All referenced upgradient wells from OW-14 (TK-568-1, TK 568-2, OW-58) and downgradient wells (OW-55 and OW-30) should have been depicted in the figure. NMED's Comment 11 also stated, "[p]rovide a figure that includes the other downgradient wells identified in this comment to provide further context to the MTBE plume migration." The Response does not include further context to the MTBE migration. Provide the appropriate figure.

The Permittee must address all comments more accurately in all future correspondence. Provide the figures discussed in Comment 1 and Comment 3 no later than **December 31, 2019**.

If you have questions regarding this letter, please contact Kristen Van Horn of my staff at 505-476-6046.

Sincerely,

Dave Cobrain
Program Manager
Hazardous Waste Bureau

cc: K. Van Horn, NMED HWB
M. Suzuki, NMED HWB
C. Chavez, OCD
L. King, EPA Region 6 (6LCRRC)
B. Moore, WRG

File: Reading File and WRG 2019 File
HWB-WRG-19-002

INVESTIGATION REPORT
OW-14 Source Area

Marathon Petroleum Company LP

Gallup Refinery
Marathon Petroleum Company
Gallup, New Mexico

EPA ID# NMD000333211

January 2019

(Revised July 2019)

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List of Acronyms

API	American Petroleum Institute
AOCs	areas of concern
BTEX	benzene, toluene, ethylbenzene, and xylene
bgl	below ground level (bgl)
btoc	below top of casing
CFR	Code of Federal Regulations
DRO	diesel range organics
DAF	dilution/attenuation factor
EPA	Environmental Protection Agency
gpm	gallons per minute
HI	hazard index
HSA	hollow-stem auger
IDW	investigation derived waste
LPG	liquefied petroleum gas
LTU	Land Treatment Unit
MADEP	Massachusetts Department of Environmental Protection
MCL	maximum contaminant level
msl	mean sea level
MW	monitoring well
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
RCRA	Resource Conservation and Recovery Act
PID	photoionization detector
PVC	polyvinyl chloride
SPH	separate phase hydrocarbon
SVOC	semi-volatile organic compound
SWMUs	Solid Waste Management Units
TPH	total petroleum hydrocarbon
TVOC	total volatile organic content
TCLP	toxicity characteristic leaching procedure
USCS	unified soil classification system
VOC	volatile organic compound
WQCC	Water Quality Control Commission

Executive Summary

The Gallup Refinery, which is located 17 miles east of Gallup, New Mexico, has been in operation since the 1950s. Past inspections by State [New Mexico Environment Department (NMED)] and federal environmental inspectors have identified locations where releases to the environment may have occurred. These locations are generally referred to as Solid Waste Management Units (SWMUs) or Areas of Concern (AOCs). Pursuant to the terms and conditions of the facility's Resource Conservation and Recovery Act (RCRA) Post-Closure Care Permit and 20.4.1.500 New Mexico Administrative Code (NMAC), this environmental site investigation was completed for the area generally up-gradient of monitor well OW-14, which includes the eastern portion of the Refinery Tank Farm (SWMU No. 6).

The activities completed include sampling and analysis of soils and groundwater in the vicinity of storage Tanks 568, 569, and 570 and along the northern boundary (east end) of the Tank Farm. The current investigation began on September 21, 2016 and continued through October 5, 2016. This included the completion of six soil borings and two permanent monitoring wells with 25 soil samples (excluding additional quality assurance samples) collected for analysis of potential site-related constituents (e.g., volatile and semi-volatile organics, total petroleum hydrocarbons, and metals). Temporary well completions were installed in all six soil borings. Eight groundwater samples (excluding additional quality assurance samples) were collected for analysis of potential site-related constituents (e.g., volatile and semi-volatile organics, total petroleum hydrocarbons (TPH), metals, and inorganic/general water quality parameters).

Manganese was detected at concentrations above the non-residential soil screening level in five soil samples. Five soil samples have reported concentrations of gasoline range organics (GRO) above the residential soil screening level and one of these samples has a concentration above the non-residential soil screening level. One soil sample has a reported concentration of diesel range organics (DRO) above the residential soil screening level. Benzene and ethylbenzene were reported at concentrations above their respective residential direct contact screening levels in one soil sample.

Seven inorganic constituents (arsenic, barium, beryllium, cobalt, iron, lead, manganese, and vanadium) were detected at concentrations (totals analyses) above residential/tap water screening levels in groundwater samples collected from permanent and temporary well completions.

At least one of these exceedances of screening levels for inorganic constituents occurred in every groundwater sample analyzed with the exception of the groundwater samples collected from TK 568-1. Arsenic, barium, iron, and manganese were detected at concentrations above screening levels in the dissolved analyses.

The following thirteen organic constituents were detected at concentrations above screening levels in at least one of the eight groundwater samples collected from the permanent/temporary well completions:

- 1,2,4-Trimethlybenzene;
- 1,2-Dibromoethane (EDB);
- 1,2-Dichloropopane;
- 1,3,5-Trimethylbenzene;
- 1-Methylnaphthalene;
- 2-Methylnaphthalene;
- Benzene;
- Ethylbenzene;
- MTBE;
- Naphthalene;
- Toluene;
- Total Xylenes; and
- Bis (2-ethylhexyl) phthalate.

Section 1 Introduction

The Gallup Refinery is located approximately 17 miles east of Gallup, New Mexico along the north side of Interstate Highway I-40 in McKinley County. The physical address is I-40, Exit #39 Jamestown, New Mexico 87347. The Gallup Refinery property covers approximately 810 acres. Figure 1 presents the refinery location and the regional vicinity, which is characterized as high desert plain comprised primarily of public lands used for grazing by cattle and sheep.

The Gallup Refinery generally processes crude oil from the Four Corners area transported to the facility by pipeline or tanker truck. Various process units are operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, alkylation, isomerization, sulfur recovery, merox treater, and hydrotreating. Current and past operations have produced gasoline, diesel fuels, jet fuels, kerosene, propane, butane, and residual fuel.

The area of investigation that is the subject of this report is shown on Figure 2 and includes the eastern portion of the Tank Farm, which is generally up-gradient of monitor well OW-14. The purpose of the site investigation is to determine the source of the increasing concentrations of primarily benzene that have been observed in OW-14. The investigation activities were conducted in accordance with 20.4.1.500 NMAC incorporating 40 Code of Federal Regulations (CFR) Section 264.101, Section IV.H.5 of the Post-Closure Care Permit and the *Investigation Work Plan OW-14 Source Area* dated April 2016 (approved with modifications May 12, 2016).

Section 2 presents background information for the area near OW-14, including a review of historical waste management activities to help identity the types of waste handled, sources of releases, and previously known impacts to the environment. Section 3 describes the scope of work completed during the site investigation, including completion of soil borings, installation of temporary monitoring wells, installation of permanent monitoring wells, and sample collection. Section 4 of the report explains the results of the field investigation, including the general surface and subsurface conditions and detailed site-specific information acquired during subsurface investigations. Section 5 explains the regulatory standards that are used for comparison to the analytical results and Section 6 presents the analytical results of soil and groundwater samples analyzed for volatile and semi-volatile organic compounds, TPH, metals, and inorganic/general chemistry constituents. The results of these analyses are compared to applicable state or federal screening levels. Section 7 summarizes and provides an evaluation of the potential impacts and provides recommendations for any future actions.

Section 2
Background

This section presents background information for the area up-gradient of monitor well OW-14, which includes the eastern portion of the Tank Farm (SWMU No. 6), including a review of historical waste management activities to identity the following:

- Type and characteristics of waste and contaminants handled in the SWMU;
- Known and possible sources of impacts;
- History of releases; and
- Known extent of impacts prior to the current investigation.

Monitor well OW-14 is located immediately north of the main refinery tank farm, which was built in the late 1950s. The *Inventory of Solid Waste Management Units* prepared in June 1985 identified six product storage tanks that contained leaded gasoline (Geoscience Consultants, Ltd., 1985). These six, as well as, additional tanks were subsequently identified as SWMU No. 6 due to the historic practice of disposing of leaded tank bottoms within the tank berms. The practice of cleaning the tanks and burying the leaded tank bottoms was reported to have occurred every five years and was terminated after November 19, 1980.

The three leaded gasoline storage tanks (TK-568, TK-569, and TK-570) closest to OW-14 were investigated as part of SWMU No. 6 in the early to mid-1990s. Tanks TK-569 and TK-570 are still used to store gasoline, while TK-568 was switched to store MTBE sometime after 1996 and later switched to ammonium thiosulfate in 1986. Impacts to soil and the presence of separate-phase hydrocarbon (SPH) on groundwater was found within the alluvium overlying the Chinle Group. Boring BG-4, which was later identified as OW-27 and RW-1, was drilled east of TK-569 to a depth of 48.5 feet (Figure 2). A water-bearing sand layer was logged at approximately 30 feet with a strong hydrocarbon odor and an elevated PID reading. Subsequently a 4-inch well screen was installed in the boring from 40.0 to 25.0 feet below ground level (bgl). The water level was initially measured at a depth of 28’ 7” with an accumulation of 8” of SPH. A second soil boring B-2, which was later identified as OW-28 and RW-2, was drilled southwest of TK-576 to a depth of 38 feet. Saturation was first encountered in a sand layer at a depth of 23.6 feet with additional deeper water-bearing sand/gravel layers extending to top of the Chinle Group at a depth of 32.9 feet. The well screen was set from 36.1 feet to 26.1 feet bgl. The water level initially was measured at 24' 3" with 2" of SPH. These historical boring logs are included in Appendix A.

A possible leak from a seam in an unidentified storage tank located adjacent to Tank 569 was reported to have been repaired in 1995 (Giant, 1997). A review of historical tank inspection files identified an email in 1990's that indicated a concern of a possible leak at Tank 568, which is located just east of Tank 569 (Appendix J). This email also indicates former usage of the tank to store MTBE, which was not previously identified as a material stored in this tank. It is likely that Tank 568, while it was in service to store leaded gasoline, contributed to the observed presence of SPH instead of the burial of leaded tank bottoms.

Subsequent to preparation of the 2016 Investigation Work Plan, DiSorbo obtained copies of recent tank inspection reports for Tanks 568, 569, and 570. The inspection of Tank 568 took place in December 2014 and was limited to an external inspection. This report notes that a new internal coating was completed in February 2006, but no description of any problems that may have required the repairs is included. The external inspection did not identify any problems that would indicate recent leaks from the Tank 568. The last internal inspection of Tank 569 was completed in January 2010. There were no indications of leaks through inspections of both the shell and floor. Four locations in the floor were found to have a wall thickness below the recommended minimum thickness per API 653 and were repaired. The most recent inspection of Tank 570 was conducted in March 2015. During the internal inspection, two ¼" diameter through holes were found in the floor. It was noted in the report that these holes were apparently in the same areas that were drilled and repaired with epoxy back in August of 1994. Based on these inspection reports, it appears that recent leaks have been occurring through the bottom of Tank 570 and may have been present in the past with earlier repairs dating back to 1994.

The estimated annual volumes of SPH recovered at RW-1 from 2005 through 2018 are shown in Table 1. The recovery volumes declined significant after the first two years (2005 and 2006) and stabilized in the 0.5 to 4 gallons per year range. In 2016 the recovery increased to 8.5 gallons and further increased to 10.5 gallons in 2017. The recovery dropped back to 1.0 gallons in 2018. Included as Appendix B is a table that summarizes the historical fluid levels for wells installed before the investigation and for wells installed during the investigation. The measured thickness of SPH in RW-1 has generally fluctuated between 3 feet to 5 feet from 2013 through early 2017, when the measured thickness began to decrease. The measured thickness of SPH was less than 1 foot in 2018.

Beginning in 2011 groundwater samples have been collected annually from RW-1 and RW-2 and analyzed for dissolved-phase organic constituents and metals. Elevated concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) and MTBE have been reported for samples collected at both recovery wells. The concentrations of BTEX are significantly higher at the recovery wells than observed in down-gradient well OW-14, but concentrations are increasing at OW-14. MTBE is also detected at higher concentrations in the up-gradient recovery wells, but the difference is less than what is observed for BTEX.

Table 2 includes the dissolved-phase concentrations reported from groundwater samples collected from the following wells:

- OW-13;
- OW-14;
- RW-1;
- RW-2;
- RW-5;
- RW-6;
- OW-57; and
- OW-58.

Recovery wells RW-5 and RW-6 are included in Table 2 as they are located within the refinery main tank farm; however, these wells are over 800 feet southwest of well OW-14 and are unlikely to represent a possible source for the constituents detected at OW-14. BTEX concentrations are less in groundwater samples collected at RW-5 and RW-6 than those collected at RW-1, RW-2, and OW-14.

Monitor wells OW-57 and OW-58 are permanent wells that were installed during this investigation in 2016. Additional groundwater samples were collected from OW-57 and OW-58 after the completion of the 2016 investigation, as part of the routine facility-wide groundwater sampling effort.

Section 3
Scope of Activities

3.1 Soil Boring, Temporary Monitoring Well Installation and Sample Collection

Pursuant to the approved Investigation Work Plan, an investigation of soils and groundwater was conducted to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil borings, temporary monitoring wells and permanent monitoring wells were installed (Figure 3).

3.1.1 Site Investigation

The scope of work focused on identifying the source of increasing concentrations of primarily benzene, also other constituents that have been detected in groundwater at monitoring well OW-14. Well OW-14 is located to the north and down-gradient of the eastern portion of the Tank Farm. Two new permanent monitoring wells were proposed along the northern boundary of the refinery tank farm to monitor the groundwater quality as it flows to the north. Both of these wells (OW-57 and OW-58) were installed as proposed in the work plan.

The other area of investigation was proposed to focus in the general area of RW-1, which is located further up-gradient within the tank farm. This included six soil borings with temporary well completions to be drilled near Tanks 568, 569, and 570. All of these borings were completed as proposed. Groundwater was encountered at each of these locations and temporary wells were installed in each of the six soil borings (TK 568-1, TK 568-2, TK 569-1, TK 569-2, TK 569-3, and TK 570-1). The groundwater samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), TPH, dissolved and total metals, and water quality parameters.

Discrete soil samples were proposed in the work plan to be retained for laboratory analysis from within the following intervals at each of the six soil borings:

- From the interval in each soil boring with the greatest apparent degree of contamination in the vadose zone, based on field observations and field screening;
- From the bottom of each borehole;

- From the 0.5 foot interval at the top of saturation; and
- Any additional intervals as determined based on field screening results.

The objectives were met at each soil boring with discussions below detailing the exact sample collection interval at each soil boring. In addition, soil samples were also collected from similar intervals during drilling of the two permanent monitoring wells. The soil samples were analyzed for VOCs, SVOCs, TPH, and metals.

The following list provides a summary of the soil borings advanced using hollow stem augers:

- TK 568-1; advanced to 49 feet bgl; temporary well installed;
- TK 568-2; advanced to 37 feet bgl; temporary well installed;
- TK 569-1; advanced to 42 feet bgl; temporary well installed;
- TK 569-2; advanced to 38 feet bgl; temporary well installed;
- TK 569-3; advanced to 39 feet bgl; temporary well installed;
- TK 570-1; advanced to 45 feet bgl; temporary well installed;
- OW-57; advanced to 27 feet bgl; permanent well installed; and
- OW-58; advanced to 48.5 feet bgl; permanent installed.

Groundwater samples were collected from six temporary well completions (TK 568-1, TK 568-2, TK 569-1, TK 569-2, TK 569-3, and TK 570-1) and two permanent monitoring wells (OW-57 and OW-58). The groundwater samples were analyzed for volatile and semi-volatile organics, TPH (GRO, DRO, and MRO), Skinner List metals, cyanide, iron, manganese, chloride, fluoride, and sulfate.

3.2 Collection and Management of Investigation Derived Waste

Drill cuttings, excess sample material and decontamination fluids, and all other investigation derived waste (IDW) associated with soil borings were contained and characterized using methods based on the boring locations and type of contaminants suspected or encountered. All drill cuttings generated during the OW-14 Source Area investigation were collected and put into 55-gallon drums.

The soils in the 23 drums were not sampled. Using a generator waste profile sheet, the drums were shipped off-site to Advanced Chemical Treatment Facility for disposal on March 13, 2017.

Copies of the waste characterization form and the waste manifest are included in Appendix C. All purge water and decontamination water were disposed in the refinery wastewater system upstream of the API Separator.

3.3 Surveys

A global positioning system receiver was used to record the coordinates of each soil boring. These coordinates were recorded on the field boring logs. Surveys were completed by a registered land surveyor for permanent wells OW-57 and OW-58 to include geographic position and land surface elevation. In the area of Tanks TK 568, TK 569 and TK 570 land surface elevations were surveyed. The survey is included in Appendix D.

Section 4
Field Investigation Results

This section provides a summary of the surface and subsurface conditions at the refinery, including the area near the refinery tank farm and in the area of OW-14. A discussion is included on the installation of soil borings, field screening of soils, and collection of soil samples for analysis. This is followed by a description of the installation of temporary and permanent well completions and the collection of groundwater samples.

4.1 Surface Conditions

A topographic map of the area near the monitoring well OW-14 and the refinery main tank farm is included as Figure 4. Site topographic features include high ground in the southeast gradually decreasing to a lowland fluvial plain to the northwest. Elevations on the refinery property range from 6,860 feet to 7,040 feet. The area of the site near OW-14 is at an approximate elevation of 6,934 feet above mean sea level (msl).

The soils in the vicinity of OW-14 include two soil types. Surface soils within most of the area of investigation are primarily Rehobeth silty clay loam. To the north are the bordering Simitarq-Celavar sandy loams. Rehobeth soil properties include a pH ranging from 8 to 9 standard units and salinity (naturally occurring and typically measuring up to approximately 8 mmhos/cm). The Simitarq-Celavar soils are well drained with a conservative permeability of 0.20 inches/hour and minimal salinity. Simitarq soils have nearly neutral pH values ranging from 7.2 to 7.4 standard units.

Regional surface water features include the refinery evaporation ponds and a number of small ponds (one cattle water pond and two small unnamed spring fed ponds). The site is located in the Puerco River Valley, north of the Zuni Uplift with overland flows directed northward to the tributaries of the Puerco River. The Puerco River continues to the west to the confluence with the Little Colorado River. The South Fork of the Puerco River is intermittent and retains flow only during and immediately following precipitation events.

4.2 Subsurface Conditions

Underground pipelines were detected during clearance of utilities in the area of the tank farm and the rail loading rack (Figure 21).

4.2.1 Geology

The shallow subsurface soils consist of fluvial and alluvial deposits comprised of clay and silt with minor inter-bedded sand layers. The diverse properties and complex, irregular stratigraphy of the surface soils across the site cause a wide range of hydraulic conductivity ranging from less than 10^{-2} cm/sec for gravely sands immediately overlying the Petrified Forest Formation to 10^{-8} cm/sec in the clay soils located near the surface (Western Refining, 2009). Generally, shallow groundwater at the refinery follows the upper contact of the Chinle Group with prevailing flow from the southeast to the northwest, with some flow potentially to the northeast on the northeastern portion of the refinery property.

The Quaternary alluvium, which occurs at the land surface in the area of the refinery is mapped regionally as a narrow band trending west-northwest and running just north of I-40 (Figure 5). The Quaternary alluvium is thought to be the parent material of the Simitarq-Celavar and Rehobeth soils discussed above in Section 4.1. Four cross sections of the shallow subsurface in the immediate vicinity of the tank farm and the area up-gradient of OW-14 (Figures 7 thru 10). Figure 6 shows the location of the cross sections. As shown on the four cross sections, the predominant lithology is sandy clay/clayey sands.

An isopach map of the thickness of potentially transmissive materials (e.g., sand, sandy gravel, clayey gravel, clayey sand, etc.) that are below the water table is included as Figure 11. The thickness of the transmissive materials is highly variable according to NMED.

A second map (Figure 12) was prepared to show the current elevation on top of the bedrock (Chinle Group). This surface is probably reflective of the land surface present when the Quaternary alluvium was deposited. There is a prominent feature on the southern portion of this map, where the surface appears to peak near TK569-2 and TK568-2 at approximately 6916 feet msl. A sharp decline in the elevation on the top of the Chinle Group extends northeastward from soil boring TK 568-2 towards soil boring TK 568-1. The elevation drops from 6916 feet MSL at TK568-3 to 6903 feet MSL at Tank 568-1. A decrease of 13 feet over an approximate distance of 100 feet. Southwest of the peak, the top of the bedrock slopes gradual to the southwest with the elevations ranging from 6912 feet MSL to 6914 feet MSL. Further to the north, an apparent trough on the bedrock surface trends north/northeast through the location of OW-58 and appears to extend north towards OW-30. To the northwest of the area of investigation, there is a prominent high on the bedrock surface near OW-13, which is likely to influence migration of contaminants away from OW-14.

Subcropping beneath the Quaternary alluvium is the Triassic Chinle Group (Figure 5). The stratigraphy of the Chinle Group was described in detail for the nearby Fort Wingate quadrangle by Lucas *et al.*, 1997. The Painted Desert Member of the Petrified Forest Formation is the uppermost member of the Chinle Group present in the area of the refinery. The Painted Desert Member is described as reddish-brown and grayish red mudstone with minor beds of resistant, laminated or crossbedded, litharenite. This is consistent with the bedrock encountered at the refinery, as depicted on cross sections A-A', B-B', C-C' and D-D' (Figures 7 through 10). Beneath the Painted Desert Member is the Sonsela Member, which is described by Lucas *et al.* (1997) as gray to yellowish-brown, fine-grained to conglomeratic, crossbedded sandstone. The base of the Sonsela Member is recognized as a basin wide unconformity, which was termed the Tr-4 unconformity (Heckert and Lucas, 1996). The Blue Mesa Member, which underlies the Sonsela Member, is the lowest member of the Petrified Forest Formation. The Blue Mesa Member is described as mostly purple and greenish-gray mudstone.

4.2.2 Hydrogeology

Figure 13 presents the potentiometric surface during field work activities conducted during the month of September 2016. A second potentiometric surface map (Figure 13A) is included using measurements collected in August 2018. The groundwater flow direction is to the north-northeast. The groundwater elevation in monitor well OW-57 was comparable to the groundwater elevations found in wells RW-5 and RW-6. The potentiometric surface appears to gradually decrease towards the northeast. There is a steep easterly groundwater gradient between OW-57 and RW-2, which coincides with an 11 foot elevation change of the top of the Chinle as seen on the paleography map presented as Figure 12. Moving further to the east, the groundwater elevations in RW-2 and OW-58 were similar in September 2016 (0.84 feet higher at OW-58) but the gradient increased to 1.59 feet in August 2018 with the flow direction to the southwest from OW-58 towards RW-2. This is in contrast to the elevation change of the top of the Chinle, which is 8 feet higher at RW-2 than OW-58. Generally, the shallow groundwater potentiometric surface reflects the topography of the top of the Chinle Formation, but not in this particular location.

In the area of Tanks 569 and 570 the groundwater elevations measured from the temporary wells ranged in difference of 1 to 2 feet between the wells. There is a groundwater elevation change of approximately 3 feet between the locations TK569-2 / TK568-2 and location TK568-1. This increase in the gradient coincides with the elevation change of the top of the Chinle as seen on Figure 12.

The diverse properties and complex, irregular stratigraphy of the Quaternary alluvium across the refinery cause a wide range of hydraulic conductivity ranging from less than 10^{-2} cm/sec for gravel like sands immediately overlying the Painted Desert Member to 10^{-8} cm/sec in the clay soils located near the surface (Western Refining, 2009). Permeability tests performed on the Quaternary alluvium beneath the nearby Land Treatment Unit (LTU) indicated an average permeability of 1.9E-05 cm/sec (Appendix G). Permeability tests performed on soils in the area of the firewater pond indicated an average permeability of 1.1E-07 cm/sec (Appendix G).

As described above, the bedrock (i.e., Petrified Forest Formation) is mainly composed of low permeability materials (e.g., mudstone) with the exception of the Sonsela Member and some thinner sandstones within the overlying Painted Desert Member. Yield tests, including slug tests and pumping tests have been performed at the refinery to estimate the hydraulic conductivity of the Painted Desert Member (Appendix G). A slug test performed on July 3, 1984 in well OW-4 indicated a hydraulic conductivity of 4.0E-7 cm/sec. A pump test was performed in well OW-24 on February 20, 1985 and it yielded a hydraulic conductivity of 2.5E-7 cm/sec. The Painted Desert Member appears to be a competent aquitard capable of reducing the potential for downward migration of contaminants from groundwater that may occur within the overlying Quaternary alluvium.

The Sonsela Member is identified as the uppermost aquifer for RCRA monitoring purposes at the LTU because the overlying groundwater bearing units are not capable of supplying sufficient quantities of groundwater to meet the definitions of an aquifer. Wells completed in a thinner permeable sandstone layer within the Painted Desert Member are also monitored near the LTU as a potential early warning network. The Sonsela's highest point occurs southeast of the site and slopes downward to the northwest as it passes under the refinery. The Sonsela Member forms a water-bearing reservoir with artesian conditions throughout the central and western portions of the refinery property (Western, 2009). Aquifer test of the Sonsela Member conducted northeast of Prewitt indicated a transmissivity of greater than 100 ft^2/day (Stone and others, 1983). Yield tests conducted at the site have shown a much lower hydraulic conductivity of 0.34 ft/day (1.2E-04 cm/sec) (Appendix G).

4.3 Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment

This subsection provides a detailed description of subsurface investigations to delineate impacts to subsurface soils and the underlying groundwater in the eastern portion of the refinery tank farm. This includes soil field screening results, soil sampling intervals and methods for detection of subsurface impacts in soils. For completeness, the following discussion includes the field work completed in September and October 2016 in accordance with the April 2016 *Investigation Work Plan OW-14 Source Area* (DiSorbo, 2016).

Discrete soil samples for laboratory analyses were scheduled for collection at the following intervals:

- From the interval in each soil boring with the greatest apparent degree of contamination in the vadose zone, based on field observations and field screening;
- From the bottom of each borehole;
- From the 0.5 foot interval at the top of saturation; and
- Any additional intervals as determined based on field screening results.

A description of the field screening and soil sampling procedures are presented in Appendix E – Field Methods. Copies of the boring/well logs are provided in Appendix F. In addition to being included on the soil boring logs, the soil vapor (i.e., headspace) screening results are summarized in Table 3. The locations of the soil borings/wells appear on Figure 3.

4.3.1 Soil Investigation

Eight soil borings, including two completed as permanent wells, were advanced using the hollow-stem auger (HSA) method to bedrock (claystone). The drilling equipment was decontaminated between each borehole, as described in Appendix E. Detailed soil boring logs are included in Appendix F. The soil boring logs describe the subsurface lithology, the presence of saturation, the field screening results, soil sample collection intervals, and any temporary or permanent well construction details. The installation of soil borings and collection of soil samples are discussed below in numerical order.

Tanks T-568, T-569 and T-570 are located in the eastern portion of the tank farm. Each tank is located within a separate tank dike system. Tank T-568 is the easternmost tank. The floor inside of the dike system has an elevation of approximately 6949.5 feet msl. Tank T-569 is located approximately 150 feet west-southwest of Tank T-568. The floor of the dike system for Tank T-569 has an elevation of approximately 6950.5 feet msl. Tank T-570 is located approximately 190 feet south of Tank T-569. The floor inside of the dike system for Tank T-570 has an elevation of approximately 6957.5 feet msl.

TK 568-1

On September 23, 2016 the drilling rig was set up on location TK 568-1. TK 568-1 was located inside the tank dike for Tank T-568 and is approximately 31 feet north of Tank T-568. It is noted that all such references to measurements from tanks are taken from the closest edge of the subject tank. Sample collection was accomplished using the HSA drilling method and split spoon samplers. Three soil samples were collected for laboratory analysis from the following intervals:

- 12 feet bgl - 14 feet bgl: PID reading – 1,957 ppm, odor and oily;
- 30 feet bgl - 32 feet bgl: Interval immediately above saturation–PID reading – 1,308 ppm, black discoloration; and
- 48 feet bgl - 49 feet bgl: Bottom of borehole, PID reading – 41 ppm.

The lithology encountered consisted of the following:

- Sandy Silty Clay: 0 – 10 feet bgl (low plasticity, soft, damp, brown, no odor from 0 to 6 feet bgl, odor from 6 feet bgl to 10 feet bgl);
- Silty Clay: 10 feet bgl – 14 feet bgl (low plasticity, firm, damp, brown, odor, oily from 12 feet bgl to 14 feet bgl, trace of very fine grain sand);
- Clayey Sandy Silt: 14 feet bgl – 16 feet bgl (very fine grain, low plasticity, soft, damp to moist, brown, odor);
- Sandy Clayey Silt: 16 feet bgl – 22 feet bgl (very fine grain, low plasticity, soft, moist in sand seams, odor);
- Clayey Sandy Silt: 22 feet bgl – 24 feet bgl (very fine grain sand, soft, damp to moist, brown, odor);
- Silty Sandy Clay: 24 feet bgl – 32 feet bgl (low plasticity, soft to firm, damp, brown, odor, black discoloration in sand at base of interval, very moist at base);
- Clayey Sand: 32 feet bgl – 33 feet bgl (fine grain sand, loose, saturated, black, odor);
- Silty Clay: 33 feet bgl – 34 feet bgl (low plasticity, firm, damp, brown, odor);
- Silty Sandy Clay: 34 feet bgl – 36 feet bgl (low plasticity, soft, damp, brown, odor, black discoloration);
- Silty Sand: 36 feet bgl – 38 feet bgl (fine grain sand, loose, saturated, grey, odor);
- Sandy Clay: 38 feet bgl – 44 feet bgl (low plasticity, firm, damp to moist, brown, odor, sheen observed on core sample, white clay at base);

- Clay: 44 feet bgl – 48 feet bgl (low plasticity, dense/crumbly, dry dark reddish brown/grey, no odor); and
- Sandy Shale (Chinle Group - Painted Desert Member): 48 feet bgl – 49 feet bgl (very dense, grey, dry, no odor).

The sampling was terminated at 49 feet bgl. Activities at this location were then shut down due to a rain storm. The augers were left in the borehole. On September 26, 2016 a temporary monitoring well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 23 feet bgl to 38 feet bgl. The top of the screen was set approximately 9 feet above the uppermost saturated interval (clayey sand – 32 feet bgl to 33 feet bgl). The screen was extended to a depth of 38 feet bgl which allowed for the screening across another saturated interval encountered (silty sand – 36 feet bgl to 38 feet bgl). The screen was not placed deeper since saturation was not encountered below 38 feet bgl. The screen did not intercept the top of the bedrock (claystone – 48 feet bgl to 49 feet bgl).

On October 1, 2016 the well was gauged and developed. No phase-separated hydrocarbon was detected during the gauging event. The water sample was collected on October 2, 2016. On October 3, 2016 the well casing and screen were removed and the borehole was grouted.

<u>TK 568-2</u>

On September 27, 2016 the drilling rig was set up on location TK 568-2. TK 568-2 was located inside the tank dike for Tank T-568 and approximately 42 feet southwest of Tank T-568. Sample collection was accomplished using the HSA drilling method and split spoon samplers. Three soil samples were collected for laboratory analysis from the following intervals:

- 22 feet bgl - 24 feet bgl: PID reading – 82 ppm, odor;
- 28 feet bgl - 30 feet bgl: Interval immediately above saturation–PID reading – 2,803 ppm; and
- 36 feet bgl - 37 feet bgl: Bottom of borehole, PID reading – 21 ppm.

The lithology encountered consisted of the following:

- Silty Clay: 0 – 6 feet bgl (low plasticity, firm, damp, brown, no odor, faint odor from 4 feet bgl to 6 feet bgl);
- Silty Clay: 6 feet bgl – 10 feet bgl (low plasticity, soft, damp, brown, no odor);

- Sandy Clay: 10 feet bgl – 22 feet bgl (low plasticity, soft, damp, brown, no odor to faint odor from 14 feet bgl to 22 feet bgl, trace gravel);
- Clayey Sand: 22 feet bgl – 32 feet bgl (fine grain sand, loose, damp, brown, trace gravel, odor, white sandstone lenses throughout, moist to saturated from 28 feet bgl to 32 feet bgl);
- Gravelly Sand: 32 feet bgl – 34 feet bgl (fine to medium grain sand, compact, saturated, brown, odor, gravel 0.25 inch to 0.5 inch, sheen on sampler);
- Sandy Gravel: 34 feet bgl – 35 feet bgl (well rounded, loose, saturated, odor); and
- Claystone (Chinle Group - Painted Desert Member): 35 feet bgl – 37 feet bgl (very hard/dense, dry, dark reddish brown, shaley at base).

The sampling was terminated at 37 feet bgl. A temporary monitor well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 26 feet bgl to 36 feet bgl. The top of the screen was set approximately 2 feet above the uppermost saturated interval (clayey sand – 30 feet bgl to 32 feet bgl). The screen was extended to a depth of 38 feet bgl which allowed for the screening across additional saturated intervals encountered (gravelly sand – 32 feet bgl to 34 feet bgl and sandy gravel – 34 feet bgl to 35 feet bgl). The screen extended to 36 feet bgl which was approximately one foot into the bedrock (claystone – 35 feet bgl to 36 feet bgl).

On October 1, 2016 the well was gauged and developed. No phase-separated hydrocarbon was detected during the gauging event. The water sample was collected on October 2, 2016. On October 3, 2016 the well casing and screen were removed and the borehole was grouted.

<u>TK 569-1</u>

On October 4, 2016 the drilling rig was set up on location TK 569-1. TK 569-1 was located inside the tank dike for Tank T-569 and approximately 15 feet northwest of Tank T-569. Sample collection was accomplished using the HSA drilling method and split spoon samplers. Four soil samples were collected for laboratory analysis from the following intervals:

- 18 feet bgl - 20 feet bgl: PID reading – 152 ppm, odor;
- 24 feet bgl - 26 feet bgl: Interval immediately above saturation–PID reading – 2,158 ppm;
- 36 feet bgl - 38 feet bgl: PID reading – 1,649 ppm, odor; and
- 40 feet bgl - 42 feet bgl: Bottom of borehole, PID reading – 95.6 ppm.

The lithology encountered consisted of the following:

- Silty Clay: 0 – 14 feet bgl (low plasticity, firm, damp, brown, no odor, trace very fine grain sand at base);
- Sandy Clay: 14 feet bgl – 20 feet bgl (low plasticity, firm to soft, damp, brown, very fine grain sand throughout, odor);
- Clayey Silty Sand: 20 feet bgl – 26 feet bgl (fine to coarse grain sand, compact, becomes more silty with depth, gravel present, damp, moist to saturated in silty sand seams, odor);
- Sandy Clay: 26 feet bgl – 28 feet bgl (very fine grain sand, increase in clay content, moist to saturated in silty sand seams, brown, odor, trace gravel at base);
- Gravelly Silty Sand: 28 feet bgl – 30 feet bgl (medium to coarse grain, compact, damp to moist in seams, odor, brown, sandstone gravel present);
- Clayey Sandy Gravel: 30 feet bgl – 31.5 feet bgl (0.125 inch to 0.5 inch gravel with medium to coarse grain sand, compact to loose, saturated, brown, odor);
- Silty Clay: 31.5 feet bgl - 36 feet bgl (low plasticity, firm, damp, brown, odor, gravel at base);
- Clayey Gravel: 36 feet bgl – 38 feet bgl (very hard, sandstone present, odor, damp);
- Clay: 38 feet bgl – 40 feet bgl (high plasticity, firm, damp, reddish brown/grey, trace gravel, odor, damp; and
- Claystone (Chinle Group - Painted Desert Member): 40 feet bgl – 42 feet bgl (very dense, light reddish purple/grey, odor).

The sampling was terminated at 42 feet bgl. A temporary monitor well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 23 feet bgl to 38 feet bgl. The top of the screen was set approximately 1 foot above the occurrence of moist to saturated sand seams within a clayey silty sand (24 feet bgl to 26 feet bgl). The screen was extended to a depth of 38 feet bgl which allowed for the screening across additional saturated intervals encountered (sandy clay – 26 feet bgl to 28 feet bgl, gravelly silty sand – 28 feet bgl to 30 feet bgl and clayey sandy gravel - 30 feet bgl to 31.5 feet bgl). The screen extended to 38 feet bgl which was approximately one foot into a damp clayey gravel. The screen did not intercept the top of the bedrock (claystone – 40 feet bgl to 42 feet bgl).

On October 5, 2016 the well was gauged and developed. Phase-separated hydrocarbon was detected during the gauging event, but was not detected after the well was developed. The water sample was collected on October 5, 2016. On October 6, 2016 the well casing and screen were removed and the borehole was grouted.

TK 569-2

On October 4, 2016 the drilling rig was set up on location TK 569-2. TK 569-2 was located inside the tank dike for Tank T-569 and approximately 17 feet northeast of Tank T-569. Sample collection was accomplished using the HSA drilling method and split spoon samplers. Three soil samples were collected for laboratory analysis from the following intervals:

- 16 feet bgl - 18 feet bgl: PID reading – 2,332 ppm, odor;
- 29 feet bgl - 31 feet bgl: Interval immediately above saturation–PID reading – 1,684 ppm/1,420 ppm; and
- 36 feet bgl - 38 feet bgl: Bottom of borehole, PID reading – 405 ppm.

The lithology encountered consisted of the following:

- Silty Clay: 0 – 4 feet bgl (low plasticity, firm, damp, brown, no odor);
- Silty Sand: 4 feet bgl – 8 feet bgl (fine grain, compact, damp, brown, no odor);
- Silty Clay: 8 feet bgl – 14 feet bgl (low plasticity, soft, damp, brown, no odor to faint odor at base);
- Clayey Sand: 14 feet bgl – 18 feet bgl (very fine grain sand, compact, damp, brown, odor);
- Clayey Sand/Sandy Clay: 18 feet bgl – 20 feet bgl (very fine grain, compact, damp, brown, odor);
- Clayey Sand: 20 feet bgl – 22 feet bgl (very fine grain, compact, brown, Sand/Gravel lens from 21 feet bgl to 21.5 feet bgl – damp, grey, loose);
- Silty Sand: 22 feet bgl – 23.5 feet bgl (fine grain, loose, damp, brown, odor);
- Sandy Gravel: 23.5 feet bgl – 30 feet bgl (grey sandstone gravel with fine to coarse grain sand, damp, odor, white sandstone present, trace clay present);
- Silty Clay: 30 feet bgl - 32 feet bgl (low plasticity, firm to soft, damp, dark brown, moist to saturated, silty sand seams throughout, odor);
- Clay: 32 feet bgl – 34 feet bgl (high plasticity, stiff, damp, brown, odor);
- Clayey Gravel; 34 feet bgl – 36 feet bgl (very hard with 4 to 6 inch sandstone (grey) at base, odor); and

- Claystone (Chinle Group - Painted Desert Member): 36 feet bgl – 38 feet bgl (very hard, dry, reddish purple and grey, odor).

The sampling was terminated at 38 feet bgl. A temporary monitor well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 26 feet bgl to 36 feet bgl. The top of the screen was set approximately 4 feet above the occurrence of moist to saturated silty sand seams within a silty clay (30 feet bgl to 32 feet bgl). The screen was extended to a depth of 36 feet bgl which corresponded to the top of the bedrock (claystone – 36 feet bgl to 38 feet bgl).

On October 5, 2016 the well was gauged and developed. Separate phase hydrocarbon was detected during the gauging event and after the well development. The water sample was collected from beneath the SPH on October 5, 2016. On October 6, 2016 the well casing and screen were removed and the borehole was grouted.

<u>TK 569-3</u>

On September 28, 2016 the drilling rig was set up on location TK 569-3. TK 569-3 was located inside the tank dike for Tank T-569 and approximately 19 feet south of Tank T-569. Sample collection was accomplished using the HSA drilling method and split spoon samplers. Three soil samples were collected for laboratory analysis from the following intervals:

- 16 feet bgl - 18 feet bgl: PID reading – 377 ppm, odor;
- 24 feet bgl - 26 feet bgl: Interval immediately above saturation–PID reading – 955 ppm, phase separated hydrocarbon present; and
- 38 feet bgl - 39 feet bgl: Bottom of borehole, PID reading – 258 ppm.

The lithology encountered consisted of the following:

- Silty Clay: 0 – 14 feet bgl (low plasticity, firm, damp, brown, no odor, odor detected from 10 feet bgl to 14 feet bgl, trace very fine grain sand from 12 feet bgl to 14 feet bgl);
- Clayey Sand: 14 feet bgl – 18 feet bgl (very fine grain, compact, damp, brown, odor);
- Clayey Sand/Sandy Clay: 18 feet bgl – 20 feet bgl (very fine grain, compact, damp, brown, odor);
- Sandy Clay: 20 feet bgl – 24 feet bgl (low plasticity, firm, damp, brown, odor);

- Silty Sand: 24 feet bgl – 27 feet bgl (fine grain, loose, very moist, brown, odor, phase separated hydrocarbon present, saturated from 26 feet bgl to 27 feet bgl);
- Sandy Gravel: 27 feet bgl – 28 feet bgl (compact, 0.5 inch to 1 inch gravel, medium to coarse grain sand, saturated, phase separated hydrocarbon present, odor);
- Sandy Clayey Gravel: 28 feet bgl – 31.5 feet bgl (compact, 0.5 inch to 1 inch gravel, medium to coarse grain sand, clay present, very moist to saturated in seams/pockets, white sandstone present, strong odor, greenish gray sandstone at 30 feet bgl, very dense);
- Silty Clay: 31.5 feet bgl – 34 feet bgl (low to moderate plasticity, firm, damp, brown, odor, grey streaks present);
- Sandy Gravel: 34 feet bgl – 36 feet bgl (compact, 0.25 inch to 0.5 inch gravel, coarse sand, saturated, odor);
- Sandy Clayey Gravel: 36 feet bgl – 38 feet bgl (very hard 0.25 inch gravel with clay and sand, damp, grey and brown, odor); and
- Claystone (Chinle Group - Painted Desert Member): 38 feet bgl – 39 feet bgl (very hard, dry, reddish purple and grey, odor).

The sampling was terminated at 39 feet bgl. A temporary monitor well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 22 feet bgl to 37 feet bgl. The top of the screen was set approximately 4 feet above the occurrence of saturation within a silty sand (26 feet bgl to 27 feet bgl). The screen was extended to a depth of 37 feet bgl which allowed for the screening across additional saturated intervals encountered (sandy gravel – 27 feet bgl to 28 feet bgl, sandy clayey gravel – 28 feet bgl to 31.5 feet bgl and sandy gravel - 34 feet bgl to 36 feet bgl). The screen extended to 37 feet bgl which was approximately one foot into a damp sandy clayey gravel. The screen did not intercept the top of the bedrock (claystone – 38 feet bgl to 39 feet bgl).

On October 1, 2016 the well was gauged and developed. Phase-separated hydrocarbon was detected during the gauging event, but was not detected after the well was developed. The water sample was collected on October 2, 2016. On October 6, 2016 the well casing and screen were removed and the borehole was grouted.

<u>TK 570-1</u>

On September 27, 2016 the drilling rig was set up on location TK 570-1. TK 570-1 was located inside the tank dike for Tank T-570 and approximately 20 feet north of Tank T-570. Sample collection was accomplished using the HSA drilling method and split spoon samplers. Three soil samples were collected for laboratory analysis from the following intervals:

- 10 feet bgl - 12 feet bgl: PID reading – 3,445 ppm, odor;
- 32 feet bgl - 34 feet bgl: Interval immediately above saturation, PID reading – 804 ppm; and
- 44 feet bgl - 45 feet bgl: Bottom of borehole, PID reading – 165 ppm.

The lithology encountered consisted of the following:

- Fill: 0 – 6 feet bgl (silt/gravel, damp, brown, no odor to faint odor from 2 feet bgl to 6 feet bgl);
- Gravelly Sand: 6 feet bgl – 8 feet bgl (medium to coarse grain, loose, damp, odor);
- Clayey Gravel: 8 feet bgl – 10 feet bgl (0.25 inch to 0.5 inch gravel in low plasticity clay, brown, damp, odor);
- Sandy Silt: 10 feet bgl – 14 feet bgl (low plasticity, very soft, damp, dark brown, odor);
- Sandy Clay: 14 feet bgl – 16 feet bgl (low plasticity, firm to soft, damp, brown, odor, sandy at base);
- Silty Clay: 16 feet bgl – 21 feet bgl (low plasticity, firm, damp, brown, odor, occasional sandy clay lenses);
- Clayey Sand: 21 feet bgl – 26 feet bgl (fine grain, compact to loose, damp, brown, odor, decrease in clay content with depth);
- Silty Sand: 26 feet bgl – 28 feet bgl (very fine grain, soft/compact, damp, brown, odor);
- Clayey Sand: 28 feet bgl – 30 feet bgl (very fine grain, compact, damp, brown, odor);
- Silty Sand: 30 feet bgl – 33 feet bgl (very fine grain, soft/loose, damp, brown, odor);
- Gravelly Sand: 33 feet bgl - 34 feet bgl (medium to coarse grain, loose, very moist to saturated, grey, odor);
- Sandy Gravel: 34 feet bgl – 37 feet bgl (0.5 inch to 1 inch gravel with sand, fine to coarse grain, brown, saturated, odor);
- Clay: 37 feet bgl – 41 feet bgl (high plasticity, firm to stiff, brown, odor, sandstone present);
- Clayey Sandy Gravel: 41 feet bgl – 42 feet bgl (compact, moist to very moist, brown, odor);
- Gravelly Clay: 42 feet bgl – 44 feet bgl (low plasticity, stiff, damp to dry, reddish brown, odor); and
- Claystone (Chinle Group - Painted Desert Member): 44 feet bgl – 45 feet bgl (very stiff, dry, odor, purple/reddish brown, odor).

The sampling was terminated at 45 feet bgl. A temporary monitor well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 28 feet bgl to 43 feet bgl. The top of the screen was set approximately 5 feet above the occurrence of saturation within a gravelly sand (33 feet bgl to 34 feet bgl). The screen was extended to a depth of 43 feet bgl which allowed for the screening across additional saturated intervals encountered (sandy gravel – 34 feet bgl to 37 feet bgl, and clayey sandy gravel – 41 feet bgl to 42 feet bgl). The screen extended to 43 feet bgl which was approximately one foot into a damp to dry gravelly clay. The screen did not intercept the top of the bedrock (claystone – 44 feet bgl to 45 feet bgl).

On September 30, 2016 the well was gauged and developed. Phase-separated hydrocarbon was detected during the gauging event and after the well was developed. The water sample was collected from beneath the SPH on September 30, 2016. On October 3, 2016 the well casing and screen were removed and the borehole was grouted.

<u>OW-57</u>

On September 21, 2016 the drilling rig was set up on location OW-57. OW-57 is located in the tank dike for Tank T-574 and is approximately 59 feet northwest of Tank T-574. The floor of the dike system for Tank T-574 has an elevation of approximately 6,930 feet msl. Sample collection was accomplished using the HSA drilling method and split spoon samplers. Two soil samples were collected for laboratory analysis from the following intervals:

- 16 feet bgl - 18 feet bgl: PID reading – 205 ppm, Interval immediately above saturation; and
- 25 feet bgl - 27 feet bgl: Bottom of borehole, PID reading – 44 ppm/39ppm.

The lithology encountered consisted of the following:

- Silty Clay: 0 – 10 feet bgl (moderate plasticity, firm, damp, brown to darker brown, no odor to odor from 8 feet bgl to 10 feet bgl);
- Sandy Clay: 10 feet bgl – 14 feet bgl (low plasticity, soft, damp, brown with brown/tan silt at base, odor);
- Clayey Silt: 14 feet bgl – 16 feet bgl (very fine grain, soft, damp, brown and tan, odor);
- Silty Clay: 16 feet bgl – 18 feet bgl (low plasticity, firm, tan and brown, damp, odor);
- Gravelly Clay: 18 feet bgl – 20 feet bgl (low plasticity, soft, damp to slightly moist to saturated, sandstone gravel, sandy, odor);

- Sandstone/Sand: 20 feet bgl – 22 feet bgl (fine grain, dense, light greenish white, very moist to saturated);
- Gravelly Sandy Clay: 22 feet bgl – 25 feet bgl (low plasticity, soft, very moist to saturated, gray, green sandstone, calcareous, odor); and
- Claystone (Chinle Group - Painted Desert Member): 25 feet bgl – 27 feet bgl (very dense, dry, purple, faint odor, grey at base).

The sampling was terminated at 27 feet bgl. A permanent monitoring well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 15 feet bgl to 25 feet bgl. The top of the screen was set approximately 3 feet above the occurrence of saturation within a gravelly clay (18 feet bgl to 20 feet bgl). The screen was extended to a depth of 25 feet bgl which allowed for the screening across additional saturated intervals encountered (sandstone/sand – 20 feet bgl to 22 feet bgl, and gravelly sandy clay – 22 feet bgl to 25 feet bgl). The screen extended to 25 feet bgl which was approximately at the base of the gravelly sandy clay. The screen did not intercept the top of the bedrock (claystone – 25 feet bgl to 27 feet bgl).

Filter pack sand was installed to a depth of 12 feet bgl. A bentonite seal was installed to 8 feet bgl. The annular seal (bentonite grout) was installed on September 21, 2016. On September 30, 2016 the well was gauged and developed. Phase-separated hydrocarbon was not detected during the gauging event. The water sample was collected on October 1, 2016. The surface completion and bollards were installed on October 5, 2016.

<u>OW-58</u>

On September 22, 2016 the drilling rig was set up on location OW-58. OW-58 is located outside of the tank farm at the northern end of the access road for the rail loading rack. OW-58 is located approximately 205 feet northeast from Tank T-576. The elevation at the northern end of the access road in this area is approximately 6,932 feet msl. Sample collection was accomplished using the HSA drilling method and split spoon samplers. Four soil samples were collected for laboratory analysis from the following intervals:

- 10 feet bgl - 12 feet bgl: PID reading – 37 ppm, black discoloration, odor, sticky;
- 22 feet bgl – 24 feet bgl: PID reading – 2,020 ppm, odor;

- 28 feet bgl – 29 feet bgl: Interval immediately above saturation, PID reading – 2,784 ppm; and
- 48 feet bgl – 48.50 feet bgl: Bottom of borehole, PID reading – 250 ppm.

The lithology encountered consisted of the following:

- Asphalt/Base: 0 – 0.75 feet bgl;
- Silty Clay: 0.75 feet bgl – 6 feet bgl (moderate plasticity, firm to stiff, damp, brown, odor);
- Silty Clay: 6 feet bgl – 14 feet bgl (low plasticity, soft, damp, brown, faint odor; from 10 feet bgl to 14 feet bgl – black discoloration, odor, sticky);
- Silty Clay: 14 feet bgl – 16 feet bgl (low plasticity, stiff, damp, brown with black discoloration, faint odor);
- Sandy Clay: 16 feet bgl – 22 feet bgl (low plasticity, stiff, damp, brown, very fine grain sand, odor);
- Silty Clay: 22 feet bgl – 24 feet bgl (low plasticity, very stiff, damp, brown, odor, tan silt pockets/seams present);
- Silty Clay: 24 feet bgl – 29 feet bgl (low plasticity, firm to soft/crumbly, damp, brown, strong odor, phase-separated hydrocarbon present; firm to stiff from 26 feet bgl to 29 feet bgl; damp to moist from 28 feet bgl to 29 feet bgl);
- Sandy Clay/Clayey Sand: 29 feet bgl – 30 feet bgl (low plasticity, soft, very moist to saturated, dark brown, odor);
- Sandy Silty Clay: 30 feet bgl – 32 feet bgl (low plasticity, firm, damp, gray/brown, odor, saturated sand at base);
- Silty Sand: 32 feet bgl – 33.5 feet bgl (fine grain, loose, saturated, gray/brown, odor);
- Silty Clay: 33.5 feet bgl – 36 feet bgl (low plasticity, soft, damp to very moist, grayish brown, odor);
- Silty Clay: 36 feet bgl – 40 feet bgl (low plasticity, firm, damp, grayish brown to brown, odor);
- Clay: 40 feet bgl – 44 feet bgl (high plasticity, firm, damp, brown, odor);
- Silty Clay: 44 feet bgl – 47 feet bgl (low to moderate plasticity, firm, damp, brown, odor, occasional gravel);
- Sandy Gravel: 47 feet bgl – 48 feet bgl (medium to coarse grain sand with 0.25 inch to 0.5 inch gravel, very moist to saturated, odor, brown, traces of silt and clay); and

- Shale (Chinle Group - Painted Desert Member): 48 feet bgl – 48.5 feet bgl (very dense/hard, dark grey, dry, odor);

The sampling was terminated at 48.5 feet bgl. A permanent monitoring well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 38 feet bgl to 48 feet bgl. The top of the screen was set approximately 9 feet above the occurrence of saturation within a sandy gravel (47 feet bgl to 48 feet bgl). The screen extended to 48 feet bgl which was approximately at the base of the sandy gravel. The screen did not intercept the top of the bedrock (shale – 48 feet bgl to 48.5 feet bgl).

Filter pack sand was installed to a depth of 35 feet bgl. A bentonite seal was installed to 32 feet bgl. On September 30, 2016 the well was gauged and developed. Phase-separated hydrocarbon was detected during the gauging event, but was not detected after the well was developed. The water sample was collected on September 30, 2016. The annular seal (bentonite grout) was installed on October 3, 2016. A flush mount surface completion was installed on October 3, 2016.

4.4 Monitor Well Construction and Groundwater Sampling

Groundwater samples were collected from six temporary well completions and two permanent well completions during the September and October 2016 field activities. The following list provides a brief summary of the well development and groundwater sample collection activities:

- TK 568-1; developed and sampled; yielded enough water for a full analytical suite;
- TK 568-2; developed and sampled; yielded enough water for a full analytical suite;
- TK 569-1; developed and sampled; yielded enough water for a full analytical suite;
- TK 569-2; developed and sampled; yielded enough water for a full analytical suite;
- TK 569-3; developed and sampled; yielded enough water for a full analytical suite;
- TK 570-1; developed and sampled; yielded enough water for a full analytical suite;
- OW-57; developed and sampled; yielded enough water for a full analytical suite; and
- OW-58; developed and sampled; yielded enough water for a full analytical suite;

4.4.1 Groundwater Investigation

The drilling equipment was decontaminated between each borehole, as described in Appendix E. The well development and purging are also discussed in Appendix E. The installation of the temporary and permanent wells and the collection of groundwater samples are discussed below in numerical order. The fluid level measurements discussed below are provided in Table 4 with the field water quality measurements.

TK568-1

On September 23, 2016 the drilling rig was set up on location TK 568-1. The boring was installed using the HSA drilling method. Groundwater was encountered in a clayey sand (32 feet bgl to 33 feet). The sampling was terminated at 49 feet bgl. Activities at this location were then shut down due to a rain storm. The augers were left in the borehole.

On September 26, 2016 a temporary monitor well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 23 feet bgl to 38 feet bgl. The top of the screen was set approximately 9 feet above the uppermost saturated interval (clayey sand – 32 feet bgl to 33 feet bgl). The screen was extended to a depth of 38 feet bgl which allowed for screening across another saturated interval encountered (silty sand – 36 feet bgl to 38 feet bgl). The screen was not placed deeper since saturation was not encountered below 38 feet bgl.

A sand filter pack was installed to approximately 21 feet bgl. A bentonite seal was installed to approximately 17.5 feet bgl. The top of casing was approximately 2 feet above ground level.

On October 1, 2016 the well was gauged. Phase-separated hydrocarbon was not detected. The depth to water was 30.88 feet below top of casing (btoc) (28.88 feet bgl). Approximately 1.5 gallons of groundwater were developed/purged from the well using a new bailer and rope. The well was bailed dry. The purge water was silty/muddy and exhibited a hydrocarbon odor.

On October 2, 2016 the well was gauged. Phase-separated hydrocarbon was not detected. The depth to water was 31.13 btoc (29.13 feet bgl). The well was sampled on October 2, 2016 and yielded enough water to collect samples for a full analytical suite.

All development/purge water was disposed at the bundle cleaning pad. On October 3, 2016 the well casing and screen were removed and the borehole was grouted.

TK568-2

On September 27, 2016 the drilling rig was set up on location TK 568-2. The boring was installed using the HSA drilling method. A temporary monitoring well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from

26 feet bgl to 36 feet bgl. The top of the screen was set approximately 2 feet above the uppermost saturated interval (clayey sand – 30 feet bgl to 32 feet bgl). The screen was extended to a depth of 38 feet bgl which allowed for the screening across additional saturated intervals encountered (gravelly sand – 32 feet bgl to 34 feet bgl and sandy gravel – 34 feet bgl to 35 feet bgl). The screen extended to 36 feet bgl which was approximately one foot into the bedrock (claystone – 35 feet bgl to 36 feet bgl).

A sand filter pack was installed to approximately 23.5 feet bgl. A bentonite seal was installed to approximately 20 feet bgl. The top of casing was approximately 2 feet above ground level.

On October 1, 2016 the well was gauged. Phase-separated hydrocarbon was not detected. The depth to water was 28.03 feet btoc (26.03 feet bgl). Approximately 2 gallons of groundwater were developed/purged from the well using a new bailer and rope. The well was bailed dry. The purge water was turbid and exhibited a hydrocarbon odor.

On October 2, 2016 the well was gauged. Phase-separated hydrocarbon was not detected. The depth to water was 29.01 feet btoc (27.01 feet bgl). The well was sampled on October 2, 2016 and yielded enough water to collect samples for a full analytical suite.

All development/purge water was disposed at the bundle cleaning pad. On October 3, 2016 the well casing and screen were removed and the borehole was grouted.

<u>TK 569-1</u>

On October 4, 2016 the drilling rig was set up on location TK 569-1. The boring was installed using the HSA drilling method. A temporary monitor well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 23 feet bgl to 38 feet bgl. The top of the screen was set approximately 1 foot above the occurrence of moist to saturated sand seams within a clayey silty sand (24 feet bgl to 26 feet bgl). The screen was extended to a depth of 38 feet bgl which allowed for the screening across additional saturated intervals encountered (sandy clay – 26 feet bgl to 28 feet bgl, gravelly silty sand – 28 feet bgl to 30 feet bgl and clayey sandy gravel - 30 feet bgl to 31.5 feet bgl). The screen extended to 38 feet bgl which was approximately one foot into a damp clayey gravel. The screen did not intercept the top of the bedrock (claystone – 40 feet bgl to 42 feet bgl).

A sand filter pack was installed to approximately 19.5 feet bgl. A bentonite seal was installed to approximately 16 feet bgl. The top of casing was approximately 2.5 feet above ground level.

On October 5, 2016 the well was gauged. Phase-separated hydrocarbon was detected at a depth of 28.95 feet btoc (26.45 feet bgl). The depth to water was 29.97 feet btoc (27.47 feet bgl). Approximately 25 gallons of groundwater and phase-separated hydrocarbons were developed/purged from the well using a new bailer and rope. The purged fluids was a mixture of groundwater and phase-separated hydrocarbons and exhibited a hydrocarbon odor.

The well was allowed to recharge for 3 hours and was gauged. Phase-separated hydrocarbon was not detected. The depth to water was 29.34 feet btoc (26.84 feet bgl). The well was sampled on October 5, 2016 and yielded enough water to collect samples for a full analytical suite.

All development/purge water was disposed at the bundle cleaning pad. On October 6, 2016 the well casing and screen were removed and the borehole was grouted.

<u>TK 569-2</u>

On October 4, 2016 the drilling rig was set up on location TK 569-2. The boring was installed using the HSA drilling method. A temporary monitor well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 26 feet bgl to 36 feet bgl. The top of the screen was set approximately 4 feet above the occurrence of moist to saturated silty sand seams within a silty clay (30 feet bgl to 32 feet bgl). The screen was extended to a depth of 36 feet bgl which corresponded to the top of the bedrock (claystone – 36 feet bgl to 38 feet bgl).

A sand filter pack was installed to approximately 23 feet bgl. A bentonite seal was installed to approximately 19 feet bgl. The top of casing was approximately 2 feet above ground level.

On October 5, 2016 the well was gauged. Phase-separated hydrocarbon was detected at a depth of 29.65 feet btoc (27.65 feet bgl). The depth to water was 29.95 feet btoc (27.95 feet bgl). Approximately 7.5 gallons of groundwater and phase-separated hydrocarbons were developed/purged from the well using a new bailer and rope. The purged fluids was a mixture of groundwater and phase-separated hydrocarbons and exhibited a hydrocarbon odor.

The well was allowed to recharge for 5 hours and was gauged. Phase-separated hydrocarbon was detected at a depth of 29.65 feet btoc (27.65 feet bgl). The depth to water was 29.72 feet btoc (27.72 feet bgl). The well was sampled on October 5, 2016 and yielded enough water to collect samples for a full analytical suite.

All development/purge water was disposed at the bundle cleaning pad. On October 6, 2016 the well casing and screen were removed and the borehole was grouted.

TK 569-3

On September 28, 2016 the drilling rig was set up on location TK 569-3. The boring was installed using the HSA drilling method. A temporary monitor well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 22 feet bgl to 37 feet bgl. The top of the screen was set approximately 4 feet above the occurrence of saturation within a silty sand (26 feet bgl to 27 feet bgl). The screen was extended to a depth of 37 feet bgl which allowed for the screening across additional saturated intervals encountered (sandy gravel – 27 feet bgl to 28 feet bgl, sandy clayey gravel – 28 feet bgl to 31.5 feet bgl and sandy gravel - 34 feet bgl to 36 feet bgl). The screen extended to 37 feet bgl which was approximately one foot into a damp sandy clayey gravel. The screen did not intercept the top of the bedrock (claystone – 38 feet bgl to 39 feet bgl).

A sand filter pack was installed to approximately 19.5 feet bgl. A bentonite seal was installed to approximately 16 feet bgl. The top of casing was approximately 2.25 feet above ground level.

On October 1, 2016 the well was gauged. Phase-separated hydrocarbon was detected at a depth of 28.35 feet btoc (26.10 feet bgl). The depth to water was 28.36 feet btoc (26.11 feet bgl). Approximately 2 gallons of groundwater and phase-separated hydrocarbons were developed/purged from the well using a new bailer and rope. The well was bailed dry at 2 gallons. The purged fluids was a mixture of groundwater and phase-separated hydrocarbons and exhibited a hydrocarbon odor.

October 2, 2016 the well was gauged prior to sampling. Phase-separated hydrocarbon was not detected. The depth to water was 28.60 feet btoc (26.35 feet bgl). The well was sampled on October 2, 2016 and yielded enough water to collect samples for a full analytical suite.

All development/purge water was disposed at the bundle cleaning pad. On October 6, 2016 the well casing and screen were removed and the borehole was grouted.

TK 570-1

On September 27, 2016 the drilling rig was set up on location TK 570-1. The boring was installed using the HSA drilling method. A temporary monitor well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from

28 feet bgl to 43 feet bgl. The top of the screen was set approximately 5 feet above the occurrence of saturation within a gravelly sand (33 feet bgl to 34 feet bgl). The screen was extended to a depth of 43 feet bgl which allowed for the screening across additional saturated intervals encountered (sandy gravel – 34 feet bgl to 37 feet bgl, and clayey sandy gravel – 41 feet bgl to 42 feet bgl). The screen extended to 43 feet bgl which was approximately one foot into a damp to dry gravelly clay. The screen did not intercept the top of the bedrock (claystone – 44 feet bgl to 45 feet bgl).

A sand filter pack was installed to approximately 25 feet bgl. A bentonite seal was installed to approximately 22.5 feet bgl. The top of casing was approximately 2 feet above ground level.

On September 30, 2016 the well was gauged. Phase-separated hydrocarbon was detected at a depth of 33.75 feet btoc (31.75 feet bgl). The depth to water was 35.63 feet btoc (33.63 feet bgl). Approximately 20 gallons of groundwater and phase-separated hydrocarbons were developed/purged from the well using a new bailer and rope. The purged fluids was a mixture of groundwater and phase-separated hydrocarbons and exhibited a hydrocarbon odor.

The well was gauged prior to sampling. Phase-separated hydrocarbon was detected at a depth of 34.60 feet btoc (32.60 feet bgl). The depth to water was 34.89 feet btoc (32.89 feet bgl). The well was sampled on September 30, 2016 and yielded enough water to collect samples for a full analytical suite.

All development/purge water was disposed at the bundle cleaning pad. On October 3, 2016 the well casing and screen were removed and the borehole was grouted.

<u>OW-57</u>

On September 21, 2016 the drilling rig was set up on location OW-57. The boring was installed using the HSA drilling method. A permanent monitoring well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 15 feet bgl to 25 feet bgl. The top of the screen was set approximately 3 feet above the occurrence of saturation within a gravelly clay (18 feet bgl to 20 feet bgl). The screen was extended to a depth of 25 feet bgl which allowed for the screening across additional saturated intervals encountered (sandstone/sand – 20 feet bgl to 22 feet bgl, and gravelly sandy clay – 22 feet bgl to 25 feet bgl). The screen extended to 25 feet bgl which was approximately at the base of the gravelly sandy clay. The screen did not intercept the top of the bedrock (claystone – 25 feet bgl to 27 feet bgl).

Filter pack sand was installed to a depth of 12 feet bgl. A bentonite seal was installed to 8 feet bgl. The annular seal (bentonite grout) was installed on September 21, 2016. The top of casing was approximately 3 feet above ground level.

On September 30, 2016 the well was gauged. Phase-separated hydrocarbon was not detected. The depth to water was 21.62 feet btoc (18.62 feet bgl). Approximately 2.5 gallons of groundwater was developed/purged from the well using a new bailer and rope. The well purged dry at 2.5 gallons. The developed/purged fluid was clear and exhibited a hydrocarbon odor.

On October 1, 2016, the well was gauged prior to sampling. Phase-separated hydrocarbon was not detected. The depth to water was 21.72 feet btoc (18.72 feet bgl). The well was sampled and yielded enough water to collect samples for a full analytical suite. All development/purge water was disposed at the bundle cleaning pad.

The surface completion consists of a stickup completion, which included a protective steel cover secured in a concrete pad. The protective steel cover is equipped with a lid that is locked. Bollards were installed around the concrete pad. The surface completion and bollards were installed on October 5, 2016.

<u>OW-58</u>

On September 22, 2016 the drilling rig was set up on location OW-58. The boring was installed using the HSA drilling method. A permanent monitoring well was installed at this location with 2-inch Schedule 40 PVC screen and casing. The well was installed with the screened interval ranging from 38 feet bgl to 48 feet bgl. The top of the screen was set approximately 9 feet above the occurrence of saturation within a sandy gravel (47 feet bgl to 48 feet bgl). The screen extended to 48 feet bgl which was approximately at the base of the sandy gravel. The screen did not intercept the top of the bedrock (shale – 48 feet bgl to 48.5 feet bgl).

Filter pack sand was installed to a depth of 35 feet bgl. A bentonite seal was installed to 32 feet bgl. The top of casing was approximately 1.66 feet above ground level.

On September 30, 2016 the well was gauged. Phase-separated hydrocarbon was detected at a depth of 27.60 feet btoc (25.94 feet bgl). The depth to water was 28.58 feet btoc (26.92 feet bgl). Approximately 50 gallons of groundwater and phase-separated hydrocarbons were developed/purged from the well using a submersible pump. The pump was decontaminated prior to development. New tubing was used. The purged fluids was a mixture of groundwater and phase-separated hydrocarbons and exhibited a hydrocarbon odor.

On September 30, 2016, the well was gauged prior to sampling. Phase-separated hydrocarbon was not detected. The depth to water was 28.98 feet btoc (27.32 feet bgl). The well was sampled and yielded enough water to collect samples for a full analytical suite. All development/purge water was disposed at the bundle cleaning pad.

The annular seal (bentonite grout) was installed on October 3, 2016. OW-58 is located in the access road at the rail loading rack and so it was required to cut the well casing flush to ground level and install a flush mount completion. The well casing is affixed with a lockable well cap and lock. The surface completion was installed on October 3, 2016.

Section 5
Regulatory Criteria

The applicable screening and potential cleanup levels are specified in NMED's *Risk Assessment Guidance for Site Investigations and Remediation* dated March 2017 and in the Environmental Protection Agency's (EPA) Regional Screening Levels dated June 2017.

For non-residential properties (e.g., the Gallup Refinery), the soil screening levels must be protective of commercial/industrial workers throughout the upper one foot of surface soils and construction workers throughout the upper ten feet based on NMED criteria. NMED residential soil screening levels are applied to the upper ten feet and soil screening levels for protection of groundwater apply throughout the vadose zone. EPA soil screening levels for direct contact exposure apply to the upper two feet of the vadose zone. To achieve closure as "corrective action complete without controls," the affected media must meet residential screening levels, which are presented in Table 5. Table 5 also provides a list of the available NMED and EPA soil screening levels for non-residential properties. While Table 5 indicates the various depths to which the individual soil screening levels are applicable, Table 7 discussed below does not include this level of detail.

The groundwater cleanup levels are based on New Mexico Water Quality Control Commission (WQCC) standards (20.6.2.7 WW NMAC, 20.6.2.3103, and 20.6.2.4103) unless there is a federal maximum contaminant level (MCL), in which case the lower of the two values is selected as the cleanup level. If neither a WCQQ standard nor an MCL is available, then the cleanup level is based on a NMED Tap Water Screening Level. If a NMED Tap Water Screening Level is not available for a constituent, then an EPA Regional Screening Level is used. If an EPA Regional Screening Level is for a carcinogenic compound, then the screening level is multiplied by 10 to bring the risk level to 1E-05 to be consistent with the NMED screening levels. Table 6 presents the groundwater cleanup levels, with the applicable cleanup level bolded.

The aforementioned Table 5 has soil screening levels for the soil-to-groundwater pathway that are based on a dilution/attenuation factor (DAF) of 1.0, which is NMED's most conservative screening level for this pathway. The soil-to-groundwater soil screening level is not applicable to the specific conditions observed in the OW-14 Source Investigation Area. NMED recently provided guidance to address this situation in Comment No. 2 in the June 14, 2018 Disapproval Investigation Report

SWMU 10 Sludge Pits. NMED stated, ". . . since groundwater contamination beneath the Sludge Pits originates from various upgradient sources, and contamination is already present in the aquifer, the use of a site-specific DAF is not applicable. DAF is used to determine if contaminants in soil can migrate to groundwater, and in this case, groundwater is contaminated in the area." The current data shows widespread groundwater impacts throughout the area of investigation and beyond.

The screening levels that are compared to individual soil sample results are presented in Table 7. The screening levels included in Table 7 are based on residential and non-residential land use. For the non-residential screening levels, the lower of the construction worker scenario and commercial/industrial scenario screening levels for each constituent is included in the data tables if NMED screening levels are available. If NMED soil screening levels are not available for a particular constituent, then EPA soils screening levels are used. If an EPA soil screening level is for a carcinogenic compound, then the screening level is multiplied by 10 to bring the risk level to 1E-05 to be consistent with the NMED screening levels. The screening levels in Table 7 have not been segregated based on depth of the soil sample as discussed above for Table 5. The screening levels that are compared to individual groundwater sample results are presented in Table 8.

A review of the NMED guidelines for TPH indicates that the TPH screening levels were developed based on screening levels and compositional assumptions developed by the Massachusetts Department of Environmental Protection (MADEP). The analytical results, as presented in Table 7, are reported for gasoline range organics (C6-C10), diesel range organics (>C10-C28), and motor oil range organics (>C28-C35). The applicable TPH screening levels for comparison to the individual soil samples are selected from Table 6-2 of the NMED guidance (NMED, 2017).

As there could have been a variety of petroleum types (e.g., various refined products) placed in potential source areas [e.g., the Refinery Tank Farm (SWMU No. 6)], the screening level for "unknown oil" was selected for comparison to the gasoline range, diesel range and motor oil range soil analytical results.

The motor oil range analytical results are compared to the "unknown oil" screening level as directed by NMED. However, it is noted that the laboratory analyses for motor oil range organics only reports results for the >C28 to C35 hydrocarbon range, while the "unknown oil" screening level is based on a hydrocarbon mixture assumed to include only C11-C22 aromatics.

Some of the individual constituents reported by the laboratory do not have screening levels but were all non-detect with respect to soil, except 4-isopropyltoluene and 3+4-methylphenol. With respect to groundwater, there were also detections of constituents that do not have screening levels. The constituents detected in groundwater that do not have screening levels include, 2-hexanone, 4-isopropyltoluene, 4-methyl-2-pentanone, n-butylbenzene, n-propylbenzene, sec-butylbenzene, and carbazole. None of these constituents are classified as a known carcinogen.

Section 6
Site Impacts

This section discusses the chemical analyses performed and presents the analytical results that were obtained through the analysis of soil and groundwater samples. The results for soils and groundwater analyses are compared to applicable screening levels, as described in Section 5.0.

6.1 Soil Analytical Results

Soil samples were analyzed by Hall Environmental Analysis Laboratory in Albuquerque, New Mexico using the following methods for organic constituents:

- SW-846 Method 8260/5035 volatile organic compounds;
- SW-846 Method 8270C semi-volatile organic compounds; and
- SW-846 Method 8015D gasoline, diesel, and motor oil range petroleum hydrocarbons.

Soil samples were analyzed for the following metals using the indicated analytical methods, respectively.

Analyte	Analytical Method
Antimony	SW-846 Method 6010B
Arsenic	SW-846 Method 6010B
Barium	SW-846 Method 6010B
Beryllium	SW-846 Method 6010B
Cadmium	SW-846 Method 6010B
Chromium	SW-846 Method 6010B
Cobalt	SW-846 Method 6010B
Cyanide	SW-846 Method 9012B
Iron	SW-846 Method 6010B
Lead	SW-846 Method 6010B
Mercury	SW-846 Method 7471
Manganese	SW-846 Method 6010B
Nickel	SW-846 Method 6010B

Analyte	Analytical Method
Selenium	SW-846 Method 6010B
Silver	SW-846 Method 6010B
Vanadium	SW-846 Method 6010B
Zinc	SW-846 Method 6010B

The analytical results for soil samples are summarized in Table 7. The individual results that exceed the applicable cleanup levels are highlighted, as noted in the table footnotes. Maps showing the distribution of constituents detected in soils above the lowest applicable screening levels are included as Figures 14 through 17. The concentrations shown on figures that exceed the screening levels in Table 7 are underlined on the figures. The laboratory analytical reports are included in Appendix H and the data validation of the results, which includes the analytical results for the associated QA/QC samples, is included in Appendix I. The constituents that have concentrations in soils above screening levels are discussed below.

Benzene was detected at a concentration (44 mg/kg) above the residential soil screening level of 17.7 mg/kg in sample TK569-3 (24-26'). This sample was collected at a depth below 10 feet and thus the residential screening level does not apply. The detected concentrations range from 0.0054 to 44 mg/kg. The concentrations are plotted on Figure 14.

All ethylbenzene sample results are less than the residential soil screening level of 74.5 mg/kg with the exception of TK 569-3 (24-26'), which has a reported concentration of 88 mg/kg. This sample was collected at a depth below 10 feet and thus the residential screening level does not apply. The detected concentrations range from 0.0004 mg/kg to 88 mg/kg. The concentrations are plotted on Figure 15.

Gasoline Range Organics were detected at concentrations above the residential soil screening level of 1,000 mg/kg in soil samples TK-568-1 (12-14'), TK 569-3 (24-26'), TK 570-1 (32-34'), OW-58 (22-24') and OW-58 (48-48.5') at concentrations of 2,700 mg/kg, 13,000 mg/kg, 2,500 mg/kg, 1,500 mg/kg, and 1,700 mg/kg, respectively. These detections were in samples collected from below 10 feet and thus the residential screening level does not apply to these samples. The concentration detected in the sample TK 569-3 (24-26') exceeded the non-residential soil screening level of 3,800 mg/kg. The detected concentrations range from 1.3 mg/kg to 13,000 mg/kg. The concentrations are plotted on Figure 16.

Diesel Range Organics were detected at a concentration (1,500 mg/kg) above the residential soil screening level of 1,000 mg/kg in one soil sample [TK 569-3 (24-26')] as indicated with highlighting in Table 7. This detection was in a sample collected from below 10 feet and thus the residential screening level does not apply to this sample. The detected concentrations range from 1.7 mg/kg to 1,500 mg/kg. The concentrations are plotted on Figure 17.

6.2 Groundwater Analytical Results

The groundwater samples were analyzed for organic constituents by the following methods:

- SW-846 Method 8260 volatile organic compounds;
- SW-846 Method 8270 semi-volatile organic compounds;
- SW-846 Method 8015D gasoline range organics; and
- SW-846 Method 8015M/D diesel and motor oil range organics.

Groundwater samples were analyzed for the following total and dissolved metals using the indicated analytical methods.

Analyte	Analytical Method
Antimony	SW-846 Method 200.8
Arsenic	SW-846 Method 200.8
Barium	SW-846 Method 200.7
Beryllium	SW-846 Method 200.7
Cadmium	SW-846 Method 200.7
Chromium	SW-846 Method 200.7
Cobalt	SW-846 Method 200.7
Iron	SW-846 Method 200.7
Lead	SW-846 Method 200.8
Manganese	SW-846 Method 200.7
Nickel	SW-846 Method 200.7
Selenium	SW-846 Method 200.8

Analyte	Analytical Method
Silver	SW-846 Method 200.7
Vanadium	SW-846 Method 200.7
Zinc	SW-846 Method 200.7

Groundwater samples were also analyzed for the following total metals using the indicated analytical methods.

Analyte	Analytical Method
Cyanide	SW-846 Method 9012B
Mercury	SW-846 Method 245.1

In addition, groundwater samples were analyzed for chloride, fluoride, and sulfate using EPA method 300.

The analytical results and the applicable cleanup levels are presented in Table 8. The individual results that exceed the applicable cleanup levels are bolded. Maps depicting the distribution of the various constituents detected in groundwater samples above the screening levels are provided in Figures 18 through 20, with the concentrations that exceed the screening levels underlined. The results for the associated QA/QC samples and the data validation are provided in Appendix I. The laboratory analytical reports are included in Appendix H. The constituents with reported concentrations that exceed screening levels are discussed below. In addition to the groundwater samples collected pursuant to the Work Plan, the chemical analyses for the groundwater sample collected at down-gradient well OW-14 and recovery wells RW-1 and RW-2 during the third quarterly sampling event in 2016 are included in Table 8 and included in the discussion below.

Total arsenic was detected above the screening level of 10 micrograms per liter (ug/l) in two samples collected at TK 569-1 and TK 570-1 with both reported at 16 ug/l. The detected total arsenic concentrations range from 4.9 ug/l to 16 ug/l. One sample (TK 569-1) has a dissolved arsenic concentration above the screening level at 14 ug/l, with dissolved detections running from 2.9 ug/l to 14 ug/l. The dissolved analyses are shown on Figure 18.

For the total analyses, barium was detected above the screening level of 2,000 ug/l in seven of the eight samples collected, including TK 568-2, TK 569-1, TK 569-2, TK 569-3, TK 570-1, OW-57, and

OW-58. The total barium analyses results range from 2,000 ug/l to 8,700 ug/l. For the dissolved analyses, barium was detected above the screening level of 1,000 ug/l in all eight of the samples collected with concentrations ranging from 1,800 ug/l to 6,300 ug/l. The samples collected at OW-14 also contained total and dissolved results above the screening level at 2,100 ug/l and 2,200 ug/l, respectively. The dissolved barium results are plotted on Figure 18.

Beryllium (total analyses only) was detected above the screening level of 4 ug/l in one groundwater sample collected at TK 570-1 at a concentration of 6.4 ug/l. None of the samples from the dissolved analyses detected the presence of beryllium above the detection limits, which are all less than the screening level. The detected total analyses range from 0.43 ug/l to 6.4 ug/l.

Cobalt (total analyses) was detected at concentrations above the screening level (6 ug/l) in five of the groundwater samples collected (TK 569-1, TK 569-2, TK 570-1, OW-57, and OW-58). The total cobalt analyses range from 4.4 ug/l to 20 ug/l. The dissolved analyses for cobalt range from 1.4 ug/l to 7.4 ug/l. These concentrations did not exceed the screening level of 50 ug/l.

Iron was detected above the screening level in samples analyzed for total (four exceedances at TK 569-1, TK 569-2, TK 570-1, and OW-58) and dissolved analyses (five exceedances at TK 568-1, TK 569-1, TK 569-3, TK 570-1, and OW-58). The total iron analyses range from 3,500 ug/l to 36,000 ug/l in comparison to a screening level of 13,800 ug/l. The dissolved analyses range from 550 ug/l to 7,900 ug/l vs. a screening level of 1,000 ug/l. The dissolved analyses results are shown on Figure 18.

Lead (total analyses) was detected at concentrations above the screening level (15 ug/l) in three of the groundwater samples collected (TK 569-1, TK 570-1, and OW-58). The total lead analyses range from 0.31 ug/l to 64 ug/l. None of the dissolved analyses exceed the screening level of 15 ug/l, with the dissolved analyses for lead ranging from 0.41 ug/l to 1.2 ug/l.

Manganese was detected above the screening levels in both total and dissolved analyses. The total concentration screening level of 2,020 ug/l was exceeded in five locations in groundwater samples collected at temporary wells TK 569-1, TK 569-2, and TK 570-1 and permanent wells OW-57 and OW-58. The total analyses results range from 1,800 ug/l to 7,200 ug/l. Dissolved manganese concentrations exceeded the screening level of 200 ug/l in eight locations (TK 568-1, TK 568-2, TK 569-1, TK 569-2, TK 569-3, TK 570-1, OW-57, and OW-58). The dissolved manganese concentrations range from 1,600 ug/l to 3,100 ug/l. Samples collected at OW-14 have also shown exceedances of the screening levels with a concentration of 2,200 ug/l for both total and dissolved analyses. The dissolved analyses results are shown on Figure 18.

One groundwater sample collected at temporary well TK 570-1, had a concentration of total vanadium (65 ug/l) that exceeds the screening level of 63.1 ug/l. The detected results for the total vanadium analyses ranged from 3.8 ug/l to 65 ug/l. The detected results for dissolved analyses range from 1.7 ug/l to 7.8 ug/l and do not exceed the screening level.

1,2,4-Trimethylbenzene was detected above the screening level of 56 ug/l at seven of the eight locations where groundwater samples were collected, including TK 568-1, TK 568-2, TK 569-1, TK 569-2, TK 569-3, TK 570-1, and OW-58. The detected concentrations range from 7.3 ug/l to 1,500 ug/l and are shown on Figure 19. Concentrations of 7.1 ug/l and 210 ug/l were detected in the samples collected at OW-14 and RW-2, respectively.

One groundwater sample collected at TK 568-1 contained 1,2-dichloropropane at a concentration of 32 ug/l, which exceeds the screening level of 5 ug/l. This was the only sample to have this constituent detected.

1,3,5-Trimethylbenzene was detected above the screening level of 60 ug/l at seven of the eight locations where groundwater samples were collected, including TK 568-1, TK 568-2, TK 569-1, TK 569-2, TK 569-3, TK 570-1, and OW-58. The detected concentrations range from 190 ug/l to 430 ug/l and are shown on Figure 19. Concentrations of 0.82 ug/l and 44 ug/l were detected in the samples collected at OW-14 and RW-2, respectively.

1-Methylnaphthalene was detected above the screening level of 1.1 ug/l in all eight groundwater samples collected with concentrations ranging from 24 ug/l to 150 ug/l. It has also been detected at OW-14 and RW-2 at 34 ug/l and 88 ug/l, respectively. The detected concentrations are shown on Figure 19.

2-Methylnaphthalene was detected above the screening level of 36 ug/l in the groundwater samples collected at TK 568-1, TK 568-2, TK 569-1, OW-57 and OW-58. The detected concentrations range from 28 ug/l to 140 ug/l and are shown on Figure 19.

Naphthalene was detected above the screening level of 1.65 ug/l in all eight groundwater samples collected with detected concentrations of ranging from 82 ug/l to 320 ug/l. Naphthalene has also recently been detected at OW-14 and RW-2 at 18 ug/l and 140 ug/l, respectively. The detected concentrations are shown on Figure 19.

The screening level for benzene (5 ug/l) was exceeded in the groundwater samples collected at all eight locations with results ranging between 11,000 ug/l and 34,000 ug/l. Benzene has also been detected at OW-14 and RW-2 with a concentration of 8,100 ug/l and 38,000 ug/l, respectively. The results are shown on Figure 20.

The screening level for ethylbenzene was exceeded in the groundwater samples collected at seven of the eight locations with only the sample collected at OW-57 having a concentration below the screening level of 700 ug/l. The detected concentrations range from 570 ug/l to 2,700 ug/l and are shown on Figure 20. Ethylbenzene was detected at concentrations of 250 ug/l and 1,200 ug/l at OW-14 and RW-2, respectively.

Methyl tert-butyl ether (MTBE) was detected above the screening level of 143 ug/l in six groundwater samples, which were collected at TK 568-1, TK 569-1, TK 569-2, TK 569-3, OW-57, and OW-58 at concentrations of 10,000 ug/l, 1,100 ug/l, 1,000 ug/l, 700 ug/l, 180 ug/l, and 3,300 ug/l, respectively. The detected concentrations range from 74 ug/l to 10,000 ug/l. In addition, MTBE has been detected at OW-14 and RW-2 at concentrations of 580 ug/l and 1,600 ug/l. The MTBE concentrations are plotted on Figure 20.

Toluene was detected above the screening level of 750 ug/l at seven of the eight locations with only the sample collected at OW-57 having a concentration (54 ug/l) below the screening level. The detected concentrations range from 54 ug/l to 41,000 ug/l. Toluene was also detected at OW-14 and RW-2 at concentrations of 2.9 ug/l and 3,800 ug/l. The results are shown on Figure 20.

Xylenes (total) was detected above the screening level of 620 ug/l in seven of the eight groundwater samples collected with only the groundwater sample collected at OW-57 having a concentration (140 ug/l) less than the screening level. The detected concentrations range from 140 ug/l to 15,000 ug/l and are shown on Figure 20. Xylenes were also detected at OW-14 and RW-2 at concentrations of 8 ug/l and 3,100 ug/l, respectively.

The semivolatile constituents that were detected above the screening levels included the following constituents with the respective wells:

- 1-Methylnaphthalene - TK 568-1, TK 568-2, TK 569-1, TK 569-2, TK 569-3, TK 570-1, OW-57, and OW-58 (concentrations range from 59 ug/l to 120 ug/l vs. a screening level of 1.1 ug/l);
- 2-Methynaphthalene - TK 568-1, TK 568-2, TK 569-1, OW-57, and OW-58 (concentrations range from 49 ug/l to 110 ug/l vs. a screening level of 36 ug/l);
- Bis(2-ethylhexyl)phthalate - TK 569-1, TK 569-2, TK 569-3, and TK 570-1 (detected concentrations range from 2.8J ug/l to 66 ug/l vs a screening level of 6 ug/l); and
- Naphthalene - TK 568-1, TK 568-2, TK 569-1, TK 569-2, TK 569-3, TK 570-1, OW-57, and OW-58 (concentrations range from 47 ug/l to 220 ug/l vs. screening level of 1.65 ug/l).

Gasoline Range Organics were detected above the screening level (0.0398 mg/l) in all eight groundwater samples. The concentrations range from 46 mg/L to 260 mg/L.

Diesel Range Organics were detected above the screening level (0.0398 mg/l) in all eight groundwater samples. The concentrations range from 5.6 mg/L to 170 mg/L.

6.3 General Groundwater Chemistry

The measurement of field purging parameters included measurement of groundwater pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, and temperature. The results of the measurements are included in Table 4.

Section 7
Conclusions and Recommendations

This section summarizes and provides an evaluation of the potential impacts as shown in field screening data and analytical data. This is followed by recommendations for any future actions.

7.1 Conclusions

Soils

As noted above in Section 6.1, all of the detections of constituents in soils at concentrations above soil screening levels occur in soil samples that were collected below the depth to which the soil screening levels would normally apply (e.g., 10 feet for residential receptors). It is also noted that no soil samples were collected for analysis from depths within the upper 10 feet and thus there is no recent analytical data to indicate the presence or absence of contamination in the upper 10 feet. The presence of soil samples with elevated concentrations of constituents does help to better understand potential transport pathways. The greatest number of detections of organic constituents with the highest concentrations occurred in the soil sample collected at a depth of 24 feet to 26 feet bgl in boring TK 569-3. This boring is located up-gradient of Tank 569 and down-gradient of Tank 570. There were much lower concentrations of organic constituents detected in a shallower (16 feet to 18 feet bgl) soil sample in the same boring, potentially indicating the deeper impacts are the result of lateral transport to this location.

Groundwater

In the area of the September 2016 investigation, groundwater was encountered in all eight of the soil borings/temporary wells and permanent wells. Separated phase hydrocarbon was detected in monitor well OW-58 and temporary wells TK 569-1, TK 569-2, TK 569-3, and TK 570-1. The groundwater samples collected from the wells were reported to have seven metals and fourteen organic constituents in concentrations above the screening levels. The highest benzene, ethylbenzene, toluene and xylene concentrations were found in the groundwater sample from TK 569-1. Temporary well TK 569-1 is located on the northwest side of Tank 569 and may be cross-gradient to Tank 569, while being down-gradient of Tank 570.

The highest MTBE concentration was found in a groundwater sample from TK 568-1 (10,000 ug/L), which is located north (downgradient) of Tank 568. The groundwater sample collected from the temporary well TK 568-2, which is up-gradient of Tank 568, was reported to have a MTBE concentration of 140 ug/L. The second highest MTBE concentration was found in groundwater collected from OW-58 (3,300 ug/L), which is located approximately 560 feet north (down-gradient) of TK 568-1.

It appears that at least one source of the hydrocarbon is Tank 570, which was recently discovered to have two small holes in the floor of the tank. Currently, there is not a well on the up-gradient side (south) of Tank 570, so other possible up-gradient sources cannot be eliminated. Tank 569 was suspected to be a source based on investigations conducted in the 1990s, but the current data cannot confirm or eliminate it as a current source. Recent tank inspections do not indicate recent leaks from Tank 569. The MTBE appears to have been sourced from Tank 568, but it was repaired and is no longer used to store petroleum products or additives.

7.2 Recommendations

An additional monitoring well is recommended to the south of Tank 570 to determine if there are any additional up-gradient sources. A well west of Tanks 569 and 570 could also provide better coverage to define impacts observed near these two tanks. Several wells could be completed northeast of RW-1 and OW-58 to evaluate the potential for contamination to migrate to the east/northeast. NMED has already requested another Investigation Work Plan for this area and further details will be provided in the Work Plan.

Section 8
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Tables

Figures

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Historical Boring Logs

Appendix B
Fluid Level Measurements

Appendix C

Waste Manifests

Appendix D

Survey Data

Appendix E

Field Methods

Field Methods

Pursuant to the Investigation Work Plan for the OW-14 Source Area Investigation, an investigation of soils and groundwater was conducted to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil borings and temporary monitoring wells were installed at the tank farm and adjacent to the rail loading rack. The field methods are described below and individual discussions are presented for the following activities:

- Drilling procedures;
- Soil screening;
- Decontamination procedures;
- Monitoring well development;
- Fluid level measurements;
- Purging of temporary monitoring wells/groundwater sample collection;
- Sample collection and handling procedures;
- Vadose zone vapor sampling;
- Equipment calibration; and
- Management of investigation derived waste.

Drilling Procedures

The soil borings were drilled using the hollow-stem auger (HSA) method. Soil samples were collected continuously and logged by a qualified geologist in accordance with the Unified Soil Classification System (USCS) nomenclature. As shown on the boring logs, the data recorded included the lithologic interval, symbol, percent recovery, field screening results, and a sample description of the cuttings and core samples.

Soil Screening

Samples obtained from the borings were screened in the field on 2-foot intervals for evidence of contaminants. Field screening results were recorded on the soil boring logs. Field screening results were used to aid in the selection of soil samples for laboratory analysis. The primary screening methods include: (1) visual examination, (2) olfactory examination, and (3) headspace vapor screening for volatile organic compounds.

Visual screening included examining the soil samples for evidence of staining caused by petroleum-related compounds or other substances that may have caused staining of soils such as elemental sulfur or cyanide compounds. Headspace vapor screening was conducted and involved placing a soil sample in a plastic sealable bag allowing space for ambient air. The bag was sealed, labeled and then shaken gently to expose the soil to the air trapped in the container. The sealed bag was allowed to rest for a minimum of 5 minutes while the vapors equilibrated. Vapors present within the sample bag's headspace were then measured by inserting the probe of a MiniRae 3000 portable volatile organic constituent (VOC) monitor in a small opening in the bag. The maximum value and the ambient air temperature were recorded on the field boring log for each sample. Field screening results and any conditions that were considered to be capable of influencing the results of the field screening were recorded on the field logs.

Decontamination Procedures

The drilling equipment (e.g., hollow-stem augers) was decontaminated between each borehole using a high pressure potable water wash. The sampling equipment coming in direct contact with the samples (e.g., hand augers and split-spoon samplers) were decontaminated using a brush, as necessary, to remove larger particulate matter followed by a rinse with potable water, wash with non-phosphate detergent, rinse with potable water, and double rinse with deionized water.

Fluid Level Measurements

The depth to separate phase hydrocarbon, if present, and groundwater was measured prior to purging the wells of potentially stagnant groundwater. A Geotech Interface Probe was used to measure fluid levels to 0.01 foot.

Well Development/Purging

The following wells were developed/purged using a new disposable bailer attached to the end of the clean rope.

- Temporary Wells – TK 568-1, TK 568-2, TK 569-1, TK-569-2, TK569-3, TK570-1; and
- Permanent Well - OW-57.

The following wells were developed/purged using a pump. The pump was decontaminated between wells. New tubing was used at each well.

- Permanent Wells - OW-58.

The groundwater and sediment removed from the wells were transported to the bundle cleaning pad in sealed 5-gallon buckets.

The purge volumes are calculated as follows:

Volume (gallons) = water column thickness (ft) x 3.14 x radius of well casing^2 (ft) x 7.48 (gals/ft). The calculated purge volumes and actual volumes removed from each well are presented below.

Well (Date)	Water Column Thickness (ft)	Calculated Purge Volume (gallons) – 3 well volumes	Actual Purge Volume (gallons)
TK 568-1 (10-1-16)	5.87	3.00	Bailed dry at 1.5
TK 568-2 (10-1-16)	10.34	5.25	Bailed dry at 2
TK 569-1 (10-5-16)	12.15	6.21	25
TK 569-2 (10-5-16)	8.75	4.47	Bailed dry at 7.5
TK 569-3 (10-5-16)	9.79	4.98	Bailed dry at 2
TK 570-1 (9-30-16)	8.72	4.44	20
OW-57 (9-30-16)	6.72	3.42	Bailed dry at 2.5
OW-58 (9-30-16)	18.82	9.60	50

NA – not applicable

Field measurements of groundwater stabilization parameters included pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, and temperature and the readings are presented in Table 4.

Sample Collection and Handling Procedures

Soil samples were collected using split-spoon samplers or directly from the auger bucket for borings completed with a hand auger. The selected portion of the sample interval was placed in pre-cleaned, laboratory-prepared sample containers for laboratory chemical analysis. Three soil samples were collected for VOC analysis in the following manner:

- Two sample aliquots were collected using a syringe for low-level VOC analysis pursuant to EPA method 5035. For these “Terracore” kits, 4- 5 grams (4cc) of soil was injected into each vial using the syringe. The syringes were disposed after soil collection.
- Two sample aliquots were collected using a syringe for preservation with methanol. For the methanol preserved kits, 10 grams (10 cc) of soil was injected into each methanol vial using the syringe. The syringes were disposed after soil collection.

- The third sample aliquot was placed in an 8-ounce glass jar, which was filled to the top to minimize any head space.

Two additional soil samples were collected in 8-ounce glass jars for semivolatile and metals analyses.

Groundwater samples were collected using disposable bailers and clean rope. The water was immediately poured directly into clean laboratory supplied sample containers with the exception of samples collected for dissolved metals analyses. Samples specified for dissolved metals analyses were filtered in the field using a disposable 0.45 micron filter. A new filter and syringe were used for each sample. All samples were immediately placed into an ice chest with ice. The samples were maintained in the custody of the sampler until the chain-of-custody form was completed and the ice chest was sealed for delivery to the laboratory.

Equipment Calibration

Soil vapor screening was conducted using a MiniRae 3000 portable VOC monitor. The instrument was calibrated at the beginning of each work day to a concentration of 100 ppm isobutylene.

The instruments used to measure groundwater stabilization parameters included an YSI Professional Series Data Logger and YSI Quatro Sonde. The calibration solutions used at the beginning of each day are as follows:

- pH solution;
- 7.0 pH solution;
- 10.0 pH solution; and
- 1.413 mS/cm conductivity solution.

Management of Investigation Derived Waste

The drilling rig and drilling equipment were decontaminated on the bundle cleaning pad. The water is diverted to the Refinery's wastewater treatment system up-stream of the API Separator. The decontamination water generated from sampling equipment was collected in buckets and disposed at the bundle cleaning pad at the end of each day of sampling. All development/purge water was collected in five gallon buckets and disposed at the bundle cleaning pad.

Soil cuttings were placed into open top 55-gallon drums and were sealed when not in use. Each drum of soils was labeled and temporarily stored in a concrete curbed area pending waste characterization and disposal.

Appendix F

Soil Boring/Well Logs

Appendix G

Permeability and Hydraulic Conductivity Evaluations

Appendix H

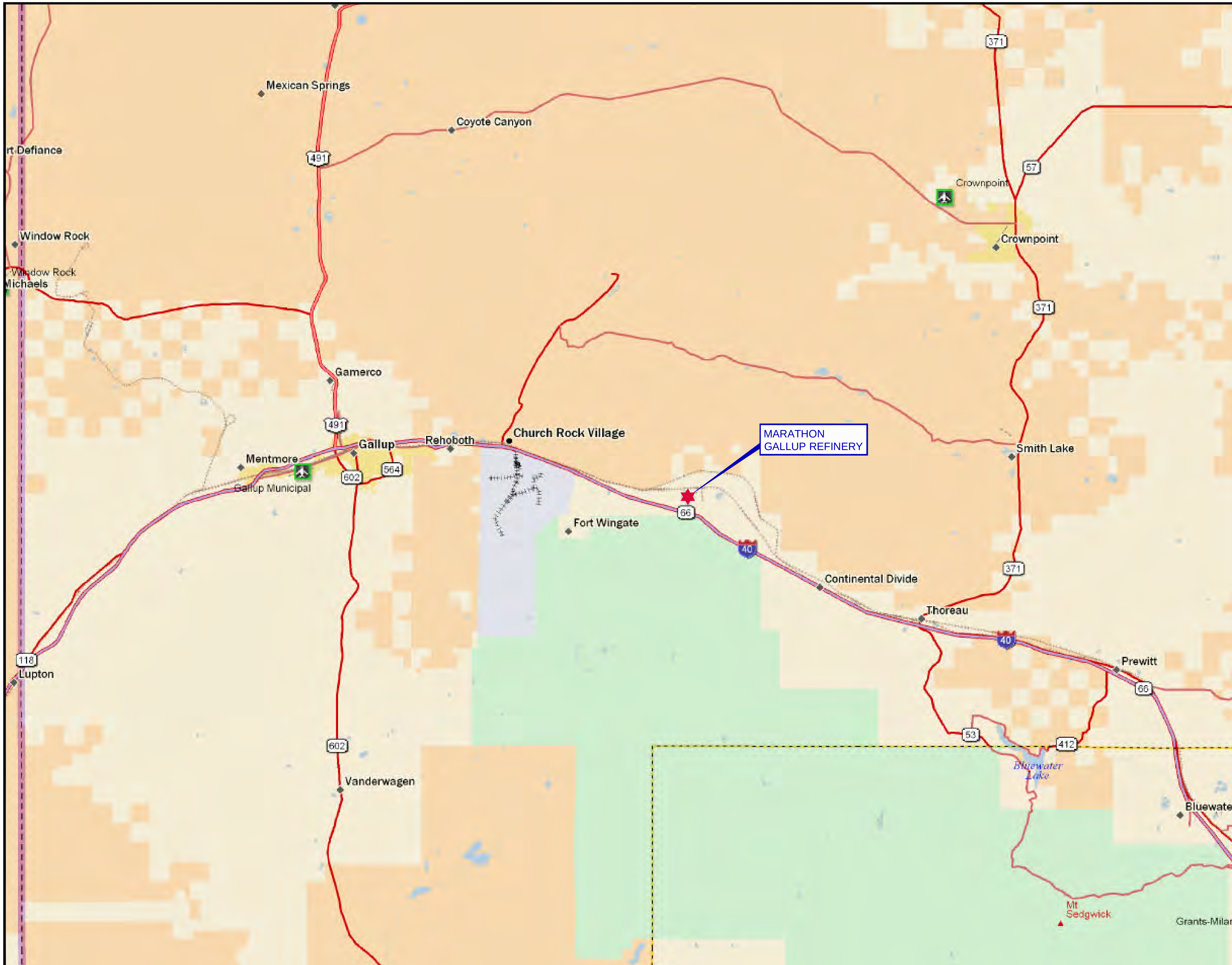
Analytical Data Reports

Appendix I

Quality Assurance/Quality Control Review

Appendix J

Tank Inspection Records



Map Source: DeLorme Street Atlas USA 2007 Plus.

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GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 12/09/18	FILE: Mathon–dB206

FIGURE 1
SITE LOCATION MAP
GALLUP REFINERY

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Austin, Texas 78759

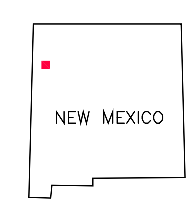
Aerial Map Source: Google Map, 01/05/2014.

0 260
SCALE IN FEET

LEGEND

OW-14 CHINLE/ALLUVIUM INTERFACE WELL LOCATION AND IDENTIFICATION NUMBER

OW-13 SONSELA MONITORING WELL LOCATION AND IDENTIFICATION NUMBER



GALLUP SITE LOCATION

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 1/20/19	FILE: Mathon–dB55

FIGURE 2
SITE MAP

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Suite 300
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Aerial Map Source: Google Map, 01/05/2014.

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PROJ. NO.: Marathon	DATE: 1/20/19	FILE: Mathon–dB147

FIGURE 3
LOCATION OF SOIL BORINGS AND WELLS

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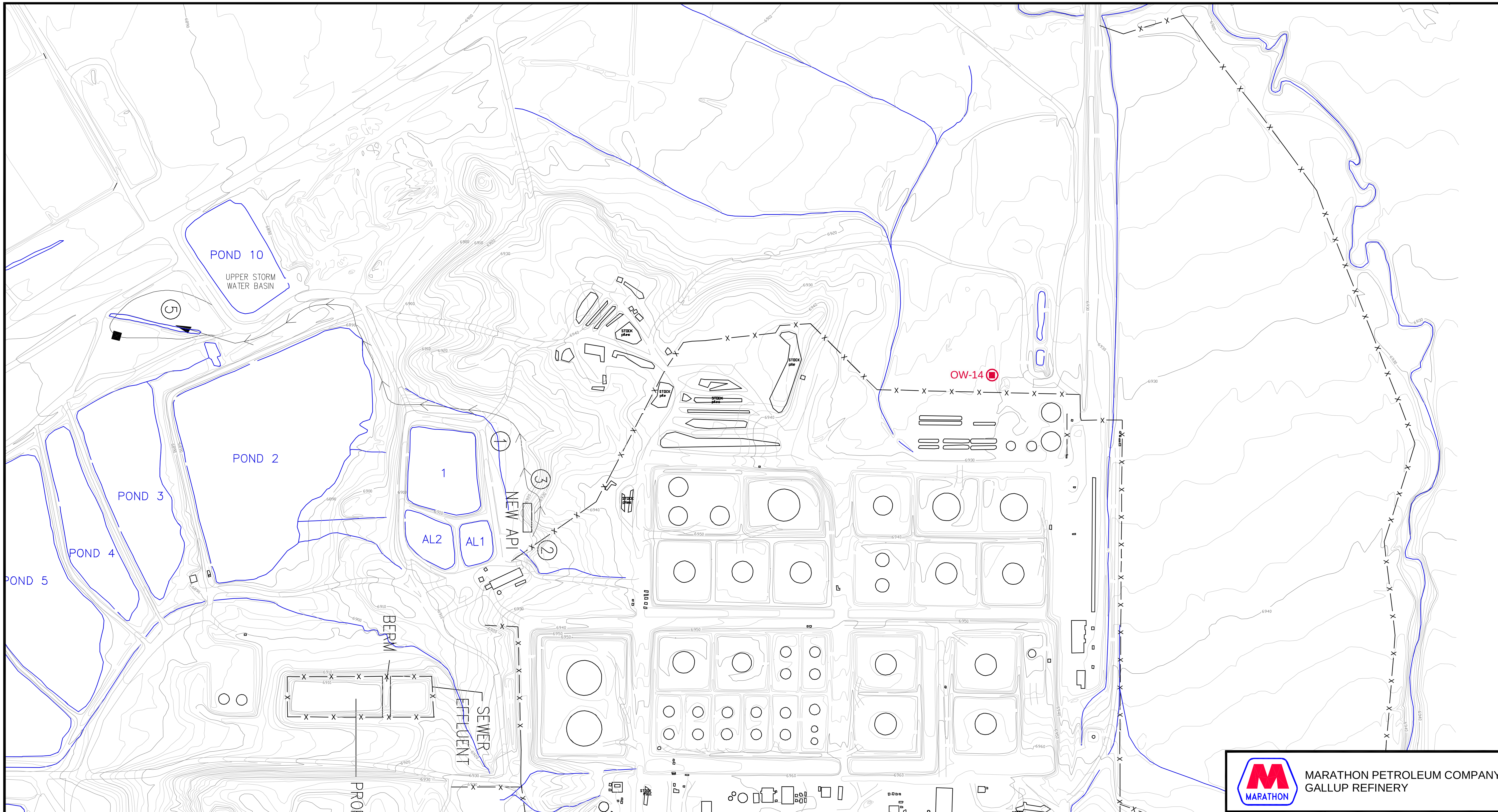

Map Source: Compiled by Photogrammetric Methods from Photography Acquired on March 1, 1998.

0 300
SCALE IN FEET

LEGEND

OW-14 — CHINLE/ALLUVIUM INTERFACE WELL LOCATION AND IDENTIFICATION NUMBER

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FIGURE 4
TOPOGRAPHIC MAP

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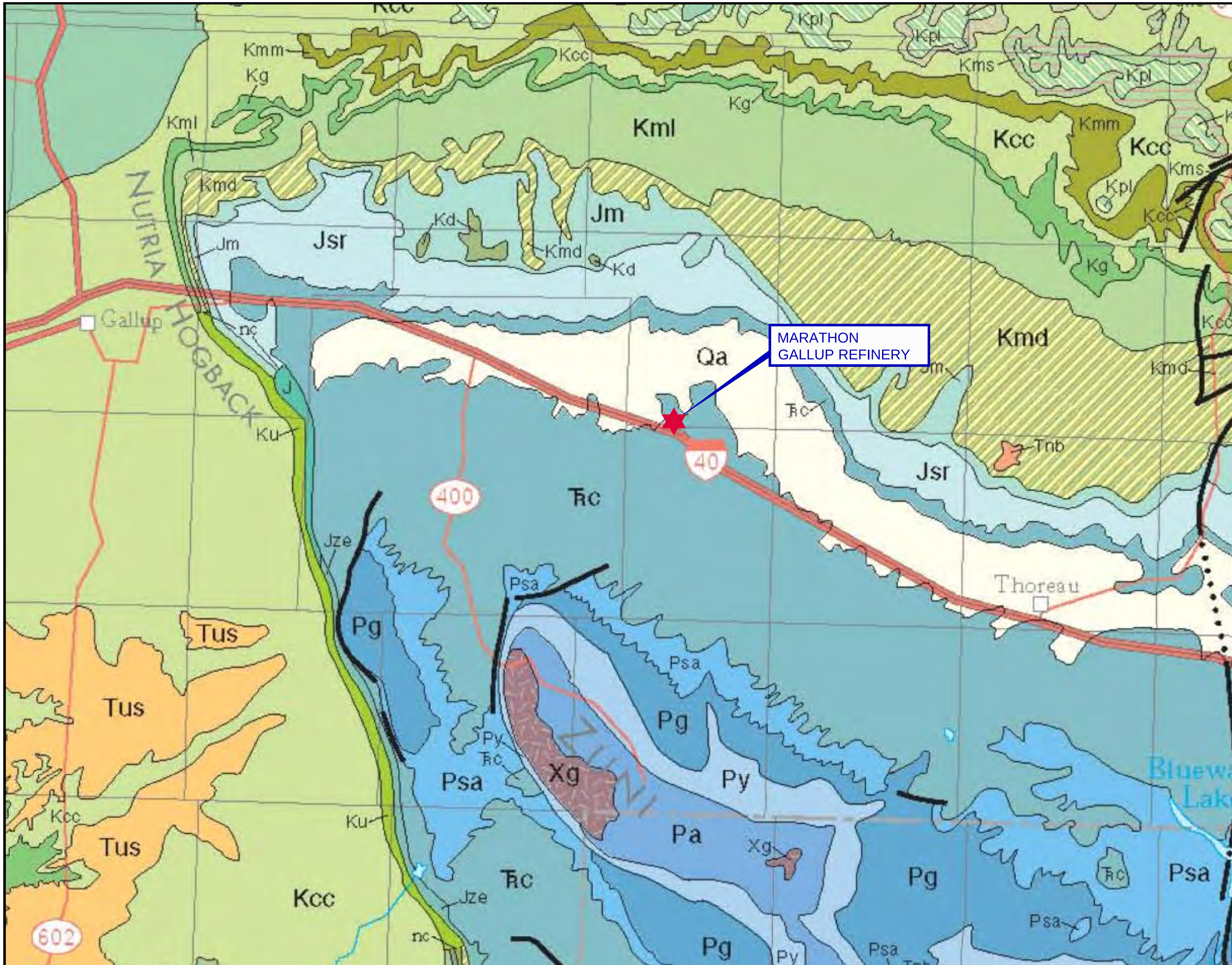

Map Source: Geologic Map of New Mexico, 2003.

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PROJ. NO.: Marathon	DATE: 4/16/19	FILE: Mathon–dB148

FIGURE 5
GEOLOGIC MAP OF NEW MEXICO
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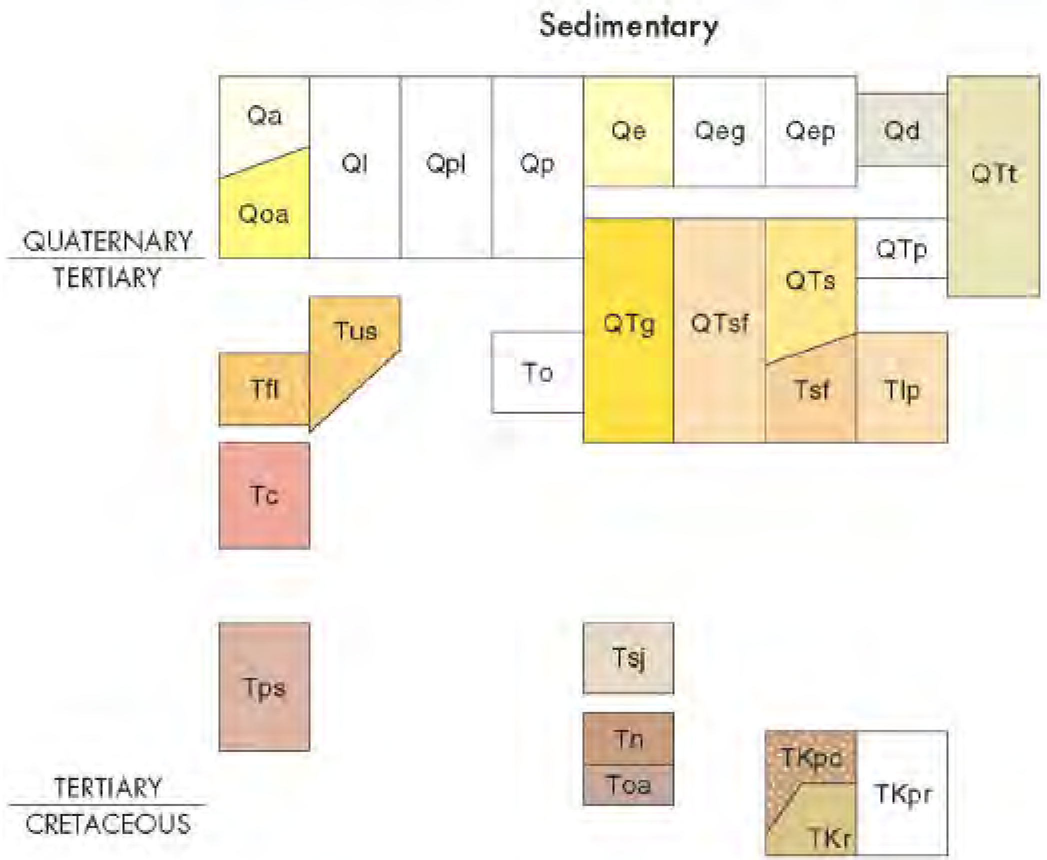

DESCRIPTION OF MAP UNITS

QUATERNARY

Qa	Alluvium (Holocene to upper Pleistocene)
Ql	Landslide deposits and colluvium (Holocene to Pleistocene)—Landslide deposits on western flanks of Socorro Mountains not shown for clarity
Qpl	Lacustrine and playa deposits (Holocene)—Includes associated alluvial and eolian deposits of major lake basins
Qp	Piedmont alluvial deposits (Holocene to lower Pleistocene)—Includes deposits of higher gradient tributaries bordering major stream valleys, alluvial veneers of the piedmont slope, and alluvial fans. May locally include uppermost Pliocene deposits
Qe	Eolian deposits (Holocene to middle Pleistocene)
Qeg	Gypsiferous eolian deposits (Holocene to middle Pleistocene)
Qep	Eolian and piedmont deposits (Holocene to middle Pleistocene)—Interlayed eolian sands and piedmont-slope deposits along the eastern flank of the Pecos River valley, primarily between Roswell and Carlsbad. Typically capped by thin eolian deposits
Qd	Glacial deposits; till and outwash (upper to middle Pleistocene)
Qoa	Older alluvial deposits of upland plains and piedmont areas, and calcic soils and eolian cover sediments of High Plains region (middle to lower Pleistocene)—Includes scattered lacustrine, playa, and alluvial deposits of the Tahoka, Double Tanks, Tule, Blackwater Draw, and Gatuña Formations, the latter of which may be Pliocene at base; outcrops, however, are basically of Quaternary deposits
Qb	Basaltic to andesitic lava flows (Holocene to middle Pleistocene)—Flows south of Grants and west of Carrizozo are Holocene. Includes minor vent deposits
Qv	Basaltic tephra and lavas near vents (upper to middle Pleistocene)—Tuff rings, maars, cinder cones, and minor proximal lavas. Includes maars at Kilbourne Hole and Zuni Salt Lake
Qbo	Basaltic to andesitic lava flows (middle to lower Pleistocene)—Includes vent deposits
Qvr	Ring-fracture rhyolite lava domes of the Valles caldera (uppermost to lower Pleistocene)—Upper members of the Valles Rhyolite in Jemez Mountains. Includes 60-ka Banco Bonito and El Cajete Members on south margin of caldera
Qr	Older rhyolite lavas and early volcaniclastic sedimentary fill deposits of the Valles caldera (lower Pleistocene)—Units are associated with resurgent doming or predate doming of the caldera core. Includes minor middle Pleistocene tuffs of the upper Valles Rhyolite on north side of caldera
Qbt	Bandelier Tuff (lower Pleistocene)—Includes large blocks of older andesite in caldera-collapse breccia facies locally exposed on resurgent dome of the Valles caldera

QUATERNARY and TERTIARY

QTt	Travertine (Holocene to Pliocene)—Includes some pedogenic carbonate south of Sierra Ladrones
QTp	Older piedmont alluvial deposits and shallow basin fill (middle Pleistocene to uppermost Pliocene)—Includes Quemado Formation and in northeast, high-level pediment gravels
QTs	Upper Santa Fe Group (middle Pleistocene to uppermost Miocene)—Includes Camp Rice, Fort Hancock, Palomas, Sierra Ladrones, Arroyo Ojito, Ancha, Puye, and Alamosa Formations
QTsf	Santa Fe Group, undivided (middle Pleistocene to uppermost Oligocene)—Basin fill of the Rio Grande rift. Locally represents upper Miocene formations of the middle Santa Fe Group in the northern Albuquerque Basin
QTg	Gila Group, Formation, or Conglomerate (middle Pleistocene to uppermost Oligocene?)—Includes Mimbres Formation and several informal units in southwestern basins
QTb	Basaltic to andesitic lava flows (upper Pleistocene to lower Pliocene)—Includes minor vent deposits

Map Source: Geologic Map of New Mexico, 2003.

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FIGURE 5
LEGEND SHEET 1 OF 8
GEOLOGIC MAP OF NEW MEXICO
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TERTIARY

Tus Upper Tertiary sedimentary units (Pliocene to upper Oligocene)—Includes Bidahochi Formation (Pliocene to upper Miocene), Picuris Formation, (Miocene to Oligocene), Las Feveras Formation (Pliocene), lower Gila Group units in the southwest, and unnamed Pliocene unit in northwestern Socorro County

To Ogallala Formation (lower Pliocene to middle Miocene)—Alluvial and eolian deposits, and petrocalcic soils of the southern High Plains. Locally includes Qoa

Tfl Fence Lake Formation (Miocene)—Conglomerate and conglomeratic sandstone, coarse fluvial volcaniclastic sediments, minor eolian facies, and pedogenic carbonates of the southern Colorado Plateau region

Tsf Lower Santa Fe Group (upper Miocene to uppermost Oligocene)—Includes Hayner Ranch, Rincon Valley, Popotosa, Cochiti, Tesuque, Chamita, Abiquiu, Zia, and other formations

Tlp Los Pinos Formation of lower Santa Fe Group (Miocene and upper Oligocene)—Includes Carson Conglomerate (Dane and Bachman, 1965) in Tusas Mountains-San Luis Basin area

Tc Chuska Sandstone (middle to upper Oligocene)—Restricted to Chuska Mountains

Tpb Basaltic to andesitic lava flows (Pliocene)—Includes minor vent deposits and small shield volcanoes. Flows are commonly interbedded in the Santa Fe and Gila Groups

Tmb Basaltic to andesitic lava flows (Miocene)—Includes minor vent deposits. Flows are commonly interbedded in the Santa Fe and Gila Groups

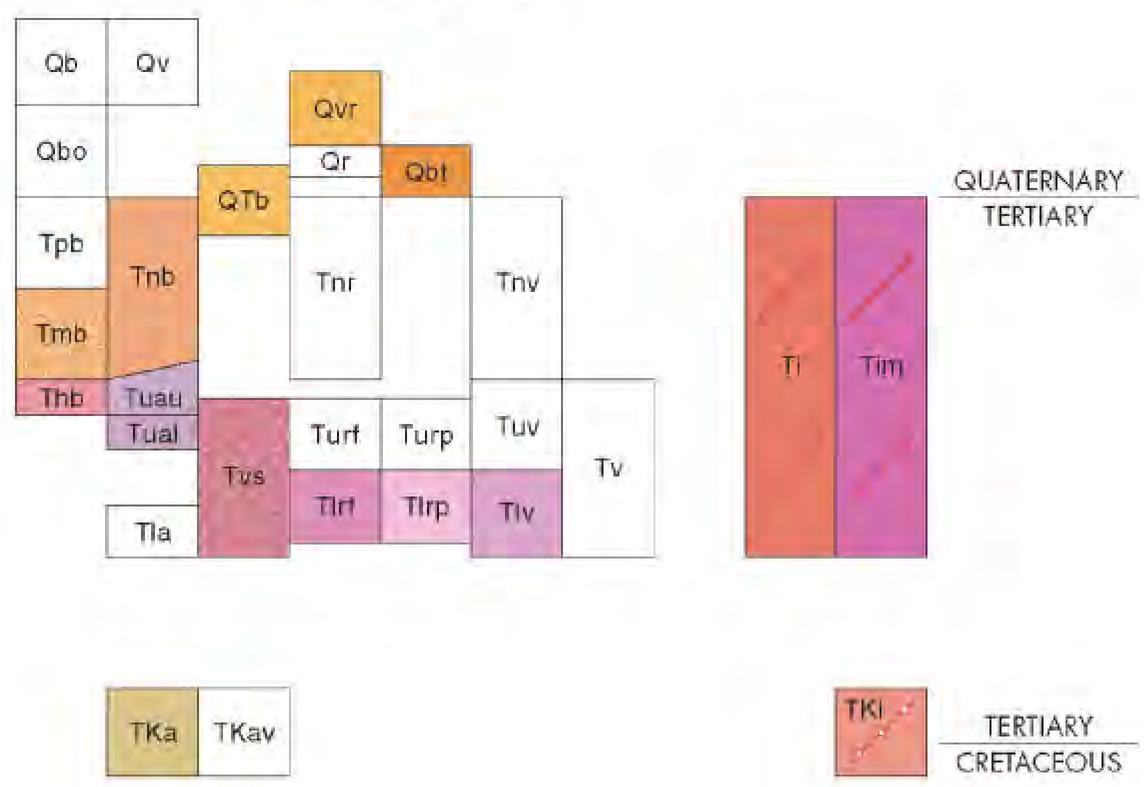
Tnb Basaltic to andesitic lava flows (Neogene)—Includes minor vent deposits. Flows are commonly interbedded in the Santa Fe and Gila Groups

Tnr Silicic to intermediate volcanic rocks (Neogene, mostly Miocene)—Rhyolite and dacite flows with associated minor tuffs. Commonly interbedded with Santa Fe or Gila Group sedimentary units. Dacitic lavas in northern Jemez Mountains are Pliocene

Tnv Intermediate to silicic volcanic rocks (Neogene)—Mostly andesitic to dacitic stratovolcanoes. Includes rhyolite lavas and tuffs in the Jemez Mountains. Volcanoes in Jemez Mountains and eastern Colfax County are upper Miocene. Mount Taylor and composite volcanoes in the Taos Plateau volcanic field are Pliocene

Thb Hinsdale Basalt (Miocene and upper Oligocene)—Northern Taos and eastern Rio Arriba Counties; basalt flows interbedded with Los Pinos Formation

Igneous



Tuau Upper middle Tertiary basaltic andesites and andesites of the Mogollon Group (lower Miocene and uppermost Oligocene, 22–26 Ma)—Includes Bearwallow Mountain Andesite and basaltic andesite of Mangas Mountain; also near vent basaltic lavas and shallow intrusions in the Chuska Mountains

Tual Lower-upper middle Tertiary basaltic andesites and andesites of the Mogollon Group (upper Oligocene, 26–29 Ma)—Includes La Jara Peak Basaltic Andesite, Uvas Basaltic Andesite, basaltic andesites of Poverty Creek and Twin Peaks, Squirrel Springs Canyon Andesite, Razorback Basalt, Bear Springs Basalt, flows of Gila Flat, Salt Creek Formation, Middle Mountain Formation, and the Alum Mountain Group. Pre-Amalia Tuff lavas in the Questa caldera are dominantly silicic andesites and dacites; elsewhere silicic lavas are a minor component of Tual

Tvs Middle Tertiary volcaniclastic sedimentary units (Oligocene to upper Eocene)—Mostly syneruptive volcaniclastic sedimentary aprons. Lower units dominantly derived from volcanic highlands of andesitic to dacitic composition. Locally includes minor lavas and tuffs. Younger units (above and intertongued with Mogollon Group tuffs, Turp) include upper Bell Top Formation, South Crosby Peak Formation, and upper Spears Group units near Quemado. Older units (below and intertongued with Datil Group tuffs, Tlrp) include Palm Park, lower Bell Top, Espinaso and Pueblo Creek Formations and lower Spears Group formations such as Rincon Windmill, Chavez Canyon, and Dog Springs

Map Source: Geologic Map of New Mexico, 2003.

MARATHON

MARATHON PETROLEUM COMPANY
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PROJ. NO.: Marathon	DATE: 4/16/19	FILE: Mathon–dB148

FIGURE 5
LEGEND SHEET 2 OF 8
GEOLOGIC MAP OF NEW MEXICO
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Turf — Upper middle Tertiary rhyolitic lavas and local tuffs (upper Oligocene, 24–29 Ma)—Includes Taylor Creek Rhyolite, Fanney Rhyolite, rhyolite of Rocky Canyon, rhyolite of Hardy Ridge, and upper rhyolite members of the Luis Lopez and Sawmill Canyon formations

Tlrf — Lower middle Tertiary rhyolitic lavas and local tuffs (lower Oligocene to upper Eocene, 36–31 Ma)—Includes Mimbres Peak Formation, rhyolite of Cedar Hills, and other units in the Bootheel region

Turp — Upper middle Tertiary rhyolitic pyroclastic rocks of the Mogollon Group, ash-flow tuffs (upper Oligocene, 24–30 Ma)—Regional ash-flow tuffs include the La Jencia, Vicks Peak, Lemitar, South Canyon, Bloodgood Canyon, Shelly Peak, Davis Canyon, Park, Rhyolite Canyon, Apache Spring, and Amalia Tuffs; the tuffs of Horseshoe Canyon, Diamond Creek, Garcia Camp, Caronita Canyon, Turkey Springs, and Little Mineral Creek; and the Jordan Canyon Formation. Includes some locally erupted lavas and tuffs within thick intracaldera units; includes minor volcaniclastic sedimentary units between thin outflow sheets

Tlrp — Lower middle Tertiary rhyolitic to dacitic pyroclastic rocks of the Datil Group, ash-flow tuffs (lower Oligocene to upper Eocene, 31–36 Ma)—Regional ash-flow tuffs include Hells Mesa, Kneeling Nun, Caballo Blanco, Datil Well, Lebya Well, Rock House Canyon, Blue Canyon, Sugarlump, Oak Creek, Bluff Creek, Gillespie, Box Canyon, Cooney, and Chiquito Peak Tuffs; the tuffs of Steins Mountain, Black Bill Canyon, Woodhaul Canyon, and Farr Ranch; tuffs of the Organ cauldron; and lower tuffs in the Bell Top Formation. Includes some locally erupted lavas and tuffs within thick intracaldera units; includes minor volcaniclastic sedimentary units and lavas between thin outflow sheets

Tla — Lower middle Tertiary andesitic to dacitic lavas and pyroclastic flow breccias (upper to middle Eocene, 33–43 Ma)—Includes Rubio Peak Formation, Orejon Andesite, andesite of Dry Leggett Canyon, andesite of Telephone Canyon, and other units in southwestern, central, and northern New Mexico. Locally includes minor mafic lavas. Ancient landslide blocks of Madera Limestone, as much as one mile long, occur within Rubio Peak lavas in the central Black Range, west of Winston

Tuv — Upper middle Tertiary volcanic rocks (lower Miocene to upper Oligocene, younger than 30 Ma)—Mostly a combination of basaltic andesite lavas and rhyolitic ash-flow tuffs of the Mogollon Group (Tuau + Tual + Turp). Includes locally erupted lavas and tuffs in some calderas

Tlv — Lower middle Tertiary volcanic rocks (lower Oligocene to upper Eocene, older than 31 Ma)—Mostly intermediate lavas of the lower Datil Group and intermediate volcaniclastic sediments of the lower Spears Group (Tla + Tvs). Locally includes ash-flow tuffs of the upper Datil Group (Tlrp). Includes intermediate volcaniclastic sedimentary rocks of the Conejos Formation in northern New Mexico

Tv — Middle Tertiary volcanic rocks, undifferentiated (lower Miocene to upper Eocene)—Includes the predominantly andesitic to dacitic stratovolcano complex at Sierra Blanca (Oligocene to upper Eocene) and many smaller outliers

Ti — Tertiary intrusive rocks of intermediate to silicic composition (Pliocene to Eocene)—Includes monzonitic to granitic plutons, stocks, laccoliths, and porphyritic dikes in deeply eroded magmatic centers; and andesitic, dacitic, or rhyolitic plugs and dikes near cauldrons or stratovolcanoes. In the Latir field, fine-grained rhyolitic dikes commonly cut coarse-grained granitic plutons. Includes alkaline laccoliths, plugs, and dikes in Colfax County. North-trending dikes near Capitan include some mafic diabase dikes

Tim — Tertiary mafic intrusive rocks (Pliocene to upper Eocene)—Includes many long basaltic andesite dikes of Oligocene age near Pie Town, Acoma, Riley, Chupadera, Truth or Consequences, Roswell, Raton, and Dulce; and several elongate or shoestring-like sills of basalt or basaltic andesite. Also includes basaltic necks of Pliocene age that dot the landscape northeast of Mount Taylor. Where dikes extend into Quaternary alluvium the contact is an unconformity

Tps — **Paleogene sedimentary units**—Includes Baca, Galisteo, El Rito, Blanco Basin, Hart Mine, Love Ranch, Lobo, Sanders Canyon, Skunk Ranch, Timberlake, and Cub Mountain Formations

Tsj — San Jose Formation (Eocene)—San Juan Basin

Tn — Nacimiento Formation (Paleocene)—San Juan Basin

Toa — Ojo Alamo Formation (Paleocene)—San Juan Basin

TERTIARY and CRETACEOUS

TKpc — Poison Canyon Formation (Paleocene and Upper Cretaceous)—Proximal conglomerates and sandstones in western Raton Basin; generally lacking coal beds. Cretaceous beds mostly restricted to subsurface

TKr — Raton Formation (Paleocene and Upper Cretaceous)—Distal sandstones, mudstones, and coal beds in eastern Raton Basin. Middle barren zone laterally equivalent to Poison Canyon Formation. K/T boundary discontinuously exposed about 100 m above basal conglomerate in area southwest of Raton

TKpr — Poison Canyon and Raton Formations (Paleocene and Upper Cretaceous)—Broadly intertonguing conglomeratic sandstones, sandstones and mudstones; minor coal beds

TKa — Animas Formation (Paleocene and Upper Cretaceous)—Volcaniclastic sedimentary rocks of intermediate composition in northern San Juan Basin

TKav — Tertiary-Cretaceous andesitic to dacitic lavas and pyroclastic breccias (Paleocene and Upper Cretaceous)—Includes many remnants of eruptive centers in Grant and Hidalgo Counties and Upper Cretaceous andesitic lavas in Sierra County

TKi — Tertiary-Cretaceous intrusive rocks (Paleocene and Upper Cretaceous)—Includes granodiorite to quartz monzonite stocks and plutons at Hanover, Fierro, Tyrone, Lordsburg, and the 73-Ma quartz monzonite porphyry stock at Copper Flats in Sierra County. Also includes many northeast-trending monzonite porphyry dikes in the Silver City region

Map Source: Geologic Map of New Mexico, 2003.

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FIGURE 5
LEGEND SHEET 3 OF 8
GEOLOGIC MAP OF NEW MEXICO
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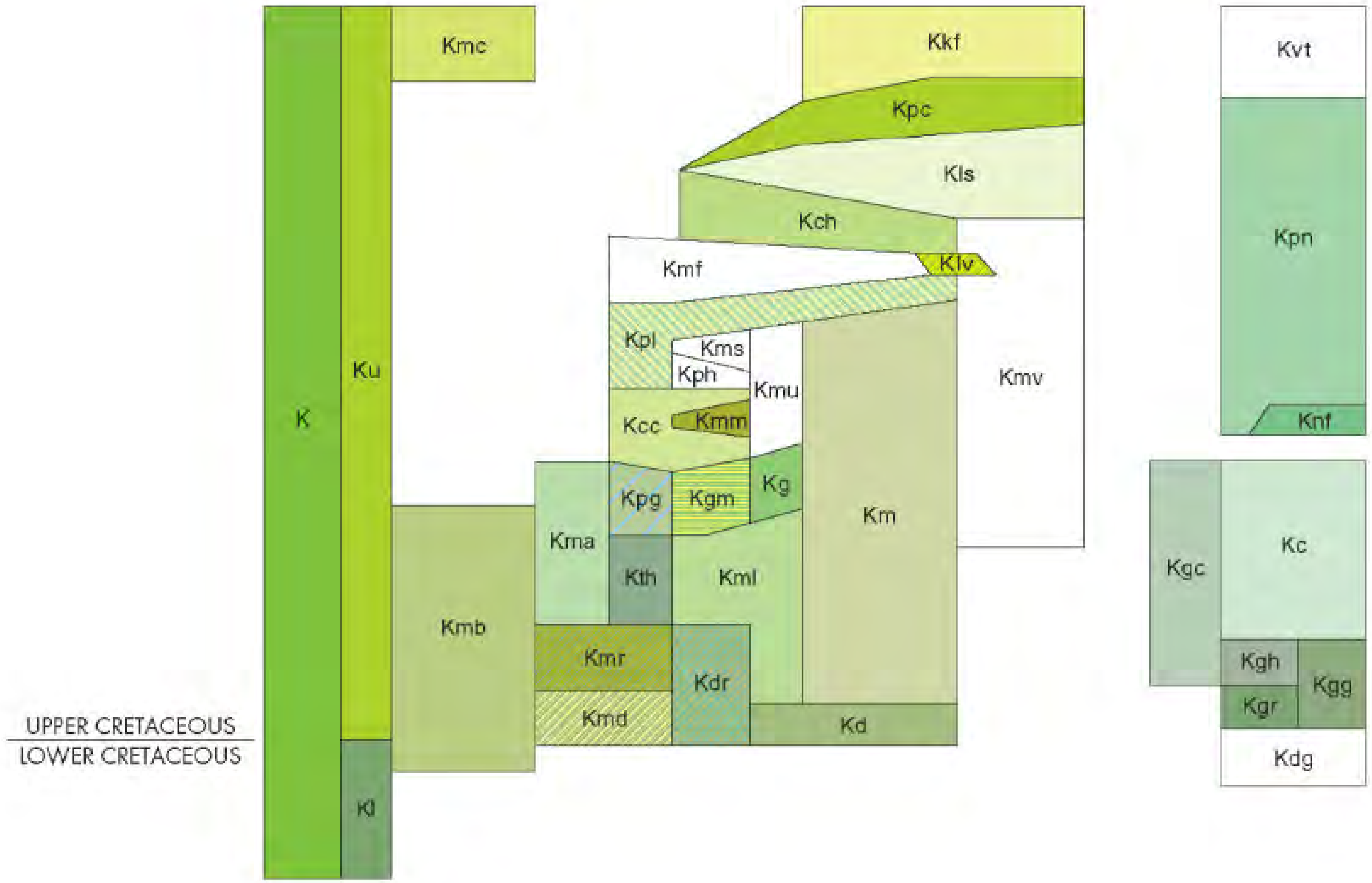

CRETACEOUS

- **K** — **Cretaceous rocks, undivided**
- **Ku** — **Upper Cretaceous rocks of southwestern New Mexico, undivided** (Maastrichtian to Cenomanian for most part, although Beartooth and Sarten Formations are in part Albian)—Includes Virden Formation in northern Hidalgo County, Ringbone Formation in Hidalgo, Luna, and Grant Counties, Beartooth and Sarten Formations in Luna and Grant Counties, Mancos Shale in Silver City area
- **Kmc** — **McRae Formation** (Maastrichtian)—Engle Basin-Cutter sag area
- **Kvt** — **Vermejo Formation and Trinidad Sandstone** (Maastrichtian to Campanian)
- **Kkf** — **Kirtland and Fruitland Formations** (Campanian)—Coal-bearing, primarily in the Fruitland
- **Kpc** — **Pictured Cliffs Sandstone** (Campanian)—Prominent, cliff-forming marine sandstone
- **Kpg** — **Pescado Tongue of the Mancos Shale and Gallup Sandstone** (Turonian)—In Zuni Basin only; Pescado is chronostratigraphic equivalent of Juana Lopez Member of Mancos Shale
- **Kth** — **Tres Hermanos Formation** (Turonian)—Formerly designated as lower Gallup Sandstone in the Zuni Basin
- **Kma** — **Moreno Hill Formation and Atarque Sandstone** (Turonian)—In Salt Lake coal field and extreme southern Zuni Basin
- **Km** — **Mancos Shale** (Cenomanian to Campanian)—Divided into upper and lower parts by Gallup Sandstone
- **Kmu** — **Mancos Shale, upper part** (Campanian to Coniacian)
- **Kml** — **Mancos Shale, lower part** (Turonian and Cenomanian)
- **Kdr** — **Dakota Sandstone** (Cenomanian) **and Rio Salado Tongue of the Mancos Shale**—In northwest Socorro County locally includes overlying Tres Hermanos Formation

Map Source: Geologic Map of New Mexico, 2003.

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FIGURE 5
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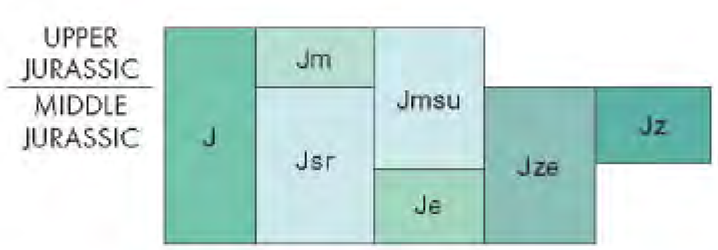
Kls	**Lewis Shale** (Campanian)—Marine shale and mudstone
Kpn	**Pierre Shale and Niobrara Formation** (Campanian to Coniacian)
Knf	**Fort Hays Limestone Member of Niobrara Formation** (Coniacian to Turonian)
Kmv	**Mesaverde Group** (Campanian to Turonian)—Includes Cliff House Sandstone, Menefee Formation and Point Lookout Sandstone
Kch	**Cliff House Sandstone** (Campanian)—Transgressive marine sandstone
Klv	**La Ventana Tongue of the Cliff House Sandstone** (Turonian)
Kmf	**Menefee Formation** (Campanian to Santonian)—Mudstone, shale, and sandstone; coal-bearing
Kpl	**Point Lookout Sandstone** (Campanian to Santonian)—Regressive marine sandstone in McKinley and Sandoval Counties; the lower, Hosta Tongue, of Point Lookout is transgressive and is separated from main body by the Satan Tongue of Mancos Shale
Kms	**Satan Tongue of Mancos Shale** (Santonian)
Kph	**Hosta Tongue of Point Lookout Sandstone** (Santonian)—Transgressive marine sandstone
Kmm	**Mulatto Tongue of Mancos Shale** (Santonian to Coniacian)
Kcc	**Crevasse Canyon Formation** (Santonian to Coniacian)—Coal-bearing units are Dilco and Gibson Coal Members; other members are Bartlett Barren, Dalton Sandstone, and Borrego Pass Sandstone (or Lentil)
Kg	**Gallup Sandstone** (Turonian)—Generally regressive marine sandstone
Kgm	**Gallup Sandstone and underlying D-Cross Tongue of the Mancos Shale** (Turonian)
Kmr	**Rio Salado Tongue of the Mancos Shale** (Turonian)—Overlies Twowells Tongue of Dakota Sandstone; mapped only where Tres Hermanos Formation or the Atarque Sandstone is present; mapped as Kdr in parts of Socorro County

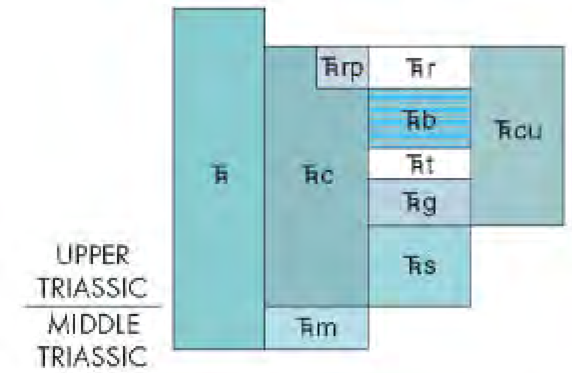


Jsr	**San Rafael Group** (Middle Jurassic)—Consists of Entrada Sandstone, Todilto and Summerville Formations, Bluff Sandstone, and locally Zuni Sandstone (or only Acoma Tongue of Zuni)
Kgc	**Greenhorn Formation and Carlile Shale, undivided** (Turonian to Cenomanian)—Locally includes Graneros Shale
Kc	**Carlile Shale** (Turonian)—Limited to northeastern area
Kgg	**Greenhorn Formation and Graneros Shale** (Turonian and Cenomanian)—Limited to northeastern area
Kgh	**Greenhorn Formation** (Turonian to Cenomanian)—Limited to northeastern area; the upper member (Bridge Creek Limestone Member) can be traced into western area where it is commonly shown as a bed-rank unit in Mancos Shale on detailed maps
Kgr	**Graneros Shale** (Cenomanian)—Limited to northeastern area
Kmd	**Intertongued Mancos Shale and Dakota Sandstone of west-central New Mexico** (Cenomanian)—Includes the Whitewater Arroyo Tongue of Mancos Shale and the Twowells Tongue of the Dakota
Kd	**Dakota Sandstone** (Cenomanian)—Includes Oak Canyon, Cubero, and Paguate Tongues; includes Clay Mesa Tongue of Mancos Shale
Kdg	**Upper and Lower Cretaceous rocks of east-central and northeast New Mexico**—Consists of Dakota Group, which includes Romeroville Sandstone (Cenomanian), Pajarito Shale, and Mesa Rica Sandstone (Albian); the underlying Tucumcari Shale (Albian) in Tucumcari area; and Glencairn Formation (Albian) in Union County
Kmb	**Mancos Shale** (Cenomanian) **and Beartooth and Sarten Formations** (Albian)—Mancos includes what was formerly referred to as Colorado Shale, which in turn may include equivalents of Tres Hermanos Formation
Kl	**Lower Cretaceous, undivided**—In northern Lea and Roosevelt Counties includes equivalents of Tucumcari Shale; in Cornudas Mountains includes Campagrande and Cox Formations and Washita Group; at Cerro de Cristo Rey includes several formations of the Fredericksburg and Washita Groups, and the Boquillas Formation (Cenomanian); in the southwest, includes Mojado, U-Bar (Aptian), and Hell-to-Finish Formations, which are equivalent to Bisbee Group of Arizona

JURASSIC

To compare this map nomenclature to the USGS nomenclature, see the diagram included on this sheet (at right)

J	**Upper and Middle Jurassic rocks, undivided.** In southwest includes the basalt-bearing Broken Jug Formation
Jm	**Morrison Formation**—Upper Jurassic nonmarine rocks
Jmsu	**Morrison Formation and upper San Rafael Group** (lowermost Cretaceous?-upper Jurassic)
Jz	**Zuni Sandstone** (Callovian)—Consists of undivided equivalents of the Summerville Formation and Bluff Sandstone; restricted to Zuni Basin area
Jze	**Zuni and Entrada Sandstones, undivided**
Je	**Entrada Sandstone** (Middle Jurassic)



TRIASSIC

Chinle Formation of previous workers (e.g., Stewart et al., 1972) is used here as Chinle Group, following Lucas (1993)

ŦR	**Triassic rocks, undivided**—Continental red beds
ŦRrp	**Rock Point Formation of Chinle Group** (Upper Triassic)—May locally include Wingate Sandstone (Triassic)
ŦRc	**Chinle Group** (Upper Triassic)—Map unit includes Moenkopi Formation (Middle Triassic) at base in many areas; in eastern part of state the following five formations are mapped
ŦRr	**Redonda Formation** (Upper Triassic)
ŦRb	**Bull Canyon Formation** (Norian)
ŦRt	**Trujillo Formation** (Norian)
ŦRg	**Garita Creek Formation** (Carnian)
ŦRs	**Santa Rosa Formation** (Carnian)—Includes Moenkopi Formation (Middle Triassic) at base in most areas
ŦRcu	**Upper Chinle Group, Garita Creek through Redonda Formations, undivided**
ŦRm	**Moenkopi Formation** (Middle Triassic)

Map Source: Geologic Map of New Mexico, 2003.

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FIGURE 5
LEGEND SHEET 5 OF 8
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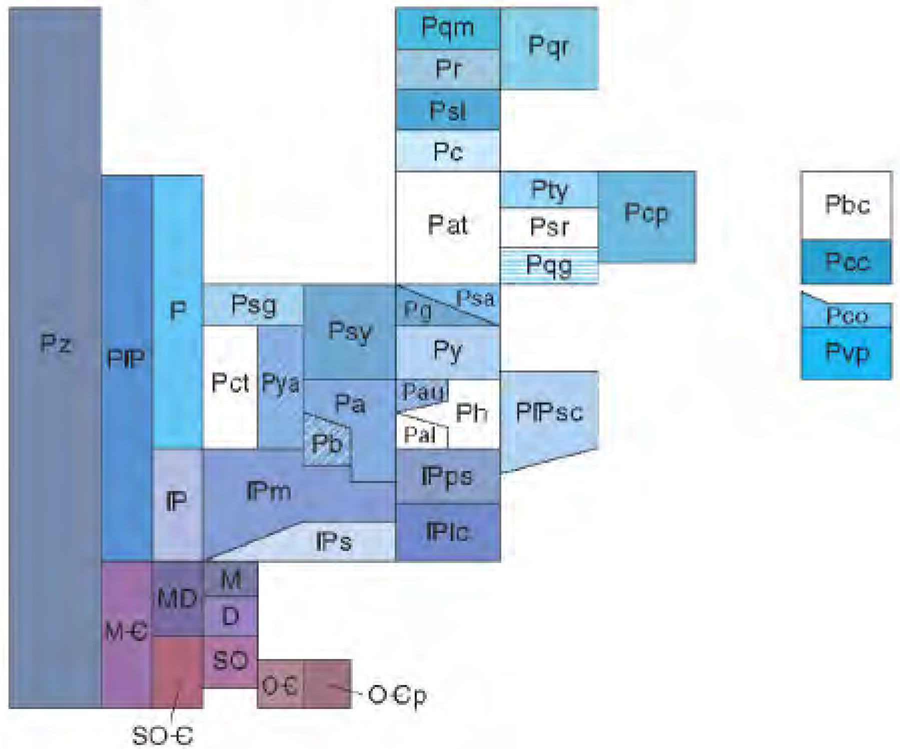

PALEOZOIC

- **Pz** — **Paleozoic rocks, undivided**
- **P** — **Permian rocks, undivided**
- **Pqm** — **Quartermaster Formation** (Upper Permian)—Red sandstone and siltstone
- **Pqr** — **Quartermaster and Rustler Formations** (Upper Permian)
- **Pr** — **Rustler Formation** (Upper Permian)—Siltstone, gypsum, sandstone, and dolomite
- **Psl** — **Salado Formation** (Upper Permian)—Evaporite sequence, dominantly halite
- **Pc** — **Castile Formation** (Upper Permian)—Dominantly anhydrite sequence
- **Pat** — **Artesia Group** (Guadalupian)—Shelf facies forming broad south-southeast trending outcrop from Glorieta to Artesia area; includes Tansill, Yates, Seven Rivers, Queen and Grayburg Formations (Guadalupian). May locally include Moenkopi Formation (Triassic) at top
- **Pty** — **Tansill and Yates Formations** (Guadalupian)—Sandstone, siltstone, limestone, dolomite, and anhydrite
- **Psr** — **Seven Rivers Formation** (Guadalupian)—Gypsum, anhydrite, salt, dolomite, and siltstone
- **Pqg** — **Queen and Grayburg Formations** (Guadalupian)—Sandstone, gypsum, anhydrite, dolomite, and red mudstone
- **Pcp** — **Capitan Formation** (Guadalupian)—Limestone (reef facies)
- **Pbc** — **Bell Canyon Formation** (Guadalupian)—Basin facies—sandstone, limestone, and shale
- **Pcc** — **Cherry Canyon Formation** (Guadalupian)—Basin facies—sandstone, limestone, and shale
- **Psa** — **San Andres Formation** (Guadalupian in south, in part Leonardian to north)—Limestone and dolomite with minor shale
- **Pg** — **Glorieta Sandstone** (Leonardian)—Texturally and mineralogically mature, high-silica quartz sandstone
- **Psg** — **San Andres Limestone and Glorieta Sandstone** (Guadalupian and Leonardian)
- **Pco** — **Cutoff Shale** (Leonardian)—In Brokeoff Mountains only
- **Pvp** — **Victorio Peak Limestone** (Leonardian)—In Brokeoff Mountains only
- **Py** — **Yeso Formation** (Leonardian)—Sandstones, siltstones, anhydrite, gypsum, halite, and dolomite
- **Pa** — **Abo Formation** (Wolfcampian)—Red beds, arkosic at base, finer and more mature above; may include limestone beds of Pennsylvanian age (Virgilian) in Zuni Mountains; in Robledo Mountains the Abo may be considered a member of the Hueco Formation
- **Pau** — **Upper part of Abo Formation** (Wolfcampian)
- **Pal** — **Lower part of Abo Formation** (locally Virgilian to Upper Pennsylvanian)
- **Psy** — **San Andres, Glorieta, and Yeso Formations, undivided**
- **Pya** — **Yeso and Abo Formations, undivided** (Lower Permian)
- **Pct** — **Cutler Formation** (Wolfcampian to Upper Pennsylvanian)—Used in northern areas and Chama embayment only
- **Ph** — **Hueco Formation or Group** (Wolfcampian)—Limestone unit restricted to south-central area. Pendejo Tongue of Hueco Formation divides Abo Formation into upper and lower parts in Sacramento Mountains
- **Pb** — **Bursum Formation** (lowermost Permian to uppermost Pennsylvanian)—Shale, arkose, and limestone
- **PIP** — **Permian and Pennsylvanian rocks, undivided**—Includes Concha, Scherrer, Colina, Epitaph, and Earp Formations (Permian) and Horquilla Limestone (Permian to Pennsylvanian)
- **PIPsc** — **Sangre de Cristo Formation** (Wolfcampian to Desmoinesian)—In Sangre de Cristo Mountains
- **IP** — **Pennsylvanian rocks, undivided**—In Sangre de Cristo Mountains may include Sandia, Madera, La Pasada, Alamitos, and Flechado Formations; elsewhere may include Bar-B, Nakaye, Red House, Oswaldo, and Syrena Formations
- **IPm** — **Madera Group** (Pennsylvanian)—In Manzano Mountains includes Wild Cow Formation and Los Moyos Limestone; in Lucero Mesa includes Red Tanks, Atrasado, Gray Mesa Formations; in Sacramento Mountains includes the non-Madera Holder, Beeman, and Gobbler Formations. May include strata lumped as Magdalena Group in a few areas
- **IPs** — **Sandia Formation** (Atokan)—Predominantly clastic unit (commonly arkosic) with minor black shales, and limestone in lower part; map unit locally includes Morrowan Osha Canyon Formation in Sierra Nacimiento
- **IPps** — **Panther Seep Formation** (Virgilian)—In Organ, Franklin, and San Andres Mountains
- **IPlc** — **Lead Camp Formation** (Atokan to Missourian)—In San Andres and Organ Mountains
- **M** — **Mississippian rocks, undivided**—Arroyo Peñasco Group in Sangre de Cristo Mountains, Sierra Nacimiento, San Pedro Mountains, and Sandia Mountains; Lake Valley Limestone in south-central New Mexico
- **MD** — **Mississippian and Devonian rocks, undivided**—Includes Helms, Rancheria, Las Cruces, Lake Valley, and Caballero Formations and Escabrosa Group (Mississippian); Percha Shale, Contadero, Sly Gap, and Oñate Formations of south-central New Mexico, and Canutillo Formation of northern Franklin Mountains and Bishops Cap area (Devonian)
- **M-Є** — **Mississippian through Cambrian rocks, undivided**—Includes Lake Valley Limestone (Mississippian); Devonian rocks, undivided; El Paso Formation and Montoya Group or Formation (Ordovician); and Bliss Sandstone (Ordovician and Cambrian)
- **D** — **Devonian rocks undivided**—Includes Percha Shale, Oñate, and Sly Gap Formations
- **SO** — **Silurian and Ordovician rocks, undivided**
- **SO-Є** — **Silurian through Cambrian rocks, undivided**
- **O-Є** — **Ordovician and Cambrian rocks, undivided**—Includes Montoya Formation (or Group), El Paso Formation, and Bliss Sandstone
- **O-Єp** — **Ordovician and Cambrian plutonic rocks of Florida Mountains**

Map Source: Geologic Map of New Mexico, 2003.

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FIGURE 5
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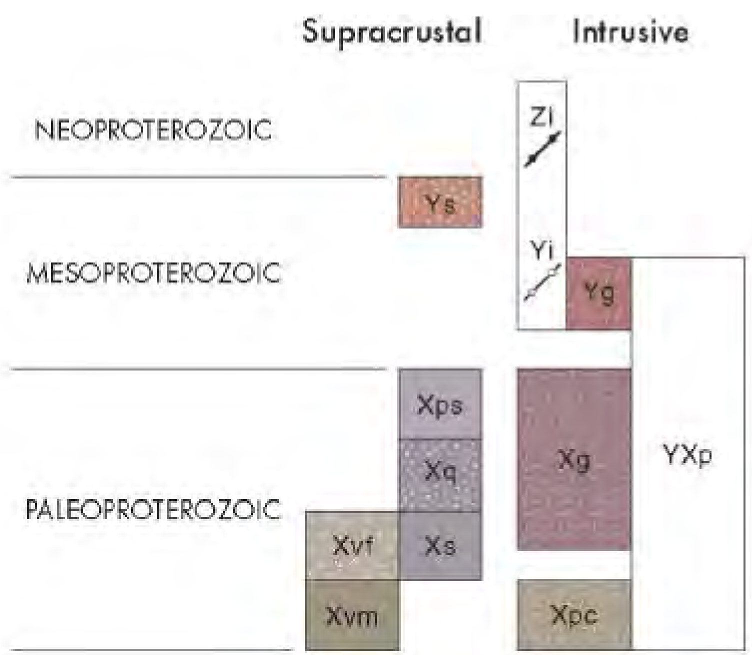

MAP SYMBOLS

- Contact
- Nomenclature change
- Gradational facies boundary
- **Fault**—Dashed where approximately located, dotted where concealed
- Tertiary dikes
- Proterozoic dikes
- Proterozoic ductile shear zone
- Playa

PROTEROZOIC

Zi **Neoproterozoic mafic dikes**—Exposed in Taos Range

Yi **Mesoproterozoic mafic dikes, diabase, metadiabase, metadiorite**—Mainly in Burro Mountains; age not well constrained

Ys **Mesoproterozoic sedimentary rocks**—Exposed in Sacramento Mountains, present in subsurface in southeastern New Mexico as De Baca Group

Yg **Mesoproterozoic granitic plutonic rocks**—Mainly 1.45-1.35 Ga megacrystic granites, generally weakly foliated except locally at their margins

YXp **Mesoproterozoic and Paleoproterozoic plutonic rocks, undivided**

Xg **Paleoproterozoic granitic plutonic rocks**—Variably foliated granites and granitic gneisses; 1.71-1.65 Ga in northern New Mexico; 1.66-1.65 Ga in central and southern New Mexico

Xps **Paleoproterozoic pelitic schist**—Includes Rinconada Formation in northern New Mexico and Blue Springs Schist in Manzano Mountains

Xq **Paleoproterozoic quartzite**—Includes ~1.70 Ga Ortega Quartzite and equivalents in northern New Mexico and ~1.67 Ga quartzites in central New Mexico

Xs **Paleoproterozoic metasedimentary rocks**—Pelitic schist, quartz-muscovite schist, immature quartzite, and subordinate amphibolite; includes parts of Vadito Group in northern New Mexico, immature metasedimentary rocks of central New Mexico, and Bullard Peak Series mixed supracrustal rocks in Burro Mountains

Xvf **Paleoproterozoic rhyolite and felsic volcanic schist**—Includes 1.70 Ga Vadito Group in northern New Mexico and ~1.68 Ga Sevilleta Metarhyolite in central New Mexico

Xpc **Paleoproterozoic calc-alkaline plutonic rocks**—Granodiorite, diorite, and gabbro complexes; 1.78-1.71 Ga; interpreted to be intrusive part of juvenile volcanic arc basement

Xvm **Paleoproterozoic mafic metavolcanic rocks with subordinate felsic metavolcanic rocks**—Includes the 1.78-1.72 Ga Moppin (Tusas Mountains), Gold Hill (Taos Range), and Pecos (Sangre de Cristo Mountains) complexes; interpreted to be supracrustal part of juvenile volcanic arc basement

Map Source: Geologic Map of New Mexico, 2003.

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FIGURE 5
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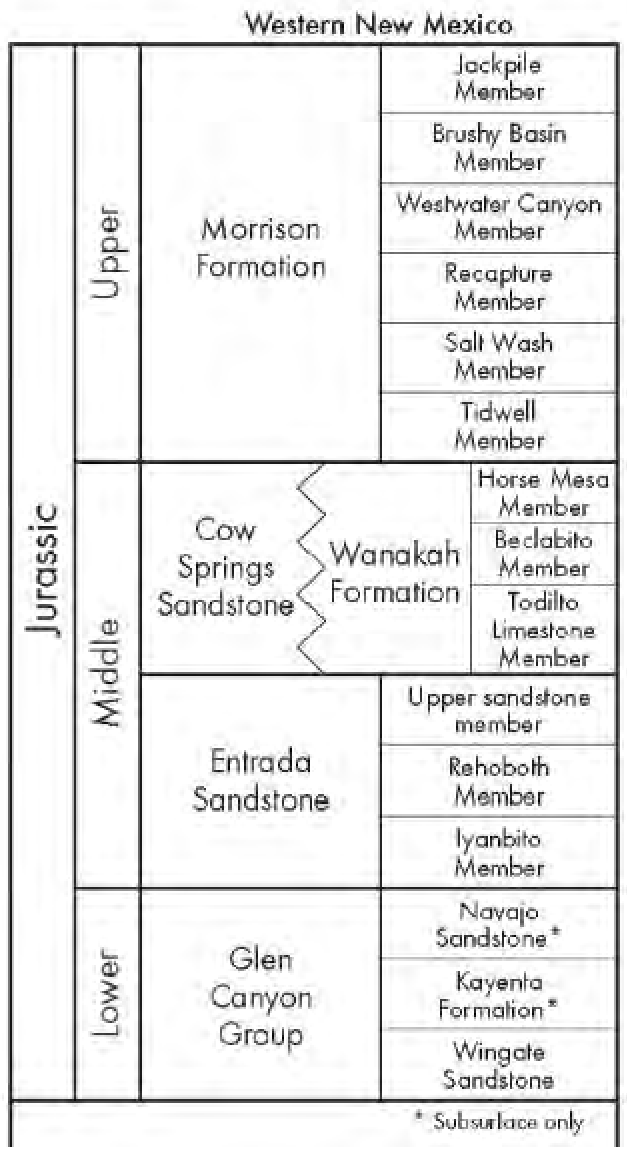

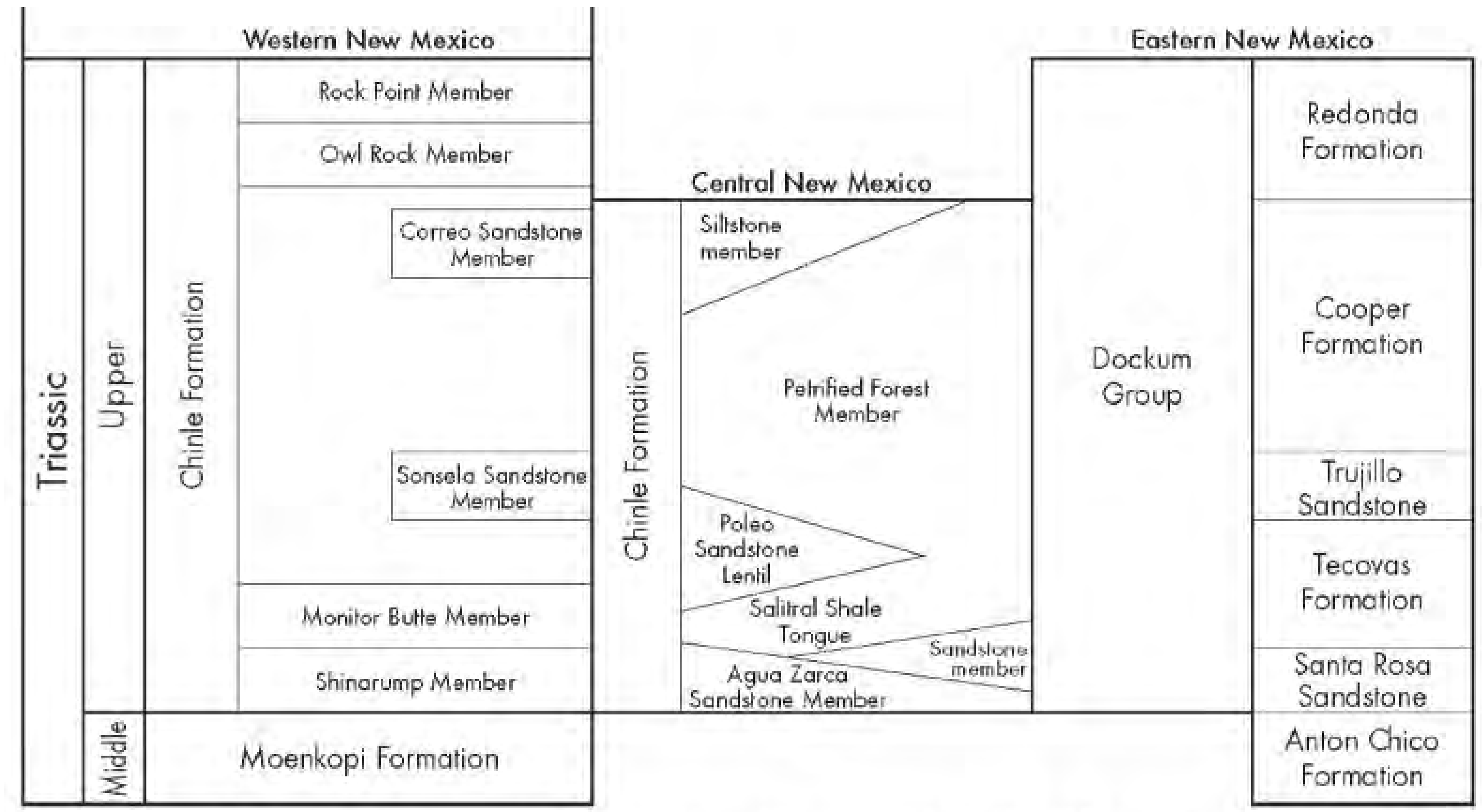

Formal stratigraphic terminology of Triassic and Jurassic rocks in New Mexico, as used in the National Geologic Map Database* of the U.S. Geological Survey. This terminology differs significantly from the Triassic and Jurassic stratigraphy represented on this map.

* http://ngmdb.usgs.gov/geolex_gs.html

Map Source: Geologic Map of New Mexico, 2003.

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FIGURE 5
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Aerial Map Source: Google Map, 01/05/2014.

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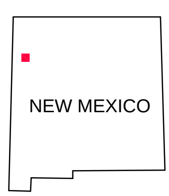
SCALE IN FEET

LEGEND

TK 568-1 SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-57 ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

A —— A' LINE OF CROSS-SECTION



GALLUP SITE LOCATION

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FIGURE 6
CROSS SECTION LOCATION MAP
(A - D)
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OW-14 SOURCE INVESTIGATION

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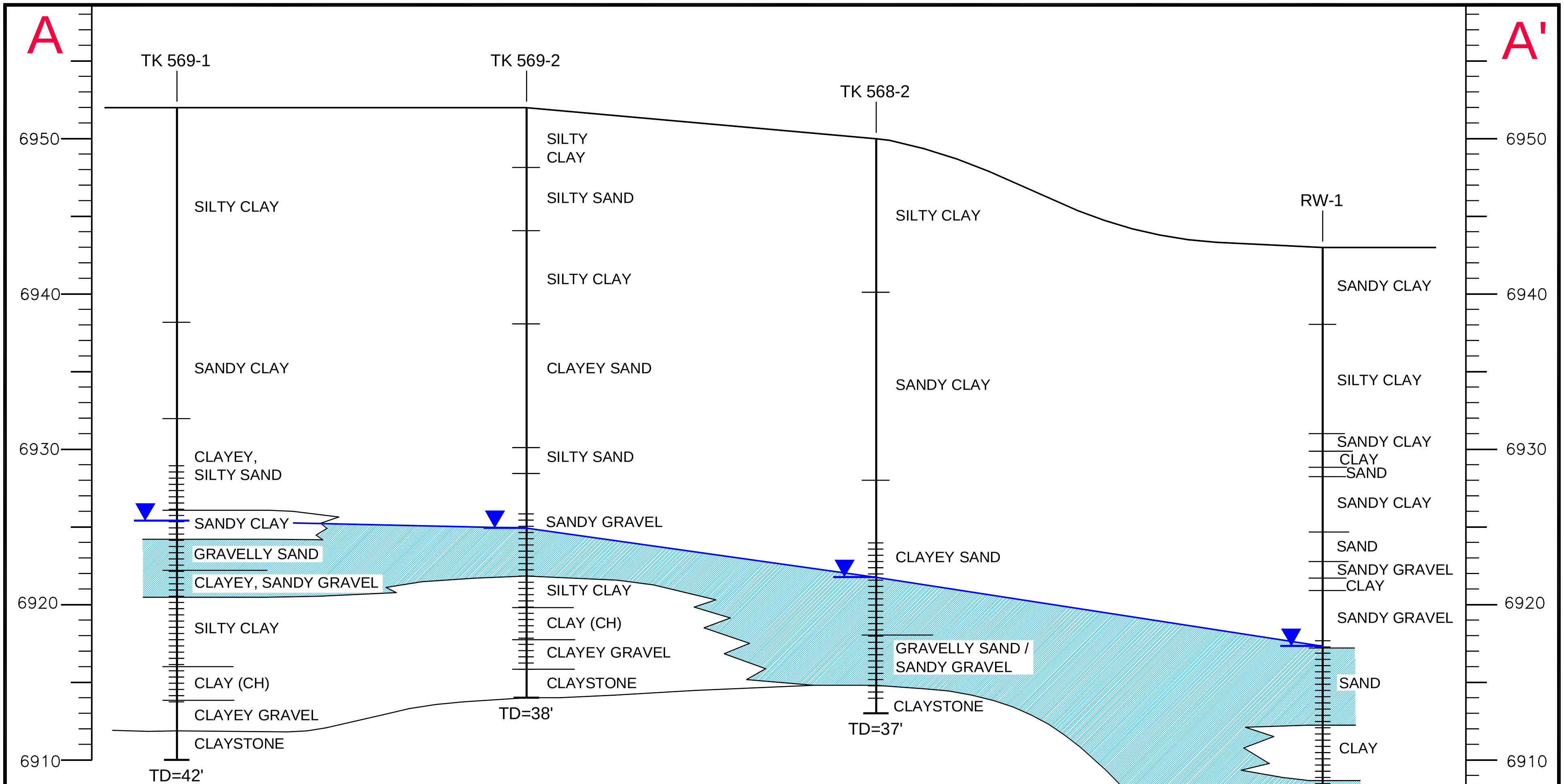

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FIGURE 7
CROSS SECTION A-A'
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OW-14 SOURCE INVESTIGATION

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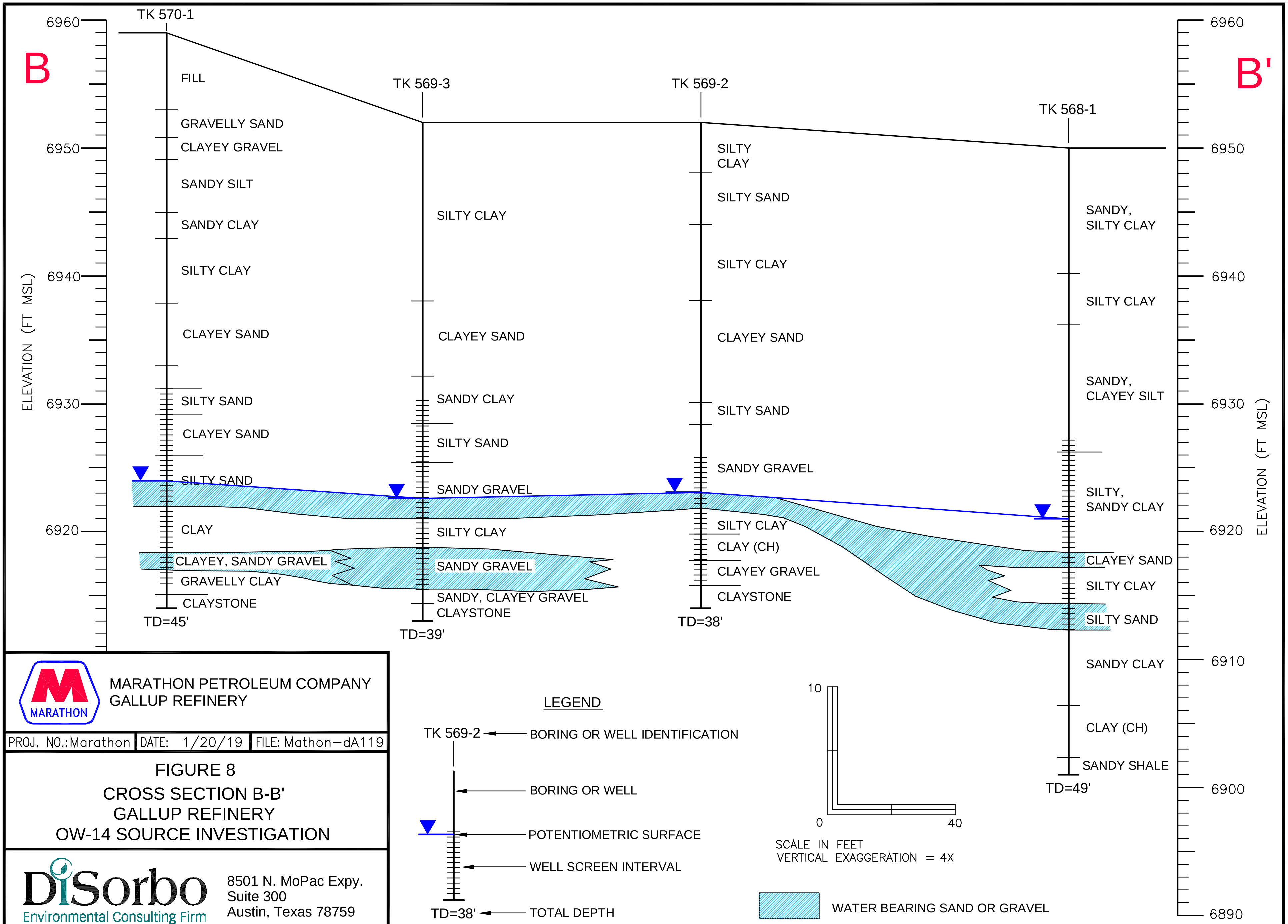

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FIGURE 8

CROSS SECTION B-B'
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OW-14 SOURCE INVESTIGATION

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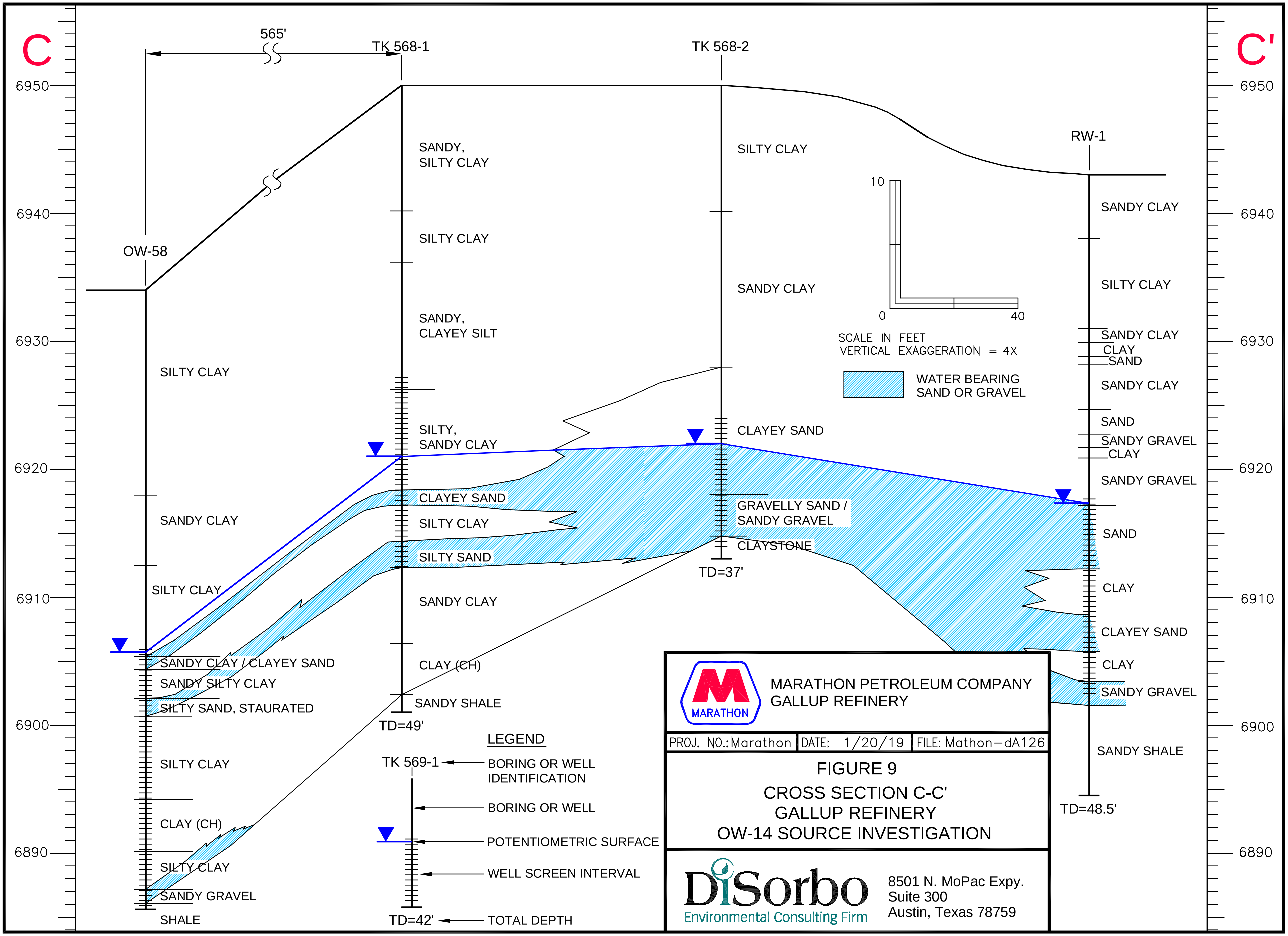

FIGURE 9

CROSS SECTION C-C'
GALLUP REFINERY
OW-14 SOURCE INVESTIGATION

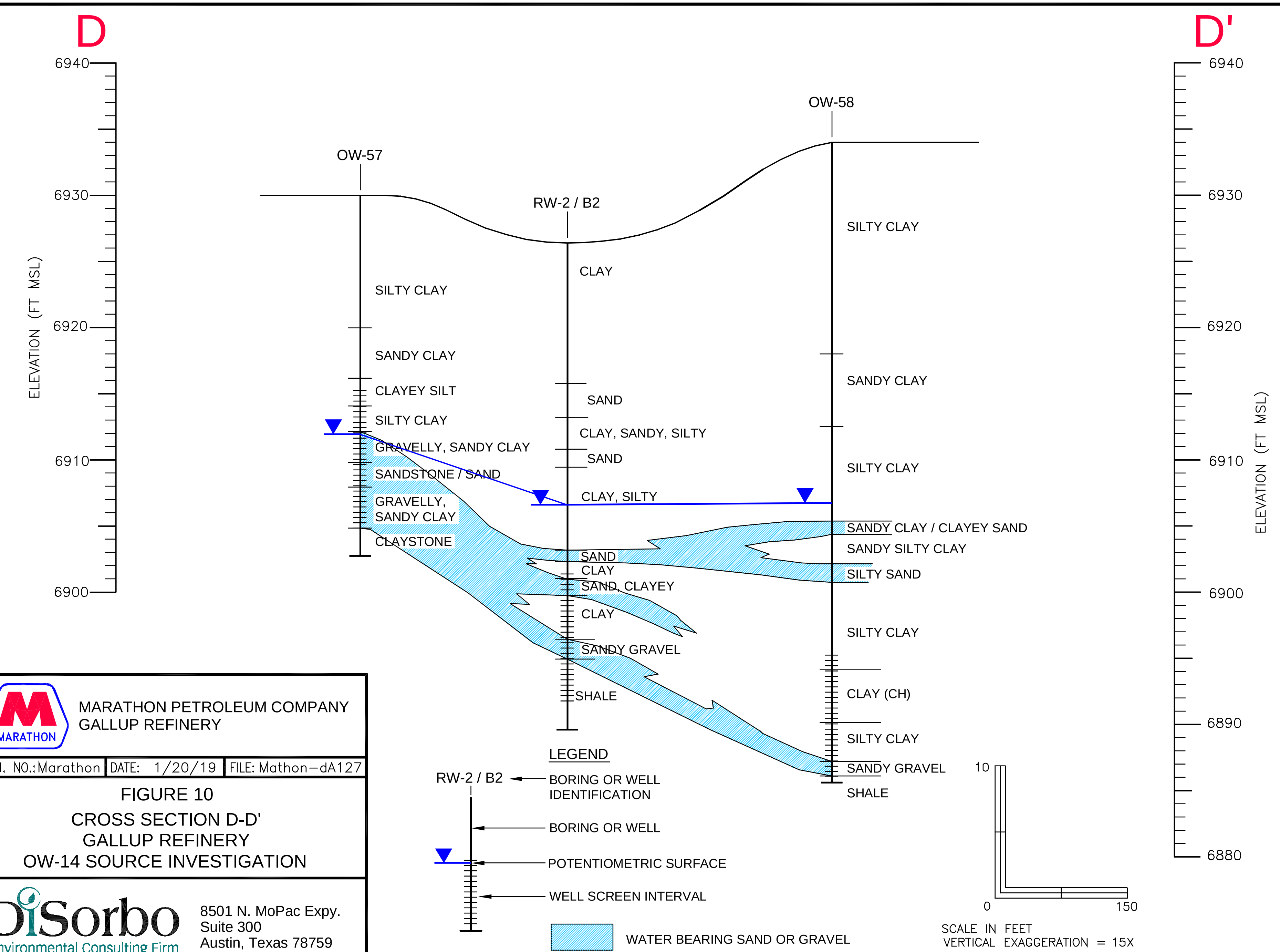

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FIGURE 10
CROSS SECTION D-D'
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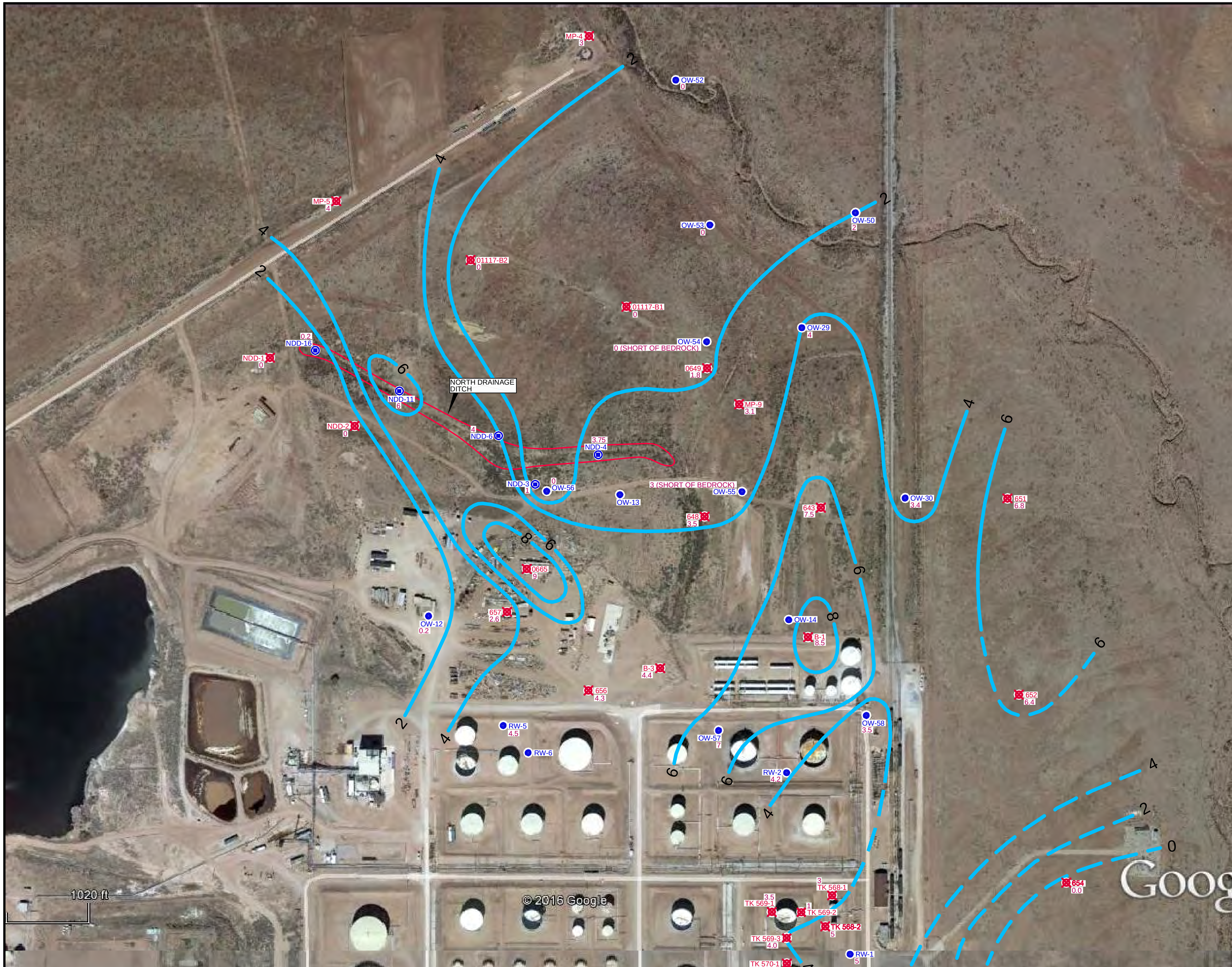

Aerial Map Source: Google Map, 03/18/2016.

0 300
SCALE IN FEET

NEW MEXICO

GALLUP SITE LOCATION

LEGEND

NDD-1	SOIL BORING LOCATION AND IDENTIFICATION NUMBER
NDD-1	TEMPORARY MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
OW-14	ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
6	CONTOUR LINE OF SAND THICKNESS ABOVE CHINLE GROUP (FT) CONTOUR INTERVAL = 2 FT
4.4	SATURATED SAND AND GRAVEL THICKNESS ABOVE CHINLE GROUP (FT)

MARATHON

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon | DATE: 1/20/19 | FILE: Mathon–dB149

FIGURE 11
ISOPACH MAP
SATURATED SAND AND GRAVEL
ABOVE CHINLE GROUP

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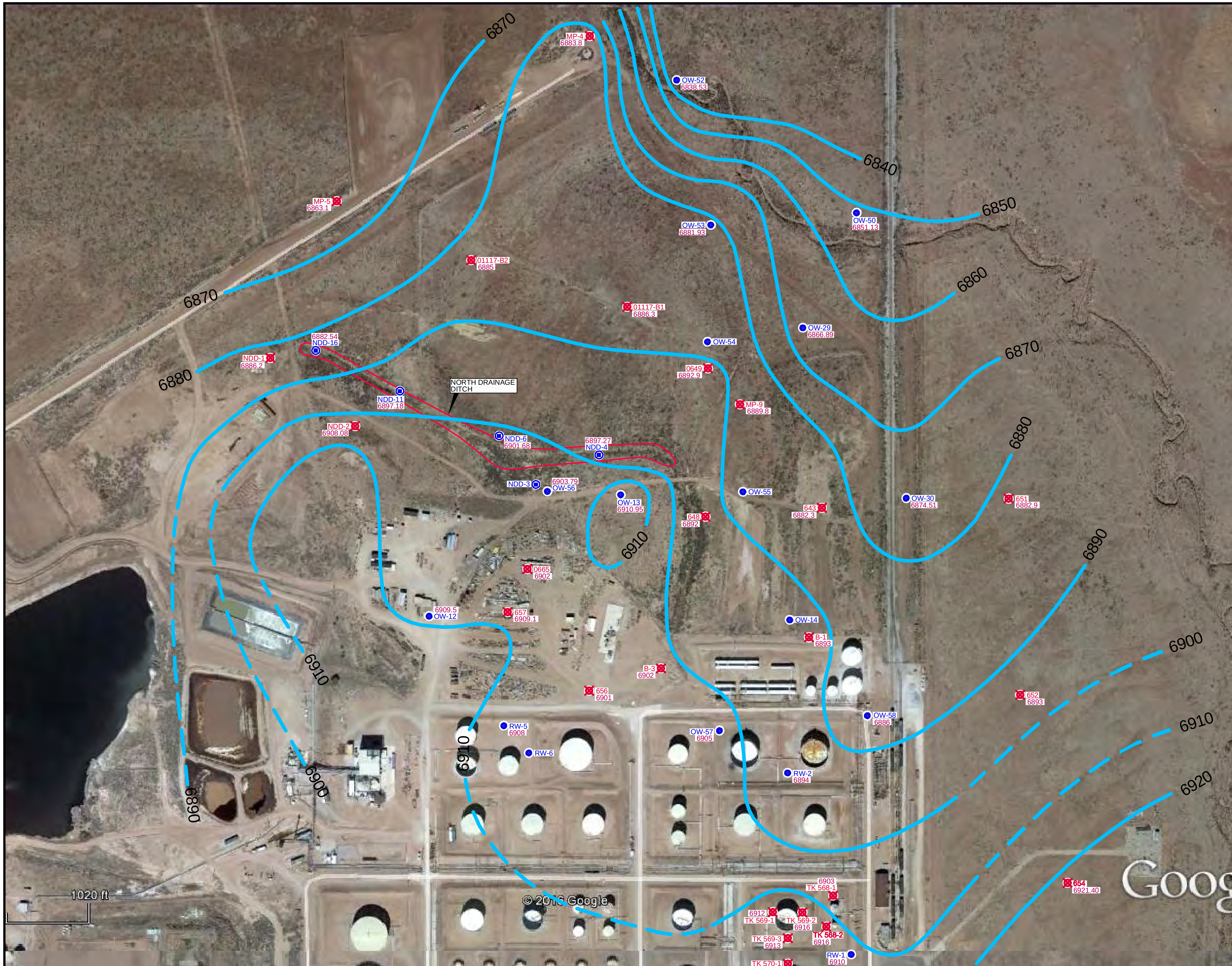

Aerial Map Source: Google Map, 03/18/2016.

N

0 300
SCALE IN FEET

GALLUP SITE LOCATION

LEGEND

NDD-1	SOIL BORING LOCATION AND IDENTIFICATION NUMBER
NDD-1	TEMPORARY MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
OW-14	ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
6900	CONTOUR LINE ELEVATION TOP OF CHINLE GROUP (FT ABOVE MSL)
6907.53	ELEVATION TOP OF CHINLE GROUP (FT ABOVE MSL) CONTOUR INTERVAL = 10'

NOTE:

LAND SURFACE ELEVATIONS USED TO CALCULATE ELEVATIONS TAKEN FROM SITE SURFACE ELEVATION CONTOUR MAP WHERE SURVEY NOT AVAILABLE

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon | DATE: 1/20/19 | FILE: Mathon–dB150

FIGURE 12
PALEOTOPOGRAPHY
TOP OF CHINLE GROUP

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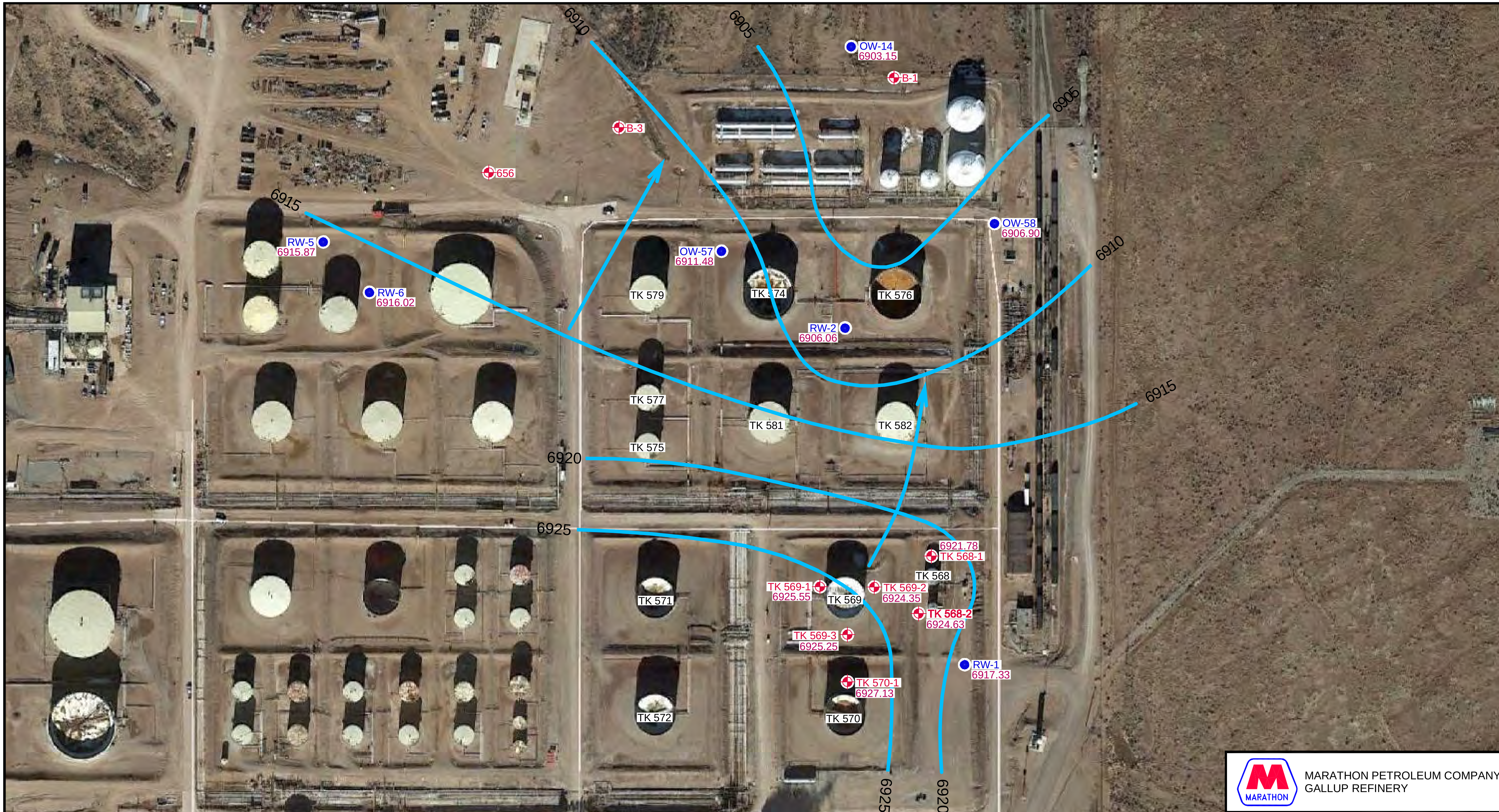

Aerial Map Source: Google Map, 01/05/2014.

0 160
SCALE IN FEET

LEGEND

TK 568-1 — SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-14 — ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

6903.15 — WATER LEVEL ELEVATION MEASURED SEPTEMBER 2016 (ABOVE MSL)

6910 — POTENTIOMETRIC CONTOUR (FT)

GROUNDWATER FLOW DIRECTION

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 1/20/19	FILE: Mathon–dB151

FIGURE 13
SEPTEMBER 2016
POTENTIOMETRIC SURFACE MAP

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Aerial Map Source: Google Map, 01/05/2014.

N

0 160
SCALE IN FEET

LEGEND

TK 568-1	SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER
OW-14	ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
6921.78	WATER LEVEL ELEVATION MEASURED SEPTEMBER 2016 (ABOVE MSL)
6915.29	WATER LEVEL ELEVATION MEASURED AUGUST 2018 (ABOVE MSL)
6910	POTENTIOMETRIC CONTOUR (FT)
	GROUNDWATER FLOW DIRECTION

NEW MEXICO
GALLUP SITE LOCATION

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon | DATE: 1/21/19 | FILE: Mathon-dB207

FIGURE 13A
AUGUST 2018
POTENTIOMETRIC SURFACE MAP

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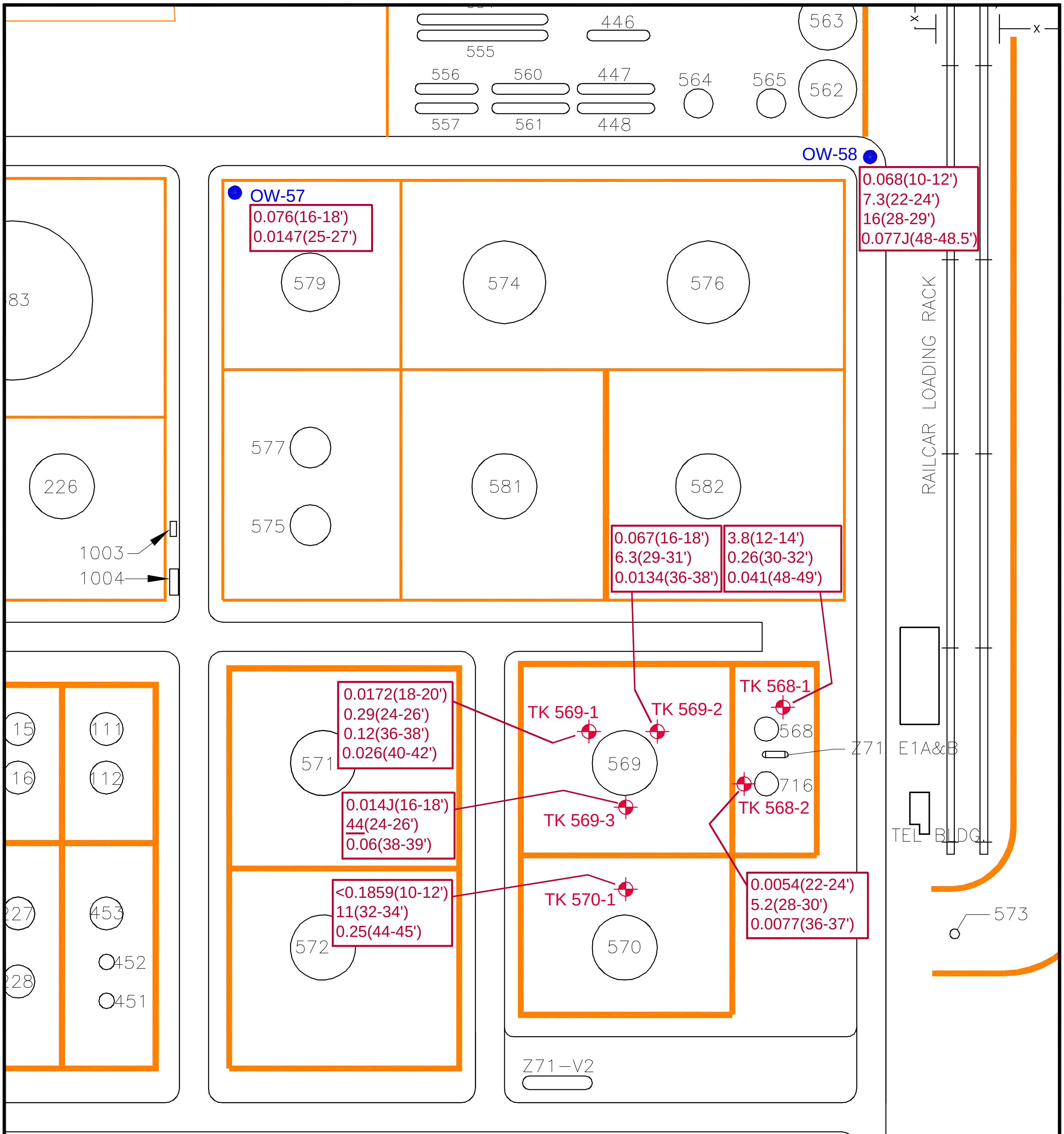

LEGEND

TK 568-1	SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER
OW-57	ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
3.8(12-14')	BENZENE CONCENTRATION, mg/kg (SAMPLE DEPTH-FT)
17.7	UNDERLINED CONCENTRATION VALUE EXCEEDS SCREENING LEVEL, mg/kg

N

0 150
SCALE IN FEET

MARATHON

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.:Marathon	DATE: 1/22/19	FILE: Mathon–dA103

FIGURE 14
BENZENE
SOILS CONCENTRATION MAP
OW-14 SOURCE INVESTIGATION

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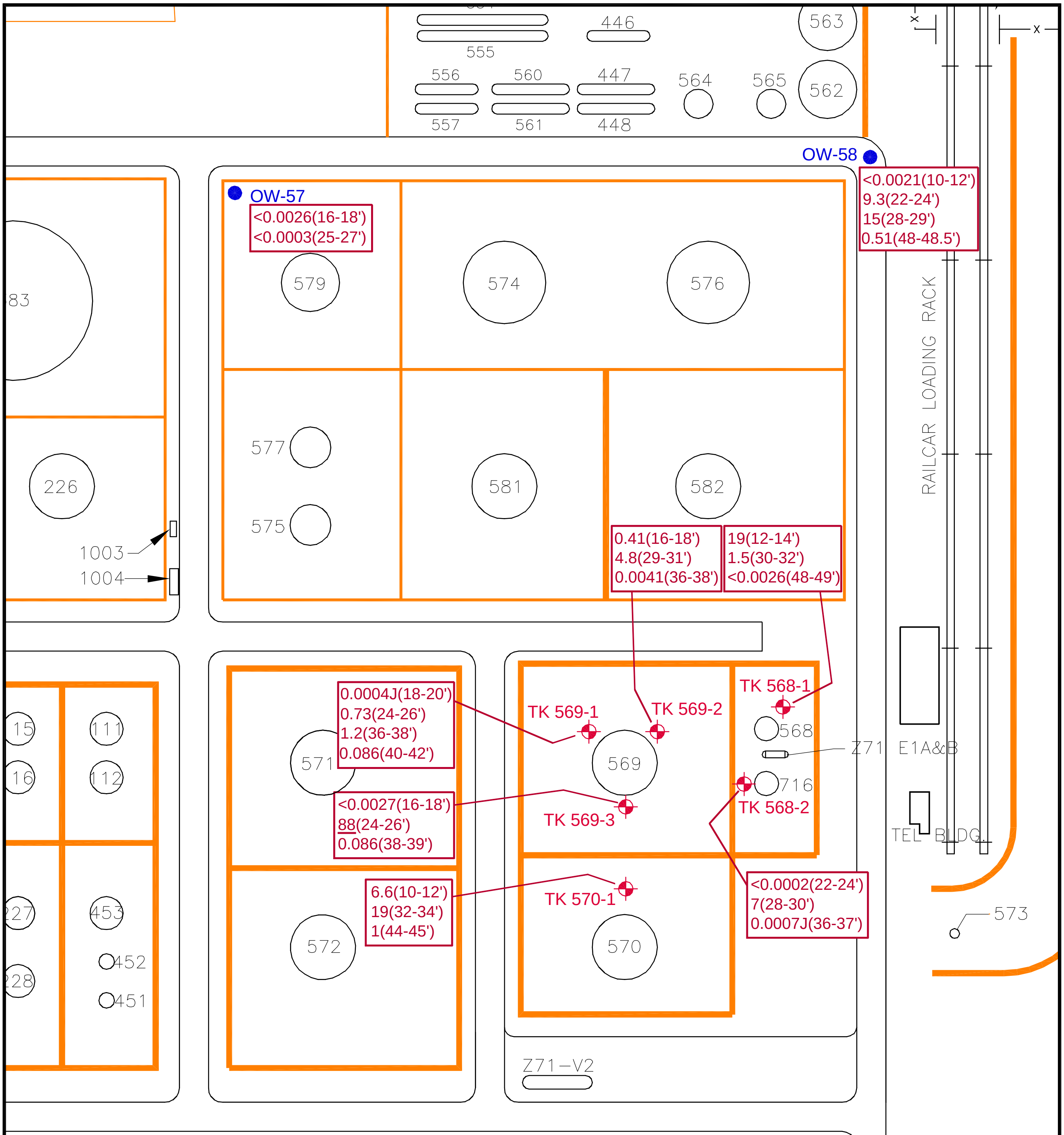

0 150
SCALE IN FEET

LEGEND

TK 568-1 — SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-57 — ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

19(12-14') — ETHYLBENZENE CONCENTRATION, mg/kg (SAMPLE DEPTH-FT)

74.5 — UNDERLINED CONCENTRATION VALUE EXCEEDS SCREENING LEVEL, mg/kg

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 1/22/19	FILE: Mathon–dA104

FIGURE 15
ETHYLBENZENE
SOILS CONCENTRATION MAP
OW-14 SOURCE INVESTIGATION

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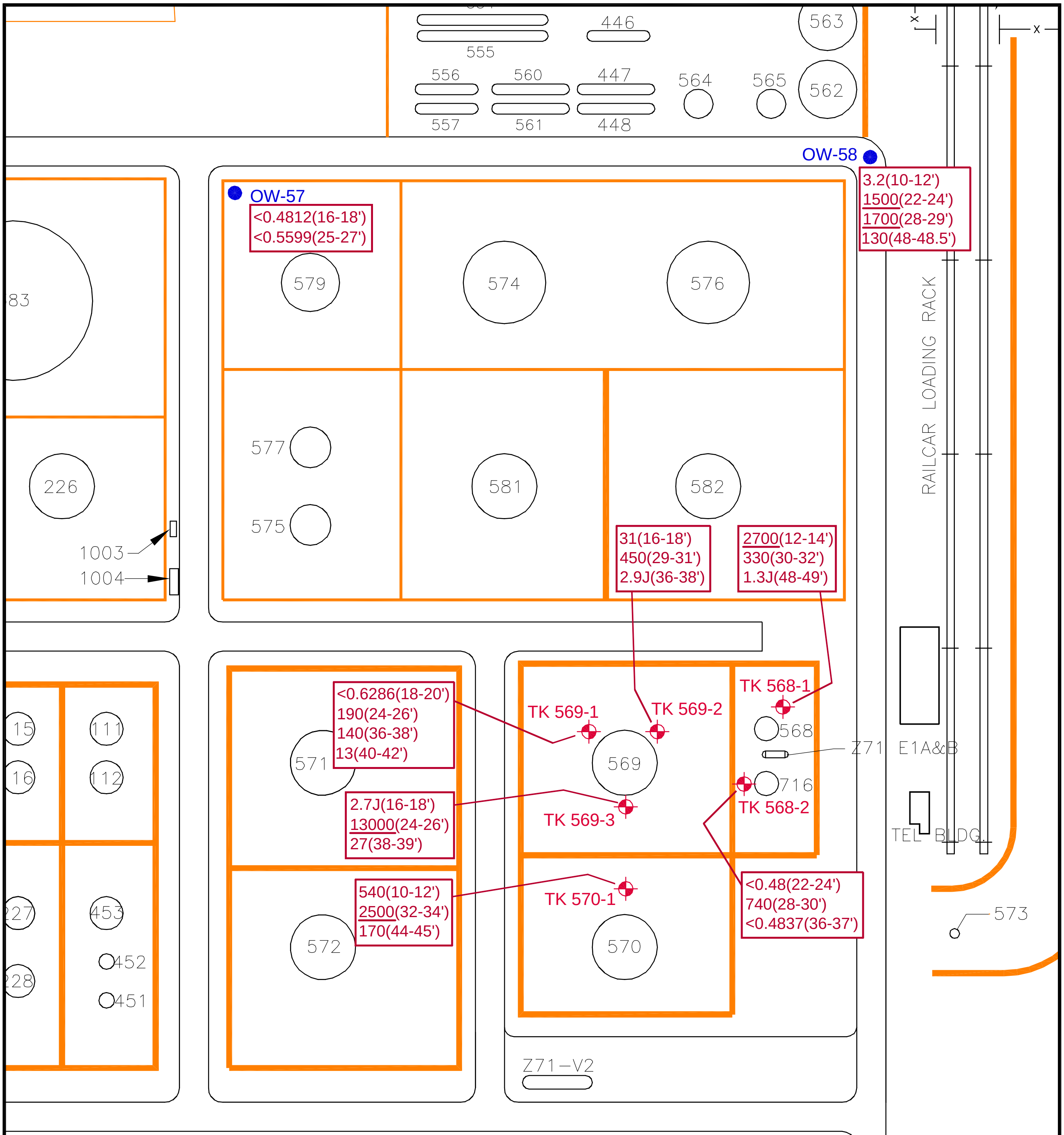

MARATHON

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 1/22/19	FILE: Mathon-dA153

FIGURE 16
GASOLINE RANGE ORGANICS
SOILS CONCENTRATION MAP
OW-14 SOURCE INVESTIGATION

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LEGEND

TK 568-1 — SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

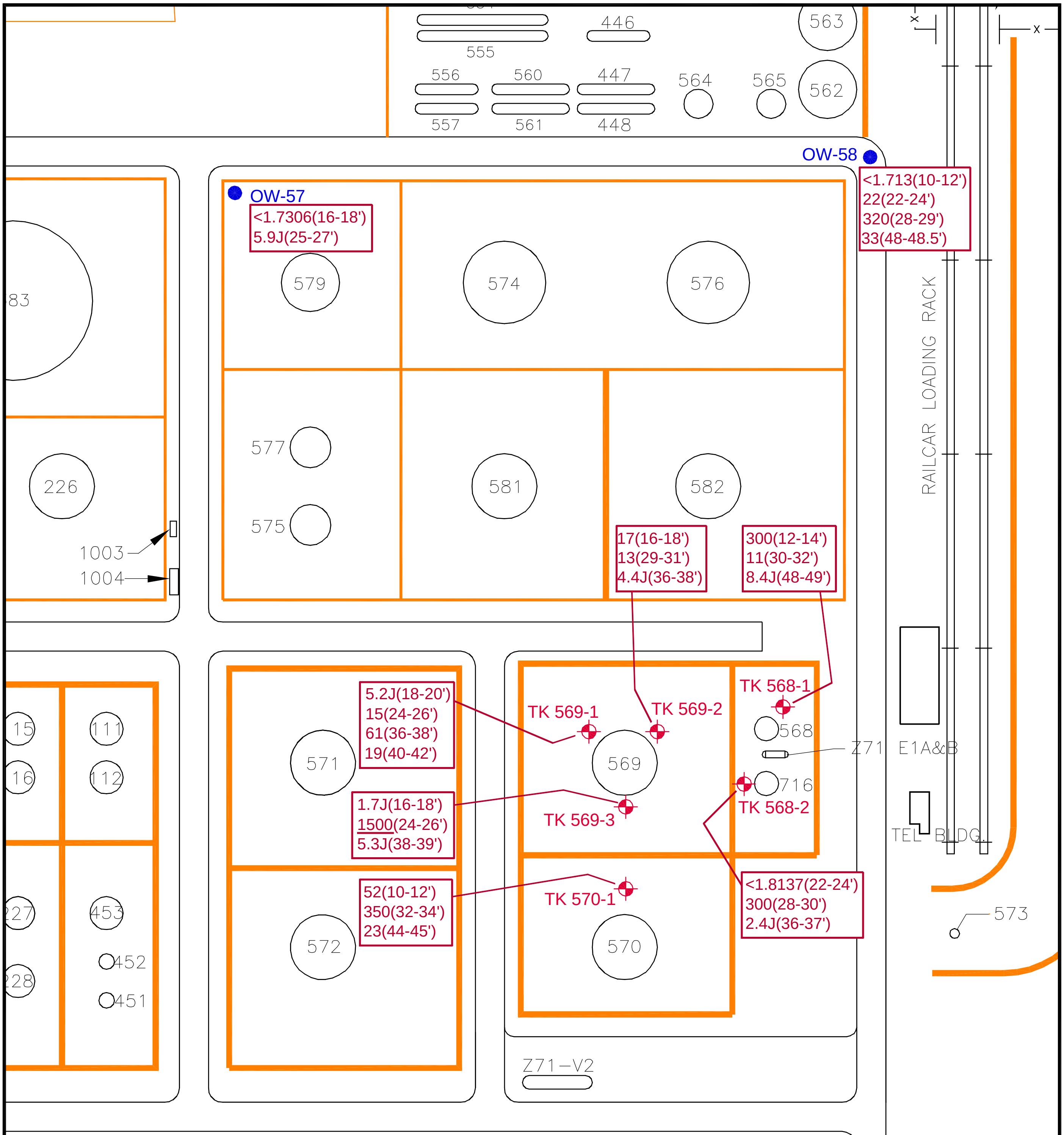
OW-57 — ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

330(12-14') — GASOLINE RANGE ORGANICS CONCENTRATION, mg/kg (SAMPLE DEPTH-FT)

1000 — UNDERLINED CONCENTRATION VALUE EXCEEDS SCREENING LEVEL, mg/kg

N

0 150
SCALE IN FEET



0 150

SCALE IN FEET

LEGEND

TK 568-1	SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER
OW-57	ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
300(12-14')	DIESEL RANGE ORGANICS CONCENTRATION, mg/kg (SAMPLE DEPTH-FT)
1000	UNDERLINED CONCENTRATION VALUE EXCEEDS SCREENING LEVEL, mg/kg

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon | DATE: 1/22/19 | FILE: Mathon-dA110

FIGURE 17
DIESEL RANGE ORGANICS
SOILS CONCENTRATION MAP
OW-14 SOURCE INVESTIGATION

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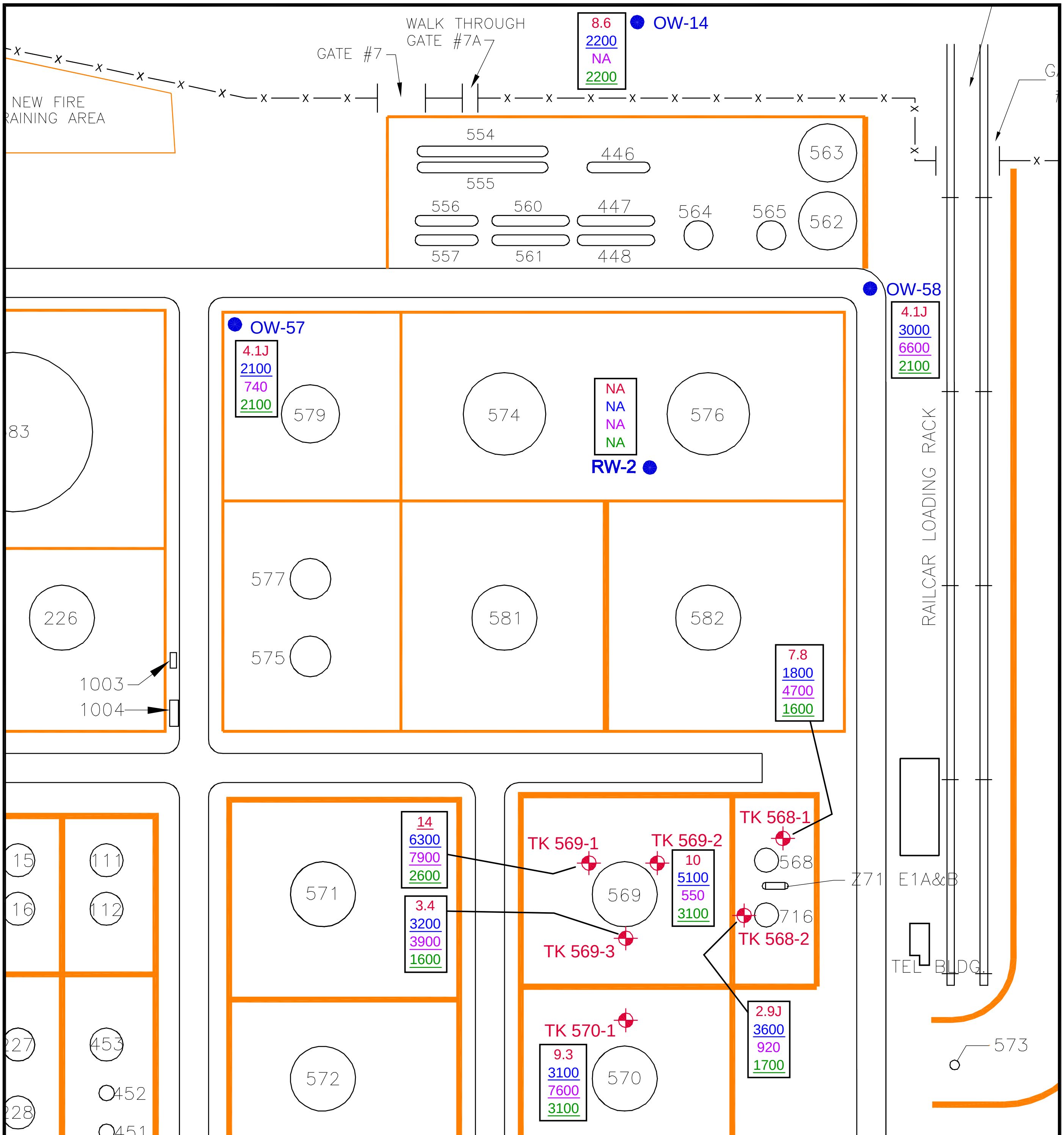

SAMPLES COLLECTED
IN SEPT 2016:
RW-2, TK 570-1 & OW-58

SAMPLES COLLECTED
IN OCT 2016:
TK 568-1, TK 568-2, TK 569-1,
TK 569-2, TK 569-3 & OW-57

NA - NOT ANALYZED

0 150
SCALE IN FEET

LEGEND

TK 568-1 — SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-57 — ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

UNDERLINED CONCENTRATION VALUE EXCEEDS SCREENING LEVEL (µg/L)

10	ARSENIC (µg/L)
1000	BARIUM (µg/L)
1000	IRON (µg/L)
200	MANGANESE (µg/L)

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon | DATE: 1/22/19 | FILE: Mathon–dA114

FIGURE 18
DISSOLVED
ARSENIC, BARIUM, IRON AND MANGANESE
GROUNDWATER MAP
OW-14 SOURCE INVESTIGATION

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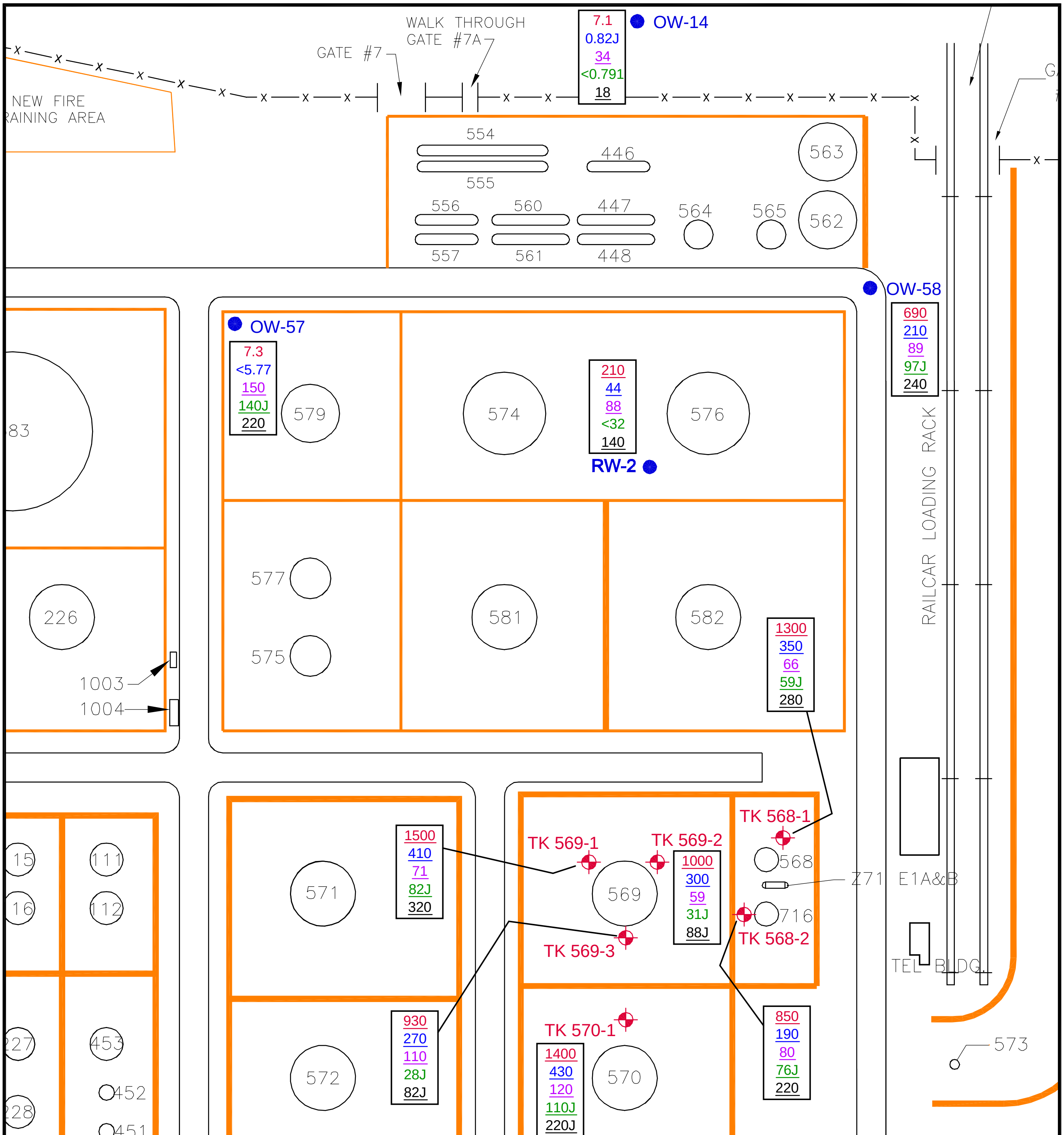

SAMPLES COLLECTED
IN SEPT 2016:
RW-2, TK 570-1 & OW-58

SAMPLES COLLECTED
IN OCT 2016:
TK 568-1, TK 568-2, TK 569-1,
TK 569-2, TK 569-3 & OW-57

LEGEND

TK 568-1 — SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-57 — ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

UNDERLINED CONCENTRATION VALUE EXCEEDS SCREENING LEVEL (µg/L)

56 — 1,2,4-TRIMETHYLBENZENE (µg/L)
60 — 1,3,5-TRIMETHYLBENZENE (µg/L)
1.1 — 1-METHYLNAPHTHALENE (µg/L)
36 — 2-METHYLNAPHTHALENE (µg/L)
1.65 — NAPHTHALENE (µg/L)

N

0 150
SCALE IN FEET

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon | DATE: 1/22/19 | FILE: Mathon–dA116

FIGURE 19
1,2,4-TRIMETHYLBENZENE,
1,3,5-TRIMETHYLBENZENE,
1-METHYLNAPHTHALENE,
2-METHYLNAPHTHALENE AND NAPHTHALENE
GROUNDWATER MAP
OW-14 SOURCE INVESTIGATION

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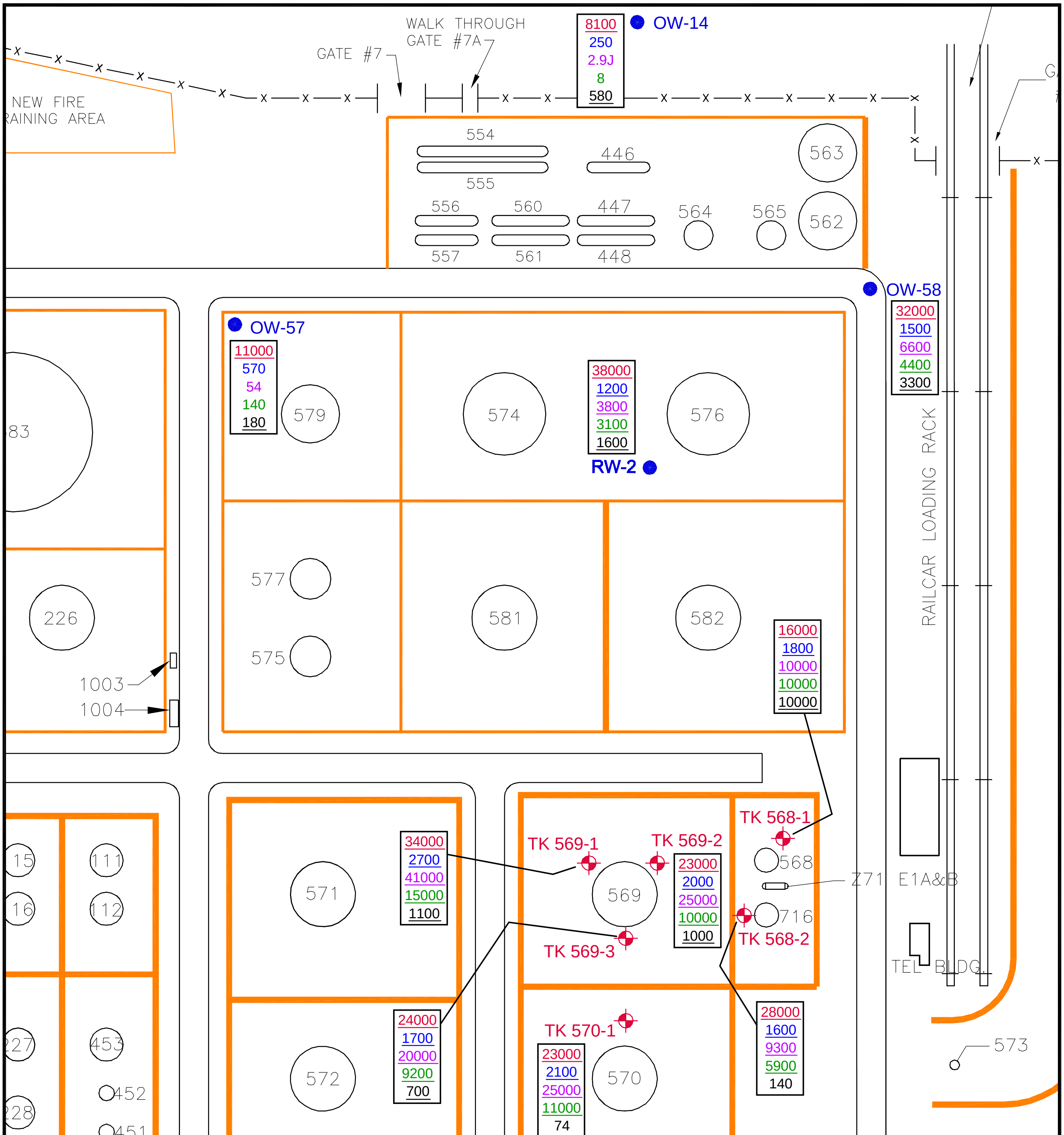
Austin, Texas 78759



SAMPLES COLLECTED
IN SEPT 2016:
RW-2, TK 570-1 & OW-58

SAMPLES COLLECTED
IN OCT 2016:
TK 568-1, TK 568-2, TK 569-1,
TK 569-2, TK 569-3 & OW-57

LEGEND

TK 568-1 — SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-57 — ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

UNDERLINED CONCENTRATION VALUE EXCEEDS SCREENING LEVEL (µg/L)

5	BENZENE (µg/L)
700	ETHYLBENZENE (µg/L)
750	TOLUENE (µg/L)
620	TOTAL XYLENES (µg/L)
143	MTBE (µg/L)

N

0 150
SCALE IN FEET

MARATHON

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.:Marathon	DATE: 1/22/19	FILE: Mathon-dA115

FIGURE 20
BENZENE, ETHYLBENZENE, TOLUENE,
TOTAL XYLENES AND MTBE
GROUNDWATER MAP
OW-14 SOURCE INVESTIGATION

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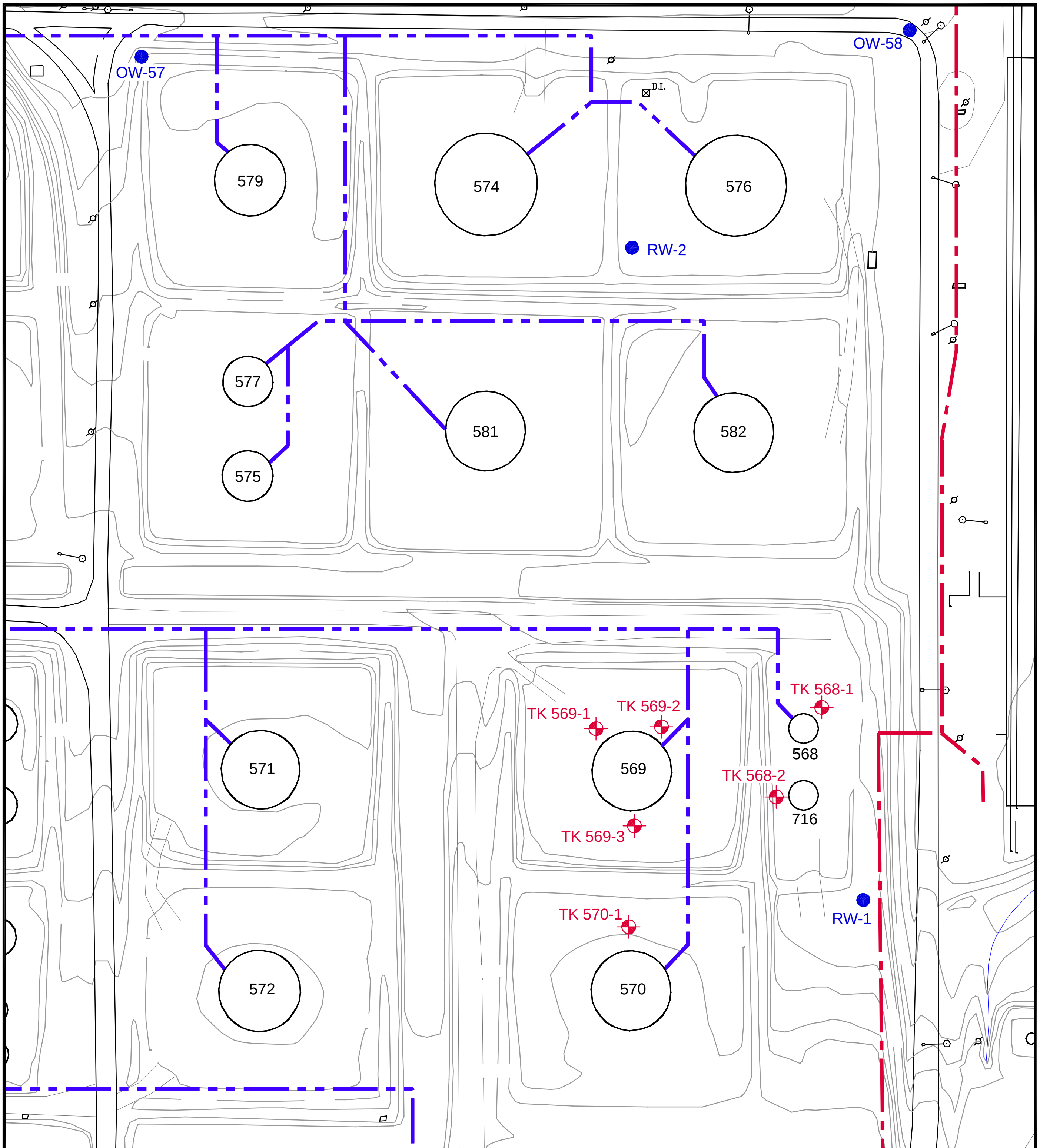

Map Source: Compiled by Photogrammetric Methods from Photography Acquired on March 1, 1998.

NEW MEXICO

SITE LOCATION

LEGEND:

SEWER PIPELINE

DIRTY OIL DRAINAGE PIPELINE

TK 568-1 SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-57 ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

N

0 120
SCALE IN FEET

MARATHON

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon | DATE: 06/27/19 | FILE: Mathon-dA163

FIGURE 21
UNDERGROUND PIPELINES

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Table 1 - RW-1 Recovery Volumes
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

Year	Product Recovered (gallons)	Water Recovered (gallons)
2005	431.5	1,210.5
2006	23.52	1,107.0
2007	1.715	148.5
2008	3.99	152.0
2009	1.78	338.0
2010	0.66	128.0
2011	0.42	165.0
2012	0.97	137.0
2013	2.328	86.0
2014	2.37	83.0
2015	2	54.0
2016	8.5	53.0
2017	10.5	50.0
2018	1	0.0
TOTAL	**491**	**3,712**

Recovery volumes are field estimates for RW-1

Table 2 - OW-14 Source Area Wells Groundwater Analytical Data
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

		Benzene (mg/L)	Toluene (mg/L)	Ethyl Benzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)	1,2,4-Trimethyl benzene (mg/L)	1,3,5-Trimethyl benzene (mg/L)	1,2-Dichloro ethane (EDC) (mg/L)	Naphthalene (mg/L)	1-Methyl naphthalene (mg/L)	2-Methylnaphthalene (mg/L)	1,1-Dichloroethane (mg/L)	Isopropyl benzene (mg/L)	n-Butylbenzene (mg/L)	n-Propylbenzene (mg/L)	2,4-Dimethylphenol (mg/L)	Acetone (mg/L)	Sec-butylbenzene (mg/L)
WQCC 20NMAC 6.2.3103		0.01	0.75	0.75	0.62	NE	NE	NE	0.01	NE	NE	NE	0.025	NE	NE	NE	NE	NE	NE
40 CFR 141.62 MCL		0.005	1.0	0.7	10	NE	NE	NE	0.005	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
NMED Tap Water (MARCH 2017)		0.00455	1.1	0.0149	0.193	0.143	NE	NE	0.0017	0.00165	NE	NE	0.0275	0.447	NE	NE	0.354	14.1	NE
EPA RSL for Tap Water (Nov. 2018)		0.00046	1.1	0.0015	0.190	0.014	0.056	0.060	0.00017	0.00017	0.0011	0.036	0.0028	0.450	1	0.66	0.360	14	2
Well ID	DATE SAMPLED																		
OW-13	11/06/18	<0.001	<0.001	<0.001	<0.0015	0.062	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.010	<0.001
	09/11/18	<0.001	<0.001	<0.001	<0.0015	0.075	<0.001	<0.001	0.00076	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	0.0045	<0.001
	05/15/18	<0.001	<0.001	<0.001	<0.0015	0.068	<0.001	<0.001	0.00081	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	0.0011	<0.001
	02/28/18	<0.001	<0.001	<0.001	<0.0015	0.058	<0.001	<0.001	0.00077	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	0.0012	<0.001
	12/11/17	<0.001	<0.001	<0.001	<0.0015	0.056	<0.001	<0.001	0.00087	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	0.0036	<0.001
	09/06/17	<0.001	<0.001	<0.001	<0.0015	0.056	<0.001	<0.001	0.00077	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	05/31/17	<0.001	<0.001	<0.001	<0.0015	0.058	<0.001	<0.001	0.00084	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	0.0036	<0.001
	02/27/17	<0.001	<0.001	<0.001	<0.0015	0.053	<0.001	<0.001	0.00085	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	11/15/16	<0.001	<0.001	<0.001	<0.0015	0.044	<0.001	<0.001	0.00076	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	08/31/16	0.00013	<0.001	<0.001	<0.0015	0.038	<0.001	<0.001	0.00079	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	06/06/16	<0.001	<0.001	<0.001	<0.0015	0.036	<0.001	<0.001	0.00075	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	03/04/16	<0.001	<0.001	<0.001	<0.0015	0.035	<0.001	<0.001	0.0008	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	10/27/15	<0.001	0.0013	<0.001	0.0016	0.035	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	08/11/15	<0.001	<0.001	<0.001	<0.0015	0.031	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.004	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	06/01/15	<0.001	<0.001	<0.001	<0.0015	0.025	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	03/09/15	<0.001	<0.001	<0.001	<0.0015	0.026	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	11/10/14	<0.001	<0.001	<0.001	<0.0015	0.027	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	09/15/14	<0.001	<0.001	<0.001	<0.0015	0.023	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	<0.01	<0.01	<0.001
	06/03/14	<0.001	<0.001	<0.001	<0.0015	0.02	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.004	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	03/07/14	<0.001	<0.001	<0.001	<0.0015	0.023	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	11/11/13	<0.001	<0.001	<0.001	<0.0015	0.017	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	9/4/2013	<0.001	<0.001	<0.001	<0.0015	0.014	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	06/13/13	<0.001	<0.001	<0.001	<0.0015	0.015	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	03/19/13	<0.001	<0.001	<0.001	<0.0015	0.012	<0.005	<0.001	<0.005	<0.01	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	11/27/12	<0.001	<0.001	<0.001	<0.0015	0.011	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	08/23/12	<0.001	<0.001	<0.001	<0.0015	0.0092	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.003	<0.001	NA	<0.01	<0.001
	06/14/12	<0.001	<0.001	<0.001	<0.0015	0.0079	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.001	<0.001	NA	<0.01	<0.001
	03/21/12	<0.001	<0.001	<0.001	<0.0015	0.0082	<0.001	<0.001	<0.001	<0.002	<0.004	<0.004	<0.001	<0.001	<0.001	<0.001	NA	<0.01	<0.001
	12/13/11	<0.001	<0.001	<0.001	<0.0015	0.0065	<0.001	NA	<0.001	<0.002	<0.004	NA	<0.001	<0.001	<0.001	<0.001	NA	<0.01	<0.001
	10/25/11	<0.001	<0.001	<0.001	<0.0015	0.0062	<0.001	NA	<0.001	<0.002	<0.004	NA	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
	06/20/11	<0.001	<0.001	<0.001	<0.0015	0.0048	<0.001	NA	<0.001	<0.002	<0.004	NA	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
	02/24/11	<0.001	<0.001	<0.001	<0.0015	0.0040	<0.001	NA	<0.001	<0.002	<0.004	NA	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
	11/08/10	<0.001	<0.001	<0.001	<0.0015	0.0038	<0.001	NA	<0.001	<0.002	<0.004	NA	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
	09/22/10	<0.001	<0.001	<0.001	<0.0015	0.0031	<0.001	NA	<0.001	<0.002	<0.004	NA	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
	06/07/10	<0.001	<0.001	<0.001	<0.0015	0.0027	<0.001	NA	<0.001	<0.002	<0.004	NA	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
	03/25/10	<0.001	<0.001	<0.001	<0.0015	0.0023	<0.001	NA	<0.001	<0.002	<0.004	NA	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001

Table 2 - OW-14 Source Area Wells Groundwater Analytical Data
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

		Benzene (mg/L)	Toluene (mg/L)	Ethyl Benzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)	1,2,4-Trimethyl benzene (mg/L)	1,3,5-Trimethyl benzene (mg/L)	1,2-Dichloro ethane (EDC) (mg/L)	Naphthalene (mg/L)	1-Methyl naphthale ne (mg/L)	2-Methylnapht halene (mg/L)	1,1-Dichloroet hane (mg/L)	Isopropyl benzene (mg/L)	n-Butylbenz ene (mg/L)	n-Propylben zene (mg/L)	2,4-Dimethylphenol (mg/L)	Acetone (mg/L)	Sec-butylbenz ene (mg/L)
WQCC 20NMAC 6.2.3103		0.01	0.75	0.75	0.62	NE	NE	NE	0.01	NE	NE	NE	0.025	NE	NE	NE	NE	NE	NE
40 CFR 141.62 MCL		0.005	1.0	0.7	10	NE	NE	NE	0.005	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
NMED Tap Water (MARCH 2017)		0.00455	1.1	0.0149	0.193	0.143	NE	NE	0.0017	0.00165	NE	NE	0.0275	0.447	NE	NE	0.354	14.1	NE
EPA RSL for Tap Water (Nov. 2018)		0.00046	1.1	0.0015	0.190	0.014	0.056	0.060	0.00017	0.00017	0.0011	0.036	0.0028	0.450	1	0.66	0.360	14	2
Well ID	DATE SAMPLED																		
OW-14	11/06/18	13	<0.05	0.64	<0.075	0.60	<0.05	<0.05	<0.05	<0.1	<0.2	<0.2	<0.05	<0.05	<0.15	<0.05	NA	<0.5	<0.05
	09/11/18	17	<0.05	0.66	0.042	0.74	<0.05	<0.05	<0.05	0.027	0.026	<0.2	<0.05	0.017	<0.15	<0.05	NA	<0.5	<0.05
	05/15/18	15	0.0088	0.71	<0.15	0.67	<0.1	<0.1	<0.1	0.017	<0.4	<0.4	<0.04	0.014	<0.3	0.027	NA	<1	<0.1
	02/27/18	14	0.0065	0.61	<0.15	0.66	<0.1	<0.1	<0.1	0.044	0.059	<0.4	<0.1	0.012	<0.3	0.032	NA	<1	<0.1
	12/11/17	13	0.013	0.64	0.052	0.63	0.013	0.0021	<0.01	0.037	0.033	<0.040	<0.01	0.016	0.003	0.028	NA	<0.1	0.0032
	09/06/17	12	0.0091	0.54	0.033	0.66	0.012	0.0016	<0.005	0.038	0.038	0.0017	<0.005	0.014	0.0021	0.025	NA	0.013	0.0027
	05/30/17	13	0.004	0.47	0.02	0.70	0.011	<0.05	<0.05	0.028	0.037	<0.2	<0.05	0.014	<0.15	0.021	NA	<0.5	<0.05
	02/27/17	12	0.0062	0.39	<0.075	0.81	0.0074	<0.05	<0.05	0.024	0.035	<0.2	<0.05	0.0083	<0.15	0.014	NA	<0.5	<0.05
	11/15/16	8.7	0.0057	0.3	0.013	0.50	0.0084	0.0015	0.0034	0.02	0.03	<0.04	<0.01	0.01	0.0034	0.013	NA	<0.1	0.0041
	08/31/16	8.1	0.0029	0.25	0.008	0.58	0.0071	0.00082	<0.005	0.018	0.034	<0.020	<0.005	0.0085	0.0013	0.011	NA	<0.05	0.0022
	06/06/16	7.8	0.0026	0.23	0.012	0.62	0.008	0.0017	<0.01	0.019	0.033	0.0033	0.0033	0.0096	<0.03	0.011	NA	<0.1	0.0031
	03/04/16	6.5	<0.05	0.23	<0.075	0.68	<0.05	<0.05	<0.05	0.017	0.03	<0.2	<0.05	<0.05	<0.15	<0.05	NA	<0.5	<0.05
	10/27/15	6.2	<0.02	0.15	<0.03	0.57	<0.02	<0.02	<0.02	<0.04	<0.08	<0.08	<0.02	<0.02	<0.06	<0.02	NA	<0.2	<0.02
	08/10/15	5.4	<0.01	0.16	<0.015	0.78	<0.01	<0.01	<0.01	<0.02	<0.04	<0.04	<0.04	<0.01	<0.03	<0.01	NA	<0.1	<0.01
	06/01/15	4.6	<0.02	0.16	<0.03	0.74	<0.02	<0.02	<0.02	<0.04	<0.08	<0.08	<0.02	<0.02	<0.06	<0.02	NA	<0.2	<0.02
	03/09/15	3.9	<0.02	0.16	<0.03	0.76	<0.02	<0.02	<0.02	<0.04	<0.08	<0.08	<0.02	<0.02	<0.06	<0.02	NA	<0.2	<0.02
	11/10/14	3.6	0.015	0.17	<0.015	0.81	<0.01	<0.01	<0.01	<0.02	0.044	<0.04	<0.01	<0.01	<0.03	<0.01	NA	<0.1	<0.01
	09/15/14	3.8	<0.02	0.16	<0.03	0.82	<0.02	<0.02	<0.02	<0.04	0.016	<0.08	<0.02	<0.02	<0.06	<0.02	<0.01	<0.2	<0.02
	06/03/14	3.7	<0.02	0.12	<0.03	0.93	<0.02	<0.02	<0.02	<0.04	<0.08	<0.08	<0.08	<0.02	<0.06	<0.02	NA	<0.2	<0.02
	03/07/14	4.0	0.026	0.14	0.032	1.1	<0.01	<0.01	<0.01	<0.02	<0.04	<0.04	<0.04	<0.01	<0.03	<0.01	NA	<0.1	<0.01
	11/11/13	3.3	0.046	0.13	0.019	1.1	<0.005	<0.005	<0.005	<0.01	0.027	<0.02	<0.005	0.0066	<0.015	<0.005	NA	<0.05	<0.005
	09/04/13	2.6	<0.005	0.063	<0.0075	0.94	<0.005	<0.005	<0.005	<0.01	0.024	<0.02	<0.005	0.006	<0.015	<0.005	NA	<0.05	<0.005
	06/13/13	3.4	<0.01	0.073	<0.015	1.3	<0.01	<0.01	<0.01	<0.02	<0.04	<0.04	<0.01	<0.01	<0.03	<0.01	NA	<0.1	<0.01
	03/19/13	2.8	<0.01	0.065	<0.015	1.3	<0.01	<0.01	<0.01	<0.02	<0.04	<0.04	<0.01	<0.01	<0.03	<0.01	NA	<0.1	<0.01
	11/27/12	2.7	<0.01	0.056	<0.015	1.4	<0.01	<0.01	<0.01	<0.02	<0.04	<0.04	<0.01	<0.01	<0.03	<0.01	NA	<0.1	<0.01
	08/23/12	2.1	<0.01	0.037	<0.015	1.6	<0.01	<0.01	<0.01	<0.02	<0.04	<0.04	<0.01	<0.01	<0.03	<0.01	NA	<0.1	<0.01
	06/14/12	2.6	<0.01	0.053	<0.015	1.2	<0.01	<0.01	<0.01	<0.02	<0.04	<0.04	<0.01	<0.01	<0.01	<0.01	NA	<0.1	<0.01
	03/21/12	2.3	<0.01	0.051	<0.015	1.4	<0.01	<0.01	<0.01	<0.02	<0.04	<0.04	<0.01	<0.01	<0.01	<0.01	NA	<0.1	<0.01
	12/13/11	1.5	<0.005	0.036	<0.0075	1.3	<0.005	NA	<0.005	<0.01	0.021	NA	<0.005	0.007	<0.005	<0.005	NA	NA	<0.005
	10/24/11	1.4	<0.005	0.045	<0.0075	1.4	<0.005	NA	<0.005	<0.01	0.022	NA	<0.005	0.008	<0.005	<0.005	NA	NA	<0.005
	06/20/11	1.8	0.0015	0.0610	<0.0015	1.6	0.001	NA	0.002	0.002	0.020	NA	0.001	0.007	<0.001	0.002	NA	NA	0.002
	02/24/11	1.3	0.0019	0.0420	<0.0015	1.4	0.001	NA	0.002	<0.002	0.019	NA	<0.001	0.005	<0.001	0.001	NA	NA	0.003
	11/08/10	0.63	<0.001	0.0180	<0.0015	1.3	0.001	NA	0.002	<0.002	0.022	NA	<0.001	0.004	<0.001	<0.001	NA	NA	0.003
	09/22/10	0.47	<0.001	0.0083	<0.0015	1.4	<0.001	NA	0.002	<0.002	0.022	NA	<0.001	0.003	<0.001	<0.001	NA	NA	0.003
	06/07/10	0.33	0.0018	0.0085	<0.0015	1.4	0.001	NA	0.002	<0.002	0.020	NA	<0.001	0.003	<0.001	<0.001	NA	NA	0.002
	03/24/10	0.25	<0.005	0.0100	<0.0075	1.5	<0.005	<0.005	<0.005	<0.01	<0.02	<0.005	<0.005	<0.005	<0.005	<0.005	NA	NA	<0.005

Table 2 - OW-14 Source Area Wells Groundwater Analytical Data
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

		Benzene (mg/L)	Toluene (mg/L)	Ethyl Benzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)	1,2,4-Trimethyl benzene (mg/L)	1,3,5-Trimethyl benzene (mg/L)	1,2-Dichloro ethane (EDC) (mg/L)	Naphthalene (mg/L)	1-Methyl naphthale ne (mg/L)	2-Methylnapht halene (mg/L)	1,1-Dichloroet hane (mg/L)	Isopropyl benzene (mg/L)	n-Butylbenz ene (mg/L)	n-Propylben zene (mg/L)	2,4-Dimethylphenol (mg/L)	Acetone (mg/L)	Sec-butylbenz ene (mg/L)
WQCC 20NMAC 6.2.3103		0.01	0.75	0.75	0.62	NE	NE	NE	0.01	NE	NE	NE	0.025	NE	NE	NE	NE	NE	NE
40 CFR 141.62 MCL		0.005	1.0	0.7	10	NE	NE	NE	0.005	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
NMED Tap Water (MARCH 2017)		0.00455	1.1	0.0149	0.193	0.143	NE	NE	0.0017	0.00165	NE	NE	0.0275	0.447	NE	NE	0.354	14.1	NE
EPA RSL for Tap Water (Nov. 2018)		0.00046	1.1	0.0015	0.190	0.014	0.056	0.060	0.00017	0.00017	0.0011	0.036	0.0028	0.450	1	0.66	0.360	14	2
Well ID	DATE SAMPLED																		
- RW 1	2018	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	2017	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	2016	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	2015	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	09/18/14	37	35.0	1.8	10	1.2	<1.0	<1.0	<1.0	<2.0	<4.0	<4.0	<1.0	<1.0	<3.0	<1.0	0.037	<10	<1.0
	09/16/13	54	35	2.4	13	2.2	1.3	<1.0	<1.0	<2.0	<4.0	<4.0	<1.0	<1.0	<3.0	<1.0	0.087	<10	<1.0
	08/23/12	45	82	4.9	31	3.1	2.8	<1.0	<1.0	<2.0	<4.0	<4.0	<1.0	<0.01	<3.0	<0.01	0.21	<10	<1.0
	10/03/11	51	37	3.7	23	2.9	5.8	0.98	NA	0.6	0.15	0.15	NA	<0.01	NA	0.4	<0.1	NA	NA
- RW 2	4th Quarter 2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	08/28/18	48	4	1.5	3.8	1.1	0.31	0.043	<0.1	0.1	0.04	<0.4	<0.1	0.024	<0.3	0.056	NA	<1	<0.1
	05/08/18	46	5	1.5	4.2	1.2	0.34	0.031	<0.2	0.095	<0.8	<0.8	<0.2	0.013	<0.6	0.042	NA	<2	<0.2
	02/20/18	42	3.7	1.5	3.8	1.2	0.32	0.038	<0.1	0.14	0.076	0.053	<0.1	0.019	0.014	0.059	NA	<1	<0.1
	12/06/17	38	2.9	1.5	3.6	1.3	0.28	0.026	<0.1	0.069	0.021	<0.4	<0.1	0.019	<0.3	0.042	NA	<1	<0.1
	09/19/17	37	6.7	1.2	4	1.3	0.27	0.046	<0.1	0.11	0.055	<0.4	<0.1	0.018	<0.3	0.037	NA	<1	<0.1
	06/20/17	47	9	1.4	4.6	1.7	0.28	0.058	<0.1	0.11	0.063	0.042	<0.1	0.021	<0.3	0.043	NA	0.13	<0.1
	03/16/17	37	2.3	1.3	3.1	1.6	0.2	0.04	<0.1	0.15	0.13	0.11	<0.1	0.025	<0.3	0.044	NA	<1	<0.1
	11/16/16	38	3.4	1.2	3.2	1.7	0.2	0.049	<0.2	0.15	0.13	<0.8	<0.2	<0.2	<0.6	0.063	NA	<2	<0.2
	09/13/16	38	3.8	1.2	3.1	1.6	0.21	0.044	<0.2	0.14	0.088	<0.8	<0.2	0.03	<0.6	0.056	NA	<2	<0.2
	06/08/16	36	2.9	1.1	3.1	1.7	0.23	0.12	<0.01	0.18	0.17	<2.0	<0.01	<0.5	<0.05	0.045	NA	<0.5	<0.05
	03/07/16	46	4.1	1.2	3.5	1.9	0.18	0.028	<0.05	0.1	0.069	0.028	<0.05	0.011	<0.150	0.045	NA	<0.5	<0.05
	10/29/15	41	4.6	1.0	2.8	1.7	0.18	0.031	<0.01	0.14	0.075	<0.04	<0.01	0.02	<0.03	0.046	NA	<0.1	<0.010
	08/23/15	42	6.9	1.1	3.7	1.8	0.21	<0.2	<0.2	<0.4	<0.8	<0.8	<0.2	<0.2	<0.6	<0.6	NA	<2	<0.2
	09/18/14	40	4.5	0.86	2.5	1.9	0.15	<0.1	<0.1	<0.2	<0.4	<0.4	<0.1	<0.1	<0.3	<0.1	0.084	<1	<0.1
	09/16/13	48	3.4	0.87	2.3	2.8	0.13	<0.1	<0.1	<0.2	<0.4	<0.4	<0.1	<0.1	<0.3	<0.1	0.15	<1	<0.1
	08/23/12	42	2.6	0.59	1.7	3.3	<0.1	<0.1	<0.1	<0.2	<0.4	<0.4	<0.1	<0.1	<0.3	<0.1	0.22	<1	<0.1
	10/03/11	39	5.3	0.57	1.5	3.7	0.098	0.024	NA	0.057	0.054	<0.04	NA	<0.01	NA	0.036	0.16	NA	NA
RW-5	4th Quarter 2018	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	3rd Quarter 2018	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	2nd Quarter 2018	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	1st Quarter 2018	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	4th Quarter 2017	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	3rd Quarter 2017	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	2nd Quarter 2017	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	03/16/17	0.64	0.0028	0.41	0.094	0.0077	0.033	0.011	<0.005	0.14	0.12	0.12	<0.005	0.025	0.013	0.06	NA	0.0067	0.0083
	11/16/16	0.72	0.0035	0.34	0.13	0.0012	0.062	0.014	<0.005	0.14	0.12	0.12	<0.005	0.02	0.012	0.043	NA	<0.05	0.0071
	09/13/16	0.57	0.0035	0.26	0.12	<0.005	0.049	0.013	<0.005	0.13	0.097	0.12	<0.005	0.016	0.012	0.037	NA	<0.05	0.0075
	06/07/16	0.54	0.0038	0.15	0.11	0.0042	0.046	0.017	<0.01	0.13	0.13	0.15	<0.01	0.01	0.016	0.026	NA	<0.1	0.0079
	03/07/16	0.39	0.0024	0.15	0.086	0.0026	0.041	0.013	<0.005	0.12	0.11	0.12	<0.005	0.012	0.014	0.032	NA	<0.05	0.01
	10/29/15	0.5	<0.01	0.13	0.095	<0.01	0.048	0.015	<0.01	0.17	0.11	0.13	<0.01	<0.01	<0.03	0.027	NA	<0.1	<0.01
	08/23/15	0.43	<0.005	0.037	0.07	<0.005	0.041	0.012	<0.005	0.085	0.067	0.083	<0.005	<0.005	<0.015	<0.005	NA	<0.05	<0.005
	09/18/14	0.35	<0.01	0.11	0.056	<0.01	0.045	0.011	<0.01	0.1	0.084	0.11	<0.01	0.012	<0.03	0.039	<0.01	<0.1	0.01
	09/16/13	0.37	<0.01	0.11	0.089	<0.01	0.09	0.022	<0.01	0.12	0.097	0.13	<0.01	<0.01	<0.03	0.031	<0.01	<0.1	<0.01
	08/23/12	0.19	<0.01	0.26	0.091	0.032	0.054	0.016	<0.01	0.11	0.11	0.17	<0.01	<0.01	<0.03	0.068	<0.01	<0.1	0.013
	10/03/11	0.56	<0.01	0.21	0.26	0.095	0.13	0.046	NA	0.17	0.11	0.16	NA	0.01	NA	0.04	<0.01	NA	NA

Table 2 - OW-14 Source Area Wells Groundwater Analytical Data
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

		Benzene (mg/L)	Toluene (mg/L)	Ethyl Benzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)	1,2,4-Trimethyl benzene (mg/L)	1,3,5-Trimethyl benzene (mg/L)	1,2-Dichloro ethane (EDC) (mg/L)	Naphthalene (mg/L)	1-Methyl naphthalene (mg/L)	2-Methylnaphthalene (mg/L)	1,1-Dichloroethane (mg/L)	Isopropyl benzene (mg/L)	n-Butylbenzene (mg/L)	n-Propylbenzene (mg/L)	2,4-Dimethylphenol (mg/L)	Acetone (mg/L)	Sec-butylbenzene (mg/L)
WQCC 20NMAC 6.2.3103		0.01	0.75	0.75	0.62	NE	NE	NE	0.01	NE	NE	NE	0.025	NE	NE	NE	NE	NE	NE
40 CFR 141.62 MCL		0.005	1.0	0.7	10	NE	NE	NE	0.005	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
NMED Tap Water (MARCH 2017)		0.00455	1.1	0.0149	0.193	0.143	NE	NE	0.0017	0.00165	NE	NE	0.0275	0.447	NE	NE	0.354	14.1	NE
EPA RSL for Tap Water (Nov. 2018)		0.00046	1.1	0.0015	0.190	0.014	0.056	0.060	0.00017	0.00017	0.0011	0.036	0.0028	0.450	1	0.66	0.360	14	2
Well ID	DATE SAMPLED																		
RW-6	4th Quarter 2018	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	3rd Quarter 2018	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	2nd Quarter 2018	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	1st Quarter 2018	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	4th Quarter 2017	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	3rd Quarter 2017	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	2nd Quarter 2017	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH	NS-SPH
	03/16/17	0.28	0.28	0.63	1.4	0.025	0.061	0.13	<0.01	0.59	0.27	0.29	<0.01	0.044	0.022	0.096	NA	<0.1	0.012
	11/16/16	0.27	0.12	0.29	0.78	0.014	0.06	0.1	<0.01	0.61	0.33	0.35	<0.01	0.024	0.015	0.048	NA	<0.1	0.0088
	09/13/16	0.28	0.11	0.29	0.81	0.017	0.064	0.12	<0.01	0.55	0.28	0.37	<0.01	0.028	0.02	0.055	NA	<0.1	0.011
	06/07/16	0.3	0.085	0.25	0.69	0.025	0.074	0.12	<0.01	0.54	0.31	0.38	<0.01	0.025	0.029	0.054	NA	<0.1	0.01
	03/07/16	0.39	0.19	0.51	0.086	0.021	0.075	0.13	<0.01	0.59	0.28	0.33	<0.01	0.012	0.014	0.032	NA	0.035	0.012
	10/29/15	0.34	0.11	0.28	0.85	0.043	0.09	0.1	<0.01	0.68	0.32	0.41	<0.01	0.025	<0.03	0.044	NA	<0.1	<0.01
	08/23/15	0.36	0.071	0.093	0.67	0.05	0.095	0.11	<0.01	0.41	0.22	0.29	<0.01	<0.01	<0.03	0.012	NA	<0.1	<0.01
	09/18/14	0.47	0.23	0.45	1.3	0.046	0.17	0.17	<0.01	0.57	0.19	0.28	<0.01	0.045	<0.03	0.11	<0.01	<0.1	<0.01
	09/16/13	0.68	<0.05	0.18	1.1	<0.05	0.28	0.14	<0.05	0.48	0.2	0.27	<0.05	<0.05	<0.15	<0.05	<0.01	<0.5	<0.05
	08/23/12	0.74	0.052	0.4	1.6	0.073	0.38	0.17	<0.05	0.58	0.22	0.36	<0.05	<0.05	<0.15	0.074	<0.01	<0.5	<0.05
	10/03/11	0.87	0.029	0.33	<0.015	<0.01	0.42	0.16	NA	0.52	0.21	0.31	NA	0.043	NA	0.078	<0.1	NA	NA
OW-57	11/29/18	11	0.061	0.51	0.11	0.10	<0.02	<0.02	<0.02	0.12	0.082	0.024	<0.02	0.014	<0.06	0.040	<0.01	<0.2	<0.02
	08/28/18	12	0.041	0.57	0.12	0.12	<0.02	<0.02	<0.02	0.12	0.086	0.022	<0.02	0.015	0.0062	0.045	<0.010	0.085	<0.02
	05/08/18	12	0.030	0.56	0.110	0.12	<0.1	<0.1	<0.1	0.11	0.12	<0.4	<0.1	0.011	<0.3	0.031	<0.010	<1	<0.1
	02/20/18	12	0.035	0.58	0.110	0.12	<0.05	<0.05	<0.05	0.12	0.09	0.033	<0.05	0.015	0.0076	0.045	<0.010	0.097	<0.05
	12/06/17	11	0.024	0.52	0.083	0.098	<0.1	<0.1	<0.1	0.045	0.045	<0.4	<0.1	0.012	<0.3	0.029	<0.010	<1	<0.1
	09/19/17	9.4	0.025	0.46	0.096	0.12	<0.05	<0.05	<0.05	0.096	0.09	0.02	<0.05	0.014	<0.15	0.033	<0.050	<0.5	<0.05
	06/21/17	14	0.03	0.54	0.11	0.15	<0.05	<0.05	<0.05	0.11	0.076	0.03	<0.05	0.015	<0.15	0.034	<0.010	<0.5	<0.05
	03/30/17	8.6	0.024	0.38	0.1	0.1	<0.05	<0.05	<0.05	0.13	0.088	0.061	<0.05	0.020	<0.15	0.045	<0.010	<0.5	<0.05
OW-58	11/29/18	35	0.11	1.2	0.19	2.5	0.015	<0.05	<0.05	0.16	0.060	0.042	<0.05	0.030	<0.15	0.097	<0.100	<0.5	<0.05
	08/28/18	38	0.097	1.2	0.19	2.9	0.028	<0.05	<0.05	0.15	0.059	0.045	<0.05	0.032	<0.15	0.098	<0.010	<0.5	<0.05
	05/08/18	38	0.084	1.2	0.18	2.8	0.03	<0.1	<0.1	0.17	0.100	0.054	<0.1	0.032	<0.30	0.1	<0.010	<1	<0.1
	02/20/18	33	0.053	1.2	0.13	2.9	0.023	<0.1	<0.1	0.17	0.065	0.073	<0.1	0.029	0.016	0.095	<0.010	<1	<0.1
	12/06/17	32	0.04	1.2	0.12	2.9	0.024	<0.1	<0.1	0.11	0.038	<0.4	<0.1	0.033	<0.3	0.089	<0.010	<1	<0.1
	09/19/17	29	0.22	1.1	0.37	3.1	0.11	0.039	<0.1	0.15	0.082	0.057	<0.1	0.036	<0.3	0.092	<0.010	<1	<0.1
	06/21/17	38	0.16	1.2	0.36	3.7	0.1	0.038	<0.1	0.15	0.085	0.068	<0.1	0.038	0.016	0.098	<0.010	<1	<0.1
	03/29/17	31	0.83	1.10	0.97	3.0	0.17	0.04	<0.1	0.18	0.07	0.06	<0.1	0.03	<0.3	0.09	<0.010	<1	<0.1

All values expressed in milligrams per liter

DEFINITIONS

NE = Not established NA = Not analyzed

Bold and highlighted values represent values above the applicable standards Bold screening level is applicable screening under RCRA Permit

STANDARDS

WQCC 20 NMAC 6.2.3103 - Standards for Ground Water of 10,000 mg/l TDS Concentration or Less.
a) Human Health Standards; b) Other Standards for Domestic Water
40 CFR 141.62 Maximum Contaminant Levels
EPA Regional Screening Level (RSL) Summary Table (November 2018)
NMED Tap Water (March 2017)

Table 3 - Vapor Screening Results
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

Sample Interval Depth (ftbgl)	TK 568-1 (ppm)	TK 568-2 (ppm)	TK 569-1 (ppm)	TK 569-2 (ppm)	TK 569-3 (ppm)	TK 570-1 (ppm)	OW-57 (ppm)	OW-58 (ppm)
0 - 2	0.8	0.2	7.3	0.3	8.9	5.3	0.6	110
2 - 4	3.1	0.5	6.6	0.1	10.4	14.9	0.6	40
4 - 6	15.9	4.3	4.1	0.0	12.4	15.8	2.6	11.2
6 - 8	66.9	4.6	0.5	0.0	31.8	24.1	6.2	2.2
8 - 10	309	5.3	0.5	0.6	27.6	1775	23.7	5.3
10 - 12	2214	30.8	2.3	7.2	50.9	3445	118	37
12 - 14	1957	34.5	4.2	36.5	63.9	2408	85	42
14 - 16	976	16.0	13.6	899	303	2350	197	25
16 - 18	1243	NR - NR	32.6	2332	377	1139	205	226
18 - 20	1731	36.5	152	702	250	1250	58	240
20 - 22	1780	29.6	41.6	833	387	1460	243	200
22 - 24	1125	82	92.2	398	405	399	846	2020
24 - 26	1119	NR - NR	2158	190	955	695	44	1980
26 - 28	965	NR - NR	1147	1973	SAT. - NR	952	39	973
28 - 30	970	2803	1060	1684	SAT. - NR	1441	TD@27 ftbgl	2784
30 - 32	1308	SAT. - NR	1353	1420	1620	968		2350
32 - 34	1680 / 733	SAT. - NR	1622	1390	1950	804		1775
34 - 36	1695	SAT. - NR / 53	1292	1210	239	SAT. - NR		575
36 - 38	1282	21	1649	405	258	676		227
38 - 40	1078	TD@37 ftbgl	1621	TD@38 ftbgl	TD@39 ftbgl	1392		545
40 - 42	383		95.6			1117		531
42 - 44	476		TD@42 ftbgl			555		288
44 - 46	144					165		357
46 - 48	80					TD@45 ftbgl		204
48 - 50	41							250
50 - 52	TD@49 ftbgl							TD@48.5ftbgl

ftbgl - feet below ground level ppm - parts per million

NR - NR - No sample recovery. No reading was collected. SAT. - NR - Interval was saturated. No reading was collected.

Table 4 - Groundwater Field Measurements
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

Well ID	Date	Depth to Groundwater (ft - BTOC) [1]	Depth to Groundwater (ft - BTOC) [2]	Depth to SPH (ft - BTOC) [1]	Depth to SPH (ft - BTOC) [2]	Maximum Observed SPH (ft)	Casing Stickup ft- ABGL	Screened Interval (ft - BTOC)
TK 568-1	10/02/16	30.88	31.13	ND	ND	ND	2.00	25 - 40
TK 568-2	10/02/16	28.03	29.01	ND	ND	ND	2.00	28 - 38
TK 569-1	10/05/16	29.97	29.34	28.95	ND	1.02	2.50	25.5 - 40.5
TK 569-2	10/05/16	29.95	29.72	29.65	29.65	0.30	2.00	28 - 38
TK 569-3	10/02/16	28.36	28.60	28.35	ND	0.01	2.25	24.25 - 39.25
TK 570-1	09/30/16	35.63	34.89	33.75	34.6	1.88	2.00	30 - 45
OW-57	10/01/16	21.62	21.72	ND	ND	ND	3.00	18 - 28
OW-58	09/30/16	28.58	28.98	27.6	ND	0.98	1.67	39.67 - 49.67

Well ID	Date	Temperature °C	Specific Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	pH	Oxygen Reduction Potential
TK 568-1	10/02/16	13.4	1452	1.86	7.20	-103.9
TK 568-2	10/02/16	13.3	1644	2.51	7.03	-65.6
TK 569-1	10/05/16	14.7	1668	2.09	6.89	-105.9
TK 569-2	10/05/16	15.0	1741	4.48	7.03	-28.0
TK 569-3	10/02/16	13.5	1590	1.70	6.97	-110.1
TK 570-1	09/30/16	Hydrocarbon was detected. Water quality measurements were not collected.				
OW-57	10/01/16	14.7	1810	1.57	7.20	-38.8
OW-58	09/30/16	15.2	1907	1.95	7.02	-122.9

1 - Depth to groundwater and SPH taken prior to purge for sampling
2 - Depth to groundwater and SPH taken after well purged for sampling
ft - BTOC - feet below top of casing
ft - ABGL - feet above group level

Table 5 - Soil Screening Levels
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	NMED Residential (0-10')	endpoint	EPA Residential (0-2')	endpoint	NMED IndOccSoil (0-1')	NMED IndOccSoil Endpoint	NMED ConsWork Soil (0-10')	NMED ConsWork Soil_ Endpoint	EPA Industrial Soil (0-2')	EPA IndSoil_key	NMED DAF1 SoilGW	EPA GW_Risk-based SSL_ SoilGW	EPA GW_MCL-based SSL_ SoilGW
Metals (mg/kg)													
Antimony	3.13E+01	n	3.10E+01	n	5.19E+02	n	1.42E+02	n	4.70E+02	n	2.71E-01	3.50E-01	2.70E-01
Arsenic	7.07E+00	c	6.80E-01	c*	3.59E+01	c	4.12E+01	n	3.00E+00	c	2.92E-01	1.50E-03	2.90E-01
Barium	1.56E+04	n	1.50E+04	n	2.55E+05	nl	4.39E+03	n	2.20E+05	nm	8.23E+01	1.60E+02	8.20E+01
Beryllium	1.56E+02	n	1.60E+02	n	2.58E+03	n	1.48E+02	n	2.30E+03	n	3.16E+00	1.90E+01	3.20E+00
Cadmium	7.05E+01	n	7.10E+01	n	1.11E+03	n	7.21E+01	n	9.80E+02	n	3.76E-01	6.90E-01	3.80E-01
Chromium	9.66E+01	c			5.05E+02	c	1.34E+02	n			1.80E+05		1.80E+05
Cobalt	2.34E+01	n	2.30E+01	n	3.88E+02	n	3.67E+01	n	3.50E+02	n	2.70E-01	2.70E-01	-
Cyanide	1.11E+01	n	2.70E+00	n	6.28E+01	n	1.20E+01	n	1.20E+01	n	3.56E-02	1.50E-02	2.00E+00
Iron	5.48E+04	n	5.50E+04	n	9.08E+05	n	2.48E+05	n	8.20E+05	n	3.48E+02	3.50E+02	
Lead	-	-	-	-	-	-	-	IEUBK	8.00E+02	nL	2.60E-03	-	1.40E+01
Manganese	1.05E+04	n	1.80E+03	n	1.60E+05	n	4.64E+02	n	2.60E+04	n	1.31E+02	2.80E+01	
Mercury	2.36E+01	n	9.40E+00	n	1.11E+02	n	2.05E+01	n	4.00E+01	ns	1.04E-01	3.30E-02	1.00E-01
Nickel	1.56E+03	n	8.40E+02	c	2.57E+04	n	7.53E+02	n	1.20E+04	c	2.42E+01		-
Selenium	3.91E+02	n	3.90E+02	n	6.49E+03	n	1.75E+03	n	5.80E+03	n	2.59E-01	5.20E-01	2.60E-01
Silver	3.91E+02	n	3.90E+02	n	6.49E+03	n	1.77E+03	n	5.80E+03	n	6.88E-01	8.00E-01	-
Vanadium	3.94E+02	n	3.90E+02	n	6.53E+03	n	6.14E+02	n	5.80E+03	n	6.31E+01	8.60E+01	-
Zinc	2.35E+04	n	2.30E+04	n	3.89E+05	n	1.06E+05	n	3.50E+05	nm	3.71E+02	3.70E+02	-
Volatiles (mg/kg)													
1,1,1,2-Tetrachloroethane	2.78E+01	c	2.00E+00	c	1.36E+02	c	6.53E+02	c	8.80E+00	cs	1.80E-03	2.20E-04	-
1,1,1-Trichloroethane	1.43E+04	n	8.10E+03	ns	7.19E+04	n	1.35E+04	n	3.60E+04	ns	6.38E-02	2.80E+00	7.00E-02
1,1,2,2-Tetrachloroethane	7.93E+00	c	6.00E-01	c	3.91E+01	c	1.95E+02	c	2.70E+00	c	2.40E-04	2.80E-05	-
1,1,2-Trichloroethane	2.59E+00	n	1.10E+00	c	1.23E+01	c	2.28E+00	n	5.00E+00	c	1.34E-03	8.90E-05	1.60E-03
1,1-Dichloroethane	7.79E+01	c	3.60E+00	c	3.80E+02	c	1.80E+03	c	1.60E+01	c	6.80E-03	7.80E-04	-
1,1-Dichloroethene	4.36E+02	n	2.30E+02	n	2.24E+03	n	4.20E+02	n	1.00E+03	n	2.40E-03	1.00E-01	2.50E-03
1,1-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	-	-	6.30E+01	n	-	-	-	-	9.30E+02	n	-	2.10E-02	-
1,2,3-Trichloropropane	5.10E-02	c	5.10E-03	c	1.21E+00	c	6.26E+00	n	1.10E-01	c	2.91E-06	3.20E-07	-
1,2,4-Trichlorobenzene	8.22E+01	n	2.40E+01	n	4.19E+02	n	7.84E+01	n	1.10E+02	ns	1.55E-01	3.30E-03	2.00E-01
1,2,4-Trimethylbenzene	-	-	5.80E+01	n	-	-	-	-	2.40E+02	ns	-	2.10E-02	-
1,2-Dibromo-3-chloropropane	8.51E-02	c	5.30E-03	c	1.17E+00	c	5.48E+00	c	6.40E-02	c	6.95E-05	1.44E-07	8.60E-05
1,2-Dibromoethane (EDB)	6.68E-01	c	3.60E-02	c	3.28E+00	c	1.62E+01	c	1.60E-01	c	1.18E-05	2.10E-06	1.40E-05
1,2-Dichlorobenzene	2.14E+03	n	1.80E+03	ns	1.29E+04	n	2.47E+03	n	9.30E+03	ns	4.54E-01	3.00E-01	5.80E-01
1,2-Dichloroethane (EDC)	8.25E+00	c	4.60E-01	c	4.03E+01	c	5.34E+01	n	2.00E+00	c	1.19E-03	4.80E-05	1.40E-03
1,2-Dichloropropane	1.76E+01	c	1.00E+00	c*	8.61E+01	c	2.52E+01	n	4.70E+00	c*	1.39E-03	1.50E-04	1.70E-03
1,3,5-Trimethylbenzene	-	-	7.80E+02	n	-	-	-	-	1.20E+04	n	-	1.70E-01	-
1,3-Dichlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	-	-	1.60E+03	n	-	-	-	-	2.30E+04	ns	-	1.30E-01	-

Table 5 - Soil Screening Levels
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	NMED Residential (0-10')	endpoint	EPA Residential (0-2')	endpoint	NMED IndOccSoil (0-1')	NMED IndOccSoil Endpoint	NMED ConsWork Soil (0-10')	NMED ConsWork Soil_ Endpoint	EPA Industrial Soil (0-2')	EPA IndSoil_key	NMED DAF1 SoilGW	EPA GW_Risk-based SSL_ SoilGW	EPA GW_MCL-based SSL_ SoilGW
1,4-Dichlorobenzene	1.29E+03	c	2.60E+00	c	6.73E+03	c	2.48E+04	c	1.10E+01	c	5.61E-02	4.60E-04	7.20E-02
1-Methylnaphthalene	1.72E+02	c	1.80E+01	c	8.13E+02	c	6.06E+03	c	7.30E+01	c	4.47E-02	5.80E-03	-
2,2-Dichloropropane	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone	3.73E+04	n	2.70E+04	ns	4.09E+05	n	9.12E+04	n	1.90E+05	nms	1.00E+00	1.20E+00	-
2-Chlorotoluene	1.56E+03	n	1.60E+03	ns	2.60E+04	n	7.08E+03	n	2.30E+04	ns	1.78E-01	2.30E-01	-
2-Hexanone	-	-	2.00E+02	-	-	-	-	-	1.30E+03	-	-	8.80E-03	-
2-Methylnaphthalene	2.32E+02	n	2.40E+02	n	3.37E+03	n	1.00E+03	n	3.00E+03	ns	1.38E-01	1.90E-01	-
4-Chlorotoluene	-	-	1.60E+03	ns	-	-	-	-	2.30E+04	ns	-	2.40E-01	-
4-Isopropyltoluene	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone	5.81E+03	n	-	-	8.15E+04	n	2.02E+04	n	-	-	2.40E-01	-	-
Acetone	6.63E+04	n	6.10E+04	n	9.59E+05	n	2.41E+05	n	6.70E+05	nms	2.49E+00	2.90E+00	-
Benzene	1.77E+01	c	1.20E+00	c*	8.65E+01	c	1.41E+02	n	5.10E+00	c*	2.09E-03	2.30E-04	2.60E-03
Bromobenzene	-	-	2.90E+02	n	-	-	-	-	1.80E+03	n	-	4.20E-02	-
Bromodichloromethane	6.14E+00	c	2.90E-01	c	2.99E+01	c	1.41E+02	c	1.30E+00	c	3.10E-04	3.60E-05	-
Bromoform	6.74E+02	c	1.90E+01	c*	1.75E+03	c	5.38E+03	n	8.60E+01	c*	7.34E-03	8.70E-04	-
Bromomethane	1.76E+01	n	6.80E+00	n	9.37E+01	n	1.77E+01	n	3.00E+01	n	1.71E-03	1.90E-03	-
Carbon disulfide	1.54E+03	n	7.70E+02	ns	8.47E+03	n	1.61E+03	n	3.50E+03	ns	2.21E-01	2.40E-01	-
Carbon tetrachloride	1.06E+01	c	6.50E-01	c	5.21E+01	c	2.00E+02	n	2.90E+00	c	1.84E-03	1.80E-04	1.90E-03
Chlorobenzene	3.76E+02	n	2.80E+02	n	2.14E+03	n	4.08E+02	n	1.30E+03	ns	5.39E-02	5.30E-02	6.80E-02
Chloroethane	1.88E+04	n	1.40E+04	ns	8.87E+04	n	1.65E+04	n	5.70E+04	ns	5.37E+00	5.90E+00	-
Chloroform	5.85E+00	c	3.20E-01	c	2.84E+01	c	1.33E+02	c	1.40E+00	c	5.46E-04	6.10E-05	-
Chloromethane	4.08E+01	c	1.10E+02	n	1.99E+02	c	2.33E+02	n	4.60E+02	n	4.76E-03	4.90E-02	-
cis-1,2-DCE	1.56E+02	n	1.60E+02	n	2.60E+03	n	7.08E+02	n	2.30E+03	ns	1.76E-02	1.10E-02	2.10E-02
cis-1,3-Dichloropropene	2.91E+01	c	1.80E+00	c*	1.46E+02	c	1.29E+02	n	8.20E+00	c*	1.40E-03	1.70E-04	-
Dibromochloromethane	1.38E+01	c	7.50E-01	c	6.69E+01	c	3.38E+02	c	3.30E+00	c	3.77E-04	4.50E-05	2.10E-02
Dibromomethane	5.74E+01	c	2.30E+01	n	2.86E+02	c	5.34E+01	c	9.80E+01	ns	1.68E-03	2.00E-03	-
Dichlorodifluoromethane	1.80E+02	n	8.70E+01	n	8.57E+02	n	1.59E+02	n	3.70E+02	n	3.61E-01	3.00E-01	-
Ethylbenzene	7.45E+01	c	5.80E+00	c	3.65E+02	c	1.76E+03	c	2.50E+01	c	6.15E-01	1.70E-03	7.80E-01
Hexachlorobutadiene	6.16E+01	n	1.20E+00	c**	5.17E+01	c	2.69E+02	n	5.30E+00	c*	2.07E-03	2.60E-04	-
Isopropylbenzene	2.35E+03	n	1.90E+03	ns	1.41E+04	n	2.71E+03	n	9.90E+03	ns	5.69E-01	7.40E-01	-
Methyl tert-butyl ether (MTBE)	9.68E+02	c	4.70E+01	c	4.78E+03	c	2.40E+04	c	2.10E+02	c	2.77E-02	3.20E-03	-
Methylene chloride	4.09E+02	n	5.70E+01	c	5.11E+03	n	1.20E+03	n	1.00E+03	c	1.11E-03	2.91E-03	1.30E-03
Naphthalene	1.16E+03	n	3.80E+00	c*	1.68E+04	n	5.02E+03	n	1.70E+01	c*	4.11E-03	5.40E-04	-
n-Butylbenzene	-	-	3.90E+03	ns	-	-	-	-	5.80E+04	ns	-	3.20E+00	-
n-Propylbenzene	-	-	3.80E+03	ns	-	-	-	-	2.40E+04	ns	-	1.20E+00	-
sec-Butylbenzene	-	-	7.80E+03	ns	-	-	-	-	1.20E+05	nms	-	5.90E+00	-
Styrene	7.23E+03	n	6.00E+03	ns	5.09E+04	n	1.01E+04	n	3.50E+04	ns	8.55E-02	1.30E+00	1.10E-01
tert-Butylbenzene	-	-	7.80E+03	ns	-	-	-	-	1.20E+05	nms	-	1.60E+00	-

Table 5 - Soil Screening Levels
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	NMED Residential (0-10')	endpoint	EPA Residential (0-2')	endpoint	NMED IndOccSoil (0-1')	NMED IndOccSoil Endpoint	NMED ConsWork Soil (0-10')	NMED ConsWork Soil_ Endpoint	EPA Industrial Soil (0-2')	EPA IndSoil_key	NMED DAF1 SoilGW	EPA GW_Risk-based SSL_ SoilGW	EPA GW_MCL-based SSL_ SoilGW
Tetrachloroethene (PCE)	1.10E+02	n	2.40E+01	c**	6.24E+02	n	1.19E+02	n	1.00E+02	c**	1.99E-03	5.10E-03	2.30E-03
Toluene	5.22E+03	n	4.90E+03	ns	6.11E+04	n	1.40E+04	n	4.70E+04	ns	5.55E-01	7.60E-01	6.90E-01
trans-1,2-DCE	2.93E+02	n	1.60E+03	n	1.60E+03	ns	3.03E+02	n	2.30E+04	ns	2.52E-02	1.10E-01	3.10E-02
trans-1,3-Dichloropropene	2.91E+01	c	1.80E+00	c*	1.46E+02	c	1.29E+02	n	8.20E+00	c*	1.40E-03	1.70E-04	-
Trichloroethene (TCE)	6.72E+00	n	9.40E-01	c**	3.61E+01	n	6.84E+00	n	6.00E+00	c**	1.55E-03	1.80E-04	1.80E-03
Trichlorofluoromethane	1.22E+03	n	7.30E+02	n	5.98E+03	n	1.12E+03	n	3.10E+03	ns	7.84E-01	7.30E-01	-
Vinyl chloride	7.41E-01	c	5.90E-02	c	2.83E+01	c	1.60E+02	c	1.70E+00	c	6.70E-04	6.50E-06	6.90E-04
Xylenes, Total	8.63E+02	n	5.50E+02	ns	4.24E+03	n	7.91E+02	n	2.40E+03	ns	7.72E+00	1.90E-01	
Semi-volatiles (mg/kg)													
1,2,4-Trichlorobenzene	8.22E+01	n	2.40E+01	c**	4.19E+02	n	7.84E+01	n	1.10E+02	c**	1.55E-01	3.30E-03	2.00E-01
1,2-Dichlorobenzene	2.14E+03	n	1.80E+03	ns	1.29E+04	n	2.47E+03	n	9.30E+03	ns	4.54E-01	3.00E-01	5.80E-01
1,3-Dichlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	1.29E+03	c	2.60E+00	c	6.73E+03	c	2.48E+04	n	1.10E+01	c	5.61E-02	4.60E-04	7.20E-02
1-Methylnaphthalene	1.72E+02	c	1.80E+01	c	8.13E+02	c	6.06E+03	c	7.30E+01	c	4.47E-02	5.80E-03	-
2,4,5-Trichlorophenol	6.16E+03	n	6.30E+03	n	9.16E+04	n	2.69E+04	n	8.20E+04	n	3.31E+00	4.40E+00	-
2,4,6-Trichlorophenol	6.16E+01	n	4.90E+01	c**	9.16E+02	n	2.69E+02	n	2.10E+02	c**	3.37E-02	1.50E-02	-
2,4-Dichlorophenol	1.85E+02	n	1.90E+02	n	2.75E+03	n	8.07E+02	n	2.50E+03	n	4.13E-02	5.40E-02	-
2,4-Dimethylphenol	1.23E+03	n	1.30E+03	n	1.83E+04	n	5.38E+03	n	1.60E+04	n	3.22E-01	4.20E-01	-
2,4-Dinitrophenol	1.23E+02	n	1.30E+02	n	1.83E+03	n	5.38E+02	n	1.60E+03	n	3.34E-02	4.40E-02	-
2,4-Dinitrotoluene	1.71E+01	c	1.70E+00	c*	8.23E+01	c	5.36E+02	n	7.40E+00	c	2.46E-03	3.20E-04	-
2,6-Dinitrotoluene	3.56E+00	c	3.60E-01	c*	1.72E+01	c	8.09E+01	n	1.50E+00	c	5.12E-04	6.70E-05	-
2-Chloronaphthalene	6.26E+03	n	4.80E+03	n	1.04E+05	n	2.83E+04	n	6.00E+04	n	2.85E+00	3.80E+00	-
2-Chlorophenol	3.91E+02	n	3.90E+02	n	6.49E+03	n	1.77E+03	n	5.80E+03	n	5.76E-02	7.40E-02	-
2-Methylnaphthalene	2.32E+02	n	2.40E+02	n	3.37E+03	n	1.00E+03	n	3.00E+03	n	1.38E-01	1.90E-01	-
'2-Methylphenol (cresol,o-)	-	-	3.20E+03	n	-	-	-	-	4.10E+04	n	-	7.50E-01	-
2-Nitroaniline	-	-	6.30E+02	n	-	-	-	-	8.00E+03	n	-	8.00E-02	-
2-Nitrophenol	-	-	-	-	-	-	-	-	-	-	-	-	-
3,3´-Dichlorobenzidine	1.18E+01	c	1.20E+00	c	5.70E+01	c	4.10E+02	c	5.10E+00	c	6.21E-03	8.10E-04	-
3+4-Methylphenol	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Nitroaniline	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	4.93E+00	n	-	-	7.33E+01	n	2.15E+01	n	-	-	1.99E-03	-	-
4-Bromophenyl phenyl ether	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloroaniline	-	-	2.70E+00	c*	-	-	-	-	1.10E+01	c	-	1.60E-04	-
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitroaniline	-	-	2.70E+01	c**	-	-	-	-	1.10E+02	c*	-	1.60E-03	-
4-Nitrophenol	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	3.48E+03	n	3.60E+03	n	5.05E+04	n	1.51E+04	n	4.50E+04	n	1.54E-03	5.50E+00	-

Table 5 - Soil Screening Levels
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	NMED Residential (0-10')	endpoint	EPA Residential (0-2')	endpoint	NMED IndOccSoil (0-1')	NMED IndOccSoil Endpoint	NMED ConsWork Soil (0-10')	NMED ConsWork Soil_ Endpoint	EPA Industrial Soil (0-2')	EPA IndSoil_key	NMED DAF1 SoilGW	EPA GW_Risk-based SSL_ SoilGW	EPA GW_MCL-based SSL_ SoilGW
Acenaphthylene	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	-	-	9.50E+01	c**	-	-	-	-	4.00E+02	c*	-	4.60E-03	-
Anthracene	1.74E+04	n	1.80E+04	n	2.53E+05	nl	7.53E+04	n	2.30E+05	nm	4.25E+01	5.80E+01	-
Azobenzene	-	-	5.60E+00	c	-	-	-	-	2.60E+01	c	-	9.20E+04	-
Benz(a)anthracene	1.53E+00	c	1.60E-01	c	3.23E+01	c	2.40E+02	c	2.90E+00	c	3.18E-02	4.30E-03	-
Benzo(a)pyrene	1.12E+00	c	1.60E-02	c	2.36E+01	c	1.06E+02	c	2.90E-01	c	1.76E-01	4.00E-03	2.40E-01
Benzo(b)fluoranthene	1.53E+00	c	1.60E-01	c	3.23E+01	c	2.40E+02	c	2.90E+00	c	3.09E-01	4.10E-02	-
Benzo(g,h,i)perylene	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	1.53E+01	c	1.60E+00	c	3.23E+02	c	2.31E+03	c	2.90E+01	c	3.02E+00	4.00E-01	-
Benzoic acid	-	-	2.50E+05	nm	-	-	-	-	3.30E+06	nm	-	1.80E+01	-
Benzyl alcohol	-	-	6.30E+03	n	-	-	-	-	8.20E+04	nm	-	4.80E-01	-
Bis(2-chloroethoxy)methane	-	-	1.90E+02	n	-	-	-	-	2.50E+03	n	-	1.30E-02	-
Bis(2-chloroethyl)ether	3.10E+00	c	2.30E-01	c	1.56E+01	c	1.93E+00	c	1.00E+00	c	3.03E-05	3.60E-06	-
Bis(2-chloroisopropyl)ether	9.93E+01	c	-	-	5.19E+02	c	3.54E+03	c	-	-	2.38E-03	-	-
Bis(2-ethylhexyl)phthalate	3.80E+02	c	3.90E+01	c*	1.83E+03	c	5.38E+03	n	1.60E+02	c	1.08E+00	1.30E+00	1.40E+00
Butyl benzyl phthalate	-	-	2.90E+02	c*	-	-	-	-	1.20E+03	c	-	2.30E-01	-
Carbazole	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	1.53E+02	c	1.60E+01	c	3.23E+03	c	2.31E+04	c	2.90E+02	c	9.30E+00	1.20E+00	-
Dibenz(a,h)anthracene	1.53E-01	c	1.60E-02	c	3.23E+00	c	2.40E+01	c	2.90E-01	c	9.84E-02	1.30E-02	-
Dibenzofuran	-	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	4.93E+04	n	5.10E+04	n	7.33E+05	n	2.15E+05	n	6.60E+05	nm	4.89E+00	6.10E+00	-
Dimethyl phthalate	6.16E+04	n	-	-	9.16E+05	n	2.69E+05	n	-	-	1.78E-01	-	-
Di-n-butyl phthalate	6.16E+03	n	-	-	9.16E+04	n	2.69E+04	n	-	-	1.69E+00	-	-
Di-n-octyl phthalate	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	2.32E+03	n	2.40E+03	n	3.37E+04	n	1.00E+04	n	3.00E+04	n	6.69E+01	8.90E+01	-
Fluorene	2.32E+03	n	2.40E+03	n	3.37E+04	n	1.00E+04	n	3.00E+04	n	4.00E+00	5.40E+00	-
Hexachlorobenzene	3.33E+00	c	2.10E-01	c	1.60E+01	c	1.17E+02	c	9.60E-01	c	9.47E-03	1.20E-04	1.30E-02
Hexachlorobutadiene	6.16E+01	n	1.20E+00	c*	5.17E+01	c	2.69E+02	n	5.30E+00	c	2.07E-03	2.60E-04	-
Hexachlorocyclopentadiene	2.28E+00	n	1.80E+00	n	5.49E+03	n	8.67E+02	n	7.50E+00	n	1.20E-01	1.30E-03	1.60E-01
Hexachloroethane	4.31E+01	n	1.80E+00	c*	6.41E+02	n	1.88E+02	n	8.00E+00	c*	1.60E-03	2.00E-04	-
Indeno(1,2,3-cd)pyrene	1.53E+00	c	1.60E-01	c	3.23E+01	c	2.40E+02	c	2.90E+00	c	1.00E+00	1.30E-01	-
Isophorone	5.61E+03	c			2.70E+04	c	5.37E+04	n			2.12E-01		
Naphthalene	1.16E+03	n	3.80E+00	c*	1.68E+04	n	5.02E+03	n	1.70E+01	c*	4.11E-03	5.40E-04	-
Nitrobenzene	5.99E+01	c	5.10E+00	c*	2.91E+02	c	3.51E+02	n	2.20E+01	c*	7.20E-04	9.20E-05	-
N-Nitrosodi-n-propylamine	-	-	7.80E-02	c	-	-	-	-	3.30E-01	c	-	8.10E-06	-
N-Nitrosodiphenylamine	1.09E+03	c	1.10E+02	c	5.24E+03	c	3.79E+04	c	4.70E+02	c	5.02E-01	6.60E-02	-
Pentachlorophenol	9.85E+00	c	1.00E+00	c	4.45E+01	c	3.46E+02	c	4.00E+00	c	7.61E-03	4.00E-04	1.00E-02
Phenanthrene	1.74E+03	n	-	-	2.53E+04	n	7.53E+03	n	-	-	4.30E+00	-	-

Table 5 - Soil Screening Levels
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	NMED Residential (0-10')	endpoint	EPA Residential (0-2')	endpoint	NMED IndOccSoil (0-1')	NMED IndOccSoil Endpoint	NMED ConsWork Soil (0-10')	NMED ConsWork Soil_ Endpoint	EPA Industrial Soil (0-2')	EPA IndSoil_key	NMED DAF1 SoilGW	EPA GW_Risk-based SSL_ SoilGW	EPA GW_MCL-based SSL_ SoilGW
Phenol	1.85E+04	n	1.90E+04	n	2.75E+05	n	7.74E+04	n	2.50E+05	nm	2.62E+00	3.30E+00	-
Pyrene	1.74E+03	n	1.80E+03	n	2.53E+04	n	7.53E+03	n	2.30E+04	n	9.59E+00	1.30E+01	-
Pyridine	-	-	7.80E+01	n	-	-	-	-	1.20E+03	n	-	6.80E-03	-
Total Petroleum Hydrocarbons (mg/kg)													
Gasoline Range Organics (GRO)	1.00E+03	-	-	-	3.80E+03	-	-	-	-	-	-	-	-
Diesel Range Organics (DRO)	1.00E+03	-	-	-	3.80E+03	-	-	-	-	-	-	-	-
Motor Oil Range Organics (MRO)	1.00E+03	-	-	-	3.80E+03	-	-	-	-	-	-	-	-

- No screening level or analytical result available
NMED - New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation (March 2017)
EPA - Environmental Protection Agency Regional Screening Levels (June 2017)
NMED TPH Soil Screening Levels "unknown oil"

c -carcinogen
cs - carcinogenic, SSL may exceed saturation
c* - where: n SL < 100X c SL
c** - where n SL < 10X c SL

n - noncarcinogenic
ns - noncarcinogenic, SSL may exceed saturation
nl - noncarcinogenic, SSL may exceed ceiling limit
nm - concentration may exceed ceiling limit

Table 6 - Groundwater Screening Levels
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	New Mexico WQCC Standards	NMED Tap Water	NMED TapW_key	EPA Screening Levels.Tap Water	EPA TapW_key	MCL
Metals (ug/l) TOTAL						
Antimony	-	7.26	n	7.80	n	**6**
Arsenic	100	0.86	c	0.05	c	**10**
Barium	-	3280	n	3800	n	**2000**
Beryllium	-	12.40	n	25	n	**4**
Cadmium	-	6.24	n	9.20	n	**5**
Chromium	**50**	5.70	c	22000	n	-
Cobalt	-	-	-	**6.00**	n	-
Cyanide	**200**	1.46	n	1.50	n	200
Iron		**13800**	n	14000	n	-
Lead	50	-	-	15	L	**15**
Manganese		**2020**	n	430	n	-
Mercury	**2**	0.63	n	0.63	n	2
Nickel	-	**372**	n	200	n	-
Selenium	**50**	98.7	n	100	n	50
Silver	**50**	81.2	n	94	n	-
Vanadium	-	**63.1**	n	86	n	-
Zinc	**10000**	5960	n	6000	n	-
Chloride	**250000**	-	-	-	-	-
Fluoride	**1600**	1180	n	800	n	4000
Sulfate	**600000**	-	-	-	-	-
Metals (ug/l) DISSOLVED						
Antimony (D)	-	7.26	n	7.80	n	**6**
Arsenic (D)	100	0.86	c	0.05	c	**10**
Barium (D)	**1000**	3280.00	n	3800	n	2000
Beryllium (D)	-	12.40	n	25	n	**4**
Cadmium (D)	10	6.24	n	9.20	n	**5**
Chromium (D)	**50**	5.70	c	22000	n	-
Cobalt (D)	**50**	-	-	6	n	-
Cyanide (D)	**200**	1.46	n	1.50	n	200
Iron (D)	**1000**	13800.00	n	15	L	-
Lead (D)	50	-	-	430	n	**15**
Manganese (D)	**200**	2020.00	n	200	n	-
Nickel (D)	-	**372**	n	100	n	-
Selenium (D)	**50**	98.7	n	94	n	50
Silver (D)	**50**	81.2	n	86	n	-
Vanadium (D)	-	**63.1**	n	6000	n	-
Zinc (D)	**10000**	5960	n		n	-
Volatiles (ug/l)						
1,1,1,2-Tetrachloroethane	-	**5.74**	c	0.57	c	-
1,1,1-Trichloroethane	**60**	8003	n	8000	n	200
1,1,2,2-Tetrachloroethane	**10**	0.76	c	0.076	c	-
1,1,2-Trichloroethane	10	0.41	c	0.28	c**	**5**
1,1-Dichloroethane	**25**	27.5	c	2.80	c	-
1,1-Dichloroethene	**5**	284	n	280	n	7
1,1-Dichloropropene	-	-	-	-	-	-
1,2,3-Trichlorobenzene	-	-	-	**7**	n	-
1,2,3-Trichloropropane	-	**0.01**	c	0.00075	c	-
1,2,4-Trichlorobenzene (V)	-	3.98	c	1.20	c**	**70**
1,2,4-Trimethylbenzene	-	-	-	**56**	n	-

Table 6 - Groundwater Screening Levels
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	New Mexico WQCC Standards	NMED Tap Water	NMED TapW_key	EPA Screening Levels.Tap Water	EPA TapW_key	MCL
1,2-Dibromo-3-chloropropane	-	0.00	c	0.00033	c	**0.2**
1,2-Dibromoethane (EDB)	0.1	0.07	c	0.0075	c	**0.05**
1,2-Dichlorobenzene (V)	-	302	n	300	n	**600**
1,2-Dichloroethane (EDC)	10	1.71	c	0.17	c*	**5**
1,2-Dichloropropane	-	4.38	c	0.85	c*	**5**
1,3,5-Trimethylbenzene	-	-	-	**60**	n	-
1,3-Dichlorobenzene (V)	-	-	-	-	-	-
1,3-Dichloropropane	-	-	-	**370**	n	-
1,4-Dichlorobenzene (V)	-	4.82	c	0.48	c	**75**
1-Methylnaphthalene (V)	-	-	-	**1.10**	c	-
2,2-Dichloropropane	-	-	-	-	-	-
2-Butanone	-	**5565**	n	5600	n	-
2-Chlorotoluene	-	-	-	**240**	n	-
2-Hexanone	-	-	-	**38**	-	-
2-Methylnaphthalene (V)	-	-	-	**36**	n	-
4-Chlorotoluene	-	-	-	**250**	n	-
4-Isopropyltoluene	-	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-	-	-
Acetone	-	**14100**	n	14000	n	-
Benzene	10	4.55	c	0.46	c*	**5**
Bromobenzene	-	-	-	**62**	n	-
Bromodichloromethane	-	**1.34**	c	0.13	c	-
Bromoform	-	-	-	**3.30**	c*	-
Bromomethane	-	**7.54**	n	7.50	n	-
Carbon disulfide	-	**810**	n	810	n	-
Carbon Tetrachloride	10	4.55	c	0.46	c	**5**
Chlorobenzene	-	77.6	n	78.00	n	**100**
Chloroethane	-	**20857**	-	-	-	-
Chloroform	**100**	2.29	c	0.22	c	-
Chloromethane	-	**20.3**	c	190.00	n	-
cis-1,2-DCE	-	36.5	n	36	n	**70**
cis-1,3-Dichloropropene	-	**4.71**	c	0.47	c	-
Dibromochloromethane	-	**1.68**	c	0.87	c	-
Dibromomethane	-	-	-	**8.30**	n	-
Dichlorodifluoromethane	-	**197**	n	200	n	-
Ethylbenzene	750	15.0	c	1.50	c	**700**
Hexachlorobutadiene (V)	-	**1.39**	c	0.14	c*	-
Isopropylbenzene	-	**447**	n	450	n	-
Methyl tert-butyl ether (MTBE)	-	**143**	c	14	c	-
Methylene Chloride	100	106	c	11	c**	**5**
Naphthalene (V)	-	**1.65**	c	0.17	c*	-
n-Butylbenzene	-	-	-	1000	-	-
n-Propylbenzene	-	-	-	660	-	-
sec-Butylbenzene	-	-	-	2000	-	-
Styrene	-	1205	n	1200	n	**100**
tert-Butylbenzene	-	-	-	-	-	-
Tetrachloroethene (PCE)	20	40.3	c	11	c**	**5**
Toluene	**750**	1093.2	n	1100	n	1000
trans-1,2-DCE	-	93.2	n	360	n	**100**
trans-1,3-Dichloropropene	-	**4.71**	c	0.47	c*	-
Trichloroethene (TCE)	100	2.59	c	0.49	c**	**5**

Table 6 - Groundwater Screening Levels
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	New Mexico WQCC Standards	NMED Tap Water	NMED TapW_key	EPA Screening Levels.Tap Water	EPA TapW_key	MCL
Trichlorofluoromethane	-	1137	n	5200	n	-
Vinyl chloride	1	0.32	c	0.019	c	2
Xylenes, Total	620	193	n	190	n	10000
Semi-volatiles (ug/l)						
1,2,4-Trichlorobenzene	-	4.0	c	1.2	c	70
1,2-Dichlorobenzene	-	302	n	300	n	600
1,3-Dichlorobenzene	-	-	-	-	-	-
1,4-Dichlorobenzene	-	4.82	c	0.48	c	75
1-Methylnaphthalene	-	-	-	1.10	c	-
2,4,5-Trichlorophenol	-	1166	n	1200	n	-
2,4,6-Trichlorophenol	-	11.9	n	4.10	c**	-
2,4-Dichlorophenol	-	45.3	n	46	n	-
2,4-Dimethylphenol	-	353.9	n	360	n	-
2,4-Dinitrophenol	-	38.7	n	39	n	-
2,4-Dinitrotoluene	-	2.37	c	0.24	c	-
2,6-Dinitrotoluene	-	0.49	c	0.049	c	-
2-Chloronaphthalene	-	733	n	750	n	-
2-Chlorophenol	-	91.0	n	91	n	-
2-Methylnaphthalene	-	-	-	36	n	-
2-Methylphenol	-	-	-	930	n	-
2-Nitroaniline	-	-	-	190	n	-
2-Nitrophenol	-	-	-	-	-	-
3,3´-Dichlorobenzidine	-	1.25	c	0.13	c	-
3+4-Methylphenol	-	-	-	930	n	-
3-Nitroaniline	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	-	1.52	n	-	-	-
4-Bromophenyl phenyl ether	-	-	-	-	-	-
4-Chloro-3-methylphenol	-	-	-	-	-	-
4-Chloroaniline	-	-	-	0.37	c	-
4-Chlorophenyl phenyl ether	-	-	-	-	-	-
4-Nitroaniline	-	-	-	3.80	c*	-
4-Nitrophenol	-	-	-	-	-	-
Acenaphthene	-	535	n	530	n	-
Acenaphthylene	-	-	-	-	-	-
Aniline	-	-	-	13	c*	-
Anthracene	-	1721	n	1800	n	-
Azobenzene	-	-	-	0.12	c	-
Benz(a)anthracene	-	0.12	c	0.03	c	-
Benzo(a)pyrene	0.7	0.25	c	0.025	c	0.2
Benzo(b)fluoranthene	-	0.34	c	0.25	c	-
Benzo(g,h,i)perylene	-	-	-	-	-	-
Benzo(k)fluoranthene	-	3.43	c	2.50	c	-
Benzoic acid	-	-	-	75000	n	-
Benzyl alcohol	-	-	-	2000	n	-
Bis(2-chloroethoxy)methane	-	-	-	59	n	-
Bis(2-chloroethyl)ether	-	0.14	c	0.014	c	-
Bis(2-chloroisopropyl)ether	-	9.81	c	-	-	-
Bis(2-ethylhexyl)phthalate	-	55.6	c	5.60	c*	6
Butyl benzyl phthalate	-	-	-	16	c	-
Carbazole	-	-	-	-	-	-
Chrysene	-	34.3	c	25.00	c	-

Table 6 - Groundwater Screening Levels
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	New Mexico WQCC Standards	NMED Tap Water	NMED TapW_key	EPA Screening Levels.Tap Water	EPA TapW_key	MCL
Dibenz(a,h)anthracene	-	**0.03**	c	0.025	c	-
Dibenzofuran	-	-	-	**7.90**	-	-
Diethyl phthalate	-	**14801**	n	15000	n	-
Dimethyl phthalate	-	-	-	-	-	-
Di-n-butyl phthalate	-	**885**	n	-	-	-
Di-n-octyl phthalate	-	-	-	-	-	-
Fluoranthene	-	**802**	n	800	n	-
Fluorene	-	**288**	n	290	n	-
Hexachlorobenzene	-	0.10	c	0.0098	c	**1**
Hexachlorobutadiene	-	**1.39**	c	0.14	c*	-
Hexachlorocyclopentadiene	-	0.41	n	0.41	n	**50**
Hexachloroethane	-	**3.28**	c	0.33	c**	-
Indeno(1,2,3-cd)pyrene	-	**0.34**	c	0.25	c	-
Isophorone	-	**781**	c	78.00	c	-
Naphthalene	-	**1.65**	c	0.17	c*	-
Nitrobenzene	-	**1.40**	n	0.14	c	-
N-Nitrosodimethylamine	-	**0.0017**	c	0.00011	c	-
N-Nitrosodi-n-propylamine	-	-	-	**0.011**	c	-
N-Nitrosodiphenylamine	-	**0.0049**	c	12.00	c	-
Phenanthrene	-	**170**	n	-	-	-
Pentachlorophenol	-	0.41	c	0.041	c	**1**
Phenol	-	**5761**	n	5800	n	-
Pyrene	-	**117**	n	120	n	-
Pyridine	-	-	-	**20**	n	-
TPH (mg/l)						
Gasoline Range Organics (GRO)	-	**0.0398**	-	-	-	-
Diesel Range Organics (DRO)	-	**0.0398**	-	-	-	-
Motor Oil Range Organics (MRO)	-	**0.0398**	-	-	-	-

- No screening level available

Bolded value represents applicable screening level for comparison to site concentrations

NMED WQCC standards - Title 20 Chapter 6, Part 2, - 20.6.2.3101 Standards for Ground Water of 10,000 mg/l TDS Concentration or less

NMED Tap Water Screening Level - Risk Assessment Guidance for Site Investigations and Remediation (March 2017)

Table 7 - Soil Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	TK-568-1 (12-14')	TK-568-1 (30-32')	TK-568-1 (48-49')	TK 568-2 (22-24')	TK 568-2 (28-30')	TK 568-2 (36-37')	TK569-1(18-20')	TK569-1(24-26')	TK569-1(36-38')	TK569-1(40-42')	TK569-2(16-18')	TK569-2(29-31')	TK569-2(36-38')	TK 569-3 (16-18')	TK 569-3 (24-26')	TK 569-3 (38-39')	TK 570-1 (10-12')	TK 570-1 (32-34')	TK 570-1 (44-45')
					1609E26-008	1609E26-009	1609E26-010	1609G64-001	1609G64-002	1609G64-003	1610238-004	1610238-005	1610238-006	1610238-007	1610238-001	1610238-002	1610238-003	1609G64-008	1609G64-009	1609G64-010	1609G64-005	1609G64-006	1609G64-007
					9/23/2016	9/23/2016	9/23/2016	9/27/2016	9/27/2016	9/27/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	9/28/2016	9/28/2016	9/28/2016	9/27/2016	9/27/2016	9/27/2016
Metals (mg/kg)																							
Antimony	3.13E+01	(1)	1.42E+02	(5)	< 0.9918 u	< 0.9808 u	< 1.0019 u	< 10.0348 u	< 0.9926 u	1.4 J	< 0.9919 u	< 0.9825 u	< 1.0132 u	< 2.0134 u	< 0.9951 u	< 1.0069 u	< 0.9847 u	1 J	< 1.0059 u	< 1.0114 u	< 0.9961 u	< 1.0019 u	2.2 J
Arsenic	7.07E+00	(1)	3.59E+01	(4)	1.8 J	1.6 J	2.7 v	< 8.8622 u	1.6 J	2.1 J	1.4 J	1.6 J	2.4 J	3.3 J	1.6 J	1.3 J	2.7 v	1.3 J	1.8 J	2.2 J	1.7 J	1.6 J	2.1 J
Barium	1.56E+04	(1)	4.39E+03	(5)	130 v	180 v	35 v	590 v	230 v	130 v	120 v	410 v	1500 v	380 v	200 v	170 v	300 v	320 v	300 v	340 v	440 v	180 v	300 v
Beryllium	1.56E+02	(1)	1.48E+02	(5)	0.82 v	0.74 v	0.74 v	< 0.3453 u	0.58 v	0.74 v	0.69 v	0.57 v	0.26 v	0.26 J	0.64 v	0.45 v	0.58 v	0.58 v	0.52 v	0.9 v	0.57 v	0.64 v	1.1 v
Cadmium	7.05E+01	(1)	7.21E+01	(5)	< 0.0625 u	< 0.0618 u	< 0.0631 u	< 0.6324 u	< 0.0626 u	< 0.0633 u	< 0.0625 u	< 0.0619 u	< 0.0639 u	< 0.1269 u	< 0.0627 u	< 0.0635 u	< 0.0621 u	< 0.0631 u	< 0.0634 u	< 0.0637 u	< 0.0628 u	< 0.0631 u	< 0.0624 u
Chromium	9.66E+01	(1)	1.34E+02	(5)	8.9 v	7.6 v	8.3 v	2.5 J	5.6 v	8.3 v	5.9 v	5.1 v	3.6 v	3 v	6.4 v	5 v	6.6 v	6.6 v	4.7 v	9 v	6.4 v	6.8 v	9.5 v
Cobalt	2.34E+01	(1)	3.67E+01	(5)	3.6 v	3.3 v	5.7 v	2.6 J	2.7 v	2.4 v	3 v	2.8 v	2.2 v	1.2 v	3.2 v	2.3 v	2.1 v	3.2 v	3.2 v	4.5 v	2.9 v	3.4 v	4.9 v
Cyanide	1.11E+01	(1)	1.20E+01	(5)	< 0.25 u	< 0.25 u	< 0.25 u	< 0.254 u	< 0.208 u	< 0.225 u	0.24 v	< 0.281 u	< 0.28 u	< 0.156 u	< 0.271 u	< 0.237 u	< 0.269 u	< 0.283 u	< 0.269 u	< 0.284 u	0.59 v	< 0.23 u	0.37 v
Iron	5.48E+04	(1)	2.48E+05	(5)	14000 v	12000 v	9300 v	4900 v	9100 v	14000 v	12000 v	9800 v	7900 v	4400 v	12000 v	9600 v	11000 v	11000 v	10000 v	7500 v	10000 v	10000 v	20000 v
Lead	-	(2)	8.00E+02	(6)	7.2 v	3.9 v	0.54 v	5.9 v	1.8 v	1.6 v	2.7 v	3.2 v	1.2 v	1.1 v	3.5 v	1.6 v	1.1 v	2.8 v	2.3 v	< 0.1747 u	3.4 v	2.7 v	4.7 v
Manganese	1.05E+04	(1)	4.64E+02	(5)	220 v	290 v	120 v	2300 v	200 v	330 v	190 v	190 v	710 v	1500 v	210 v	370 v	450 v	230 v	300 v	130 v	390 v	200 v	300 v
Mercury	2.36E+01	(1)	2.05E+01	(5)	0.0045 J	0.0028 J	0.00089 J	0.0028 J	0.0021 J	< 0.0006 u	0.0019 J	0.0015 J	0.0042 J	< 0.0006 u	0.0042 J	0.002 J	< 0.0006 u	0.0019 J	0.002 J	< 0.0006 u	0.0033 J	0.0021 J	< 0.0006 u
Nickel	1.56E+03	(1)	7.53E+02	(5)	7.1 v	5.9 v	8.6 v	3.1 J	4.7 v	5.7 v	5.4 v	5 v	3.2 v	3.3 v	5.5 v	4.5 v	6.1 v	5.7 v	4.7 v	11 v	4.6 v	5.5 v	9 v
Selenium	3.91E+02	(1)	1.75E+03	(5)	< 1.7933 u	< 1.7733 u	< 1.8115 u	< 18.1434 u	< 1.7947 u	< 1.8162 u	< 1.7934 u	< 1.7765 u	< 1.8319 u	< 3.6403 u	< 1.7993 u	< 1.8205 u	< 1.7804 u	< 1.8104 u	< 1.8187 u	< 1.8287 u	< 1.8011 u	< 1.8115 u	< 1.7897 u
Silver	3.91E+02	(1)	1.77E+03	(5)	< 0.0617 u	< 0.061 u	< 0.0623 u	< 0.6244 u	< 0.0618 u	< 0.0625 u	< 0.0617 u	< 0.0611 u	< 0.063 u	< 0.1253 u	< 0.0619 u	< 0.0626 u	< 0.0613 u	< 0.0623 u	< 0.0626 u	< 0.0629 u	< 0.062 u	< 0.0623 u	< 0.0616 u
Vanadium	3.94E+02	(1)	6.14E+02	(5)	14 v	14 v	26 v	58 v	10 v	6.4 v	9.8 v	10 v	14 v	9.4 v	12 v	10 v	3.5 v	13 v	13 v	25 v	14 v	13 v	13 v
Zinc	2.35E+04	(1)	1.06E+05	(5)	13 v	11 v	27 v	6.3 J	9.3 v	9 v	9.8 v	8.3 v	7.6 v	4.8 J	9.6 v	8.5 v	7 v	9.3 v	9.9 v	20 v	11 v	10 v	22 v
Volatiles (mg/kg)																							
1,1,1,2-Tetrachloroethane	2.78E+01	(1)	1.36E+02	(4)	< 0.12 u	< 0.0288 u	< 0.003 u	<0.0017 u	< 0.0622 u	<0.0017 u	<0.0017 u	< 0.0025 u	< 0.009 u	< 0.0031 u	< 0.0056 u	< 0.0121 u	<0.0019 u	< 0.0031 u	< 0.5838 u	< 0.003 u	< 0.0445 u	< 0.1195 u	< 0.0064 u
1,1,1-Trichloroethane	1.43E+04	(1)	1.35E+04	(5)	< 0.0765 u	< 0.0184 u	< 0.0019 u	<0.0017 u	< 0.0397 u	<0.0017 u	<0.0017 u	< 0.0016 u	< 0.0057 u	< 0.002 u	< 0.0035 u	< 0.0077 u	<0.0019 u	< 0.002 u	< 0.3722 u	< 0.0019 u	< 0.0284 u	< 0.0762 u	< 0.0041 u
1,1,2,2-Tetrachloroethane	7.93E+00	(1)	3.91E+01	(4)	< 0.2031 u	< 0.0487 u	< 0.0051 u	<0.0017 u	< 0.1054 u	<0.0017 u	<0.0017 u	< 0.0043 u	< 0.0153 u	< 0.0053 u	< 0.0094 u	< 0.0204 u	<0.0019 u	< 0.0053 u	< 0.9885 u	< 0.0051 u	< 0.0753 u	< 0.2023 u	< 0.0108 u
1,1,2-Trichloroethane	2.59E+00	(1)	2.28E+00	(5)	< 0.1477 u	< 0.0355 u	< 0.0037 u	<0.0017 u	< 0.0766 u	<0.0017 u	<0.0017 u	< 0.0031 u	< 0.0111 u	< 0.0038 u	< 0.0068 u	< 0.0148 u	<0.0019 u	< 0.0039 u	< 0.7189 u	< 0.0037 u	< 0.0548 u	< 0.1471 u	< 0.0078 u
1,1-Dichloroethane	7.79E+01	(1)	3.80E+02	(4)	< 0.0678 u	< 0.0163 u	< 0.0017 u	<0.0017 u	< 0.0351 u	<0.0017 u	<0.0017 u	< 0.0014 u	< 0.0051 u	< 0.0018 u	< 0.0031 u	< 0.0068 u	<0.0019 u	< 0.0018 u	< 0.3297 u	< 0.0017 u	< 0.0251 u	< 0.0675 u	< 0.0036 u
1,1-Dichloroethene	4.36E+02	(1)	4.20E+02	(5)	< 0.4105 u	< 0.0985 u	< 0.0102 u	<0.0003 u	< 0.2129 u	<0.0003 u	<0.0003 u	< 0.0086 u	< 0.0308 u	< 0.0107 u	< 0.019 u	< 0.0412 u	<0.0003 u	< 0.0107 u	< 1.9977 u	< 0.0104 u	< 0.1522 u	< 0.4089 u	< 0.0218 u
1,1-Dichloropropene	-	-	-	-	< 0.0994 u	< 0.0239 u	< 0.0025 u	<0.0017 u	< 0.0516 u	<0.0017 u	<0.0017 u	< 0.0021 u	< 0.0075 u	< 0.0026 u	< 0.0046 u	< 0.01 u	<0.0019 u	< 0.0026 u	< 0.4838 u	< 0.0025 u	< 0.0369 u	< 0.099 u	< 0.0053 u
1,2,3-Trichlorobenzene	6.30E+01	(2)	9.30E+02	(6)	< 0.1875 u	< 0.045 u	< 0.0047 u	<0.0004 u	< 0.0973 u	<0.0004 u	<0.0004 u	< 0.0039 u	< 0.0141 u	< 0.0049 u	< 0.0087 u	< 0.0188 u	<0.0005 u	< 0.0049 u	< 0.9126 u	< 0.0047 u	< 0.0695 u	< 0.1868 u	< 0.01 u
1,2,3-Trichloropropane	5.10E-02	(1)	1.21E+00	(4)	< 0.2168 u	< 0.052 u	< 0.0054 u	<0.0017 u	< 0.1124 u	<0.0017 u	<0.0017 u	< 0.0045 u	< 0.0163 u	< 0.0056 u	< 0.01 u	< 0.0218 u	<0.0019 u	< 0.0057 u	< 1.055 u	< 0.0055 u	< 0.0804 u	< 0.2159 u	< 0.0115 u
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 0.1341 u	< 0.0322 u	< 0.0033 u	<0.0005 u	< 0.0695 u	<0.0005 u	<0.0005 u	< 0.0028 u	< 0.0101 u	< 0.0035 u	< 0.0062 u	< 0.0135 u	<0.0006 u	< 0.0035 u	< 0.6524 u	< 0.0034 u	< 0.0497 u	< 0.1335 u	< 0.0071 u
1,2,4-Trimethylbenzene	3.00E+02	(2)	1.80E+03	(6)	32 v	5.5 v	0.011 J	0.0003 J	18 v	0.0006 J	<0.0003 u	1.6 v	3.8 v	0.22 v	2.2 v	8.5 v	0.0055 v	0.012 J	140 v	0.23 v	19 v	35 v	2.4 v
1,2-Dibromo-3-chloropropane	8.51E-02	(1)	1.17E+00	(4)	< 0.3839 u	< 0.0921 u	< 0.0096 u	<0.0002 u	< 0.1991 u	<0.0002 u	<0.0002 u	< 0.008 u	< 0.0288 u	< 0.01 u	< 0.0178 u	< 0.0386 u	<0.0002 u	< 0.01 u	< 1.8683 u	< 0.0097 u	< 0.1423 u	< 0.3824 u	< 0.0204 u
1,2-Dibromoethane (EDB)	6.68E-01	(1)	3.28E+00	(4)	< 0.0892 u	< 0.0214 u	< 0.0022 u	<0.0017 u	< 0.0462 u	<0.0017 u	<0.0017 u	< 0.0019 u	< 0.0067 u	< 0.0023 u	< 0.0041 u	< 0.009 u	<0.0019 u	< 0.0023 u	< 0.4339 u	< 0.0023 u	< 0.033 u	< 0.0888 u	< 0.0047 u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.1094 u	< 0.0262 u	< 0.0027 u	<0.0002 u	< 0.0567 u	<0.0002 u	<0.0002 u	< 0.0023 u	< 0.0082 u	< 0.0028 u	< 0.0051 u	< 0.011 u	<0.0003 u	< 0.0029 u	< 0.5323 u	< 0.0028 u	< 0.0405 u	< 0.109 u	< 0.0058 u
1,2-Dichloroethane (EDC)	8.25E+00	(1)	4.03E+01	(4)	< 0.3268 u	< 0.0784 u	< 0.0081 u	<0.0017 u	< 0.1695 u	<0.0017 u	<0.0017 u	< 0.0068 u	< 0.0245 u	< 0.0085 u	< 0.0151 u	< 0.0328 u	<0.0019 u	< 0.0085 u	< 1.5904 u	< 0.0083 u	< 0.1211 u	< 0.3255 u	< 0.0174 u
1,2-Dichloropropane	1.76E+01	(1)	2.52E+01	(5)	< 0.1051 u	< 0.0252 u	< 0.0026 u	<0.0017 u	< 0.0545 u	<0.0017 u	<0.0017 u	< 0.0022 u	< 0.0079 u	< 0.0027 u	< 0.0049 u	< 0.0106 u	<0.0019 u	< 0.0027 u	< 0.5116 u	< 0.0027 u	< 0.039 u	< 0.1047 u	< 0.0056 u
1,3,5-Trimethylbenzene	2.70E+02	(2)	1.50E+03	(6)	11 v	1.9 v	0.0025 J	<0.0003 u	5.6 v	<0.0003 u	<0.0003 u	0.6 v	1.3 v	0.076 v	0.69 v	2.8 v	0.0029 v	0.0026 J	51 v	0.083 v	5.8 v	13 v	0.87 v
1,3-Dichlorobenzene	-	-	-	-	< 0.1028 u	< 0.0247 u	< 0.0026 u	<0.0003 u	< 0.0533 u	<0.0003 u	<0.0003 u	< 0.0022 u	< 0.0077 u	< 0.0027 u	< 0.0048 u	< 0.0103 u	<0.0003 u	< 0.0027 u	< 0.5002 u	< 0.0026 u	< 0.0381 u	< 0.1024 u	< 0.0055 u
1,3-Dichloropropane	1.60E+03	(2)	2.30E+04	(6)	< 0.1422 u	< 0.0341 u	< 0.0035 u	<0.0017 u	< 0.0738 u	<0.0017 u	<0.0017 u	< 0.003 u	< 0.0107 u	< 0.0037 u	< 0.0066 u	< 0.0143 u	<0.0019 u	< 0.0037 u	< 0.6921 u	< 0.0036 u	< 0.0527 u	< 0.1417 u	< 0.0076 u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.1553 u	< 0.0373 u	< 0.0039 u	<0.0003 u	< 0.0806 u	<0.0003 u	<0.0003 u	< 0.0033 u	< 0.0117 u	< 0.004 u	< 0.0072 u	< 0.0156 u	<0.0003 u	< 0.004 u	< 0.7558 u	< 0.0039 u	< 0.0576 u	< 0.1547 u	< 0.0082 u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	0.59 J	0.23 J	< 0.0069 u	0.0002 J	0.86 J	0.0003 J	0.0002 J	0.028 J	0.17 J	< 0.0073 u	0.32 v	0.21 J	0.0004 J	< 0.0073 u	< 1.3563 u	< 0.0071 u	0.73 J	0.49 J	0.023 J
2,2-Dichloropropane	-	-	-	-	< 0.0718 u	< 0.0172 u	< 0.0018 u	<0.0002 u	< 0.0372 u	<0.0002 u	<0.0002 u	< 0.0015 u	< 0.0054 u	< 0.0019 u	< 0.0033 u	< 0.0072 u	<0.0002 u	< 0.0019 u	< 0.3493 u	< 0.0018 u	< 0.0266 u	< 0.0715 u	< 0.0038 u
2-Butanone	3.73E+04	(1)	9.12E+04	(5)	< 0.7163 u	< 0.1719 u	< 0.0178 u	<0.0006 u	< 0.3715 u	<0.0006 u	0.002 J	< 0.015 u	< 0.0538 u	< 0.0186 u	< 0.0332 u	< 0.072 u	0.0009 J	< 0.0187 u	< 3.4856 u	< 0.0181 u	< 0.2655 u	< 0.7134 u	< 0.038 u
2-Chlorotoluene	1.56E+03	(1)	7.08E+03	(5)	< 0.0925 u	< 0.0222 u	< 0.0023 u	<0.0003 u	< 0.048 u	<0.0003 u	<0.0003 u	< 0.0019 u	< 0.0069 u	< 0.0024 u	< 0.0043 u	< 0.0093 u	<0.0003 u	< 0.0024 u	< 0.45 u	< 0.0023 u	< 0.0343 u	< 0.0921 u	< 0.0049 u
2-Hexanone	2.00E+02	(2)	1.30E+03	(6)	< 0.6821 u	< 0.1637 u	< 0.017 u	<0.0004 u	< 0.3537 u	<0.0004 u	<0.0004 u	< 0.0143 u	< 0.0512 u	< 0.0177 u	< 0.0316 u	< 0.0685 u	<0.0005 u	< 0.0178 u	< 3.319 u	< 0.0173 u	< 0.2528 u	< 0.6793 u	< 0.0362 u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	1.6 J	0.55 J	< 0.0067 u	<0.0004 u	1.9 J	<0.0004 u	<0.0004 u	0.041 J	0.3 J	0.0092 J	0.61 v	0.46 J	<0.0005 u	0.0075 J	< 1.3065 u	< 0.0068 u	1.6 J	1.1 J	0.045 J
4-Chlorotoluene	1.60E+03	(2)	2.30E+04	(6)	< 0.1109 u	< 0.0266 u	< 0.0028 u	<0.0003 u	< 0.0575 u	<0.0003 u	<0.0003 u	< 0.0023 u	< 0.0083 u	< 0.0029 u	< 0.0051 u	< 0.0111 u	<0.0003 u	< 0.0029 u	< 0.5395 u	< 0.0028 u	< 0.0411 u	< 0.1104 u	< 0.0059 u
4-Isopropyltoluene	-	-	-	-	< 0.1125 u	< 0.027 u	< 0.0028 u	<0.0003 u	0.13 J	<0.0003 u	<0.0003 u	0.12 v	0.035 J	< 0.0029 u	0.03 J	0.049 J	0.0004 J	< 0.0029 u	8.5 v	0.01 J	0.22 J	1.5 v	0.17 v
4-Methyl-2-pentanone	5.81E+03	(1)	2.02E+04	(5)	< 0.3653 u	< 0.0877 u	< 0.0091 u	<0.0033 u	< 0.1894 u	<0.0034 u	<0.0034 u	< 0.0077 u	< 0.0274 u	< 0.0095 u	< 0.0169 u	< 0.0367 u	<0.0037 u	< 0.0095 u	< 1.7775 u	< 0.0092 u	< 0.1354 u	< 0.3638 u	< 0.0194 u
Acetone	6.63E+04	(1)	2.41E+05	(5)	< 1.6217 u	< 0.3892 u	< 0.0404 u	0.0085 v	< 0.841 u	0.0053 J	0.0046 J	< 0.034 u	< 0.1218 u	< 0.0422 u	< 0.0752 u	< 0.1629 u	0.0044 J	< 0.0423 u	< 7.8917 u	< 0.041 u	< 0.6011 u	< 1.6153 u	< 0.0861 u
Benzene	1.77E+01	(1)	8.65E+01	(4)	3.8 v	0.26 v	0.041 v	0.0054 v	5.2 v	0.0077 v	0.0172 v	0.29 v	0.12 v	0.026 v	0.067 v	6.3 v	0.0134 v	0.014 J	**44** v	0.06 v	< 0.1859 u	11 v	0.25 v
Bromobenzene	2.90E+02	(2)	1.80E+03	(6)	< 0.101 u	< 0.0242 u	< 0.0025 u	<0.0002 u	< 0.0524 u	<0.0002 u	<0.0002 u	< 0.0021 u	< 0.0076 u	< 0.0026 u	< 0.0047 u	< 0.0101 u	<0.0002 u	< 0.0026 u	< 0.4917 u	< 0.0026 u	< 0.0374 u	< 0.1006 u	< 0.0054 u
Bromodichloromethane	6.14E+00	(1)	2.99E+01	(4)	< 0.073 u	< 0.0175 u	< 0.0018 u	<0.0017 u	< 0.0379 u	<0.0017 u	<0.0017 u	< 0.0015 u	< 0.0055 u	< 0.0019 u	< 0.0034 u	< 0.0073 u	<0.0019 u	< 0.0019 u	< 0.3554 u	< 0.0018 u	< 0.0271 u	< 0.0727 u	< 0.0039 u
Bromoform	6.74E+02	(1)	1.75E+03	(4)	< 0.1527 u	< 0.0366 u	< 0.0038 u	<0.0017 u	< 0.0792 u	<0.0017 u	<0.0017 u	< 0.0032 u	< 0.0115 u	< 0.004 u	< 0.0071 u	< 0.0153 u	<0.0019 u	< 0.004 u	< 0.7429 u	< 0.0039 u	< 0.0566 u	< 0.1521 u	< 0.0081 u
Bromomethane	1.76E+01	(1)	1.77E+01	(5)	< 0.4618 u	< 0.1108 u	0.012 J	<0.0003 u	< 0.2395 u	<0.0003 u	<0.0003 u	< 0.0097 u	< 0.0347 u	< 0.012 u	< 0.0214 u	< 0.0464 u	<0.0003 u	< 0.012 u	< 2.247 u	< 0.0117 u	< 0.1711 u	< 0.4599 u	< 0.0245 u
Carbon disulfide	1.54E+03	(1)	1.61E+03	(5)	< 0.4138 u	< 0.0993 u	< 0.0103 u	<0.0006 u	< 0.2146 u	<0.0006 u	<0.0006 u	< 0.0087 u	< 0.0311 u	< 0.0108 u	< 0.0192 u	< 0.0416 u	<0.0007 u	< 0.0108 u	< 2.0138 u	< 0.0105 u	< 0.1534 u	< 0.4122 u	< 0.022 u
Carbon tetrachloride	1.06E+01	(1)	5.21E+01	(4)	< 0.0823 u	< 0.0197 u	< 0.0021 u	<0.0017 u	< 0.0427 u	<0.0017 u	<0.0017 u	< 0.0017 u	< 0.0062 u	< 0.0021 u	< 0.0038 u	< 0.0083 u	<0.0019 u	< 0.0021 u	< 0.4005 u	< 0.0021 u	< 0.0305 u	< 0.082 u	< 0.0044 u
Chlorobenzene	3.76E+02	(1)	4.08E+02	(5)	< 0.102 u	< 0.0245 u	< 0.0025 u	<0.0002 u	< 0.0529 u	<0.0002 u	<0.0002 u	< 0.0021 u	< 0.0077 u	< 0.0027 u	< 0.0047 u	< 0.0103 u	<0.0002 u	< 0.0027 u	< 0.4966 u	< 0.0026 u	< 0.0378 u	< 0.1016 u	< 0.0054 u
Chloroethane	1.88E+04	(1)	1.65E+04	(5)	< 0.2502 u	< 0.06 u	< 0.0062 u	<0.0003 u	< 0.1297 u	<0.0003 u	<0.0003 u	< 0.0052 u	< 0.0188 u	< 0.0065 u	< 0.0116 u	< 0.0251 u	<0.0003 u	< 0.0065 u	< 1.2174 u	< 0.0063 u	< 0.0927 u	< 0.2492 u	< 0.0133 u
Chloroform	5.85E+00	(1)	2.84E+01	(4)	< 0.0946 u	< 0.0227 u	< 0.0024 u	<0.0017 u	< 0.049 u	<0.0017 u	<0.0017 u	< 0.002 u	< 0.0071 u	< 0.0025 u	< 0.0044 u	< 0.0095 u	<0.0019 u	< 0.0025 u	< 0.4602 u	< 0.0024 u	< 0.0351 u	< 0.0942 u	< 0.005 u
Chloromethane	4.08E+01	(1)	1.99E+02	(4)	< 0.1116 u	< 0.0268 u	< 0.0028 u	<0.0004 u	< 0.0579 u	<0.0004 u	<0.0004 u	< 0.0023 u	< 0.0084 u	< 0.0029 u	< 0.0052 u	< 0.0112 u	<0.0005 u	< 0.0029 u	< 0.5429 u	< 0.0028 u	< 0.0414 u	< 0.1111 u	< 0.0059 u
cis-1,2-DCE	1.56E+02	(1)	7.08E+02	(5)	< 0.0729 u	< 0.0175 u	< 0.0018 u	<0.0017 u	< 0.0378 u	<0.0017 u	<0.0017 u	< 0.0015 u	< 0.0055 u	< 0.0019 u	< 0.0034 u	< 0.0073 u	<0.0019 u	< 0.0019 u	< 0.3547 u	< 0.0018 u	< 0.027 u	< 0.0726 u	< 0.0039 u
cis-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.1156 u	< 0.0277 u	< 0.0029 u	<0.0017 u	< 0.0599 u	<0.0017 u	<0.0017 u	< 0.0024 u	< 0.0087 u	< 0.003 u	< 0.0054 u	< 0.0116 u	<0.0019 u	< 0.003 u	< 0.5624 u	< 0.0029 u	< 0.0428 u	< 0.1151 u	< 0.0061 u
Dibromochloromethane	1.38E+01	(1)	6.69E+01	(4)	< 0.1132 u	< 0.0272 u	< 0.0028 u	<0.0017 u	< 0.0587 u	<0.0017 u	<0.0017 u	< 0.0024 u	< 0.0085 u	< 0.0029 u	< 0.0052 u	< 0.0114 u	<0.0019 u	< 0.003 u	< 0.5511 u	< 0.0029 u	< 0.042 u	< 0.1128 u	< 0.006 u
Dibromomethane	5.74E+01	(1)	5.34E+01	(5)	< 0.1086 u	< 0.0261 u	< 0.0027 u	<0.0017 u	< 0.0563 u	<0.0017 u	<0.0017 u	< 0.0023 u	< 0.0082 u	< 0.0028 u	< 0.005 u	< 0.0109 u	<0.0019 u	< 0.0028 u	< 0.5284 u	< 0.0027 u	< 0.0402 u	< 0.1081 u	< 0.0058 u
Dichlorodifluoromethane	1.80E+02	(1)	1.59E+02	(5)	< 0.3878 u	< 0.0931 u	< 0.0097 u	<0.001 u	< 0.2011 u	<0.001 u	<0.001 u	< 0.0081 u	< 0.0291 u	< 0.0101 u	< 0.018 u	< 0.039 u	<0.0011 u	< 0.0101 u	< 1.8873 u	< 0.0098 u	< 0.1437 u	< 0.3863 u	< 0.0206 u
Ethylbenzene	7.45E+01	(1)	3.65E+02	(4)	19 v	1.5 v	< 0.0026 u	<0.0002 u	7 v	0.0007 J	0.0004 J	0.73 v	1.2 v	0.086 v	0.41 v	4.8 v	0.0041 v	< 0.0027 u	**88** v	0.086 v	6.6 v	19 v	1 v

Table 7 - Soil Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	TK-568-1 (12-14')	TK-568-1 (30-32')	TK-568-1 (48-49')	TK 568-2 (22-24')	TK 568-2 (28-30')	TK 568-2 (36-37')	TK569-1(18-20')	TK569-1(24-26')	TK569-1(36-38')	TK569-1(40-42')	TK569-2(16-18')	TK569-2(29-31')	TK569-2(36-38')	TK 569-3 (16-18')	TK 569-3 (24-26')	TK 569-3 (38-39')	TK 570-1 (10-12')	TK 570-1 (32-34')	TK 570-1 (44-45')
					1609E26-008	1609E26-009	1609E26-010	1609G64-001	1609G64-002	1609G64-003	1610238-004	1610238-005	1610238-006	1610238-007	1610238-001	1610238-002	1610238-003	1609G64-008	1609G64-009	1609G64-010	1609G64-005	1609G64-006	1609G64-007
					9/23/2016	9/23/2016	9/23/2016	9/27/2016	9/27/2016	9/27/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	9/28/2016	9/28/2016	9/28/2016	9/27/2016	9/27/2016	9/27/2016
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 0.1533 u	< 0.0368 u	< 0.0038 u	<0.0004 u	< 0.0795 u	<0.0004 u	<0.0004 u	< 0.0032 u	< 0.0115 u	< 0.004 u	< 0.0071 u	< 0.0154 u	<0.0004 u	< 0.004 u	< 0.7459 u	< 0.0039 u	< 0.0568 u	< 0.1527 u	< 0.0081 u
Isopropylbenzene	2.35E+03	(1)	2.71E+03	(5)	0.94 J	0.11 J	< 0.0027 u	<0.0002 u	0.34 J	<0.0002 u	<0.0002 u	0.23 v	0.089 J	0.0031 J	0.071 v	0.21 v	0.001 J	< 0.0028 u	23 v	0.02 J	0.64 v	3.8 v	0.32 v
Methyl tert-butyl ether (MTBE)	9.68E+02	(1)	4.78E+03	(4)	< 0.3939 u	1 v	0.014 J	0.0006 J	< 0.2043 u	0.0124 v	<0.0003 u	< 0.0083 u	< 0.0296 u	< 0.0102 u	< 0.0183 u	0.1 J	0.0025 v	< 0.0103 u	< 1.9168 u	< 0.01 u	< 0.146 u	< 0.3923 u	< 0.0209 u
Methylene chloride	4.09E+02	(1)	1.20E+03	(5)	< 0.3614 u	< 0.0867 u	< 0.009 u	<0.0017 u	< 0.1874 u	<0.0017 u	<0.0017 u	< 0.0076 u	< 0.0271 u	< 0.0094 u	< 0.0168 u	< 0.0363 u	<0.0019 u	< 0.0094 u	< 1.7587 u	< 0.0091 u	< 0.134 u	< 0.36 u	< 0.0192 u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	3 v	0.61 v	< 0.0049 u	<0.0017 u	2.6 v	<0.0017 u	<0.0017 u	0.044 J	0.32 v	< 0.0051 u	0.58 v	0.75 v	<0.0019 u	< 0.0051 u	1.2 J	< 0.005 u	2.8 v	2.1 J	0.079 J
n-Butylbenzene	3.90E+03	(2)	5.80E+04	(6)	1.3 J	0.37 J	< 0.0028 u	<0.0004 u	0.87 J	<0.0004 u	<0.0004 u	0.14 v	0.21 J	0.013 J	0.23 v	0.35 J	0.0005 J	< 0.0029 u	9.9 J	0.019 J	1.4 v	2.6 J	0.24 v
n-Propylbenzene	3.80E+03	(2)	2.40E+04	(6)	5.2 v	0.83 v	< 0.0024 u	<0.0003 u	2.4 v	<0.0003 u	<0.0003 u	0.37 v	0.6 v	0.037 v	0.34 v	1.3 v	0.0016 J	< 0.0025 u	33 v	0.048 v	2.9 v	7.4 v	0.53 v
sec-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	0.49 J	0.11 J	< 0.0043 u	<0.0003 u	0.31 J	<0.0003 u	<0.0003 u	0.12 v	0.076 J	0.0073 J	0.072 v	0.1 J	0.0006 J	< 0.0045 u	11 v	0.017 J	0.42 J	1.8 v	0.19 v
Styrene	7.23E+03	(1)	1.01E+04	(5)	< 0.1119 u	< 0.0269 u	< 0.0028 u	<0.0002 u	< 0.058 u	<0.0002 u	<0.0002 u	< 0.0023 u	< 0.0084 u	< 0.0029 u	< 0.0052 u	< 0.0112 u	<0.0002 u	< 0.0029 u	< 0.5446 u	< 0.0028 u	< 0.0415 u	< 0.1115 u	< 0.0059 u
tert-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	< 0.1039 u	< 0.0249 u	< 0.0026 u	<0.0002 u	< 0.0539 u	<0.0002 u	<0.0002 u	0.0084 J	< 0.0078 u	< 0.0027 u	< 0.0048 u	< 0.0104 u	<0.0003 u	< 0.0027 u	< 0.5057 u	< 0.0026 u	< 0.0385 u	< 0.1035 u	< 0.0055 u
Tetrachloroethene (PCE)	1.10E+02	(1)	1.19E+02	(5)	< 0.104 u	< 0.0249 u	< 0.0026 u	<0.0002 u	< 0.0539 u	<0.0002 u	<0.0002 u	< 0.0022 u	< 0.0078 u	< 0.0027 u	< 0.0048 u	< 0.0104 u	<0.0002 u	< 0.0027 u	< 0.5059 u	< 0.0026 u	< 0.0385 u	< 0.1035 u	< 0.0055 u
Toluene	5.22E+03	(1)	1.40E+04	(5)	76 v	0.4 v	< 0.0018 u	0.0009 J	28 v	0.0013 J	0.0004 J	1.6 v	2.5 v	0.26 v	0.7 v	32 v	0.0111 v	0.011 J	310 v	0.21 v	16 v	73 v	2.3 v
trans-1,2-DCE	2.93E+02	(1)	3.03E+02	(5)	< 0.3509 u	< 0.0842 u	< 0.0087 u	<0.0002 u	< 0.182 u	<0.0002 u	<0.0002 u	< 0.0074 u	< 0.0264 u	< 0.0091 u	< 0.0163 u	< 0.0352 u	<0.0002 u	< 0.0091 u	< 1.7074 u	< 0.0089 u	< 0.13 u	< 0.3495 u	< 0.0186 u
trans-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.1835 u	< 0.044 u	< 0.0046 u	<0.0002 u	< 0.0951 u	<0.0002 u	<0.0002 u	< 0.0038 u	< 0.0138 u	< 0.0048 u	< 0.0085 u	< 0.0184 u	<0.0002 u	< 0.0048 u	< 0.8927 u	< 0.0046 u	< 0.068 u	< 0.1827 u	< 0.0097 u
Trichloroethene (TCE)	6.72E+00	(1)	6.84E+00	(5)	< 0.1344 u	< 0.0322 u	< 0.0033 u	<0.0017 u	< 0.0697 u	<0.0017 u	<0.0017 u	< 0.0028 u	< 0.0101 u	< 0.0035 u	< 0.0062 u	< 0.0135 u	<0.0019 u	< 0.0035 u	< 0.6539 u	< 0.0034 u	< 0.0498 u	< 0.1338 u	< 0.0071 u
Trichlorofluoromethane	1.22E+03	(1)	1.12E+03	(5)	< 0.0937 u	< 0.0225 u	< 0.0023 u	<0.0002 u	< 0.0486 u	<0.0002 u	<0.0002 u	< 0.002 u	< 0.007 u	< 0.0024 u	< 0.0043 u	< 0.0094 u	<0.0002 u	< 0.0024 u	< 0.4561 u	< 0.0024 u	< 0.0347 u	< 0.0933 u	< 0.005 u
Vinyl chloride	7.41E-01	(1)	2.83E+01	(4)	< 0.1025 u	< 0.0246 u	< 0.0026 u	<0.0004 u	< 0.0532 u	<0.0004 u	<0.0004 u	< 0.0021 u	< 0.0077 u	< 0.0027 u	< 0.0048 u	< 0.0103 u	<0.0005 u	< 0.0027 u	< 0.4988 u	< 0.0026 u	< 0.038 u	< 0.1021 u	< 0.0054 u
Xylenes, Total	8.63E+02	(1)	7.91E+02	(5)	120 v	9.1 v	< 0.0059 u	0.001 J	46 v	0.002 v	<0.0007 u	4.2 v	7.7 v	0.51 v	2.5 v	30 v	0.019 v	0.015 J	500 v	0.5 v	42 v	110 v	6 v
Semi-volatiles (mg/kg)																							
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 1.0571 u	< 0.1076 u	< 0.1083 u	< 0.1074 u	< 0.1079 u	< 0.1063 u	< 0.1073 u	< 0.1048 u	< 0.1075 u	< 0.1076 u	< 0.1077 u	< 0.1051 u	< 0.1088 u	< 0.1074 u	< 1.0818 u	< 0.1081 u	< 0.1087 u	< 0.1071 u	< 0.1075 u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.7485 u	< 0.0762 u	< 0.0766 u	< 0.076 u	< 0.0764 u	< 0.0753 u	< 0.0759 u	< 0.0742 u	< 0.0761 u	< 0.0762 u	< 0.0763 u	< 0.0744 u	< 0.077 u	< 0.076 u	< 0.766 u	< 0.0765 u	< 0.0769 u	< 0.0759 u	< 0.0761 u
1,3-Dichlorobenzene	-	-	-	-	< 0.7553 u	< 0.0769 u	< 0.0773 u	< 0.0767 u	< 0.0771 u	< 0.076 u	< 0.0766 u	< 0.0748 u	< 0.0768 u	< 0.0769 u	< 0.077 u	< 0.0751 u	< 0.0777 u	< 0.0767 u	< 0.773 u	< 0.0772 u	< 0.0776 u	< 0.0766 u	< 0.0768 u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.8262 u	< 0.0841 u	< 0.0846 u	< 0.0839 u	< 0.0843 u	< 0.0831 u	< 0.0838 u	< 0.0819 u	< 0.084 u	< 0.0841 u	< 0.0842 u	< 0.0821 u	< 0.085 u	< 0.0839 u	< 0.8455 u	< 0.0845 u	< 0.0849 u	< 0.0837 u	< 0.084 u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	1.5 J	< 0.1 u	< 0.1006 u	< 0.0997 u	0.66 v	< 0.0987 u	< 0.0996 u	< 0.0973 u	< 0.0999 u	< 0.1 u	0.13 J	< 0.0976 u	< 0.1011 u	< 0.0998 u	< 1.0049 u	< 0.1004 u	0.15 J	1.3 v	< 0.0999 u
2,4,5-Trichlorophenol	6.16E+03	(1)	2.69E+04	(5)	< 0.978 u	< 0.0996 u	< 0.1002 u	< 0.0993 u	< 0.0998 u	< 0.0983 u	< 0.0992 u	< 0.0969 u	< 0.0995 u	< 0.0996 u	< 0.0997 u	< 0.0972 u	< 0.1007 u	< 0.0994 u	< 1.0008 u	< 0.1 u	< 0.1005 u	< 0.0991 u	< 0.0995 u
2,4,6-Trichlorophenol	6.16E+01	(1)	2.69E+02	(5)	< 0.8108 u	< 0.0826 u	< 0.083 u	< 0.0823 u	< 0.0827 u	< 0.0815 u	< 0.0823 u	< 0.0803 u	< 0.0824 u	< 0.0825 u	< 0.0826 u	< 0.0806 u	< 0.0834 u	< 0.0824 u	< 0.8297 u	< 0.0829 u	< 0.0833 u	< 0.0822 u	< 0.0825 u
2,4-Dichlorophenol	1.85E+02	(1)	8.07E+02	(5)	< 0.9116 u	< 0.0928 u	< 0.0934 u	< 0.0926 u	< 0.093 u	< 0.0917 u	< 0.0925 u	< 0.0903 u	< 0.0927 u	< 0.0928 u	< 0.0929 u	< 0.0906 u	< 0.0938 u	< 0.0926 u	< 0.9329 u	< 0.0932 u	< 0.0937 u	< 0.0924 u	< 0.0927 u
2,4-Dimethylphenol	1.23E+03	(1)	5.38E+03	(5)	< 1.0613 u	< 0.1081 u	< 0.1087 u	< 0.1078 u	< 0.1083 u	< 0.1067 u	< 0.1077 u	< 0.1052 u	< 0.1079 u	< 0.108 u	< 0.1081 u	< 0.1055 u	< 0.1092 u	< 0.1078 u	< 1.086 u	< 0.1085 u	< 0.1091 u	0.27 J	< 0.108 u
2,4-Dinitrophenol	1.23E+02	(1)	5.38E+02	(5)	< 0.6482 u	< 0.066 u	< 0.0664 u	< 0.0658 u	< 0.0662 u	< 0.0652 u	< 0.0658 u	< 0.0642 u	< 0.0659 u	< 0.066 u	< 0.066 u	< 0.0644 u	< 0.0667 u	< 0.0658 u	< 0.6633 u	< 0.0663 u	< 0.0666 u	< 0.0657 u	< 0.0659 u
2,4-Dinitrotoluene	1.71E+01	(1)	8.23E+01	(4)	< 0.8727 u	< 0.0889 u	< 0.0894 u	< 0.0886 u	< 0.0891 u	< 0.0878 u	< 0.0885 u	< 0.0865 u	< 0.0887 u	< 0.0888 u	< 0.0889 u	< 0.0868 u	< 0.0898 u	< 0.0887 u	< 0.8931 u	< 0.0892 u	< 0.0897 u	< 0.0885 u	< 0.0888 u
2,6-Dinitrotoluene	3.56E+00	(1)	1.72E+01	(4)	< 1.034 u	< 0.1053 u	< 0.1059 u	< 0.105 u	< 0.1055 u	< 0.104 u	< 0.1049 u	< 0.1025 u	< 0.1052 u	< 0.1053 u	< 0.1054 u	< 0.1028 u	< 0.1064 u	< 0.105 u	< 1.0582 u	< 0.1057 u	< 0.1063 u	< 0.1048 u	< 0.1052 u
2-Chloronaphthalene	6.26E+03	(1)	2.83E+04	(5)	< 0.7693 u	< 0.0783 u	< 0.0788 u	< 0.0781 u	< 0.0785 u	< 0.0774 u	< 0.0781 u	< 0.0762 u	< 0.0782 u	< 0.0783 u	< 0.0784 u	< 0.0765 u	< 0.0792 u	< 0.0782 u	< 0.7873 u	< 0.0787 u	< 0.0791 u	< 0.078 u	< 0.0783 u
2-Chlorophenol	3.91E+02	(1)	1.77E+03	(5)	< 0.7704 u	< 0.0784 u	< 0.0789 u	< 0.0782 u	< 0.0786 u	< 0.0775 u	< 0.0782 u	< 0.0763 u	< 0.0783 u	< 0.0784 u	< 0.0785 u	< 0.0766 u	< 0.0793 u	< 0.0783 u	< 0.7883 u	< 0.0788 u	< 0.0792 u	< 0.0781 u	< 0.0784 u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	3.3 Z	< 0.1181 u	< 0.1187 u	< 0.1178 u	1.3 v	< 0.1166 u	< 0.1176 u	< 0.1149 u	< 0.1179 u	< 0.118 u	0.28 v	< 0.1153 u	< 0.1193 u	< 0.1178 u	< 1.1867 u	< 0.1185 u	0.31 v	2.9 v	< 0.118 u
'2-Methylphenol (cresol,o-)	3.20E+03	(2)	4.10E+04	(6)	< 0.8169 u	< 0.0832 u	< 0.0836 u	< 0.083 u	0.14 J	< 0.0821 u	< 0.0829 u	< 0.0809 u	< 0.0831 u	< 0.0831 u	< 0.0832 u	0.13 J	< 0.0841 u	< 0.083 u	< 0.8359 u	< 0.0835 u	0.13 J	< 0.0828 u	< 0.0831 u
2-Nitroaniline	6.30E+02	(2)	8.00E+03	(6)	< 1.0533 u	< 0.1073 u	< 0.1079 u	< 0.107 u	< 0.1075 u	< 0.1059 u	< 0.1069 u	< 0.1044 u	< 0.1071 u	< 0.1072 u	< 0.1073 u	< 0.1047 u	< 0.1084 u	< 0.107 u	< 1.0779 u	< 0.1077 u	< 0.1083 u	< 0.1068 u	< 0.1071 u
2-Nitrophenol	-	-	-	-	< 0.9695 u	< 0.0987 u	< 0.0993 u	< 0.0985 u	< 0.099 u	< 0.0975 u	< 0.0984 u	< 0.0961 u	< 0.0986 u	< 0.0987 u	< 0.0988 u	< 0.0964 u	< 0.0998 u	< 0.0985 u	< 0.9922 u	< 0.0991 u	< 0.0996 u	< 0.0983 u	< 0.0986 u
3,3´-Dichlorobenzidine	1.18E+01	(1)	5.70E+01	(4)	< 0.7195 u	< 0.0733 u	< 0.0737 u	< 0.0731 u	< 0.0734 u	< 0.0724 u	< 0.073 u	< 0.0713 u	< 0.0732 u	< 0.0732 u	< 0.0733 u	< 0.0715 u	< 0.0741 u	< 0.0731 u	< 0.7363 u	< 0.0736 u	< 0.074 u	< 0.0729 u	< 0.0732 u
3+4-Methylphenol	-	-	-	-	< 0.7075 u	< 0.072 u	< 0.0724 u	< 0.0718 u	0.15 J	< 0.0711 u	< 0.0718 u	< 0.0701 u	< 0.0719 u	< 0.072 u	< 0.0721 u	0.14 J	< 0.0728 u	< 0.0719 u	< 0.724 u	< 0.0723 u	0.11 J	0.44 v	< 0.072 u
3-Nitroaniline	-	-	-	-	< 0.8615 u	< 0.0877 u	< 0.0882 u	< 0.0875 u	< 0.0879 u	< 0.0866 u	< 0.0874 u	< 0.0854 u	< 0.0876 u	< 0.0877 u	< 0.0878 u	< 0.0856 u	< 0.0887 u	< 0.0875 u	< 0.8816 u	< 0.0881 u	< 0.0885 u	< 0.0873 u	< 0.0876 u
4,6-Dinitro-2-methylphenol	4.93E+00	(1)	2.15E+01	(5)	< 0.5909 u	< 0.0602 u	< 0.0605 u	< 0.06 u	< 0.0603 u	< 0.0594 u	< 0.06 u	< 0.0586 u	< 0.0601 u	< 0.0602 u	< 0.0602 u	< 0.0588 u	< 0.0608 u	< 0.06 u	< 0.6047 u	< 0.0604 u	< 0.0607 u	< 0.0599 u	< 0.0601 u
4-Bromophenyl phenyl ether	-	-	-	-	< 0.9343 u	< 0.0951 u	< 0.0957 u	< 0.0949 u	< 0.0954 u	< 0.0939 u	< 0.0948 u	< 0.0926 u	< 0.095 u	< 0.0951 u	< 0.0952 u	< 0.0929 u	< 0.0962 u	< 0.0949 u	< 0.9561 u	< 0.0955 u	< 0.096 u	< 0.0947 u	< 0.095 u
4-Chloro-3-methylphenol	-	-	-	-	< 1.1659 u	< 0.1187 u	< 0.1194 u	< 0.1184 u	< 0.119 u	< 0.1172 u	< 0.1183 u	< 0.1155 u	< 0.1186 u	< 0.1187 u	< 0.1188 u	< 0.1159 u	< 0.12 u	< 0.1184 u	< 1.1931 u	< 0.1192 u	< 0.1198 u	< 0.1182 u	< 0.1186 u
4-Chloroaniline	2.70E+01	(3)	1.10E+02	(7)	< 1.0624 u	< 0.1082 u	< 0.1088 u	< 0.1079 u	< 0.1084 u	< 0.1068 u	< 0.1078 u	< 0.1053 u	< 0.108 u	< 0.1081 u	< 0.1083 u	< 0.1056 u	< 0.1093 u	< 0.1079 u	< 1.0872 u	< 0.1086 u	< 0.1092 u	< 0.1077 u	< 0.1081 u
4-Chlorophenyl phenyl ether	-	-	-	-	< 1.1165 u	< 0.1137 u	< 0.1143 u	< 0.1134 u	< 0.114 u	< 0.1123 u	< 0.1133 u	< 0.1106 u	< 0.1135 u	< 0.1137 u	< 0.1138 u	< 0.111 u	< 0.1149 u	< 0.1134 u	< 1.1426 u	< 0.1141 u	< 0.1148 u	< 0.1132 u	< 0.1136 u
4-Nitroaniline	2.70E+02	(3)	1.10E+03	(7)	< 0.689 u	< 0.0702 u	< 0.0706 u	< 0.07 u	< 0.0703 u	< 0.0693 u	< 0.0699 u	< 0.0683 u	< 0.0701 u	< 0.0701 u	< 0.0702 u	< 0.0685 u	< 0.0709 u	< 0.07 u	< 0.7051 u	< 0.0704 u	< 0.0708 u	< 0.0698 u	< 0.0701 u
4-Nitrophenol	-	-	-	-	< 0.7444 u	< 0.0758 u	< 0.0762 u	< 0.0756 u	< 0.076 u	< 0.0749 u	< 0.0755 u	< 0.0738 u	< 0.0757 u	< 0.0758 u	< 0.0759 u	< 0.074 u	< 0.0766 u	< 0.0756 u	< 0.7618 u	< 0.0761 u	< 0.0765 u	< 0.0755 u	< 0.0757 u
Acenaphthene	3.48E+03	(1)	1.51E+04	(5)	< 0.8379 u	< 0.0853 u	< 0.0858 u	< 0.0851 u	< 0.0855 u	< 0.0843 u	< 0.085 u	< 0.083 u	< 0.0852 u	< 0.0853 u	< 0.0854 u	< 0.0833 u	< 0.0862 u	< 0.0851 u	< 0.8575 u	< 0.0857 u	< 0.0861 u	< 0.0849 u	< 0.0852 u
Acenaphthylene	-	-	-	-	< 0.7952 u	< 0.081 u	< 0.0814 u	< 0.0808 u	< 0.0812 u	< 0.08 u	< 0.0807 u	< 0.0788 u	< 0.0809 u	< 0.0809 u	< 0.081 u	< 0.0791 u	< 0.0818 u	< 0.0808 u	< 0.8138 u	< 0.0813 u	< 0.0817 u	< 0.0806 u	< 0.0809 u
Aniline	9.50E+02	(3)	4.00E+03	(7)	< 0.9233 u	< 0.094 u	< 0.0946 u	< 0.0938 u	< 0.0942 u	< 0.0928 u	< 0.0937 u	< 0.0915 u	< 0.0939 u	< 0.094 u	< 0.0941 u	< 0.0918 u	< 0.095 u	< 0.0938 u	< 0.9449 u	< 0.0944 u	< 0.0949 u	< 0.0936 u	< 0.0939 u
Anthracene	1.74E+04	(1)	7.53E+04	(5)	< 0.6487 u	< 0.0661 u	< 0.0664 u	< 0.0659 u	< 0.0662 u	< 0.0652 u	< 0.0658 u	< 0.0643 u	< 0.066 u	< 0.066 u	< 0.0661 u	< 0.0645 u	< 0.0668 u	< 0.0659 u	< 0.6638 u	< 0.0663 u	< 0.0667 u	< 0.0657 u	< 0.066 u
Azobenzene	5.60E+01	(3)	2.60E+02	(7)	< 1.1908 u	< 0.1213 u	< 0.1219 u	< 0.1209 u	< 0.1215 u	< 0.1197 u	< 0.1208 u	< 0.118 u	< 0.1211 u	< 0.1212 u	< 0.1213 u	< 0.1184 u	< 0.1226 u	< 0.121 u	< 1.2186 u	< 0.1217 u	< 0.1224 u	< 0.1207 u	< 0.1211 u
Benz(a)anthracene	1.53E+00	(1)	3.23E+01	(4)	< 0.8412 u	< 0.0857 u	< 0.0861 u	< 0.0854 u	< 0.0859 u	< 0.0846 u	< 0.0853 u	< 0.0834 u	< 0.0855 u	< 0.0856 u	< 0.0857 u	< 0.0836 u	< 0.0866 u	< 0.0855 u	< 0.8609 u	< 0.086 u	< 0.0865 u	< 0.0853 u	< 0.0856 u
Benzo(a)pyrene	1.12E+00	(1)	2.36E+01	(4)	< 0.74 u	< 0.0753 u	< 0.0758 u	< 0.0751 u	< 0.0755 u	< 0.0744 u	< 0.0751 u	< 0.0733 u	< 0.0752 u	< 0.0753 u	< 0.0754 u	< 0.0736 u	< 0.0762 u	< 0.0752 u	< 0.7572 u	< 0.0756 u	< 0.0761 u	< 0.075 u	< 0.0753 u
Benzo(b)fluoranthene	1.53E+00	(1)	3.23E+01	(4)	< 0.8826 u	< 0.0899 u	< 0.0904 u	< 0.0896 u	< 0.0901 u	< 0.0887 u	< 0.0895 u	< 0.0875 u	< 0.0897 u	< 0.0898 u	< 0.0899 u	< 0.0877 u	< 0.0908 u	< 0.0897 u	< 0.9032 u	< 0.0902 u	< 0.0907 u	< 0.0895 u	< 0.0898 u
Benzo(g,h,i)perylene	-	-	-	-	< 0.8617 u	< 0.0877 u	< 0.0882 u	< 0.0875 u	< 0.0879 u	< 0.0866 u	< 0.0874 u	< 0.0854 u	< 0.0876 u	< 0.0877 u	< 0.0878 u	< 0.0857 u	< 0.0887 u	< 0.0875 u	< 0.8818 u	< 0.0881 u	< 0.0886 u	< 0.0873 u	< 0.0877 u
Benzo(k)fluoranthene	1.53E+01	(1)	3.23E+02	(4)	< 0.8609 u	< 0.0877 u	< 0.0882 u	< 0.0874 u	< 0.0879 u	< 0.0866 u	< 0.0873 u	< 0.0853 u	< 0.0875 u	< 0.0876 u	< 0.0877 u	< 0.0856 u	< 0.0886 u	< 0.0875 u	< 0.881 u	< 0.088 u	< 0.0885 u	< 0.0873 u	< 0.0876 u
Benzoic acid	2.50E+05	(2)	3.30E+06	(6)	2.1 J	< 0.0825 u	< 0.083 u	< 0.0823 u	< 0.0827 u	< 0.0815 u	< 0.0822 u	0.081 J	< 0.0824 u	< 0.0825 u	0.11 J	< 0.0805 u	< 0.0834 u	< 0.0823 u	2 J	< 0.0828 u	0.17 J	< 0.0821 u	0.13 J
Benzyl alcohol	6.30E+03	(2)	8.20E+04	(6)	< 0.765 u	< 0.0779 u	< 0.0783 u	< 0.0777 u	< 0.0781 u	< 0.0769 u	< 0.0776 u	< 0.0758 u	< 0.0778 u	< 0.0779 u	< 0.0779 u	< 0.0761 u	< 0.0787 u	< 0.0777 u	< 0.7828 u	< 0.0782 u	< 0.0786 u	< 0.0775 u	< 0.0778 u
Bis(2-chloroethoxy)methane	1.90E+02	(2)	2.50E+03	(6)	< 1.0604 u	< 0.108 u	< 0.1086 u	< 0.1077 u	< 0.1082 u	< 0.1066 u	< 0.1076 u	< 0.1051 u	< 0.1078 u	< 0.1079 u	< 0.108 u	< 0.1054 u	< 0.1091 u	< 0.1077 u	< 1.0851 u	< 0.1084 u	< 0.109 u	< 0.1075 u	< 0.1079 u
Bis(2-chloroethyl)ether	3.10E+00	(1)	1.93E+00	(5)	< 0.718 u	< 0.0731 u	< 0.0735 u	< 0.0729 u	< 0.0733 u	< 0.0722 u	< 0.0728 u	< 0.0712 u	< 0.073 u	< 0.0731 u	< 0.0732 u	< 0.0714 u	< 0.0739 u	< 0.0729 u	< 0.7348 u	< 0.0734 u	< 0.0738 u	< 0.0728 u	< 0.073 u
Bis(2-chloroisopropyl)ether	9.93E+01	(1)	5.19E+02	(4)	< 0.8725 u	< 0.0888 u	< 0.0894 u	< 0.0886 u	< 0.0891 u	< 0.0877 u	< 0.0885 u	< 0.0865 u	< 0.0887 u	< 0.0888 u	< 0.0889 u	< 0.0867 u	< 0.0898 u	< 0.0886 u	< 0.8929 u	< 0.0892 u	< 0.0897 u	< 0.0884 u	< 0.0888 u
Bis(2-ethylhexyl)phthalate	3.80E+02	(1)	1.83E+03	(4)	< 0.7962 u	0.12 J	0.14 J	< 0.0809 u	0.1 J	0.12 J	0.13 J	< 0.0789 u	0.096 J	0.14 J	0.12 J	0.1 J	0.096 J	0.11 J	< 0.8148 u	0.12 J	0.11 J	0.14 J	0.12 J
Butyl benzyl phthalate	2.90E+03	(3)	1.20E+04	(7)	< 0.8651 u	< 0.0881 u	< 0.0886 u	< 0.0879 u	< 0.0883 u	< 0.087 u	< 0.0878 u	< 0.0857 u	< 0.088 u	< 0.0881 u	< 0.0882 u	< 0.086 u	< 0.089 u	< 0.0879 u	< 0.8853 u	< 0.0884 u	< 0.0889 u	< 0.0877 u	< 0.088 u
Carbazole	-	-	-	-	< 0.6599 u	< 0.0672 u	< 0.0676 u	< 0.067 u	< 0.0674 u	< 0.0664 u	< 0.067 u	< 0.0654 u	< 0.0671 u	< 0.0672 u	< 0.0672 u	< 0.0656 u	< 0.0679 u	< 0.067 u	< 0.6753 u	< 0.0675 u	< 0.0678 u	< 0.0669 u	< 0.0671 u
Chrysene	1.53E+02	(1)	3.23E+03	(4)	< 0.8321 u	< 0.0847 u	< 0.0852 u	< 0.0845 u	< 0.0849 u	< 0.0837 u	< 0.0844 u	< 0.0825 u	< 0.0846 u	< 0.0847 u	< 0.0848 u	< 0.0827 u	< 0.0856 u	< 0.0845 u	< 0.8516 u	< 0.0851 u	< 0.0855 u	< 0.0843 u	< 0.0846 u

Table 7 - Soil Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	TK-568-1 (12-14')		TK-568-1 (30-32')		TK-568-1 (48-49')		TK 568-2 (22-24')		TK 568-2 (28-30')		TK 568-2 (36-37')		TK569-1(18-20')		TK569-1(24-26')		TK569-1(36-38')	
					1609E26-008		1609E26-009		1609E26-010		1609G64-001		1609G64-002		1609G64-003		1610238-004		1610238-005		1610238-006	
					9/23/2016		9/23/2016		9/23/2016		9/27/2016		9/27/2016		9/27/2016		10/4/2016		10/4/2016		10/4/2016	
Dibenz(a,h)anthracene	1.53E-01	(1)	3.23E+00	(4)	< 0.7902	u	< 0.0805	u	< 0.0809	u	< 0.0802	u	< 0.0806	u	< 0.0795	u	< 0.0802	u	< 0.0783	u	< 0.0804	u
Dibenzofuran	-	-	-	-	< 0.9829	u	< 0.1001	u	< 0.1006	u	< 0.0998	u	< 0.1003	u	< 0.0988	u	< 0.0997	u	< 0.0974	u	< 0.0999	u
Diethyl phthalate	4.93E+04	(1)	2.15E+05	(5)	< 0.991	u	0.16	J	0.16	J	< 0.1006	u	0.12	J	0.14	J	0.13	J	< 0.0982	u	< 0.1008	u
Dimethyl phthalate	6.16E+04	(1)	2.69E+05	(5)	< 0.9559	u	< 0.0973	u	< 0.0979	u	< 0.0971	u	< 0.0976	u	< 0.0961	u	< 0.097	u	< 0.0947	u	< 0.0972	u
Di-n-butyl phthalate	6.16E+03	(1)	2.69E+04	(5)	< 0.7307	u	0.15	J	0.2	J	0.094	J	0.12	J	0.14	J	0.24	J	0.18	J	0.087	J
Di-n-octyl phthalate	-	-	-	-	< 0.8336	u	< 0.0849	u	< 0.0854	u	< 0.0847	u	< 0.0851	u	< 0.0838	u	< 0.0846	u	< 0.0826	u	< 0.0848	u
Fluoranthene	2.32E+03	(1)	1.00E+04	(5)	< 0.5629	u	< 0.0573	u	< 0.0576	u	< 0.0572	u	< 0.0574	u	< 0.0566	u	< 0.0571	u	< 0.0558	u	< 0.0572	u
Fluorene	2.32E+03	(1)	1.00E+04	(5)	< 0.8945	u	< 0.0911	u	< 0.0916	u	< 0.0908	u	< 0.0913	u	< 0.0899	u	< 0.0907	u	< 0.0886	u	< 0.091	u
Hexachlorobenzene	3.33E+00	(1)	1.60E+01	(4)	< 0.7705	u	< 0.0785	u	< 0.0789	u	< 0.0783	u	< 0.0786	u	< 0.0775	u	< 0.0782	u	< 0.0764	u	< 0.0784	u
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 1.1012	u	< 0.1121	u	< 0.1128	u	< 0.1118	u	< 0.1124	u	< 0.1107	u	< 0.1117	u	< 0.1091	u	< 0.112	u
Hexachlorocyclopentadiene	2.28E+00	(1)	8.67E+02	(5)	< 1.1173	u	< 0.1138	u	< 0.1144	u	< 0.1135	u	< 0.114	u	< 0.1123	u	< 0.1134	u	< 0.1107	u	< 0.1136	u
Hexachloroethane	4.31E+01	(1)	1.88E+02	(5)	< 0.8395	u	< 0.0855	u	< 0.086	u	< 0.0853	u	< 0.0857	u	< 0.0844	u	< 0.0852	u	< 0.0832	u	< 0.0854	u
Indeno(1,2,3-cd)pyrene	1.53E+00	(1)	3.23E+01	(4)	< 0.7631	u	< 0.0777	u	< 0.0781	u	< 0.0775	u	< 0.0779	u	< 0.0767	u	< 0.0774	u	< 0.0756	u	< 0.0776	u
Isophorone	5.61E+03	(1)	2.70E+04		< 1.0804	u	< 0.11	u	< 0.1106	u	< 0.1097	u	< 0.1103	u	< 0.1086	u	< 0.1096	u	< 0.1071	u	< 0.1099	u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	4.2	Z	< 0.0955	u	< 0.0961	u	< 0.0953	u	1.4	v	< 0.0943	u	< 0.0952	u	< 0.093	u	< 0.0954	u
Nitrobenzene	5.99E+01	(1)	2.91E+02	(4)	< 1.0084	u	< 0.1027	u	< 0.1033	u	< 0.1024	u	< 0.1029	u	< 0.1014	u	< 0.1023	u	< 0.0999	u	< 0.1025	u
N-Nitrosodi-n-propylamine	7.80E-01	(3)	3.30E+00	(7)	< 0.9391	u	< 0.0956	u	< 0.0962	u	< 0.0954	u	< 0.0959	u	< 0.0944	u	< 0.0953	u	< 0.0931	u	< 0.0955	u
N-Nitrosodiphenylamine	1.09E+03	(1)	5.24E+03	(4)	< 0.9543	u	< 0.0972	u	< 0.0977	u	< 0.0969	u	< 0.0974	u	< 0.096	u	< 0.0968	u	< 0.0946	u	< 0.097	u
Pentachlorophenol	9.85E+00	(1)	4.45E+01	(4)	< 0.628	u	< 0.064	u	< 0.0643	u	< 0.0638	u	< 0.0641	u	< 0.0632	u	< 0.0637	u	< 0.0622	u	< 0.0639	u
Phenanthrene	1.74E+03	(1)	7.53E+03	(5)	< 0.6638	u	< 0.0676	u	< 0.068	u	< 0.0674	u	0.07	J	< 0.0668	u	< 0.0673	u	< 0.0658	u	< 0.0675	u
Phenol	1.85E+04	(1)	7.74E+04	(5)	< 0.736	u	< 0.0749	u	< 0.0754	u	< 0.0747	u	0.14	J	< 0.074	u	< 0.0747	u	< 0.0729	u	< 0.0748	u
Pyrene	1.74E+03	(1)	7.53E+03	(5)	< 0.7385	u	< 0.0752	u	< 0.0756	u	< 0.075	u	< 0.0754	u	< 0.0743	u	< 0.0749	u	< 0.0732	u	< 0.0751	u
Pyridine	7.80E+01	(2)	1.20E+03	(6)	< 0.7746	u	< 0.0789	u	< 0.0793	u	< 0.0787	u	< 0.0791	u	< 0.0779	u	< 0.0786	u	< 0.0768	u	< 0.0788	u
Total Petroleum Hydrocarbons (mg/kg)																						
Gasoline Range Organics (GRO)	1.00E+03	(8)	3.80E+03	(8)	**2700**	v	330	v	1.3	J	< 0.48	u	740	v	< 0.4837	u	< 0.6286	u	190	v	140	v
Diesel Range Organics (DRO)	1.00E+03	(8)	3.80E+03	(8)	300	v	11	v	8.4	J	< 1.8137	u	300	v	2.4	J	5.2	J	15	v	61	v
Motor Oil Range Organics (MRO)	1.00E+03	(8)	3.80E+03	(8)	< 487	u	< 48	u	< 49	u	< 49	u	< 46	u	< 49	u	< 50	u	< 48	u	< 48	u

	TK569-1(40-42')		TK569-2(16-18')		TK569-2(29-31')		TK569-2(36-38')		TK 569-3 (16-18')		TK 569-3 (24-26')		TK 569-3 (38-39')		TK 570-1 (10-12')		TK 570-1 (32-34')		TK 570-1 (44-45')	
	1610238-007		1610238-001		1610238-002		1610238-003		1609G64-008		1609G64-009		1609G64-010		1609G64-005		1609G64-006		1609G64-007	
	10/4/2016		10/4/2016		10/4/2016		10/4/2016		9/28/2016		9/28/2016		9/28/2016		9/27/2016		9/27/2016		9/27/2016	
Dibenz(a,h)anthracene	< 0.0804	u	< 0.0805	u	< 0.0786	u	< 0.0813	u	< 0.0803	u	< 0.8086	u	< 0.0808	u	< 0.0812	u	< 0.0801	u	< 0.0804	u
Dibenzofuran	< 0.1	u	< 0.1001	u	< 0.0977	u	< 0.1012	u	< 0.0998	u	< 1.0058	u	< 0.1005	u	< 0.101	u	< 0.0996	u	< 0.1	u
Diethyl phthalate	0.12	J	0.13	J	0.12	J	0.13	J	0.12	J	< 1.0141	u	0.17	J	0.11	J	0.15	J	0.17	J
Dimethyl phthalate	< 0.0973	u	< 0.0974	u	< 0.095	u	< 0.0984	u	< 0.0971	u	< 0.9782	u	< 0.0977	u	< 0.0983	u	< 0.0969	u	< 0.0972	u
Di-n-butyl phthalate	0.27	J	0.27	J	0.21	J	0.1	J	0.22	J	< 0.7478	u	0.23	J	0.13	J	0.24	J	0.24	J
Di-n-octyl phthalate	< 0.0849	u	< 0.0849	u	< 0.0829	u	< 0.0858	u	< 0.0847	u	< 0.8531	u	< 0.0852	u	< 0.0857	u	< 0.0845	u	< 0.0848	u
Fluoranthene	< 0.0573	u	< 0.0574	u	< 0.056	u	< 0.0579	u	< 0.0572	u	< 0.576	u	< 0.0575	u	< 0.0579	u	< 0.057	u	< 0.0573	u
Fluorene	< 0.091	u	< 0.0911	u	< 0.0889	u	< 0.0921	u	< 0.0909	u	< 0.9153	u	< 0.0914	u	< 0.0919	u	< 0.0907	u	< 0.091	u
Hexachlorobenzene	< 0.0784	u	< 0.0785	u	< 0.0766	u	< 0.0793	u	< 0.0783	u	< 0.7885	u	< 0.0788	u	< 0.0792	u	< 0.0781	u	< 0.0784	u
Hexachlorobutadiene	< 0.1121	u	< 0.1122	u	< 0.1095	u	< 0.1133	u	< 0.1119	u	< 1.127	u	< 0.1126	u	< 0.1132	u	< 0.1116	u	< 0.112	u
Hexachlorocyclopentadiene	< 0.1137	u	< 0.1138	u	< 0.1111	u	< 0.115	u	< 0.1135	u	< 1.1433	u	< 0.1142	u	< 0.1148	u	< 0.1132	u	< 0.1137	u
Hexachloroethane	< 0.0855	u	< 0.0855	u	< 0.0835	u	< 0.0864	u	< 0.0853	u	< 0.8591	u	< 0.0858	u	< 0.0863	u	< 0.0851	u	< 0.0854	u
Indeno(1,2,3-cd)pyrene	< 0.0777	u	< 0.0778	u	< 0.0759	u	< 0.0785	u	< 0.0775	u	< 0.7809	u	< 0.078	u	< 0.0784	u	< 0.0773	u	< 0.0776	u
Isophorone	< 0.11	u	< 0.1101	u	< 0.1074	u	< 0.1112	u	< 0.1098	u	< 1.1056	u	< 0.1104	u	< 0.111	u	< 0.1095	u	< 0.1099	u
Naphthalene	< 0.0955	u	0.17	J	0.12	J	< 0.0966	u	< 0.0953	u	1.2	J	< 0.0959	u	0.52	v	3.6	v	< 0.0954	u
Nitrobenzene	< 0.1027	u	< 0.1028	u	< 0.1003	u	< 0.1038	u	< 0.1024	u	< 1.032	u	< 0.1031	u	< 0.1036	u	< 0.1022	u	< 0.1026	u
N-Nitrosodi-n-propylamine	< 0.0956	u	< 0.0957	u	< 0.0934	u	< 0.0967	u	< 0.0954	u	< 0.9611	u	< 0.096	u	< 0.0965	u	< 0.0952	u	< 0.0955	u
N-Nitrosodiphenylamine	< 0.0971	u	< 0.0972	u	< 0.0949	u	< 0.0982	u	< 0.0969	u	< 0.9766	u	< 0.0976	u	< 0.0981	u	< 0.0967	u	< 0.0971	u
Pentachlorophenol	< 0.0639	u	< 0.064	u	< 0.0624	u	< 0.0646	u	< 0.0638	u	< 0.6427	u	< 0.0642	u	< 0.0646	u	< 0.0637	u	< 0.0639	u
Phenanthrene	< 0.0676	u	< 0.0676	u	< 0.066	u	< 0.0683	u	< 0.0674	u	< 0.6793	u	< 0.0679	u	< 0.0682	u	< 0.0673	u	< 0.0675	u
Phenol	< 0.0749	u	< 0.075	u	0.13	J	< 0.0757	u	< 0.0748	u	< 0.7532	u	< 0.0752	u	< 0.0756	u	0.44	v	< 0.0749	u
Pyrene	< 0.0752	u	< 0.0752	u	< 0.0734	u	< 0.076	u	< 0.075	u	< 0.7557	u	< 0.0755	u	< 0.0759	u	< 0.0748	u	< 0.0751	u
Pyridine	< 0.0788	u	< 0.0789	u	< 0.077	u	< 0.0797	u	< 0.0787	u	< 0.7927	u	< 0.0792	u	< 0.0796	u	< 0.0785	u	< 0.0788	u
Total Petroleum Hydrocarbons (mg/kg)																				
Gasoline Range Organics (GRO)	13	v	31	v	450	v	2.9	J	2.7	J	**13000**	v	27	v	540	v	**2500**	v	170	v
Diesel Range Organics (DRO)	19	v	17	v	13	v	4.4	J	1.7	J	**1500**	v	5.3	J	52	v	350	v	23	v
Motor Oil Range Organics (MRO)	< 48	u	< 48	u	< 48	u	< 48	u	< 47	u	< 502	u	< 47	u	< 49	u	< 467	u	< 50	u

- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (March 2017)

EPA - Regional Screening Levels (June 2017)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels

(7) EPA Industrial - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(8) NMED Table 6-2 TPH Soil Screening Levels "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Residential Soil Screening Level
Yellow highlight represents value above Non-Residential Soil Screening Level
Bold with yellow highlight value exceeds Residential Soil Screening Level and Non-Residential Soil Screening Level

v = reportable detection above the Practical quantitation limit (PQL)

u - result is not detected at method detection limit (MDL)

j - estimated result at concentration above MDL but less than PQL

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	OW-57 (16-18')		OW-57 (25-27')		OW-58 (10-12)		OW-58 (22-24')		OW-58 (28-29')		OW-58 (48-48.5')	
					1609E26-001		1609E26-002		1609E26-004		1609E26-005		1609E26-006		1609E26-007	
					9/21/2016		9/21/2016		9/22/2016		9/22/2016		9/22/2016		9/22/2016	
Metals (mg/kg)																
Antimony	3.13E+01	(1)	1.42E+02	(5)	< 0.9801	u	< 0.985	u	< 1.0176	u	< 0.9768	u	< 0.992	u	< 1.0049	u
Arsenic	7.07E+00	(1)	3.59E+01	(4)	1.8	J	2.8	v	2.2	J	2	J	2.7	v	1.8	J
Barium	1.56E+04	(1)	4.39E+03	(5)	180	v	1200	v	320	v	160	v	360	v	45	v
Beryllium	1.56E+02	(1)	1.48E+02	(5)	0.52	v	0.83	v	0.88	v	1.1	v	0.66	v	0.58	v
Cadmium	7.05E+01	(1)	7.21E+01	(5)	< 0.0618	u	< 0.0621	u	< 0.0641	u	< 0.0616	u	< 0.0625	u	< 0.0633	u
Chromium	9.66E+01	(1)	1.34E+02	(5)	8.8	v	9.4	v	10	v	13	v	9.4	v	7.3	v
Cobalt	2.34E+01	(1)	3.67E+01	(5)	4	v	3.4	v	4.1	v	4.7	v	4.4	v	3.7	v
Cyanide	1.11E+01	(1)	1.20E+01	(5)	< 0.25	u	< 0.25	u	< 0.25	u	< 0.25	u	< 0.25	u	< 0.25	u
Iron	5.48E+04	(1)	2.48E+05	(5)	12000	v	15000	v	15000	v	18000	v	14000	v	11000	v
Lead	-	(2)	8.00E+02	(6)	2.8	v	2.8	v	2.8	v	2.6	v	3.8	v	1.5	v
Manganese	1.05E+04	(1)	4.64E+02	(5)	510	v	1700	v	270	v	280	v	180	v	97	v
Mercury	2.36E+01	(1)	2.05E+01	(5)	0.0055	J	0.0026	J	0.0038	J	0.0056	J	0.0047	J	0.0014	J
Nickel	1.56E+03	(1)	7.53E+02	(5)	6.3	v	7.9	v	7.6	v	9.2	v	7.1	v	6.1	v
Selenium	3.91E+02	(1)	1.75E+03	(5)	< 1.7721	u	< 1.781	u	< 1.8398	u	< 1.7661	u	< 1.7936	u	< 1.8169	u
Silver	3.91E+02	(1)	1.77E+03	(5)	< 0.061	u	< 0.0613	u	< 0.0633	u	< 0.0608	u	< 0.0617	u	< 0.0625	u
Vanadium	3.94E+02	(1)	6.14E+02	(5)	17	v	23	v	18	v	19	v	21	v	14	v
Zinc	2.35E+04	(1)	1.06E+05	(5)	15	v	9.6	v	13	v	16	v	19	v	17	v
Volatiles (mg/kg)																
1,1,1,2-Tetrachloroethane	2.78E+01	(1)	1.36E+02	(4)	< 0.0031	u	<0.0019	u	< 0.0024	u	< 0.0662	u	< 0.0509	u	< 0.0151	u
1,1,1-Trichloroethane	1.43E+04	(1)	1.35E+04	(5)	< 0.002	u	<0.0019	u	< 0.0016	u	< 0.0422	u	< 0.0325	u	< 0.0097	u
1,1,2,2-Tetrachloroethane	7.93E+00	(1)	3.91E+01	(4)	< 0.0052	u	<0.0019	u	< 0.0041	u	< 0.1121	u	< 0.0862	u	< 0.0256	u
1,1,2-Trichloroethane	2.59E+00	(1)	2.28E+00	(5)	< 0.0038	u	<0.0019	u	< 0.003	u	< 0.0815	u	< 0.0627	u	< 0.0186	u
1,1-Dichloroethane	7.79E+01	(1)	3.80E+02	(4)	< 0.0017	u	<0.0019	u	< 0.0014	u	< 0.0374	u	< 0.0288	u	< 0.0086	u
1,1-Dichloroethene	4.36E+02	(1)	4.20E+02	(5)	< 0.0105	u	<0.0003	u	< 0.0084	u	< 0.2266	u	< 0.1743	u	< 0.0518	u
1,1-Dichloropropene	-	-	-	-	< 0.0025	u	<0.0019	u	< 0.002	u	< 0.0549	u	< 0.0422	u	< 0.0125	u
1,2,3-Trichlorobenzene	6.30E+01	(2)	9.30E+02	(6)	< 0.0048	u	<0.0005	u	< 0.0038	u	< 0.1035	u	< 0.0796	u	< 0.0237	u
1,2,3-Trichloropropane	5.10E-02	(1)	1.21E+00	(4)	< 0.0055	u	<0.0019	u	< 0.0044	u	< 0.1197	u	< 0.092	u	< 0.0274	u
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 0.0034	u	<0.0006	u	< 0.0027	u	< 0.074	u	< 0.0569	u	< 0.0169	u
1,2,4-Trimethylbenzene	3.00E+02	(2)	1.80E+03	(6)	< 0.0024	u	<0.0003	u	< 0.0019	u	23	v	30	v	1.4	v
1,2-Dibromo-3-chloropropane	8.51E-02	(1)	1.17E+00	(4)	< 0.0098	u	<0.0002	u	< 0.0078	u	< 0.2119	u	< 0.163	u	< 0.0485	u
1,2-Dibromoethane (EDB)	6.68E-01	(1)	3.28E+00	(4)	< 0.0023	u	<0.0019	u	< 0.0018	u	< 0.0492	u	< 0.0378	u	< 0.0113	u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.0028	u	<0.0003	u	< 0.0022	u	< 0.0604	u	< 0.0464	u	< 0.0138	u
1,2-Dichloroethane (EDC)	8.25E+00	(1)	4.03E+01	(4)	< 0.0083	u	<0.0019	u	< 0.0067	u	< 0.1804	u	< 0.1387	u	< 0.0412	u
1,2-Dichloropropane	1.76E+01	(1)	2.52E+01	(5)	< 0.0027	u	<0.0019	u	< 0.0021	u	< 0.058	u	< 0.0446	u	< 0.0133	u
1,3,5-Trimethylbenzene	2.70E+02	(2)	1.50E+03	(6)	< 0.0023	u	<0.0003	u	< 0.0019	u	7.7	v	9.9	v	0.5	v
1,3-Dichlorobenzene	-	-	-	-	< 0.0026	u	<0.0003	u	< 0.0021	u	< 0.0567	u	< 0.0436	u	< 0.013	u
1,3-Dichloropropane	1.60E+03	(2)	2.30E+04	(6)	< 0.0036	u	<0.0019	u	< 0.0029	u	< 0.0785	u	< 0.0604	u	< 0.0179	u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.004	u	<0.0004	u	< 0.0032	u	< 0.0857	u	< 0.0659	u	< 0.0196	u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	< 0.0071	u	0.0003	J	< 0.0057	u	2.8	v	1.6	J	0.083	J
2,2-Dichloropropane	-	-	-	-	< 0.0018	u	<0.0002	u	< 0.0015	u	< 0.0396	u	< 0.0305	u	< 0.0091	u
2-Butanone	3.73E+04	(1)	9.12E+04	(5)	< 0.0183	u	0.0023	J	0.055	J	< 0.3953	u	< 0.3041	u	< 0.0904	u
2-Chlorotoluene	1.56E+03	(1)	7.08E+03	(5)	< 0.0024	u	<0.0003	u	< 0.0019	u	< 0.051	u	< 0.0393	u	< 0.0117	u
2-Hexanone	2.00E+02	(2)	1.30E+03	(6)	< 0.0174	u	<0.0005	u	< 0.0139	u	< 0.3765	u	< 0.2895	u	< 0.0861	u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	< 0.0068	u	<0.0005	u	< 0.0055	u	4.9	v	3.2	v	0.14	J
4-Chlorotoluene	1.60E+03	(2)	2.30E+04	(6)	< 0.0028	u	<0.0003	u	< 0.0023	u	< 0.0612	u	< 0.0471	u	< 0.014	u
4-Isopropyltoluene	-	-	-	-	< 0.0029	u	<0.0004	u	< 0.0023	u	0.24	J	0.27	J	0.048	J
4-Methyl-2-pentanone	5.81E+03	(1)	2.02E+04	(5)	< 0.0093	u	<0.0037	u	< 0.0074	u	< 0.2016	u	< 0.1551	u	< 0.0461	u
Acetone	6.63E+04	(1)	2.41E+05	(5)	< 0.0414	u	0.0191	v	0.65	v	< 0.8951	u	< 0.6884	u	< 0.2047	u
Benzene	1.77E+01	(1)	8.65E+01	(4)	0.076	v	0.0147	v	0.068	v	7.3	v	16	v	0.077	J
Bromobenzene	2.90E+02	(2)	1.80E+03	(6)	< 0.0026	u	<0.0002	u	< 0.0021	u	< 0.0558	u	< 0.0429	u	< 0.0128	u
Bromodichloromethane	6.14E+00	(1)	2.99E+01	(4)	< 0.0019	u	<0.0019	u	< 0.0015	u	< 0.0403	u	< 0.031	u	< 0.0092	u
Bromoform	6.74E+02	(1)	1.75E+03	(4)	< 0.0039	u	<0.0019	u	< 0.0031	u	< 0.0843	u	< 0.0648	u	< 0.0193	u
Bromomethane	1.76E+01	(1)	1.77E+01	(5)	0.016	J	<0.0003	u	< 0.0094	u	< 0.2549	u	< 0.196	u	< 0.0583	u
Carbon disulfide	1.54E+03	(1)	1.61E+03	(5)	< 0.0106	u	<0.0007	u	< 0.0084	u	< 0.2284	u	< 0.1757	u	< 0.0522	u
Carbon tetrachloride	1.06E+01	(1)	5.21E+01	(4)	< 0.0021	u	<0.0019	u	< 0.0017	u	< 0.0454	u	< 0.0349	u	< 0.0104	u
Chlorobenzene	3.76E+02	(1)	4.08E+02	(5)	< 0.0026	u	<0.0002	u	< 0.0021	u	< 0.0563	u	< 0.0433	u	< 0.0129	u
Chloroethane	1.88E+04	(1)	1.65E+04	(5)	< 0.0064	u	<0.0003	u	< 0.0051	u	< 0.1381	u	< 0.1062	u	< 0.0316	u
Chloroform	5.85E+00	(1)	2.84E+01	(4)	< 0.0024	u	<0.0019	u	< 0.0019	u	< 0.0522	u	< 0.0401	u	< 0.0119	u
Chloromethane	4.08E+01	(1)	1.99E+02	(4)	< 0.0028	u	<0.0005	u	0.0085	J	< 0.0616	u	< 0.0474	u	< 0.0141	u
cis-1,2-DCE	1.56E+02	(1)	7.08E+02	(5)	< 0.0019	u	<0.0019	u	< 0.0015	u	< 0.0402	u	< 0.0309	u	< 0.0092	u
cis-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.0029	u	<0.0019	u	< 0.0024	u	< 0.0638	u	< 0.0491	u	< 0.0146	u
Dibromochloromethane	1.38E+01	(1)	6.69E+01	(4)	< 0.0029	u	<0.0019	u	< 0.0023	u	< 0.0625	u	< 0.0481	u	< 0.0143	u
Dibromomethane	5.74E+01	(1)	5.34E+01	(5)	< 0.0028	u	<0.0019	u	< 0.0022	u	< 0.0599	u	< 0.0461	u	< 0.0137	u
Dichlorodifluoromethane	1.80E+02	(1)	1.59E+02	(5)	< 0.0099	u	<0.0011	u	< 0.0079	u	< 0.2141	u	< 0.1646	u	< 0.0489	u
Ethylbenzene	7.45E+01	(1)	3.65E+02	(4)	< 0.0026	u	<0.0003	u	< 0.0021	u	9.3	v	15	v	0.51	v

Table 7 - Soil Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	OW-57 (16-18')		OW-57 (25-27')		OW-58 (10-12)		OW-58 (22-24')		OW-58 (28-29')		OW-58 (48-48.5')	
					1609E26-001		1609E26-002		1609E26-004		1609E26-005		1609E26-006		1609E26-007	
					9/21/2016		9/21/2016		9/22/2016		9/22/2016		9/22/2016		9/22/2016	
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 0.0039	u	<0.0004	u	< 0.0031	u	< 0.0846	u	< 0.0651	u	< 0.0193	u
Isopropylbenzene	2.35E+03	(1)	2.71E+03	(5)	< 0.0027	u	<0.0002	u	< 0.0022	u	0.57	J	0.82	v	0.09	J
Methyl tert-butyl ether (MTBE)	9.68E+02	(1)	4.78E+03	(4)	< 0.01	u	0.0008	J	< 0.008	u	< 0.2174	u	0.39	J	< 0.0497	u
Methylene chloride	4.09E+02	(1)	1.20E+03	(5)	< 0.0092	u	<0.0019	u	0.01	J	< 0.1995	u	< 0.1534	u	< 0.0456	u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	< 0.005	u	<0.0019	u	< 0.004	u	3	v	3.6	v	0.085	J
n-Butylbenzene	3.90E+03	(2)	5.80E+04	(6)	< 0.0028	u	<0.0005	u	< 0.0023	u	1.4	J	1.3	J	0.11	J
n-Propylbenzene	3.80E+03	(2)	2.40E+04	(6)	< 0.0025	u	<0.0003	u	< 0.002	u	3.4	v	4.7	v	0.28	v
sec-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	< 0.0044	u	<0.0003	u	< 0.0035	u	0.43	J	0.48	J	0.091	J
Styrene	7.23E+03	(1)	1.01E+04	(5)	< 0.0029	u	<0.0002	u	< 0.0023	u	< 0.0618	u	< 0.0475	u	< 0.0141	u
tert-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	< 0.0026	u	<0.0003	u	< 0.0021	u	< 0.0574	u	< 0.0441	u	< 0.0131	u
Tetrachloroethene (PCE)	1.10E+02	(1)	1.19E+02	(5)	< 0.0027	u	<0.0002	u	< 0.0021	u	< 0.0574	u	< 0.0441	u	< 0.0131	u
Toluene	5.22E+03	(1)	1.40E+04	(5)	< 0.0019	u	<0.0002	u	< 0.0015	u	45	v	77	v	1.1	v
trans-1,2-DCE	2.93E+02	(1)	3.03E+02	(5)	< 0.0089	u	<0.0002	u	< 0.0071	u	< 0.1937	u	< 0.1489	u	< 0.0443	u
trans-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.0047	u	<0.0002	u	< 0.0037	u	< 0.1013	u	< 0.0779	u	< 0.0232	u
Trichloroethene (TCE)	6.72E+00	(1)	6.84E+00	(5)	< 0.0034	u	<0.0019	u	< 0.0027	u	< 0.0742	u	< 0.057	u	< 0.017	u
Trichlorofluoromethane	1.22E+03	(1)	1.12E+03	(5)	< 0.0024	u	<0.0002	u	< 0.0019	u	< 0.0517	u	< 0.0398	u	< 0.0118	u
Vinyl chloride	7.41E-01	(1)	2.83E+01	(4)	< 0.0026	u	<0.0005	u	< 0.0021	u	< 0.0566	u	< 0.0435	u	< 0.0129	u
Xylenes, Total	8.63E+02	(1)	7.91E+02	(5)	< 0.0061	u	<0.0007	u	0.0063	J	55	v	92	v	3.1	v
Semi-volatiles (mg/kg)																
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 0.1085	u	< 0.1062	u	< 0.1074	u	< 0.1078	u	< 0.1078	u	< 0.1088	u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.0769	u	< 0.0752	u	< 0.076	u	< 0.0763	u	< 0.0763	u	< 0.077	u
1,3-Dichlorobenzene	-	-	-	-	< 0.0776	u	< 0.0759	u	< 0.0767	u	< 0.077	u	< 0.077	u	< 0.0777	u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.0848	u	< 0.083	u	< 0.0839	u	< 0.0843	u	< 0.0842	u	< 0.085	u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	< 0.1008	u	< 0.0986	u	< 0.0997	u	0.12	J	1.2	v	< 0.101	u
2,4,5-Trichlorophenol	6.16E+03	(1)	2.69E+04	(5)	< 0.1004	u	< 0.0982	u	< 0.0993	u	< 0.0998	u	< 0.0997	u	< 0.1006	u
2,4,6-Trichlorophenol	6.16E+01	(1)	2.69E+02	(5)	< 0.0832	u	< 0.0814	u	< 0.0823	u	< 0.0827	u	< 0.0826	u	< 0.0834	u
2,4-Dichlorophenol	1.85E+02	(1)	8.07E+02	(5)	< 0.0936	u	< 0.0916	u	< 0.0926	u	< 0.093	u	< 0.0929	u	< 0.0938	u
2,4-Dimethylphenol	1.23E+03	(1)	5.38E+03	(5)	< 0.109	u	< 0.1066	u	< 0.1078	u	< 0.1082	u	0.19	J	< 0.1092	u
2,4-Dinitrophenol	1.23E+02	(1)	5.38E+02	(5)	< 0.0666	u	< 0.0651	u	< 0.0658	u	< 0.0661	u	< 0.0661	u	< 0.0667	u
2,4-Dinitrotoluene	1.71E+01	(1)	8.23E+01	(4)	< 0.0896	u	< 0.0877	u	< 0.0886	u	< 0.089	u	< 0.089	u	< 0.0898	u
2,6-Dinitrotoluene	3.56E+00	(1)	1.72E+01	(4)	< 0.1062	u	< 0.1039	u	< 0.105	u	< 0.1055	u	< 0.1054	u	< 0.1064	u
2-Chloronaphthalene	6.26E+03	(1)	2.83E+04	(5)	< 0.079	u	< 0.0773	u	< 0.0781	u	< 0.0785	u	< 0.0784	u	< 0.0792	u
2-Chlorophenol	3.91E+02	(1)	1.77E+03	(5)	< 0.0791	u	< 0.0774	u	< 0.0782	u	< 0.0786	u	< 0.0785	u	< 0.0793	u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	< 0.1191	u	< 0.1165	u	< 0.1178	u	0.22	v	2.1	v	< 0.1193	u
'2-Methylphenol (cresol,o-)	3.20E+03	(2)	4.10E+04	(6)	< 0.0839	u	< 0.0821	u	< 0.083	u	< 0.0833	u	0.26	J	< 0.084	u
2-Nitroaniline	6.30E+02	(2)	8.00E+03	(6)	< 0.1081	u	< 0.1058	u	< 0.107	u	< 0.1074	u	< 0.1074	u	< 0.1084	u
2-Nitrophenol	-	-	-	-	< 0.0995	u	< 0.0974	u	< 0.0985	u	< 0.0989	u	< 0.0988	u	< 0.0997	u
3,3´-Dichlorobenzidine	1.18E+01	(1)	5.70E+01	(4)	< 0.0739	u	< 0.0723	u	< 0.0731	u	< 0.0734	u	< 0.0733	u	< 0.074	u
3+4-Methylphenol	-	-	-	-	< 0.0726	u	< 0.0711	u	< 0.0718	u	< 0.0722	u	0.26	v	< 0.0728	u
3-Nitroaniline	-	-	-	-	< 0.0885	u	< 0.0865	u	< 0.0875	u	< 0.0879	u	< 0.0878	u	< 0.0886	u
4,6-Dinitro-2-methylphenol	4.93E+00	(1)	2.15E+01	(5)	< 0.0607	u	< 0.0594	u	< 0.06	u	< 0.0603	u	< 0.0602	u	< 0.0608	u
4-Bromophenyl phenyl ether	-	-	-	-	< 0.0959	u	< 0.0939	u	< 0.0949	u	< 0.0953	u	< 0.0952	u	< 0.0961	u
4-Chloro-3-methylphenol	-	-	-	-	< 0.1197	u	< 0.1171	u	< 0.1184	u	< 0.1189	u	< 0.1188	u	< 0.12	u
4-Chloroaniline	2.70E+01	(3)	1.10E+02	(7)	< 0.1091	u	< 0.1067	u	< 0.1079	u	< 0.1084	u	< 0.1083	u	< 0.1093	u
4-Chlorophenyl phenyl ether	-	-	-	-	< 0.1146	u	< 0.1122	u	< 0.1134	u	< 0.1139	u	< 0.1138	u	< 0.1149	u
4-Nitroaniline	2.70E+02	(3)	1.10E+03	(7)	< 0.0707	u	< 0.0692	u	< 0.07	u	< 0.0703	u	< 0.0702	u	< 0.0709	u
4-Nitrophenol	-	-	-	-	< 0.0764	u	< 0.0748	u	< 0.0756	u	< 0.0759	u	< 0.0759	u	< 0.0766	u
Acenaphthene	3.48E+03	(1)	1.51E+04	(5)	< 0.086	u	< 0.0842	u	< 0.0851	u	< 0.0855	u	< 0.0854	u	< 0.0862	u
Acenaphthylene	-	-	-	-	< 0.0817	u	< 0.0799	u	< 0.0808	u	< 0.0811	u	< 0.0811	u	< 0.0818	u
Aniline	9.50E+02	(3)	4.00E+03	(7)	< 0.0948	u	< 0.0928	u	< 0.0938	u	< 0.0942	u	< 0.0941	u	< 0.095	u
Anthracene	1.74E+04	(1)	7.53E+04	(5)	< 0.0666	u	< 0.0652	u	< 0.0659	u	< 0.0662	u	< 0.0661	u	< 0.0667	u
Azobenzene	5.60E+01	(3)	2.60E+02	(7)	< 0.1223	u	< 0.1196	u	< 0.1209	u	< 0.1215	u	< 0.1214	u	< 0.1225	u
Benz(a)anthracene	1.53E+00	(1)	3.23E+01	(4)	< 0.0864	u	< 0.0845	u	< 0.0854	u	< 0.0858	u	< 0.0857	u	< 0.0865	u
Benzo(a)pyrene	1.12E+00	(1)	2.36E+01	(4)	< 0.076	u	< 0.0743	u	< 0.0751	u	< 0.0755	u	< 0.0754	u	< 0.0761	u
Benzo(b)fluoranthene	1.53E+00	(1)	3.23E+01	(4)	< 0.0906	u	< 0.0887	u	< 0.0896	u	< 0.09	u	< 0.09	u	< 0.0908	u
Benzo(g,h,i)perylene	-	-	-	-	< 0.0885	u	< 0.0866	u	< 0.0875	u	< 0.0879	u	< 0.0878	u	< 0.0887	u
Benzo(k)fluoranthene	1.53E+01	(1)	3.23E+02	(4)	< 0.0884	u	< 0.0865	u	< 0.0874	u	< 0.0878	u	< 0.0877	u	< 0.0886	u
Benzoic acid	2.50E+05	(2)	3.30E+06	(6)	< 0.0832	u	< 0.0814	u	< 0.0823	u	< 0.0826	u	< 0.0826	u	< 0.0834	u
Benzyl alcohol	6.30E+03	(2)	8.20E+04	(6)	< 0.0785	u	< 0.0768	u	< 0.0777	u	< 0.078	u	< 0.078	u	< 0.0787	u
Bis(2-chloroethoxy)methane	1.90E+02	(2)	2.50E+03	(6)	< 0.1089	u	< 0.1065	u	< 0.1077	u	< 0.1082	u	< 0.1081	u	< 0.1091	u
Bis(2-chloroethyl)ether	3.10E+00	(1)	1.93E+00	(5)	< 0.0737	u	< 0.0721	u	< 0.0729	u	< 0.0732	u	< 0.0732	u	< 0.0739	u
Bis(2-chloroisopropyl)ether	9.93E+01	(1)	5.19E+02	(4)	< 0.0896	u	< 0.0877	u	< 0.0886	u	< 0.089	u	< 0.0889	u	< 0.0898	u
Bis(2-ethylhexyl)phthalate	3.80E+02	(1)	1.83E+03	(4)	0.13	J	0.11	J	0.12	J	0.12	J	0.14	J	0.12	J
Butyl benzyl phthalate	2.90E+03	(3)	1.20E+04	(7)	< 0.0888	u	< 0.0869	u	< 0.0879	u	< 0.0882	u	< 0.0882	u	< 0.089	u
Carbazole	-	-	-	-	< 0.0678	u	< 0.0663	u	< 0.067	u	< 0.0673	u	< 0.0673	u	< 0.0679	u
Chrysene	1.53E+02	(1)	3.23E+03	(4)	< 0.0854	u	< 0.0836	u	< 0.0845	u	< 0.0849	u	< 0.0848	u	< 0.0856	u

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	OW-57 (16-18')		OW-57 (25-27')		OW-58 (10-12)		OW-58 (22-24')		OW-58 (28-29')		OW-58 (48-48.5')	
					1609E26-001		1609E26-002		1609E26-004		1609E26-005		1609E26-006		1609E26-007	
					9/21/2016		9/21/2016		9/22/2016		9/22/2016		9/22/2016		9/22/2016	
Dibenz(a,h)anthracene	1.53E-01	(1)	3.23E+00	(4)	< 0.0811	u	< 0.0794	u	< 0.0802	u	< 0.0806	u	< 0.0805	u	< 0.0813	u
Dibenzofuran	-	-	-	-	< 0.1009	u	< 0.0987	u	< 0.0998	u	< 0.1002	u	< 0.1002	u	< 0.1011	u
Diethyl phthalate	4.93E+04	(1)	2.15E+05	(5)	0.14	J	0.17	J	0.12	J	0.14	J	0.21	v	0.16	J
Dimethyl phthalate	6.16E+04	(1)	2.69E+05	(5)	< 0.0982	u	< 0.096	u	< 0.0971	u	< 0.0975	u	< 0.0974	u	< 0.0983	u
Di-n-butyl phthalate	6.16E+03	(1)	2.69E+04	(5)	0.16	J	0.15	J	0.14	J	0.15	J	0.25	J	0.15	J
Di-n-octyl phthalate	-	-	-	-	< 0.0856	u	< 0.0837	u	< 0.0847	u	< 0.085	u	< 0.085	u	< 0.0858	u
Fluoranthene	2.32E+03	(1)	1.00E+04	(5)	< 0.0578	u	< 0.0565	u	< 0.0572	u	< 0.0574	u	< 0.0574	u	< 0.0579	u
Fluorene	2.32E+03	(1)	1.00E+04	(5)	< 0.0918	u	< 0.0899	u	< 0.0908	u	< 0.0912	u	0.12	J	< 0.092	u
Hexachlorobenzene	3.33E+00	(1)	1.60E+01	(4)	< 0.0791	u	< 0.0774	u	< 0.0783	u	< 0.0786	u	< 0.0785	u	< 0.0793	u
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 0.1131	u	< 0.1106	u	< 0.1118	u	< 0.1123	u	< 0.1122	u	< 0.1133	u
Hexachlorocyclopentadiene	2.28E+00	(1)	8.67E+02	(5)	< 0.1147	u	< 0.1122	u	< 0.1135	u	< 0.114	u	< 0.1139	u	< 0.1149	u
Hexachloroethane	4.31E+01	(1)	1.88E+02	(5)	< 0.0862	u	< 0.0843	u	< 0.0853	u	< 0.0856	u	< 0.0856	u	< 0.0864	u
Indeno(1,2,3-cd)pyrene	1.53E+00	(1)	3.23E+01	(4)	< 0.0784	u	< 0.0767	u	< 0.0775	u	< 0.0778	u	< 0.0778	u	< 0.0785	u
Isophorone	5.61E+03	(1)	2.70E+04		< 0.1109	u	< 0.1085	u	< 0.1097	u	< 0.1102	u	< 0.1101	u	< 0.1112	u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	< 0.0963	u	< 0.0942	u	< 0.0953	u	0.11	J	1.3	v	< 0.0965	u
Nitrobenzene	5.99E+01	(1)	2.91E+02	(4)	< 0.1035	u	< 0.1013	u	< 0.1024	u	< 0.1029	u	< 0.1028	u	< 0.1038	u
N-Nitrosodi-n-propylamine	7.80E-01	(3)	3.30E+00	(7)	< 0.0964	u	< 0.0943	u	< 0.0954	u	< 0.0958	u	< 0.0957	u	< 0.0966	u
N-Nitrosodiphenylamine	1.09E+03	(1)	5.24E+03	(4)	< 0.098	u	< 0.0959	u	< 0.0969	u	< 0.0973	u	< 0.0973	u	< 0.0982	u
Pentachlorophenol	9.85E+00	(1)	4.45E+01	(4)	< 0.0645	u	< 0.0631	u	< 0.0638	u	< 0.0641	u	< 0.064	u	< 0.0646	u
Phenanthrene	1.74E+03	(1)	7.53E+03	(5)	< 0.0682	u	< 0.0667	u	< 0.0674	u	< 0.0677	u	0.27	v	< 0.0683	u
Phenol	1.85E+04	(1)	7.74E+04	(5)	< 0.0756	u	< 0.0739	u	< 0.0747	u	< 0.0751	u	0.31	v	< 0.0757	u
Pyrene	1.74E+03	(1)	7.53E+03	(5)	< 0.0758	u	< 0.0742	u	< 0.075	u	< 0.0753	u	< 0.0753	u	< 0.076	u
Pyridine	7.80E+01	(2)	1.20E+03	(6)	< 0.0795	u	< 0.0778	u	< 0.0787	u	< 0.079	u	< 0.079	u	< 0.0797	u
Total Petroleum Hydrocarbons (mg/kg)																
Gasoline Range Organics (GRO)	1.00E+03	(8)	3.80E+03	(8)	< 0.4812	u	< 0.5599	u	3.2	v	**1500**	v	**1700**	v	130	v
Diesel Range Organics (DRO)	1.00E+03	(8)	3.80E+03	(8)	< 1.7306	u	5.9	J	< 1.713	u	22	v	320	v	33	v
Motor Oil Range Organics (MRO)	1.00E+03	(8)	3.80E+03	(8)	< 47	u	< 48	u	< 46	u	< 48	u	< 49	u	< 47	u

- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (March 2017)

EPA - Regional Screening Levels (June 2017)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels

(7) EPA Industrial - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(8) NMED Table 6-2 TPH Soil Screening Levels "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Residential Soil Screening Level
Yellow highlight represents value above Non-Residential Soil Screening Level
Bold with yellow highlight value exceeds Residential Soil Screening Level and Non-Residential Soil Screening Level

v = reportable detection above the Practical quantitation limit (PQL)
u - result is not detected at method detection limit (MDL)
j - estimated result at concentration above MDL but less than PQL

Table 8 - Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
Metals (ug/l) TOTAL																						
Antimony	6	(2)	<0.47	u	<0.47	u	<2.36	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	-		-	
Arsenic	10	(2)	7.7	v	4.9	J	16	Z	10	Z	8	J	16	Z	8.7	J	9.4	v	-		7.6	J
Barium	2000	(2)	2000	Z	3800	Z	8700	Z	4900	Z	4200	Z	8500	Z	3000	Z	5200	Z	-		2100	Z
Beryllium	4	(2)	0.71	J	<0.36	u	1.7	J	0.43	J	<0.36	u	6.4	Z	0.51	J	3.7	v	-		-	
Cadmium	5	(2)	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	-		<1.484	u
Chromium	50	(3)	11	v	<2.66	u	14	v	14	v	<2.66	u	31	v	4.5	J	17	v	-		<2.656	u
Cobalt	6	(1)	4.6	J	<1.7	u	9.4	v	7.6	v	4.4	J	20	v	12	v	13	v	-		-	
Cyanide	200	(3)	<10	u	<10	u	<10	u	11.5	v	<10	u	<10	u	<10	u	27.3	v	-		-	
Iron	13800	(4)	10000	Z	3500	Z	28000	Z	17000	Z	8200	Z	36000	Z	9100	Z	27000	Z	-		4900	Z
Lead	15	(2)	12	v	0.31	J	21	Z	3.5	v	1.9	v	64	Z	9.3	v	36	Z	-		0.14	J
Manganese	2020	(4)	1800	Z	1800	Z	4200	Z	3400	Z	1900	Z	7200	Z	3500	Z	4100	Z	-		2200	Z
Mercury	2	(3)	0.16	J	0.15	J	0.21	v	0.16	J	0.12	J	0.18	J	0.14	J	0.13	J	-		-	
Nickel	372	(4)	34	v	70	v	57	v	54	v	82	v	100	Z	84	v	35	v	-		-	
Selenium	50	(3)	13	v	11	v	14	J	16	v	10	v	9.2	v	13	v	12	v	-		14	v
Silver	50	(3)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	-		<1.548	u
Vanadium	63.1	(4)	16	J	3.8	J	31	J	8.6	J	7.4	J	65	v	17	J	43	J	-		-	
Zinc	10000	(3)	30	v	8.2	J	61	v	15	v	13	v	64	v	17	v	48	v	-		15	v
Chloride	250000	(3)	130000	v	150000	v	140000	v	170000	v	140000	v	94000	v	180000	v	160000	v	-		-	
Fluoride	1600	(3)	240	v	370	v	<250	u	<250	u	440	v	<250	u	220	v	250	v	-		-	
Sulfate	600000	(3)	35000	v	5800	v	990	J	960	J	3100	v	4100	v	6200	v	1200	v	-		-	
Metals (ug/l) DISSOLVED																						
Antimony (D)	6	(2)	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	-		-	
Arsenic (D)	10	(2)	7.8	J	2.9	J	14	Z	10	Z	3.4	v	9.3	v	4.1	J	4.1	J	-		8.6	v
Barium (D)	1000	(3)	1800	v	3600	Z	6300	Z	5100	Z	3200	Z	3100	Z	2100	Z	3000	Z	-		2200	Z
Beryllium (D)	4	(2)	<0.31	u	<0.31	u	<0.31	u	<0.00031	u	<0.31	u	<0.31	u	<0.31	u	<0.31	u	-		-	
Cadmium (D)	5	(2)	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	-		<0.746	u
Chromium (D)	50	(3)	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	-		<1.754	u
Cobalt (D)	50	(3)	2.6	J	1.4	J	3.5	J	6.8	v	5.2	J	5.1	J	7.4	v	2.2	J	-		-	
Iron (D)	1000	(3)	4700	Z	920	Z	7900	Z	550	Z	3900	Z	7600	Z	740	Z	6600	Z	-		-	
Lead (D)	15	(2)	0.41	J	<0.00013	u	<0.00013	J	<0.17	u	<0.17	u	1.2	v	<0.17	u	1.1	v	-		<0.168	u
Manganese (D)	200	(3)	1600	Z	1700	Z	2600	Z	3100	Z	1600	Z	3100	Z	2100	Z	2100	Z	-		2200	Z
Nickel (D)	372	(4)	31	v	69	v	50	v	61	v	74	v	88	v	80	v	15	v	-		-	
Selenium (D)	50	(3)	7.4	J	5.6	J	9.7	J	11	J	5.2	J	4.2	J	8.2	J	6.4	J	-		12	J
Silver (D)	50	(3)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	-		<2.751	u
Vanadium (D)	63.1	(4)	1.7	J	4.7	J	4.8	J	4.4	J	4.8	J	7.8	J	4.9	J	4.6	J	-		-	
Zinc (D)	10000	(3)	4.9	J	9.3	J	22	v	6.9	J	9.5	J	10	v	5.3	J	3	J	-		28	v
Volatiles (ug/l)																						
1,1,1,2-Tetrachloroethane	5.74	(4)	<2.23	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<22.3	u	<0.557	u
1,1,1-Trichloroethane	60	(3)	<1.83	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<18.3	u	<0.457	u
1,1,2,2-Tetrachloroethane	10	(3)	<2.56	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<25.6	u	<0.641	u
1,1,2-Trichloroethane	5	(2)	<2.55	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<25.5	u	<0.637	u
1,1-Dichloroethane	25	(3)	<2.16	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<21.6	u	<0.54	u
1,1-Dichloroethene	5	(3)	<2.14	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<21.4	u	<0.536	u
1,1-Dichloropropene	-		<2.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<26.6	u	<0.666	u
1,2,3-Trichlorobenzene	7	(1)	<2.26	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<22.6	u	<0.564	u
1,2,3-Trichloropropane	0.01	(4)	<4.04	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<40.4	u	<1.01	u
1,2,4-Trichlorobenzene (V)	70	(2)	<2.66	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<26.6	u	<0.664	u
1,2,4-Trimethylbenzene	56	(1)	1300	v	850	v	1500	v	1000	v	930	v	1400	v	7.3	J	690	v	210	v	7.1	v
1,2-Dibromo-3-chloropropane	0.2	(2)	<4.69	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<46.9	u	<1.172	u
1,2-Dibromoethane (EDB)	0.05	(2)	57	v	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<22.4	u	<0.559	u

Table 8 - Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
1,2-Dichlorobenzene (V)	600	(2)	<8	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<80	u	<2	u
1,2-Dichloroethane (EDC)	5	(2)	<2.3	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<23	u	<0.575	u
1,2-Dichloropropane	5	(2)	32	v	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<22	u	<0.549	u
1,3,5-Trimethylbenzene	60	(1)	350	v	190	v	410	v	300	v	270	v	430	v	<5.77	u	210	v	44	J	0.82	J
1,3-Dichlorobenzene (V)	-		<2.86	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<28.6	u	<0.716	u
1,3-Dichloropropane	370	(1)	<3.11	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<31.1	u	<0.779	u
1,4-Dichlorobenzene (V)	75	(2)	<2.85	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<28.5	u	<0.713	u
1-Methylnaphthalene (V)	1.10	(1)	40	J	67	J	61	J	26	J	24	J	24	J	150	J	89	J	88	J	34	v
2,2-Dichloropropane	-		<3.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<33.3	u	<0.833	u
2-Butanone	5565	(4)	77	J	<36.85	u	830	v	740	v	<36.85	u	110	J	<36.85	u	<36.85	u	<147.4	u	<3.685	u
2-Chlorotoluene	240	(1)	<8	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<80	u	<2	u
2-Hexanone	38	(1)	<16.8	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<168	u	<4.199	u
2-Methylnaphthalene (V)	36	(1)	59	J	76	J	82	J	31	J	28	J	33	J	140	J	97	J	<31.7	u	<0.791	u
4-Chlorotoluene	250	(1)	<2.56	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<25.6	u	<0.641	u
4-Isopropyltoluene	-		6.4	J	16	J	9.7	J	26	J	21	J	47	J	<7.03	u	15	J	<28.1	u	<0.703	u
4-Methyl-2-pentanone	-		<8.55	u	<21.38	u	200	J	160	J	<21.38	u	240	J	<21.38	u	<21.38	u	<85.5	u	<2.138	u
Acetone	14100	(4)	140	J	<245.44	u	1500	v	770	v	<245.44	u	<245.44	u	<245.44	u	<245.44	u	<981.7	u	<24.544	u
Benzene	5	(2)	16000	v	28000	v	34000	v	23000	v	24000	v	23000	v	11000	v	32000	v	38000	v	8100	v
Bromobenzene	62	(1)	<1.95	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<19.5	u	<0.489	u
Bromodichloromethane	1.34	(4)	<2.8	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<28	u	<0.699	u
Bromoform	3.3	(1)	<2.04	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<20.4	u	<0.511	u
Bromomethane	7.54	(4)	<15.6	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<156	u	<3.899	u
Carbon disulfide	810	(4)	<11.95	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<119.5	u	<2.987	u
Carbon Tetrachloride	5	(2)	<2.16	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<21.6	u	<0.541	u
Chlorobenzene	100	(2)	<2.29	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<22.9	u	<0.572	u
Chloroethane	20857	(4)	<3.82	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<38.2	u	<0.955	u
Chloroform	100	(3)	<1.78	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<17.8	u	<0.444	u
Chloromethane	20.3	(4)	<4.26	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<42.6	u	<1.064	u
cis-1,2-DCE	70	(2)	<2.48	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<24.8	u	<0.621	u
cis-1,3-Dichloropropene	4.71	(4)	<2.13	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<21.3	u	<0.533	u
Dibromochloromethane	1.68	(4)	<1.73	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<17.3	u	<0.434	u
Dibromomethane	8.3	(1)	<2.38	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<23.8	u	<0.596	u
Dichlorodifluoromethane	197	(4)	<7.15	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<71.5	u	<1.787	u
Ethylbenzene	700	(2)	1800	v	1600	v	2700	v	2000	v	1700	v	2100	v	570	v	1500	v	1200	v	250	v
Hexachlorobutadiene (V)	1.39	(4)	<3.97	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<39.7	u	<0.993	u
Isopropylbenzene	447	(4)	43	v	74	v	53	v	160	v	140	v	220	v	22	J	72	v	30	J	8.5	v
Methyl tert-butyl ether (MTBE)	143	(4)	10000	v	140	v	1100	v	1000	v	700	v	74	v	180	v	3300	v	1600	v	580	v
Methylene Chloride	5	(2)	<3.75	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<37.5	u	<0.937	u
Naphthalene (V)	1.65	(4)	280	v	220	v	320	v	88	J	82	J	92	J	220	v	240	v	140	J	18	v
n-Butylbenzene	1000	(1)	14	J	18	J	20	J	22	J	17	J	47	J	9.1	J	21	J	<32.1	u	1.3	J
n-Propylbenzene	660		160	v	140	v	190	v	180	v	160	v	270	v	48	J	150	v	56	J	11	v
sec-Butylbenzene	2000	(1)	7.8	J	17	J	11	J	26	J	21	J	51	v	<6.15	u	18	J	<24.6	u	2.2	J
Styrene	100	(2)	<2.2	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<22	u	<0.55	u
tert-Butylbenzene	-		<2.3	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<23	u	<0.575	u
Tetrachloroethene (PCE)	5	(2)	<3.04	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<30.4	u	<0.76	u
Toluene	750	(3)	10000	v	9300	v	41000	v	25000	v	20000	v	25000	v	54	v	6600	v	3800	v	2.9	J
trans-1,2-DCE	100	(2)	<8	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<80	u	< 2	u
trans-1,3-Dichloropropene	4.71	(4)	<2.07	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<20.7	u	<0.516	u
Trichloroethene (TCE)	5	(2)	<3.5	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<35	u	<0.875	u
Trichlorofluoromethane	1137	(4)	<4.09	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<40.9	u	<1.022	u
Vinyl chloride	1	(3)	<3.91	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<39.1	u	<0.977	u

Table 8 - Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
Xylenes, Total	620	(3)	**10000**	v	**5900**	v	**15000**	v	**10000**	v	**9200**	v	**11000**	v	140	v	**4400**	v	**3100**	v	8	v
Semi-volatiles (ug/l)																						
1,2,4-Trichlorobenzene	70	(2)	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<26.2	u	<2.62	u	<2.62	u	-		-	
1,2-Dichlorobenzene	600	(2)	<2.29	u	<2.29	u	<2.29	u	<2.29	u	<2.29	u	<22.85	u	<2.29	u	<2.29	u	-		-	
1,3-Dichlorobenzene	-		<2.26	u	<2.26	u	<2.26	u	<2.26	u	<2.26	u	<22.57	u	<2.26	u	<2.26	u	-		-	
1,4-Dichlorobenzene	75	(2)	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<23.88	u	<2.39	u	<2.39	u	-		-	
1-Methylnaphthalene	1.1	(5)	**66**	v	**80**	v	**71**	v	**59**	v	**110**	v	**120**	v	**110**	v	**65**	v	-		-	
2,4,5-Trichlorophenol	1166	(4)	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<21.8	u	<2.18	u	<2.18	u	-		-	
2,4,6-Trichlorophenol	11.9	(4)	<2.45	u	<2.45	u	<2.45	u	<2.45	u	<2.45	u	<24.46	u	<2.45	u	<2.45	u	-		-	
2,4-Dichlorophenol	45.3	(4)	<2.33	u	<2.33	u	<2.33	u	<2.33	u	<2.33	u	<23.3	u	<2.33	u	<2.33	u	-		-	
2,4-Dimethylphenol	353.9	(4)	71	v	34	v	33	v	46	v	97	v	52	J	8.4	J	3.9	J	-		-	
2,4-Dinitrophenol	38.7	(4)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<27.53	u	<2.75	u	<2.75	u	-		-	
2,4-Dinitrotoluene	2.37	(4)	<3.13	u	<3.13	u	<3.13	u	<3.13	u	<3.13	u	<31.29	u	<3.13	u	<3.13	u	-		-	
2,6-Dinitrotoluene	0.485	(4)	<2.73	u	<2.73	u	<2.73	u	<2.73	u	<2.73	u	<27.34	u	<2.73	u	<2.73	u	-		-	
2-Chloronaphthalene	733	(4)	<2.25	u	<2.25	u	<2.25	u	<2.25	u	<2.25	u	<22.51	u	<2.25	u	<2.25	u	-		-	
2-Chlorophenol	91	(4)	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<21.84	u	<2.18	u	<2.18	u	-		-	
2-Methylnaphthalene	36	(1)	**57**	v	**49**	v	**76**	v	<2.89	u	<2.89	u	**110**	v	**98**	v	**71**	v	-		-	
2-Methylphenol	930	(1)	65	v	23	v	68	v	80	v	98	v	210	v	<2.54	u	5.2	J	-		-	
2-Nitroaniline	190	(1)	<2.76	u	<2.76	u	<2.76	u	<2.76	u	<2.76	u	<27.58	u	<2.76	u	<2.76	u	-		-	
2-Nitrophenol	-		<2.38	u	<2.38	u	<2.38	u	<2.38	u	<2.38	u	<23.78	u	<2.38	u	<2.38	u	-		-	
3,3´-Dichlorobenzidine	1.25	(4)	<2.4	u	<2.4	u	<2.4	u	<2.4	u	<2.4	u	<23.96	u	<2.4	u	<2.4	u	-		-	
3+4-Methylphenol	930	(1)	87	v	26	v	110	v	130	v	99	v	200	v	<2.3	u	7.9	J	-		-	
3-Nitroaniline	-		<2.95	u	<2.95	u	<2.95	u	<2.95	u	<2.95	u	<29.48	u	<2.95	u	<2.95	u	-		-	
4,6-Dinitro-2-methylphenol	1.52	(4)	<1.8	u	<1.8	u	<1.8	u	<1.8	u	<1.8	u	<17.97	u	<1.8	u	<1.8	u	-		-	
4-Bromophenyl phenyl ether	-		<2.64	u	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<26.37	u	<2.64	u	<2.64	u	-		-	
4-Chloro-3-methylphenol	-		<2.56	u	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<25.59	u	<2.56	u	<2.56	u	-		-	
4-Chloroaniline	0.37	(5)	<2.71	u	<2.71	u	<2.71	u	<2.71	u	<2.71	u	<27.12	u	<2.71	u	<2.71	u	-		-	
4-Chlorophenyl phenyl ether	-		<2.56	u	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<25.56	u	<2.56	u	<2.56	u	-		-	
4-Nitroaniline	3.8	(5)	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<25.59	u	<2.56	u	<2.56	u	-		-	
4-Nitrophenol	-		<2.55	u	<2.55	u	<2.55	u	<2.55	u	<2.55	u	<25.53	u	<2.55	u	<2.55	u	-		-	
Acenaphthene	535	(4)	<2.55	u	<2.55	u	<2.55	u	<2.55	u	<2.55	u	<25.53	u	<2.55	u	<2.55	u	-		-	
Acenaphthylene	-		<2.36	u	<2.36	u	<2.36	u	<2.36	u	<2.36	u	<23.57	u	<2.36	u	<2.36	u	-		-	
Aniline	13	(5)	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<24.41	u	<2.44	u	<2.44	u	-		-	
Anthracene	1720	(4)	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<24.86	u	<2.49	u	<2.49	u	-		-	
Azobenzene	0.12	(5)	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<26.68	u	<2.67	u	<2.67	u	-		-	
Benz(a)anthracene	0.12	(4)	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<26.39	u	<2.64	u	<2.64	u	-		-	
Benzo(a)pyrene	0.2	(2)	<2.72	u	<2.72	u	<2.72	u	<2.72	u	<2.72	u	<27.18	u	<2.72	u	<2.72	u	-		-	
Benzo(b)fluoranthene	0.343	(4)	<2.88	u	<2.88	u	<2.88	u	<2.88	u	<2.88	u	<28.8	u	<2.88	u	<2.88	u	-		-	
Benzo(g,h,i)perylene	-		<2.64	u	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<26.43	u	<2.64	u	<2.64	u	-		-	
Benzo(k)fluoranthene	3.43	(4)	<3	u	<3	u	<3	u	<3	u	<3	u	<29.98	u	<3	u	<3	u	-		-	
Benzoic acid	75000	(1)	41	v	45	v	43	v	43	v	68	v	450	v	32	v	16	J	-		-	
Benzyl alcohol	2000	(1)	<3.01	u	<3.01	u	<3.01	u	<3.01	u	<3.01	u	<30.12	u	<3.01	u	<3.01	u	-		-	
Bis(2-chloroethoxy)methane	59	(1)	<2.81	u	<2.81	u	<2.81	u	<2.81	u	<2.81	u	<28.14	u	<2.81	u	<2.81	u	-		-	
Bis(2-chloroethyl)ether	0.137	(4)	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<26.74	u	<2.67	u	<2.67	u	-		-	
Bis(2-chloroisopropyl)ether	9.81	(4)	<1.91	u	<1.91	u	<1.91	u	<1.91	u	<1.91	u	<19.09	u	<1.91	u	<1.91	u	-		-	
Bis(2-ethylhexyl)phthalate	6	(2)	6	J	<2.62	u	**12**	v	**7.1**	J	**7.8**	J	**66**	J	4.2	J	2.8	J	-		-	
Butyl benzyl phthalate	16	(5)	<2.48	u	<2.48	u	<2.48	u	<2.48	u	<2.48	u	<24.78	u	<2.48	u	<2.48	u	-		-	
Carbazole	-		2.6	J	5	J	<2.29	u	<2.29	u	<2.29	u	<22.87	u	4.2	J	2.8	J	-		-	
Chrysene	34.3	(4)	<2.78	u	<2.78	u	<2.78	u	<2.78	u	<2.78	u	<27.79	u	<2.78	u	<2.78	u	-		-	
Dibenz(a,h)anthracene	0.0343	(4)	<2.66	u	<2.66	u	<2.66	u	<2.66	u	<2.66	u	<26.61	u	<2.66	u	<2.66	u	-		-	
Dibenzofuran	7.9	(1)	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<24.93	u	<2.49	u	<2.49	u	-		-	

Table 8 - Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
Diethyl phthalate	14800	(4)	<2.71	u	<2.71	u	<2.71	u	<2.71	u	3.4	J	<27.15	u	<2.71	u	<2.71	u	-		-	
Dimethyl phthalate	-		3.1	J	3	J	26	v	18	v	31	v	<24.29	u	<2.43	u	<2.43	u	-		-	
Di-n-butyl phthalate	885	(4)	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<24.44	u	<2.44	u	<2.44	u	-		-	
Di-n-octyl phthalate	-		2	J	<1.98	u	6.8	J	6.8	J	<1.98	u	<19.83	u	<1.98	u	<1.98	u	-		-	
Fluoranthene	802	(4)	<2.61	u	<2.61	u	<2.61	u	<2.61	u	<2.61	u	<26.07	u	<2.61	u	<2.61	u	-		-	
Fluorene	288	(4)	<2.72	u	3.1	J	<2.72	u	<2.72	u	<2.72	u	<27.24	u	7.2	J	3.8	J	-		-	
Hexachlorobenzene	0.0976	(4)	<2.63	u	<2.63	u	<2.63	u	<2.63	u	<2.63	u	<26.33	u	<2.63	u	<2.63	u	-		-	
Hexachlorobutadiene	1.387	(4)	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<21.84	u	<2.18	u	<2.18	u	-		-	
Hexachlorocyclopentadiene	50	(4)	<2.28	u	<2.28	u	<2.28	u	<2.28	u	<2.28	u	<22.84	u	<2.28	u	<2.28	u	-		-	
Hexachloroethane	3.28	(4)	<2.37	u	<2.37	u	<2.37	u	<2.37	u	<2.37	u	<23.68	u	<2.37	u	<2.37	u	-		-	
Indeno(1,2,3-cd)pyrene	0.343	(4)	<2.96	u	<2.96	u	<2.96	u	<2.96	u	<2.96	u	<29.64	u	<2.96	u	<2.96	u	-		-	
Isophorone	781	(4)	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<26.15	u	<2.62	u	<2.62	u	-		-	
Naphthalene	1.65	(4)	**210**	v	**130**	v	**210**	v	**47**	v	**68**	v	**220**	v	**140**	v	**160**	v	-		-	
Nitrobenzene	1.4	(4)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<27.53	u	<2.75	u	<2.75	u	-		-	
N-Nitrosodimethylamine	0.0017	(4)	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<21.58	u	<2.16	u	<2.16	u	-		-	
N-Nitrosodi-n-propylamine	0.011	(5)	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<23.89	u	<2.39	u	<2.39	u	-		-	
N-Nitrosodiphenylamine	0.0049	(4)	<2.32	u	<2.32	u	<2.32	u	<2.32	u	<2.32	u	<23.2	u	<2.32	u	<2.32	u	-		-	
Phenanthrene	170	(4)	<2.59	u	<2.59	u	<2.59	u	<2.59	u	<2.59	u	<25.87	u	7.6	J	2.9	J	-		-	
Pentachlorophenol	1	(4)	<2.34	u	<2.34	u	<2.34	u	<2.34	u	<2.34	u	<23.42	u	<2.34	u	<2.34	u	-		-	
Phenol	5760	(4)	160	v	69	v	69	v	96	v	98	v	120	v	88	v	51	v	-		-	
Pyrene	117	(4)	<3.09	u	<3.09	u	<3.09	u	<3.09	u	<3.09	u	<30.94	u	<3.09	u	<3.09	u	-		-	
Pyridine	20	(1)	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<21.61	u	<2.16	u	<2.16	u	-		-	
TPH (mg/l)																						
Gasoline Range Organics (GRO	3.98E-02	(6)	**140**	v	**140**	v	**260**	v	**160**	v	**170**	v	**240**	v	**46**	v	**150**	v	**140000**	v	**31000**	v
Diesel Range Organics (DRO)	3.98E-02	(6)	**10**	v	**12**	v	**22**	v	**14**	v	**21**	v	**170**	v	**9.3**	v	**5.6**	v	**14000**	v	**4100**	v
Motor Oil Range Organics (MRO	3.98E-02	(6)	< 5	u	< 5	u	< 5	u	< 5	u	< 5	u	< 50	u	< 5	u	< 5	u	<5000	u	<5000	u

\- No screening level or analytical result available
450 - bolded value exceeds screening level
(1) EPA - Regional Screening Levels (November 2018) - Tap Water
(2) EPA - Regional Screening Levels (November 2018) - MCL
(3) NMED WQCC standards - Title 20 Chapter 6, Part 2, - 20.6.2.3101 Standards for Ground Water of 10,000 mg/l TDS Concentration or less
(4) NMED Tap Water Screening Level - Risk Assessment Guidance for Site Investigations and Remediation (March 2017)
(5) EPA Screening Level - Tap Water x 10 for carcinogenic compounds
(6) NMED groundwater screening level for unknown oil
v = reportable detection above the Practical quantitation limit (PQL)
u - result is not detected at method detection limit (MDL)
j - estimated result at concentration above MDL but less than PQL
z - concentration exceeds MCL

Marathon Petroleum Company LP

September 7, 2019

Mr. John E. Kieling, Chief
New Mexico Environmental Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, NM 87505-6303

RE: Investigation Work Plan No. 2 OW-14 Source Area
Marathon Petroleum Company LP, Gallup Refinery
(dba Western Refining Southwest, Inc.)
EPA ID# NMD000333211

Dear Mr. Kieling:

Marathon Petroleum Company LP (dba Western Refining Southwest, Inc.) Gallup Refinery is submitting the enclosed Investigation Work Plan pursuant to your Comments No. 9 and 21 (dated April 2, 2019) on the OW-14 Source Area Investigation Report. If there are any questions, please call Brian Moore at 505-726-9745.

Certification

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

Sincerely,
Marathon Petroleum Company LP, Gallup Refinery

Robert S. Hanks

Robert S. Hanks
Refinery General Manager

Enclosure

cc K. Van Horn NMED
C. Chavez NMOCD
B. Moore Marathon Gallup Refinery

92 Giant Crossing Road
Jamestown, NM 87347

RESPONSE TO COMMENTS
April 2, 2019 Comments on OW-14 Source Area Investigation Report (Jan. 2019)

NMED Comment 9:
In Section 4.2.1, *Geology,* page 4-2, the Permittee states, "[f]our cross sections of the shallow subsurface in the immediate vicinity of the tank farm and the area up-gradient of OW-14 (Figures 7 thru 10). Figure 6 shows the location of the cross sections." Figure 7, *Cross Section A-A'* and Figure 10, *Cross Section D-D'* indicate that the potentiometric surface is higher to the west and lower to the east. Figure 13, *September 2016 Potentiometric Surface Map* presents potentiometric contours in the area and the groundwater flow direction appears to be consistent with the interpretation depicted in Figures 7 and 10. If groundwater flows eastward from the suspected source area, the SPH plume may have expanded east of well RW-1. In order to delineate the extent of dissolved phase contaminant plumes, the Permittee proposed to install a monitoring well northeast of OW-30 in the *Work Plan 2015 Annual Groundwater Report Comments,* dated October 2018; however, the proposed well will not delineate the eastern extent of the SPH plume. Propose to submit a work plan to install groundwater monitoring wells to define the eastern extent of the SPH plume.

MPC Response 9:
A new well is proposed to the east of RW-1.

NMED Comment 21:
In Section 7.2, *Recommendations,* page 7-2, the Permittee states, "[a]n additional monitoring well is recommended to the south of Tank 570 to determine if there are any additional up gradient sources. A well west of Tanks 569 and 570 could also provide better coverage to define impacts observed near these two tanks." NMED concurs with installation of additional monitoring wells south of Tank 570 and west of Tanks 569 and 570. Propose to submit a work plan to install the wells.

MPC Response 21:
A new well is proposed to the south of Tank 570. As we already have recently installed two wells (OW-61 and OW-65) west of Tanks 569 and 570 that contain SPH, we are looking at conducting additional subsurface investigation near Tanks 569 and 570 using laser inducted fluorescence (LIF) technology. We propose to conduct the LIF investigation before installing any additional wells to the west of Tank 569 and 570.

Investigation Work Plan No. 2
OW-14 Source Area

Marathon Petroleum Company LP

Gallup Refinery
Western Refining Southwest, Inc.
Gallup, New Mexico

EPA ID# NMD000333211

SEPTEMBER 2019

Scott Crouch
Senior Geologist

DiSorbo
Environmental Consulting Firm

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Appendices

List of Acronyms

benzene, toluene, ethylbenzene, and xylene (BTEX)
Code of Federal Regulations (CFR)
Contract Laboratory Program (CLP)
data quality objective (DQO)
diesel range organics (DRO)
dilution attenuation factor (DAF)
Environmental Protection Agency (EPA)
investigation derived waste (IDW)
Maximum Contaminant Level (MCL)
mean sea level (msl)
monitoring well (MW)
motor oil range organics (MRO)
methyl tert butyl ether (MTBE)
New Mexico Administrative Code (NMAC)
New Mexico Environment Department (NMED)
New Mexico Oil Conservation Division (NMOCD)
photoionization detector (PID)
polynuclear aromatic hydrocarbon (PAH)
polyvinyl chloride (PVC)
quality assurance/quality control (QA/QC)
Resource Conservation and Recovery Act (RCRA)
separate-phase hydrocarbon (SPH)
semi-volatile organic compound (SVOC)
Solid Waste Management Unit (SWMU)
total petroleum hydrocarbon (TPH)
toxicity characteristic leaching procedure (TCLP)
volatile organic compound (VOC)

Executive Summary

The Gallup Refinery, which is located 17 miles east of Gallup, New Mexico, has been in operation since the 1950s. Pursuant to the terms and conditions of the facility Resource Conservation and Recovery Act (RCRA) Post-Closure Care Permit and 20.4.1.500 New Mexico Administrative Code, this Investigation Work Plan has been prepared for the area up-gradient of monitoring well OW-14.

Groundwater samples collected from monitoring well OW-14 have indicated increasing concentrations of benzene and ethylbenzene since 2009, although the concentrations of ethylbenzene remain below screening levels. Methyl tert butyl ether (MTBE) has been detected at concentrations above the screening level since 2008 and 1-methylnaphthalene has sporadically been reported at concentrations above the screening level. OW-14 is located down-gradient of recovery wells RW-1 (OW-27) and RW-2 (OW-28), which were installed in near Tanks 569 and 576 in 1995 to address the presence of separate-phase hydrocarbon (SPH). The initial investigation effort near Tanks 569 and 576 was conducted as part of the investigation of Solid Waste Management Unit (SWMU) No. 6. In 2016, two permanent monitoring wells (OW-57 and OW-58) were installed between Tank 569 and monitoring well OW-14 and six soil borings/temporary wells were drilled near Tanks 568, 569, and 570. This investigation confirmed high concentrations of petroleum hydrocarbons and MTBE in subsurface soils and groundwater near these three tanks.

This investigation will add two additional permanent monitoring wells. One well will be located to the south and up-gradient of Tank 570 to help determine if there are up-gradient sources of the observed hydrocarbons. A second new well will be installed to the east and potentially down-gradient of RW-1 to help define the extent of SPH and dissolved-phase constituents.

Section 1 Introduction

The Gallup Refinery is located approximately 17 miles east of Gallup, New Mexico along the north side of Interstate Highway I-40 in McKinley County. The physical address is I-40, Exit #39 Jamestown, New Mexico 87347. The Gallup Refinery is located on 810 acres. Figure 1 presents the refinery location and the regional vicinity.

The Gallup Refinery generally processes crude oil from the Four Corners area transported to the facility by pipeline or tanker truck. Various process units are operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, alkylation, sulfur recovery, merox treater, and hydrotreating. Current and past operations have produced gasoline, diesel fuels, jet fuels, kerosene, propane, butane, and residual fuel.

This investigation work plan addresses the area up-gradient of monitoring well OW-14 in the eastern portion of the refinery tank farm (Figure 2). The purpose of this investigation is to determine if contaminants in groundwater are migrating into the area of Tank 570 from any potential up-gradient sources and to define the extent of SPH and dissolved phase contaminants to the east of RW-1. The investigation activities will be conducted in accordance with Section IV.H.5 of the Post-Closure Care Permit.

Section 2
Background

This section presents background information for the area of the refinery property up-gradient of monitoring well OW-14, including a review of historical waste management activities to identity the following:

- Type and characteristics of all waste and all contaminants handled in the subject areas;
- Known and possible sources of contamination;
- History of operations; and
- Prior investigations.

Monitoring well OW-14 is located immediately north of the main refinery tank farm, which was built in the late 1950s. The *Inventory of Solid Waste Management Units* prepared in June 1985 identified six product storage tanks that contained leaded gasoline (Geoscience Consultants, Ltd., 1985). These six, as well as, additional tanks were subsequently identified as SWMU No. 6 due to the historic practice of disposing of leaded tank bottoms within the tank berms. The practice of cleaning the tanks and burying the leaded tank bottoms was reported to have occurred every five years and was terminated after November 19, 1980.

The three leaded gasoline storage tanks (TK-568, TK-569, and TK-570) closest to OW-14 were investigated as part of SWMU No. 6 in the early to mid 1990s. Impacts to soil and the presence of separate-phase hydrocarbon (SPH) on groundwater was found within the alluvium overlying the Chinle Group. Boring BG-4, which was later identified as OW-27 and RW-1, was drilled east of TK-569 to a depth of 48.5 feet (Figure 2). A water-bearing sand layer was logged at approximately 30 feet with a strong hydrocarbon odor and an elevated PID reading. Subsequently 4-inch well screen was installed in the boring from 40.0 to 25.0 feet. The water level was initially measured at a depth of 28' 7" with an accumulation of 8" of SPH. A second soil boring B-2, which was later identified as OW-28 and RW-2, was drilled southwest of TK-576 to a depth of 38 feet. Saturation was first encountered in a sand layer at a depth of 23.6 feet with additional deeper water-bearing sand/gravel layers extending to top of the Chinle Group at a depth of 32.9 feet. The well screen was set from

36.1 feet to 26.1 feet below ground surface. The water level initially was measured at 24' 3" with 2" of SPH. The boring logs are included in Appendix A.

A possible leak from a seam in an unidentified storage tank located adjacent to Tank 569 was reported to have been repaired in 1995 (Giant, 1997). Two small holes were identified in the bottom of Tank 570 during an internal tank inspection conducted in 2015 (Sentinel, 2015).

RW-1 had an estimated 1.00 gallon of SPH recovered in 2018 using a bailer, while no SPH has been observed in RW-2 since before 2005 (Western, 2018). The estimated annual volumes of SPH recovered at RW-1 from 2005 through 2018 are shown in Table 1.

Beginning in 2011 groundwater samples have been collected annually from RW-1 and RW-2 and analyzed for dissolved-phase organic constituents and metals. Elevated concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) and MTBE have been reported for samples collected at both recovery wells. The concentrations of BTEX are significantly higher at the recovery wells than observed in down-gradient well OW-14, although concentrations continue to increase down-gradient at OW-14. MTBE is also detected at higher concentrations in the up-gradient recovery wells, but the difference is less than what is observed for BTEX. The dissolved-phase concentrations are included in Table 2.

The most recent investigation of soil and groundwater in the eastern portion of the Tank Farm began on September 21, 2016 and continued through October 5, 2016 (DiSorbo, 2019). The activities included sampling and analysis of soils and groundwater in the vicinity of storage Tanks 568, 569, and 570 and along the northern boundary (east end) of the Tank Farm. This included the completion of six soil borings and two permanent monitoring wells with 25 soil samples (excluding additional quality assurance samples) collected for analysis of potential site-related constituents [e.g., volatile and semi-volatile organics, total petroleum hydrocarbons (TPH), and metals]. Temporary well completions were installed in all six soil borings. Eight groundwater samples (excluding additional quality assurance samples) were collected for analysis of potential site-related constituents (e.g., volatile and semi-volatile organics, TPH, metals, and inorganic/general water quality parameters).

Manganese was detected at concentrations above the non-residential soil screening level in five soil samples (NMED, 2019). Five soil samples have reported concentrations of gasoline range organics (GRO) above the residential soil screening level and one of these samples has a concentration above the non-residential soil screening level. One soil sample has a reported concentration of diesel range organics (DRO) above the residential soil screening level. Benzene and ethylbenzene were reported at concentrations above their respective residential direct contact screening levels in one soil sample.

Eight inorganic constituents (arsenic, barium, beryllium, cobalt, iron, lead, manganese, and vanadium) were detected at concentrations (totals analyses) above residential/tap water screening levels in groundwater samples collected from the permanent and temporary well completions. Arsenic, barium, iron, and manganese were detected at concentrations above screening levels in the dissolved analyses.

Thirteen organic constituents [1,2,4-Trimethlybenzene, 1,2-Dibromoethane (EDB), 1,2-Dichloropropane, 1,3,5-Trimethylbenzene, 1-Methylnaphthalene, 2-Methylnaphthalene, Benzene, Ethylbenzene, MTBE, Naphthalene, Toluene, Total Xylenes, and Bis (2-ethylhexyl) phthalate] were detected at concentrations above screening levels in at least one of the eight groundwater samples collected from the permanent/temporary well completions. A map showing the sample locations, summary tables for the soil and groundwater analyses, and boring/well completions logs are provided in Appendix C.

In August 2019, four more temporary wells (TK 570-2, TK 570-3, TK 570-4, and TK 570-5) were drilled around the perimeter of Tank 570 to evaluate a potential release from the tank based on fluid level measurements taken inside the tank that indicated a potential leak from the tank. Fluid levels were measured after the temporary wells were developed, with SPH identified on the north, west and east sides of Tank 570. The locations of the four new temporary wells are shown on Figure 2. The boring/well completion logs and a table summarizing the fluid level measurements are provided in Appendix D.

Section 3
Site Conditions

3.1 Surface Conditions

A topographic map of the area near the eastern portion of main tank farm is included as Figure 3. Site topographic features include high ground in the southeast gradually decreasing to a lowland fluvial plain to the northwest. Elevations on the refinery property range from 7,040 feet to 6,860 feet. The area of the site near Tank 570 is at an approximate elevation of 6,960 feet above mean sea level (msl).

The soils in the vicinity of the tank farm include two soil types. Surface soils within most of the area of investigation are primarily Rehobeth silty clay loam. To the north are the bordering Simitarq-Celavar sandy loams. Rehobeth soil properties include a pH ranging from 8 to 9 standard units and salinity (naturally occurring and typically measuring up to approximately 8 mmhos/cm). The Simitarq-Celavar soils are well drained with a conservative permeability of 0.20 inches/hour and minimal salinity. Simitarq soils have nearly neutral pH values ranging from 7.2 to 7.4 standard units.

Regional surface water features include the refinery evaporation ponds and a number of small ponds (one cattle water pond and two small unnamed spring fed ponds). The site is located in the Puerco River Valley, north of the Zuni Uplift with overland flows directed northward to the tributaries of the Puerco River. The Puerco River continues to the east to the confluence with the Rio Grande. The South Fork of the Puerco River is intermittent and retains flow only during and immediately following precipitation events.

3.2 Subsurface Conditions

The shallow subsurface soils consist of fluvial and alluvial deposits comprised of clay and silt with minor inter-bedded sand layers. Very low permeability bedrock (e.g., claystones and siltstones) underlie the surface soils and effectively form an aquitard. The Chinle Group, which is Upper Triassic, crops out over a large area on the southern margin of the San Juan Basin. The uppermost recognized local Formation is the Petrified Forest Formation and the Sonsela Sandstone Bed is the uppermost recognized regional aquifer. Aquifer test of the Sonsela Bed northeast of Prewitt indicated a transmissivity of greater than 100 ft^2/day (Stone and others, 1983). The Sonsela Sandstone's highest point occurs southeast of the site and slopes downward to the northwest as it passes under the refinery. The Sonsela Sandstone forms a water-bearing reservoir with artesian conditions throughout the central and western portions of the refinery property.

The diverse properties and complex, irregular stratigraphy of the surface soils across the site cause a wide range of hydraulic conductivity ranging from less than 10-2 cm/sec for gravel like sands immediately overlying the Petrified Forest Formation to 10-8 cm/sec in the clay soils located near the surface (Western, 2009). Generally, shallow groundwater at the refinery follows the upper contact of the Petrified Forest Formation with prevailing flow from the southeast to the northwest, although localized areas may have varying flow directions (Figure 4). Fluid level measurements for wells near Tank 570 are included in Table 3. Fluid levels in these wells indicate an apparent upward trend based on the data dating back to 2014.

Section 4
Scope of Services

The site investigation of soils and groundwater will be conducted to determine if contaminated groundwater is flowing into the area of Tank 570 from a potential up-gradient source and to help define the extent of SPH and dissolved-phase impacts in groundwater east of RW-1. The investigation will commence upon approval of this investigation work plan by NMED.

4.1 Investigation

Two new permanent monitoring wells are proposed, one to the south of Tank 570 and one east of RW-1 (Figure 2). The borings will be advanced to the top of bedrock, anticipated to be the Petrified Forest Formation.

4.1.1 Soil Sample Field Screening and Logging

All soil borings will be drilled to the alluvium/Chinle Group contact and continuously logged and samples field screened. Samples obtained from the soil borings will be screened in the field on 2.0 foot intervals for evidence of contaminants. Field screening results will be recorded on the exploratory boring logs. Field screening results will be used to aid in selection of soil samples for laboratory analysis. The primary screening methods include: (1) visual examination, (2) olfactory examination, and (3) headspace vapor screening for volatile organic compounds. Additional screening for site- or release-specific characteristics such as pH or for specific compounds using field test kits may be conducted where appropriate.

Visual screening includes examination of soil samples for evidence of staining caused by petroleum-related compounds or other substances that may cause staining of natural soils such as elemental sulfur or cyanide compounds. Headspace vapor screening targets volatile organic compounds and involves placing a soil sample in a plastic sample bag or a foil sealed container allowing space for ambient air. The container will be sealed and then shaken gently to expose the soil to the air trapped in the container. The sealed container will be allowed to rest for a minimum of 5 minutes while vapors equilibrate. Vapors present within the sample bag's headspace will then be measured by inserting the probe of the instrument in a small opening in the bag or through the foil. The maximum value and the ambient air temperature will be recorded on the field boring or test pit log for each sample.

The monitoring instruments will be calibrated each day to the manufacturer's standard for instrument operation. A photoionization detector (PID) equipped with a 10.6 or higher electron volt (eV) lamp or a combustible gas indicator will be used for VOC field screening. Field screening results may be site- and boring-specific and the results may vary with instrument type, the media screened, weather conditions, moisture content, soil type, and type of contaminant, therefore, all conditions capable of influencing the results of field screening will be recorded on the field logs.

Discrete soil samples will be retained for laboratory analysis from within the following intervals:

- From the interval in each soil boring with the greatest apparent degree of contamination in the vadose zone, based on field observations and field screening;
- From the bottom of each borehole;
- From the 0.5 foot interval at the top of saturation; and
- Any additional intervals as determined based on field screening results.

The physical characteristics of the samples (such as mineralogy, ASTM soil classification, moisture content, texture, color, presence of stains or odors, and/or field screening results), depth where each sample was obtained, method of sample collection, and other observations will be recorded in the field log by a qualified geologist or engineer. Detailed logs of each boring will be completed in the field by a qualified engineer or geologist. Additional information, such as the presence of water-bearing zones and any unusual or noticeable conditions encountered during drilling, will be recorded on the logs.

Quality Assurance/Quality Control (QA/QC) samples will be collected to monitor the validity of the soil sample collection procedures as follows:

- Field duplicates will be collected at a rate of 10 percent; and
- Equipment blanks will be collected from all sampling apparatus at a frequency of one per day.

4.1.2 Drilling Activities

Soil borings will be drilled using hollow-stem augers. The drilling equipment will be properly decontaminated before drilling each boring. The NMED will be notified as early as practicable if conditions arise or are encountered that do not allow the advancement of borings to the specified depths or at planned sampling locations. Appropriate actions (e.g., installation of protective surface casing or relocation of borings to a less threatening location) will be taken to minimize any negative impacts from investigative borings. Slotted (0.01 inch) PVC well screen will be placed at the bottom of the borings and will extend for 20 feet to ensure that the well is screened across the water table, where water table conditions exist, and to the extent possible the entire saturated zone is open to the well. A 10/20 sand filter pack will be installed to two feet over the top of the well screen.

4.1.3 Groundwater Sample Collection

Groundwater samples shall initially be obtained from newly installed monitoring wells between ten and 30 days after completion of well development. Well development and purging prior to sample collection will be in accordance with procedures described in Appendix E. Prior to collection of groundwater samples for laboratory analyses, the fluid levels and the total depths of each well will be measured. Groundwater samples will be collected if SPH is not present within 24 hours of the completion of well purging using disposal bailers. Alternatively, well sampling may also be conducted in accordance with the NMED's Position Paper *Use of Low-Flow and other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring* (October 30, 2001, as updated). Sample collection methods will be documented in the field monitoring reports. The samples will be transferred to the appropriate, clean, laboratory-prepared containers provided by the analytical laboratory. Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below in Section 4.1.4.

Groundwater samples intended for metals analysis will be submitted to the laboratory as both total and dissolved metals samples. QA/QC samples will be collected to monitor the validity of the groundwater sample collection procedures as follows:

- Field duplicate water samples will be obtained at a frequency of ten percent, with a minimum, of one duplicate sample per sampling event;
- Equipment rinsate blanks will be obtained for chemical analysis at the rate of ten percent or a minimum of one rinsate blank per sampling day. Equipment rinsate blanks will be collected at a rate of one per sampling day if disposable sampling equipment is used. Rinsate samples will be generated by rinsing deionized water through unused or decontaminated sampling equipment. The rinsate sample will be placed in the appropriate sample container and submitted with the groundwater samples to the analytical laboratory for the appropriate analyses; and

- Trip blanks will accompany laboratory sample bottles and shipping and storage containers intended for VOC analyses. Trip blanks will consist of a sample of analyte-free deionized water prepared by the laboratory and placed in an appropriate sample container. The trip blank will be prepared by the analytical laboratory prior to the sampling event and will be kept with the shipping containers and placed with other water samples obtained from the site each day. Trip blanks will be analyzed at a frequency of one for each shipping container of groundwater samples to be analyzed for VOCs.

4.1.4 Sample Handling

At a minimum, the following procedures will be used at all times when collecting samples during investigation, corrective action, and monitoring activities:

1. Neoprene, nitrile, or other protective gloves will be worn when collecting samples. New disposable gloves will be used to collect each sample;
2. All samples collected of each medium for chemical analysis will be transferred into clean sample containers supplied by the project analytical laboratory with the exception of soil, rock, and sediment samples obtained in Encore® samplers. Sample container volumes and preservation methods will be in accordance with the most recent standard EPA and industry accepted practices for use by accredited analytical laboratories. Sufficient sample volume will be obtained for the laboratory to complete the method-specific QC analyses on a laboratory-batch basis; and
3. Sample labels and documentation will be completed for each sample following procedures discussed below. Immediately after the samples are collected, they will be stored in a cooler with ice or other appropriate storage method until they are delivered to the analytical laboratory. Standard chain-of-custody procedures, as described below, will be followed for all samples collected. All samples will be submitted to the laboratory soon enough to allow the laboratory to conduct the analyses within the method holding times.

Chain-of-custody and shipment procedures will include the following:

1. Chain-of-custody forms will be completed at the end of each sampling day, prior to the transfer of samples off site.
2. Individual sample containers will be packed to prevent breakage and transported in a sealed cooler with ice or other suitable coolant or other EPA or industry-wide accepted

method. The drainage hole at the bottom of the cooler will be sealed and secured in case of sample container leakage. Temperature blanks will be included with each shipping container.

3. Each cooler or other container will be delivered directly to the analytical laboratory.
4. Glass bottles will be separated in the shipping container by cushioning material to prevent breakage.
5. Plastic containers will be protected from possible puncture during shipping using cushioning material.
6. The chain-of-custody form and sample request form will be shipped inside the sealed storage container to be delivered to the laboratory.
7. Chain-of-custody seals will be used to seal the sample-shipping container in conformance with EPA protocol.
8. Signed and dated chain-of-custody seals will be applied to each cooler prior to transport of samples from the site.
9. Upon receipt of the samples at the laboratory, the custody seals will be broken, the chain-of-custody form will be signed as received by the laboratory, and the conditions of the samples will be recorded on the form. The original chain-of-custody form will remain with the laboratory and copies will be returned to the relinquishing party.
10. Copies of all chain-of-custody forms generated as part of sampling activities will be maintained on-site.

4.1.5 Collection and Management of Investigation Derived Waste

Drill cuttings, excess sample material and decontamination fluids, and all other investigation derived waste (IDW) associated with soil borings will be contained and characterized using methods based on the boring location, boring depth, drilling method, and type of contaminants suspected or encountered. All purged groundwater and decontamination water will be characterized prior to disposal unless it is disposed in the refinery wastewater treatment system upstream of the API Separator. An IDW management plan is included as Appendix B.

Field equipment requiring calibration will be calibrated to known standards, in accordance with the manufacturers' recommended schedules and procedures. At a minimum, calibration checks will be conducted daily, or at other intervals approved by the Department, and the instruments will be recalibrated, if necessary. Calibration measurements will be recorded in the daily field logs. If field equipment becomes inoperable, its use will be discontinued until the necessary repairs are made. In the interim, a properly calibrated replacement instrument will be used.

4.1.6 Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded in a field log book. Copies of the completed forms will be maintained in a bound and sequentially numbered field file for reference during field activities. Indelible ink will be used to record all field activities. Photographic documentation of field activities will be performed, as appropriate. The daily record of field activities will include the following:

1. Site or unit designation;
2. Date;
3. Time of arrival and departure;
4. Field investigation team members including subcontractors and visitors;
5. Weather conditions;
6. Daily activities and times conducted;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log, as appropriate;
10. Field monitoring data, including health and safety monitoring;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage or disposal; and
14. Signature of personnel completing the field record.

4.1.7 Chemical Analyses

All samples collected for laboratory analysis will be submitted to an accredited laboratory. The laboratory will use the most recent standard EPA and industry-accepted analytical methods for target analytes as the testing methods for each medium sampled. Chemical analyses will be performed in accordance with the most recent EPA standard analytical methodologies and extraction methods.

Groundwater and soil samples will be analyzed by the following methods:

- SW-846 Method 8260 for Skinner List volatile organic compounds;
- SW-846 Method 8270 for Skinner List semi-volatile organic compounds; and

- SW-846 Method 8015B gasoline range (C5-C10), diesel range (>C10-C28), and motor oil range (>C28-C36) organics.

Groundwater and soil samples will also be analyzed for the following Skinner List inorganics and iron, and manganese using the indicated analytical methods shown. The groundwater samples collected for metals analysis will be analyzed for total and dissolved concentrations. Groundwater samples will also be analyzed for chloride, fluoride, nitrate, nitrite, and sulfate.

Inorganic Analytical Methods

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.4/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020
Iron	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Chloride	EPA method 300.0
Fluoride	EPA method 300.0
Sulfate	EPA method 300.0
Nitrite	EPA method 300.0
Nitrate	EPA method 300.0

Groundwater field measurements will be obtained for pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, turbidity, and temperature.

4.1.8 Data Quality Objectives

The Data Quality Objectives (DQOs) were developed to ensure that newly collected data are of sufficient quality and quantity to address the project goals, including Quality Assurance/Quality Control (QA/QC) issues (EPA, 2006). The project goals are established to determine and evaluate the presence, nature, and extent of releases of contaminants at specified SWMUs. The type of data required to meet the project goals includes chemical analyses of soil and groundwater to determine if there has been a release of contaminants.

The quantity of data is location specific and is based on the historical operations at individual locations. Method detection limits should be 20% or less of the applicable background levels, cleanup standards and screening levels.

Additional DQOs include precision, accuracy, representativeness, completeness, and comparability. Precision is a measurement of the reproducibility of measurements under a given set of circumstances and is commonly stated in terms of standard deviation or coefficient of variation (EPA, 1987). Precision is also specific to sampling activities and analytical performance. Sampling precision will be evaluated through the analyses of duplicate field samples and laboratory replicates will be utilized to assess laboratory precision.

Accuracy is a measurement in the bias of a measurement system and may include many sources of potential error, including the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques (EPA, 1987). An evaluation of the accuracy will be performed by reviewing the results of field/trip blanks, matrix spikes, and laboratory QC samples.

Representativeness is an expression of the degree to which the data accurately and precisely represent the true environmental conditions. Sample locations and the number of samples have been selected to ensure the data is representative of actual environmental conditions. Based on SWMU specific conditions, this may include either biased (i.e., judgmental) locations/depths or unbiased (systematic grid samples) locations. In addition, sample collection techniques (e.g., field monitoring and decontamination of sampling equipment) will be utilized to help ensure representative results.

Completeness is defined as the percentage of measurements taken that are actually valid measurements, considering field QA and laboratory QC problems. EPA Contract Laboratory Program (CLP) data has been found to be 80-85% complete on a nationwide basis and this has been extrapolated to indicate that Level III, IV, and V analytical techniques will generate data that are approximately 80% complete (EPA, 1987). As an overall project goal, the completeness goal is 85%; however, some samples may be critical based on location or field screening results and thus a sample–by-sample evaluation will be performed to determine if the completeness goals have been obtained.

Comparability is a qualitative parameter, which expresses the confidence with which one data set can be compared to another. Industry standard sample collection techniques and routine EPA analytical methods will be utilized to help ensure data are comparable to historical and future data. Analytical results will be reported in appropriate units for comparison to historical data and cleanup levels.

Section 5
References

DiSorbo, 2019, Investigation Report OW-14 Source Area, Gallup Refinery - Marathon Petroleum Company, Gallup, New Mexico, p. 46.

EPA, 1987, Data Quality Objectives for Remedial Response Activities; United States Environmental Protection Agency, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, OSWER Directive 9355.0-7B, 85p.

EPA, 2006, Guidance on Systematic Planning Using the Data Quality Objectives Process, United States Environmental Protection Agency, Office of Environmental Information; EPA/240/B-06/001, p. 111.

Geoscience Consultants, Ltd, 1985, Inventory of Solid Waste Management Units, June 14, 1985, p. 22.

Giant Refining Company, 1997, Comprehensive Facility Investigation Work Plan (Stage 1 Abatement Plan), June 30, 1997, p. 7.

NMED, 2019, Risk Assessment Guidance for Site Investigation and Remediation, New Mexico Environment Department.

Sentinel, 2015, 83 Unleaded Gasoline Storage Tank TK-570 Internal/External Inspection, Western Refining Gallup New Mexico, p. 29.

Stone, W.J., Lyford, F.P., Frenzel, P.F., Mizel, N.H., and Padgett, E.T., 1983, Hydrogeology and Water Resources of San Juan Basin, New Mexico; Hydrogeologic Report 6, New Mexico Bureau of Mines and Mineral Resources, p. 70.

Western, 2009, Facility-wide Groundwater Monitoring Plan: Gallup Refinery, p. 97.

Tables

Table 1 - RW-1 Recovery Volumes
Western Refining Southwest, Inc. - Gallup Refinery

Year	Product Recovered (gallons)	Water Recovered (gallons)
2005	431.5	1,210.5
2006	23.52	1,107.0
2007	1.72	148.5
2008	3.99	152.0
2009	1.78	338.0
2010	0.66	128.0
2011	0.42	165.0
2012	0.97	137.0
2013	2.328	86.0
2014	2.37	83.0
2015	2	54.0
2016	8.5	53.0
2017	11	42.0
2018	1	1.5
total	491.758	3,705.5

recovery volumes are field estimates for RW-1

Table 2 - Groundwater Analyses
Western Refining Southwest, Inc. - Gallup Refinery

		Benzene (mg/L)	Toluene (mg/L)	Ethyl Benzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)	1,2,4-Trimethyl benzene (mg/L)	1,3,5-Trimethylbenzene (mg/L)	Naphthalene (mg/L)	1-Methyl naphthalene (mg/L)	n-Propylbenzene (mg/L)	Sec-butylbenzene (mg/L)
WQCC 20NMAC 6.2.3103 (Dec. 2018)		**0.005**	**1**	**0.7**	**0.62**	**0.1**	NE	NE	**0.03**	NE	NE	NE
40 CFR 141.62 MCL		0.005	1.0	0.7	10	NE	NE	NE	NE	NE	NE	NE
NMED Tap Water (March 2019)		0.00455	1.09	0.0149	0.193	0.143	NE	NE	0.00165	**0.0114**	NE	NE
EPA RSL for Tap Water (Nov 2018)		0.00046	1.1	0.0015	0.19	0.014	**0.056**	**0.060**	0.00017	0.0011	**0.66**	**2**
Well ID	DATE SAMPLED											
OW-14	11/09/18	**13**	<0.05	0.64	<0.05	**0.6**	<0.05	<0.05	<0.1	<0.2	<0.05	<0.05
	09/11/18	**17**	<0.05	0.66	0.042	**0.74**	<0.05	<0.05	0.027	**0.026**	0.03	<0.05
	05/15/18	**15**	0.0088	**0.71**	<0.15	**0.67**	<0.1	<0.1	0.017	<4.0	0.027	<0.1
	02/27/18	**14**	0.0065	0.61	<0.15	**0.66**	<0.1	<0.1	**0.044**	**0.059**	0.032	<0.1
	12/11/17	**13**	0.013	0.64	0.052	**0.63**	0.013	0.0021	**0.037**	**0.033**	0.028	0.0032
	09/06/17	**12**	0.0091	0.54	0.033	**0.66**	0.012	0.0016	**0.038**	**0.038**	0.025	0.0027
	05/30/17	**13**	0.004	0.47	0.02	**0.7**	0.011	<0.05	0.028	**0.037**	0.021	<0.05
	02/27/17	**12**	0.0062	0.39	<0.075	**0.81**	0.0074	<0.05	0.024	**0.035**	0.014	<0.05
	11/15/16	**8.7**	0.0057	0.3	0.013	**0.5**	0.0084	0.0015	0.02	**0.03**	0.013	0.0041
	08/31/16	**8.1**	0.0029	0.25	0.008	**0.58**	0.0071	0.00082	0.018	**0.034**	0.011	0.0022
	06/06/16	**7.8**	0.0026	0.23	0.012	**0.62**	0.008	0.0017	0.019	**0.033**	0.011	0.0031
	03/04/16	**6.5**	<0.05	0.23	<0.075	**0.68**	<0.05	NA	0.017	**0.03**	<0.05	<0.05
	10/27/15	**6.2**	<0.02	0.15	<0.03	**0.57**	<0.02	NA	<0.04	<0.08	<0.02	<0.02
	08/10/15	**5.4**	<0.01	0.16	<0.015	**0.78**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	6/1/2015	**4.6**	<0.02	0.16	<0.03	**0.74**	<0.02	NA	<0.04	<0.08	<0.02	<0.02
	3/9/2015	**3.9**	<0.02	0.16	<0.03	**0.76**	<0.02	NA	<0.04	<0.08	<0.02	<0.02
	11/10/2014	**3.6**	0.015	0.17	<0.015	**0.81**	<0.01	NA	<0.02	**0.044**	<0.01	<0.01
	9/15/2014	**3.8**	<0.02	0.16	<0.03	**0.82**	<0.02	NA	<0.04	**0.016**	<0.02	<0.02
	6/3/2014	**3.7**	<0.02	0.12	<0.03	**0.93**	<0.02	NA	<0.04	<0.08	<0.02	<0.02
	3/7/2014	**4.0**	0.026	0.14	0.032	**1.1**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	11/11/2013	**3.3**	0.046	0.13	0.019	**1.1**	<0.005	NA	<0.01	**0.027**	<0.005	<0.005
	9/4/2013 [2]	**2.6**	<0.005	0.063	<0.0075	**0.94**	<0.005	NA	<0.01	**0.024**	<0.005	<0.005
	6/13/2013	**3.4**	<0.01	0.073	<0.015	**1.3**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	3/19/2013	**2.8**	<0.01	0.065	<0.015	**1.3**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	11/27/2012	**2.7**	<0.01	0.056	<0.015	**1.4**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	8/23/2012	**2.1**	<0.01	0.037	<0.015	**1.6**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	6/14/2012	**2.6**	<0.01	0.053	<0.015	**1.2**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	3/21/2012	**2.3**	<0.01	0.051	<0.015	**1.4**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	12/13/2011	**1.5**	<0.005	0.036	<0.0075	**1.3**	<0.005	NA	<0.01	**0.021**	<0.005	<0.005
	10/24/2011	**1.4**	<0.005	0.045	<0.0075	**1.4**	<0.005	NA	<0.01	**0.022**	<0.005	<0.005
	6/20/2011	**1.8**	0.0015	0.0610	<0.0015	**1.6**	0.001	NA	0.002	**0.020**	0.002	0.002
	2/24/2011	**1.3**	0.0019	0.0420	<0.0015	**1.4**	0.001	NA	<0.002	**0.019**	0.001	0.003
	11/8/2010	**0.63**	<0.001	0.0180	<0.0015	**1.3**	0.001	NA	<0.002	**0.022**	<0.001	0.003
	9/22/2010	**0.47**	<0.001	0.0083	<0.0015	**1.4**	<0.001	NA	<0.002	**0.022**	<0.001	0.003
	6/7/2010	**0.33**	0.0018	0.0085	<0.0015	**1.4**	0.001	NA	<0.002	**0.020**	<0.001	0.002
	3/24/2010	**0.25**	<0.005	0.0100	<0.0075	**1.5**	<0.005	<0.005	<0.01	<0.02	<0.005	<0.005

Table 2 - Groundwater Analyses
Western Refining Southwest, Inc. - Gallup Refinery

		Benzene (mg/L)	Toluene (mg/L)	Ethyl Benzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)	1,2,4-Trimethyl benzene (mg/L)	1,3,5-Trimethylbenzene (mg/L)	Naphthalene (mg/L)	1-Methyl naphthalene (mg/L)	n-Propylbenzene (mg/L)	Sec-butylbenzene (mg/L)
WQCC 20NMAC 6.2.3103 (Dec. 2018)		**0.005**	**1**	**0.7**	**0.62**	**0.1**	NE	NE	**0.03**	NE	NE	NE
40 CFR 141.62 MCL		0.005	1.0	0.7	10	NE	NE	NE	NE	NE	NE	NE
NMED Tap Water (March 2019)		0.00455	1.09	0.0149	0.193	0.143	NE	NE	0.00165	**0.0114**	NE	NE
EPA RSL for Tap Water (Nov 2018)		0.00046	1.1	0.0015	0.19	0.014	**0.056**	**0.060**	0.00017	0.0011	**0.66**	**2**
Well ID	DATE SAMPLED											
-	9/18/2014	37	35.0	1.8	10	1.2	<1.0	<1.0	<2.0	<4.0	<1.0	<1.0
RW 1	9/16/2013	54	35	2.4	13	2.2	1.3	<1.0	<2.0	<4.0	<1.0	<1.0
	8/23/2012	45	82	4.9	31	3.1	2.8	<1.0	<2.0	<4.0	<0.01	NA
	10/3/2011	51	37	3.7	23	2.9	5.8	0.98	0.6	0.15	0.4	NA
	08/28/18	**48**	**4**	**1.5**	**3.8**	**1.1**	**0.31**	0.043	**0.1**	**0.04**	0.056	NA
	05/08/18	**46**	**5**	**1.5**	**4.2**	**1.2**	**0.34**	0.031	**0.095**	<0.8	0.042	NA
	02/20/18	**42**	**3.7**	**1.5**	**3.8**	**1.2**	**0.32**	0.038	**0.14**	**0.076**	0.059	NA
	12/06/17	**38**	**2.9**	**1.5**	**3.6**	**1.3**	**0.28**	0.026	**0.069**	**0.021**	0.042	NA
	09/19/17	**37**	**6.7**	**1.2**	**4**	**1.3**	**0.27**	0.046	**0.11**	**0.055**	0.037	NA
	06/20/17	**47**	**9**	**1.4**	**4.6**	**1.7**	**0.28**	0.058	**0.11**	**0.063**	0.043	NA
-	03/16/17	**37**	**2.3**	**1.3**	**3.1**	**1.6**	**0.2**	0.04	**0.15**	**0.13**	0.044	NA
RW 2	11/16/16	**38**	**3.4**	**1.2**	**3.2**	**1.7**	**0.2**	0.049	**0.15**	**0.13**	0.063	NA
	09/13/16	**38**	**3.8**	**1.2**	**3.1**	**1.6**	**0.21**	0.044	**0.14**	**0.088**	0.056	NA
	06/08/16	**36**	**2.9**	**1.1**	**3.1**	**1.7**	**0.23**	**0.12**	**0.18**	**0.17**	0.071	NA
	03/07/16	**46**	**4.1**	**1.2**	**3.5**	**1.9**	**0.18**	0.028	**0.1**	**0.069**	0.045	NA
	08/23/15	**42**	**6.9**	**1.1**	**3.7**	**1.8**	**0.21**	<0.2	<0.4	<0.8	<0.6	NA
	9/18/2014	40	4.5	0.86	2.5	1.9	0.15	<0.1	<0.2	<0.4	<0.1	NA
	9/16/2013	48	3.4	0.87	2.3	2.8	0.13	<0.1	<0.2	<0.4	<0.1	NA
	8/23/2012	42	2.6	0.59	1.7	3.3	<0.1	<0.1	<0.2	<0.4	<0.1	NA
	10/3/2011	39	5.3	0.57	1.5	3.7	0.098	0.024	0.057	0.054	0.036	NA

All values expressed in milligrams per liter

DEFINITIONS

NE = Not established

NA = Not analyzed

Bold and highlighted values represent values above the applicable standards

Bold screening level is applicable screening under RCRA Permit

STANDARDS

WQCC 20 NMAC 6.2.3103 - Standards for Ground Water of 10,000 mg/l TDS Concentration or Less.

a) Human Health Standards; b) Other Standards for Domestic Water

40 CFR 141.62 Maximum Contaminant Levels (MCL)

EPA Regional Screening Level (RSL) Summary Table

TABLE 3
FLUID LEVEL MEASUREMENTS

Date of Installation	Well ID Number	Inspection or Sample Date	Casing Diameter (Inch)	Ground Level Elevation (ft)	Well Casing Rim Elevation (ft)	2011 Survey [1] Ground Elevation Inside Steel Sleeve (ft)	Stick-up length (ft)	Well Casing Bottom Elevation (ft)	Total Well Depth (ft)	Depth to SPH (ft)	SPH Column Thickness (ft)	Depth to Water (ft)	Ground water Elevation (ft)	Corrected Water Table [1] Elevation (ft)	Screened Interval Depth Top to Bottom (ft)
12/17/80	OW-14	03/07/14	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	24.12	6,902.53	NA	35 - 45
		06/03/14	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	24.15	6,902.50	NA	35 - 45
		09/15/14	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	24.40	6,902.25	NA	35 - 45
		11/10/14	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	24.25	6,902.40	NA	35 - 45
		03/09/15	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.95	6,902.70	NA	35 - 45
		06/01/15	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.88	6,902.77	NA	35 - 45
		08/10/15	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.96	6,902.69	NA	35 - 45
		10/27/15	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.69	6,902.96	NA	35 - 45
		03/04/16	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.20	6,903.45	NA	35 - 45
		06/06/16	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.18	6,903.47	NA	35 - 45
		08/31/16	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.50	6,903.15	NA	35 - 45
		11/15/16	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.28	6,903.37	NA	35 - 45
		02/27/17	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	22.83	6,903.82	NA	35 - 45
		05/30/17	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.18	6,903.47	NA	35 - 45
		09/06/17	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	22.56	6,904.09	NA	35 - 45
		12/11/17	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	22.20	6,904.45	NA	35 - 45
		02/27/18	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	21.80	6,904.85	NA	35 - 45
		04/26/18	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.75	ND	NA	21.75	6,904.90	NA	35 - 45
		08/14/18	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.78	ND	NA	21.95	6,904.70	NA	35 - 45
		11/06/18	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	21.82	6,904.83	NA	35 - 45
03/28/95	RW-1	03/14/14	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.11	3.54	31.65	6,914.41	6,917.24	25 - 40
		06/09/14	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.05	5.01	33.06	6,913.00	6,917.01	25 - 40
		09/18/14	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.31	NA	NA	NA	NA	25 - 40
		11/13/14	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.15	4.89	33.04	6,913.02	6,916.93	25 - 40
		03/23/15	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.10	4.70	32.80	6,913.26	6,917.02	25 - 40
		06/09/15	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.70	4.40	32.10	6,913.96	6,917.48	25 - 40
		08/23/15	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.08	1.94	30.02	6,916.04	6,917.59	25 - 40
		10/29/15	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.65	2.45	30.10	6,915.96	6,917.92	25 - 40
		03/04/16	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.05	2.50	30.55	6,915.51	6,917.51	25 - 40
		06/08/16	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.98	3.82	31.80	6,914.26	6,917.32	25 - 40
		09/13/16	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.90	4.14	32.04	6,914.02	6,917.33	25 - 40
		11/16/16	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.80	3.10	30.90	6,915.16	6,917.64	25 - 40
		03/16/17	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.05	3.50	30.55	6,915.51	6,918.31	25 - 40
		06/20/17	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	26.77	1.65	28.42	6,917.64	6,918.96	25 - 40
		09/19/17	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	26.52	1.08	27.60	6,918.46	6,919.32	25 - 40

TABLE 3
FLUID LEVEL MEASUREMENTS

Date of Installation	Well ID Number	Inspection or Sample Date	Casing Diameter (Inch)	Ground Level Elevation (ft)	Well Casing Rim Elevation (ft)	2011 Survey [1] Ground Elevation Inside Steel Sleeve (ft)	Stick-up length (ft)	Well Casing Bottom Elevation (ft)	Total Well Depth (ft)	Depth to SPH (ft)	SPH Column Thickness (ft)	Depth to Water (ft)	Ground water Elevation (ft)	Corrected Water Table [1] Elevation (ft)	Screened Interval Depth Top to Bottom (ft)
		12/12/17	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	26.50	1.00	27.50	6,918.56	6,919.36	25 - 40
		02/13/18	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	26.94	0.28	27.22	6,918.84	6,919.06	25 - 40
		04/25/18	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.35	26.94	0.27	27.21	6,918.85	6,919.07	25 - 40
		08/16/18	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.45	27.44	0.26	27.70	6,918.36	6,918.57	25 - 40
03/29/95	RW-2	03/17/14	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	24.59	6,903.94	NA	26.1 - 36.1
		06/09/14	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.79	6,904.74	NA	26.1 - 36.1
		09/18/14	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.95	6,904.58	NA	26.1 - 36.1
		11/13/14	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.90	6,904.63	NA	26.1 - 36.1
		03/23/15	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.52	6,905.01	NA	26.1 - 36.1
		06/09/15	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.02	6,905.51	NA	26.1 - 36.1
		08/23/15	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.37	6,905.16	NA	26.1 - 36.1
		10/29/15	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	22.80	6,905.73	NA	26.1 - 36.1
		03/04/16	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	22.45	6,906.08	NA	26.1 - 36.1
		06/08/16	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	22.31	6,906.22	NA	26.1 - 36.1
		09/13/16	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	22.47	6,906.06	NA	26.1 - 36.1
		11/16/16	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	22.22	6,906.31	NA	26.1 - 36.1
		03/16/17	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	21.65	6,906.88	NA	26.1 - 36.1
		06/20/17	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	21.19	6,907.34	NA	26.1 - 36.1
		09/19/17	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	20.71	6,907.82	NA	26.1 - 36.1
		12/05/17	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	40.00	ND	NA	20.34	6,908.19	NA	26.1 - 36.1
		02/19/18	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	40.00	ND	NA	20.00	6,908.53	NA	26.1 - 36.1
		04/25/18	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.99	ND	NA	20.03	6,908.50	NA	26.1 - 36.1
		08/16/18	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	40.00	ND	NA	20.10	6,908.43	NA	26.1 - 36.1

DEFINITIONS:

DTB - Depth to Bottom — NA = Not Applicable — ND = Not Detected

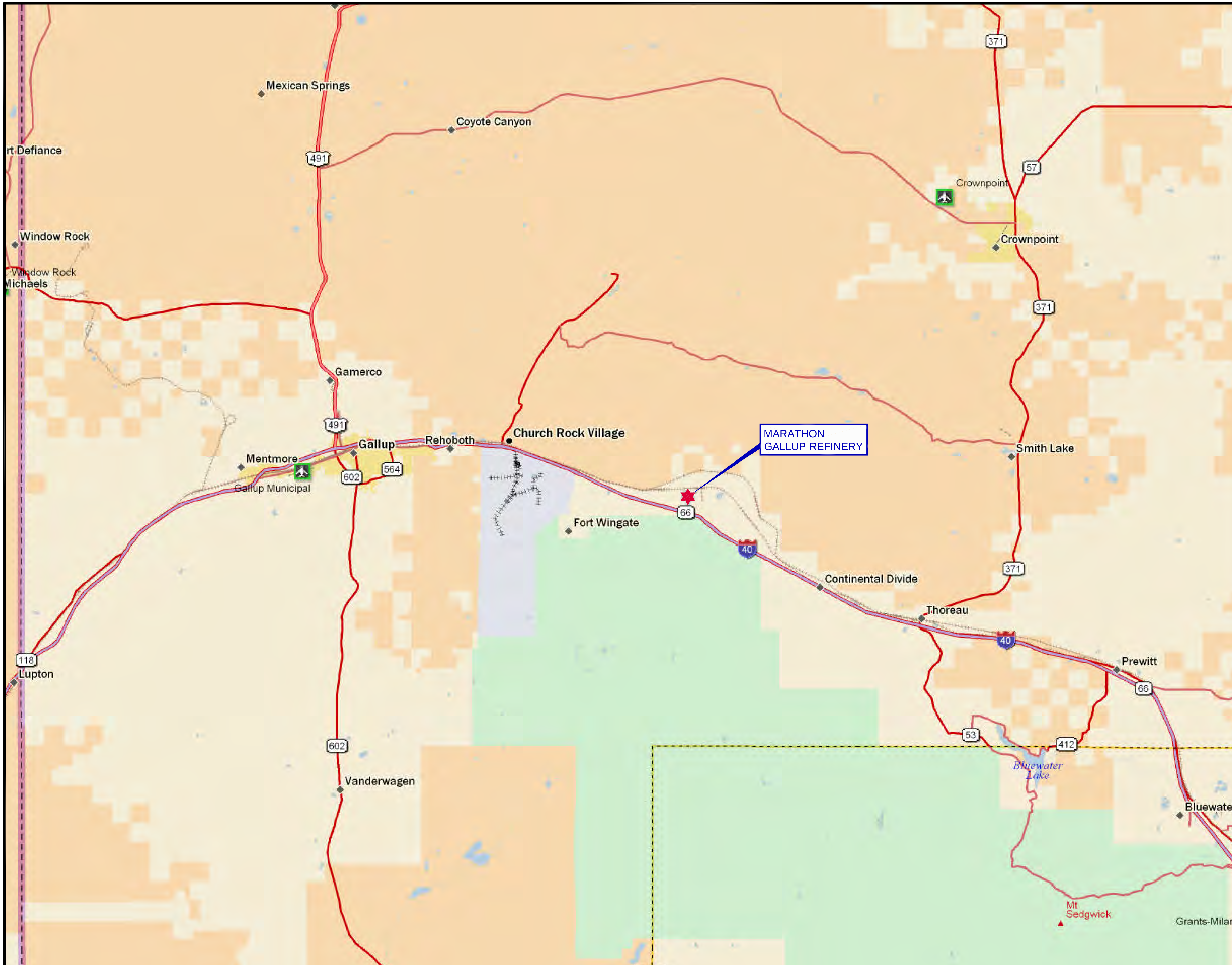
DTW - Depth to Water — Negative number in Stick up Length column indicates well is flushmount and located at or below ground level.

SPH = Separate Phase Hydrocarbons — Depth to Water Column - if 0.00 is indicated - means water is at top of casing (full) under artesian flow conditions.

NOTES:

1. Corrected Water Table Elevation applies only if SPH thickness column measurement exists. (0.8 X SPH thickness + Groundwater Elevation)

Figures



Map Source: DeLorme Street Atlas USA 2007 Plus.

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 12/09/18	FILE: Mathon–dB206

FIGURE 1
SITE LOCATION MAP
GALLUP REFINERY

DiSorbo Environmental Consulting Firm
8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759

Aerial Map Source: Google Map, 01/05/2014.

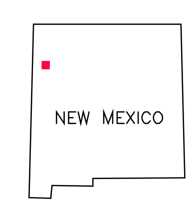
0 160
SCALE IN FEET

LEGEND

PROPOSED MONITORING WELL LOCATION

TK 568-1 SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-14 ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER



GALLUP SITE LOCATION

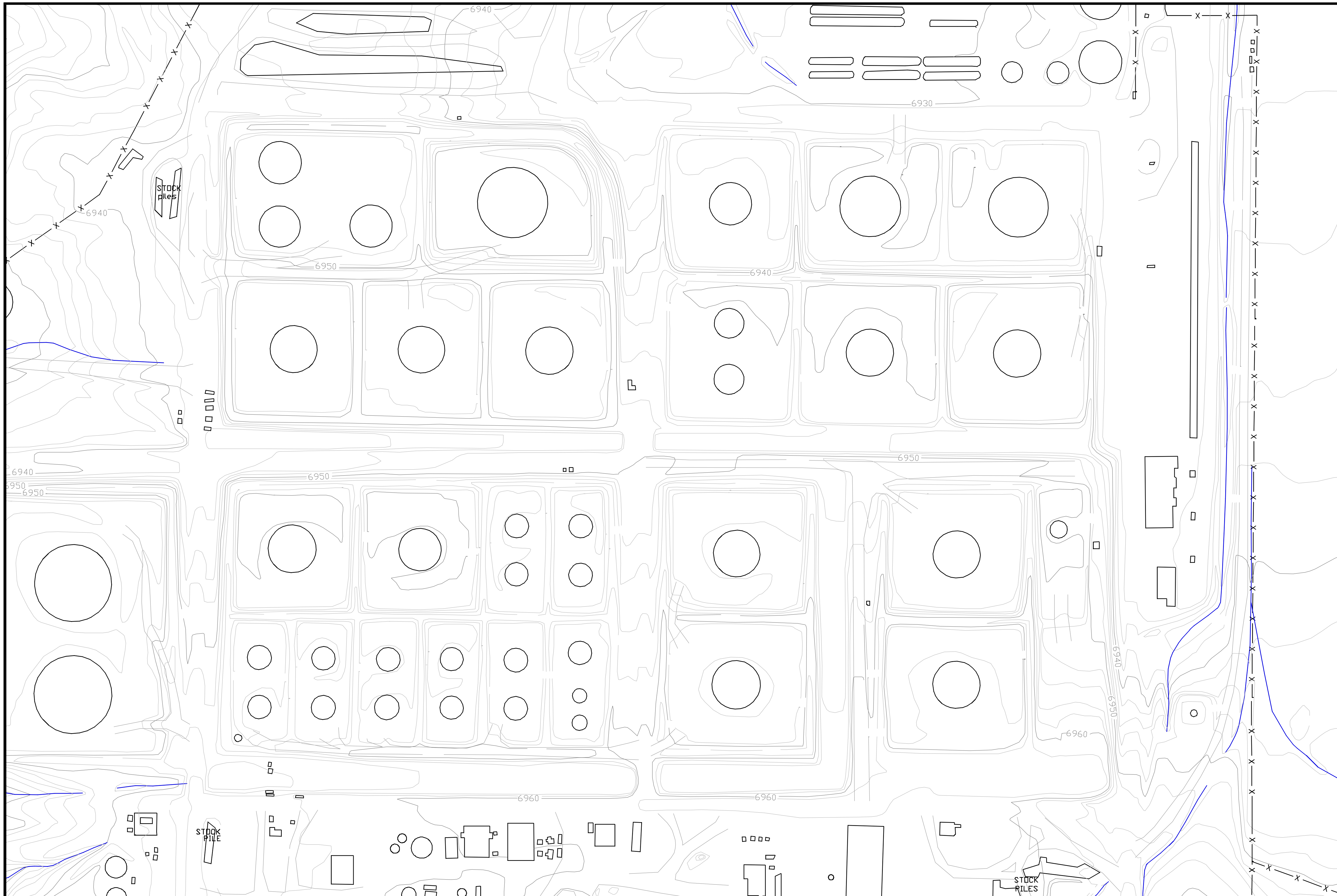
MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 09/01/19	FILE: Mathon–dB228

FIGURE 2
SITE MAP

DiSorbo
Environmental Consulting Firm

8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759



Map Source: Compiled by Photogrammetric Methods from Photography Acquired on March 1, 1998.

0 150
SCALE IN FEET

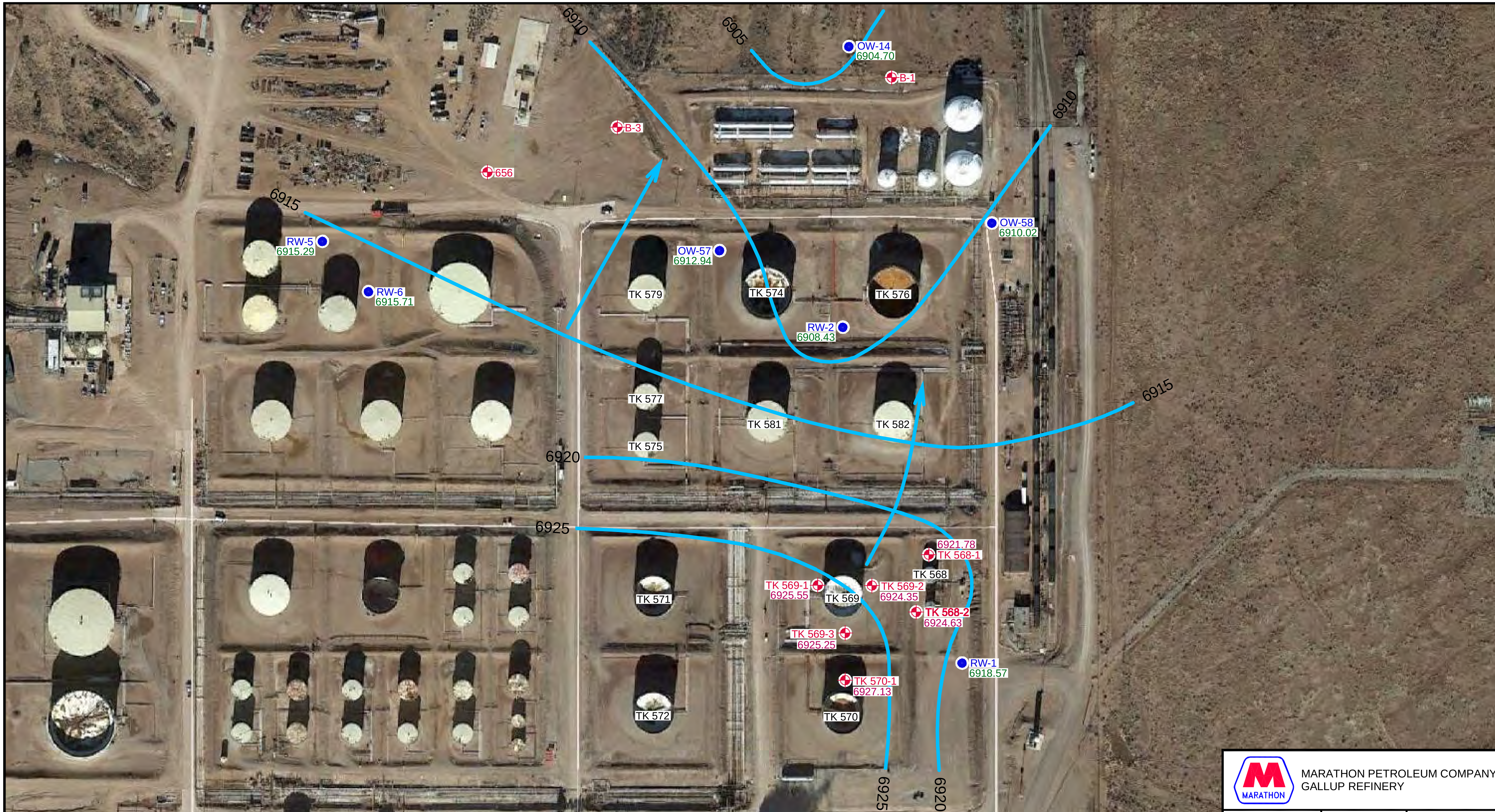
MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 09/01/19	FILE: Mathon–dB229

FIGURE 3
TOPOGRAPHIC MAP

DiSorbo Environmental Consulting Firm

8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759



Aerial Map Source: Google Map, 01/05/2014.

0 160
SCALE IN FEET

LEGEND

TK 568-1	SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER
OW-14	ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
6921.78	WATER LEVEL ELEVATION MEASURED SEPTEMBER 2016 (ABOVE MSL)
6915.29	WATER LEVEL ELEVATION MEASURED AUGUST 2018 (ABOVE MSL)
6910	POTENTIOMETRIC CONTOUR (FT)
	GROUNDWATER FLOW DIRECTION

NEW MEXICO
GALLUP SITE LOCATION

MARATHON
MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon | DATE: 09/01/19 | FILE: Mathon–dB207

FIGURE 4
AUGUST 2018
POTENTIOMETRIC SURFACE MAP

DiSorbo
Environmental Consulting Firm
8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759

Appendix A

Boring Logs

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

PROJECT: Tank 569
LOCATION: See Boring Plan

FILE #: 95-018
ELEVATION: 6943.7
TOTAL DEPTH: 48.5
LOGGED BY: WHK
DATE: 3-28-95
STATIC WATER: 28.0
BORING ID: BG4
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-0.3	*********		C	**Sand**, fine, dry, brown, loose	
0.3-0.4	xxxxxxxxx	1.0	C	**Asphalt Cement Concrete**	11.0
0.4-5.0	///***///		C	**Clay**, sandy, wet, brown, firm, (fill), odor below 3.9', water saturated @ 4.8'	>1438
	///***///		C	bottom of fill is at 4.8'	
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
5.0-11.8	///--+///	5.0	C	**Clay**, silty, blocky, wet, brown, firm, scattered carbonate filaments, some	0.0
	///--+///		C	nodules, native, no odor, redder >10'	
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///	11	C		
	///--+///		C		
11.8-13.0	///***///	12	C	**Clay**, sandy, very fine, wet, red brown to brown, soft	0.0
	///***///		C		
13.0-14.1	////+++//	13	C	**Clay**, stiff, fissured, wet, brown, some carbonate nodules	0.0
	////+++//		C		
14.1-14.6	*********	14	C	**Sand**, fine, clean, damp, white, loose	0.0
14.6-15.0	///**0*//		C	**Clay**, sandy, slightly gravelly, wet, brown, very stiff to hard	0.0
15.0-16.9	///**////	15	C	**Clay**, very fine sandy, laminar bedded, wet, brown, soft	0.0
	///**////		C		
	///**////		C		
	///**////		C		
16.9-18.1	///*/////	17	C	**Clay**, very fine sandy, slightly less than above, slightly blocky, wet, brown, firm	0.0
	///*/////		C		
	///*/////	18	C		
18.1-19.8	****//***		C	**Sand**, some clay, sandy in bands, moist to wet, brown, moderately dense to soft	0.0
	****//***		C	interbedded with finer soil	
19.8-21.3	000***000		C	**Gravel**, sandy, moist, light grey to white, dense, subrounded	0.0
	000***000	20	C		
	000***000		C		
	000***000	21	C		
21.3-21.8	///***///		C	**Clay**, sandy, wet, brown, soft	
21.8-25.5	000**/000	22	C	**Gravel**, slightly sandy, some clay as binder, moist, grey to brown, dense	
	000**/000		C	odor @ 24.4'	20 @ 22.5'
	000**/000		C		

LOGGED BY: WHK

ZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6943.7
TOTAL DEPTH: 48.5
LOGGED BY: WHK
DATE: 3-28-95
STATIC WATER: 28.0
BORING ID: BG4
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	000**/000		C	continued from page 1	
	000**/000	24	C		
	000**/000		C		160 @ 24.4'
	000**/000	25	C		
25.5-29.4	*********		C	**Sand**, fine, clean of silt and clay, moist, brown, loose	45.0
	*********	26	C		
	*********		C		
	*********		C		
	*********		C		
	*********		C		
	*********		C		
	*********	29	C		
29.4-30.5	*********		C	**Sand** as above but **very weakly water bearing @ 29.4'**, grey to black, strong odor	1100
	*********	30	C		
30.5-31.2	///***///		C	**Clay**, sandy, wet, brown, soft, odor	770
	///***///	31	C		
31.2-34.0	///+++///		C	**Clay**, blocky, wet, very stiff, numerous carbonate filaments, brown, slightly	770
	///+++///		C	fissured, odor	
	///+++///		C		
	///+++///		C		
	///+++///		C		
34.0-35.0	***---***	34	C	**Sand**, silty, very fine, does not appear water bearing, but sample covered with	700
	---		C	water from above, very dark brown to black, soft, strong odor	
35.0-37.3	***///***	35	C	**Sand**, very fine, clayey, **saturated, water bearing zones--2" thick**, gradational to	1000
	///		C	clay below, brown, strong odor	
	///		C		
	///		C		
	///	37	C		
37.3-39.2	///+++///		C	**Clay**, wet, brown, stiff, carbonate filaments, soft to firm, not blocky or fissured	320
	///+++///		C		
	///+++///		C		
	///+++///	39	C		
39.2-40.9	000**/000		C	**Gravel**, sandy, slightly clayey, **water bearing**, brown, dense, rounded to subrounded	800
	000**/000		C	odor	
	000**/000		C		
40.9-45.0	----*----	41	C	**CHINLE FORMATION**	
	----*----		C	**Shale**, slightly sandy, fissle, fissured, slightly blocky, moist, red brown, hard	2.0
	----*----		C	some grey green banding, no odor	
	----*----		C		
	----*----		C		
	----*----		C		
	----*----		C		
	----*----		C		
45.0-48.5	----**---	45	C	**Shale**, sandy, fissle, moist to damp, hard, water from above runs into fissle	
	----**---		C	partings (dry on interior of sample) difficult to obtain uncontaminated sample	
	----**---		C	dark red brown, suspect samples taken may be contaminated by water from above	

LOGGED BY: WHK

IZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT:	Tank 569
LOCATION:	See Boring Plan

LOG OF TEST BORINGS

FILE #:	95-018
ELEVATION:	6943.7
TOTAL DEPTH:	48.5
LOGGED BY:	WHK
DATE:	3-28-95
STATIC WATER:	28'-7"
BORING ID:	BG4
PAGE:	3

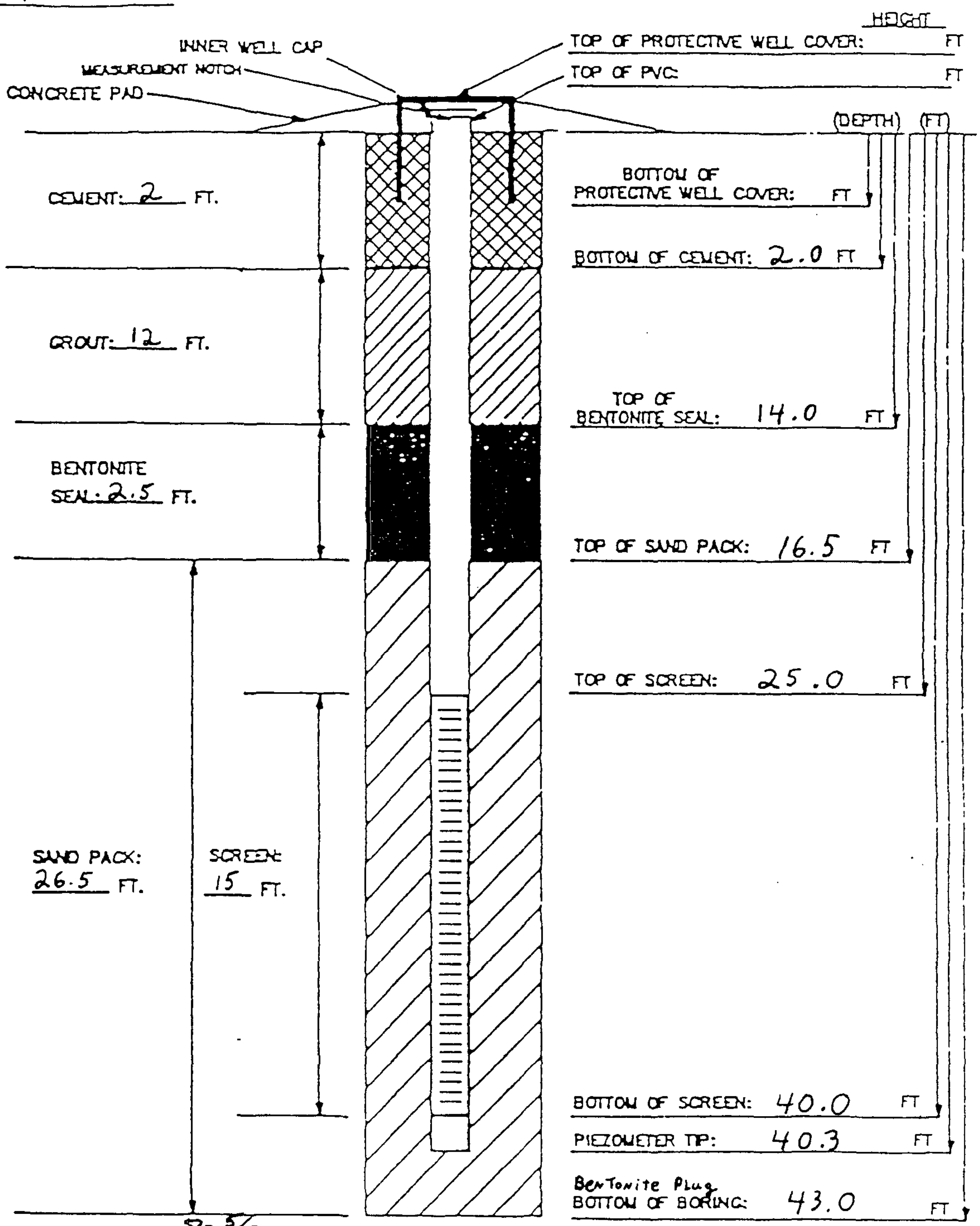
DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	----**---		C	continued from page 2	
	----**---	47	C		23 @ 47.0'
	----**---		C		
	----**---	48	C		
	----**---		C		12 @ 48.5'
TD				stop drilling 11:05a	
				water @ 18.8' @ 11:30a -- 8" of hydrocarbon on water @ 2:00p water level @ 28'-7"	
				completed 4" well, screened from 25' to 40'	
				(see attached completion diagram)	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

INSTALLATION DATE: 032895

INSTALLATION DIAGRAM
MONITORING WELL NO.
BG-4



BOREHOLE DIAMETER: 8-5/8 INCHES

MATERIALS USED:

SAND TYPE AND QUANTITY: 20-40
BENTONITE PELLETS (5-GALLON BUCKETS): 1
BAGS OF GROUT: 1
AMOUNT OF CEMENT: 8-94# Bags+75#Gel
AMOUNT OF WATER USED: 8 gal
OTHER:

Bottom Cap Used? YES
Screen Lengths: 15'
Riser Used: 30'
Top Cap Used? ______
Well Size: 4" Dia.

J-Plug Used? YES
Flush Mount Vault ______
Avove Ground Vault YES
Bollards, No.& Size:

TASK: Tank 569 GEOLOGIST/ENGINEER: WHK

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

PROJECT: Tank 569
LOCATION: See Boring Plan
Tank 576

FILE #: 95-018
ELEVATION: 6927.3
TOTAL DEPTH: 38.0
LOGGED BY: WHK
DATE: 3-29-95
STATIC WATER: 24'-3"
BORING ID: B2
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-5.0	///-*////		C	start at 10:00a	
	///-*////		C	**Clay**, slightly silty, little sand, wet, brown, soft to firm, no odor	0.0
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////	5.0	C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////	8.0	C		
8.4-10.6	///***///		C	**Clay**, fine sandy, gradational fine above and to below, wet, brown, firm, no odor	0.0
	///***///		C		
	///***///		C		
	///***///	10	C		
10.6-12.0	***---***		C	**Sand**, silty, fine, moist, light red brown, loose, no odor	0.0
	---		C		
	---		C		
12.0-12.5	***OOO***	12	C	**Sand**, very gravelly, to 2", moist, light red brown, dense, slightly rounded rock	0.0
12.5-13.1	***---***		C	**Sand**, silty, moist, light red brown, loose, no odor	0.0
13.1-15.0	///**--//	13	C	**Clay**, sandy, silty, moist, red brown, firm to stiff, some root filaments	0.0
	///**--//		C		
	///**--//		C		
	///**--//		C		
15.0-16.8	***///***	15	C	**Sand**, clayey, fine, moist, red brown, moderately dense, no odor	0.0
	///		C		
	///		C		
	///		C		
16.8-19.1	//*++-///	17	C	**Clay**, silty grading to very fine sandy, moist to wet, red brown, stiff, no odor	0.0
	//*++-///		C	carbonate filaments common	
	//*++-///		C		
	//*++-///		C		
	//*++-///	19	C		
19.1-20.0	//--OO++/		C	**Clay**, silty, large gravel present (2"), wet, dark brown, hard, no odor	0.0
	//--OO++/	20	C	numerous carbonate filaments	
20.0-23.6	//--++///		C	**Clay**, silty, brown, stiff, slightly blocky, no odor, carbonate filaments	0.0
	//--++///		C		
	//--++///		C		
	//--++///		C		
	//--++///		C		540 @ 22.6'
	//--++///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569

LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6927.3
TOTAL DEPTH: 38.0
LOGGED BY: WHK
DATE: 3-29-95
STATIC WATER: 24'-3"
BORING ID: B2
PAGE: 2

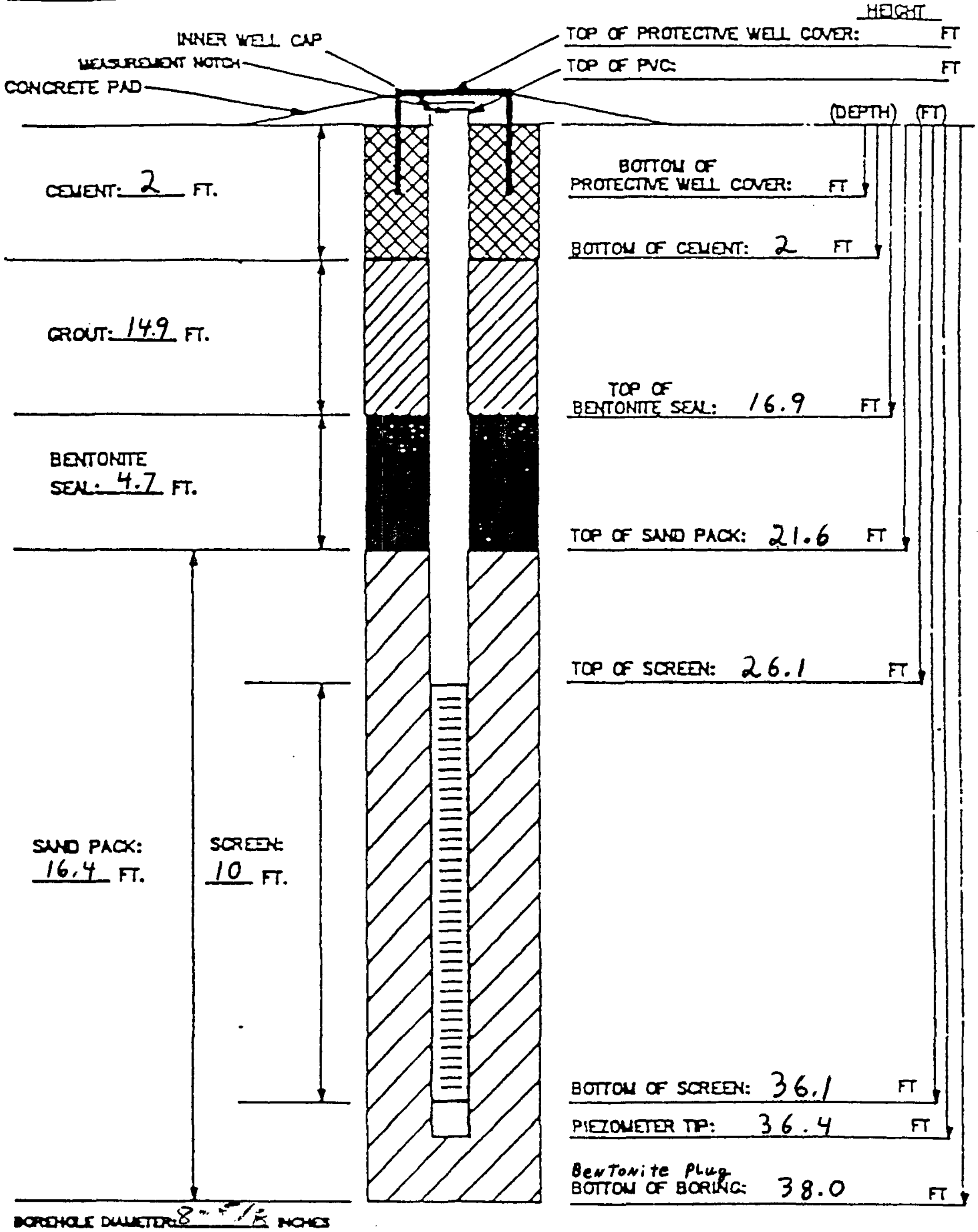
DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
23.6-24.2	***OO****		C	**Sand**, coarse, some fine gravel, saturated but does not appear water bearing, brown	1000
	OO*	24	C	dense, hydrocarbon odor	
24.2-25.5	/////////		C	**Clay**, wet, not water bearing, brown, stiff, hydrocarbon odor	1060
	/////////	25	C		
25.5-27.1	***///***		C	**Sand**, clayey, **water bearing**, brown, odor	610
	///		C		
	///		C		
27.1-28.5	/////////	27	C	**Clay**, some sand @ 28'-28.5', wet, brown, soft, slightly blocky, hydrocarbon odor	
	/////////		C	saturated but not water bearing	
	/////////	28	C		
28.5-30.9	///***///		C	**Clay**, sandy, some laminations, wet, brown, stiff	60
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
30.9-32.9	000**0000	31	C	**Gravel**, some sand, silica rock, **water bearing**, brown, dense, rounded to subrounded	1030
	000**0000		C		
	000**0000		C		
	000**0000		C		
32.9-35.0	---------	33	C	**CHINLE FORMATION**	
	---------		C	**Shale**, weathered, wet to moist, some green mottling, red brown overall, stiff	20
	---------		C	weak odor	
	---------		C		
35.0-38.0	----*----	35	C	**Shale**, as above, slightly more sand, blocky, dark red brown, wet to moist	57
	----*----		C	suspect contamination by water flowing from gravel above--gravel produces more	
	----*----		C	water at this location than previous drilling	
	----*----		C		
	----*----		C		
	----*----		C		
	----*----	38	C		
TD				stop drilling 11:25a	
				completed 4" well - see attached well completion diagram	
				24'-3" to water	
				2" product on water	

LOGGED BY: WHK

IZE AND TYPE OF BORING: 4'-1/4" HSA

INSTALLATION DATE: 032995

INSTALLATION DIAGRAM
MONITORING WELL NO.
B-2



BOREHOLE DIAMETER: 8-7/8 INCHES

MATERIALS USED:

SAND TYPE AND QUANTITY: 20-40
BENTONITE PELLETS (5-GALLON BUCKETS): 2
BAGS OF GROUT: -
AMOUNT OF CEMENT: 8 - 94 # Bags + 75 #
AMOUNT OF WATER USED: 8 Gal Gal
OTHER:

Bottom Cap Used? YES
Screen Lengths: 10'
Riser Used: 30'
Top Cap Used? ______
Well Size: 4 " Dia.

J-Plug Used? YES
Flush Mount Vault ______
Avove Ground Vault YES
Bollards, No.& Size:

TASK: Tank 569 GEOLOGIST/ENGINEER: WHK

Appendix B

Investigation Derived Waste Management Plan

Investigation Derived Waste (IDW) Management Plan

All IDW will be properly characterized and disposed of in accordance with all federal, State, and local rules and regulations for storage, labeling, handling, transport, and disposal of waste. The IDW may be characterized for disposal based on the known or suspected contaminants potentially present in the waste.

A dedicated decontamination area will be setup prior to any sample collection activities. The decontamination pad will be constructed so as to capture and contain all decontamination fluids (e.g., wash water and rinse water) and foreign materials washed off the sampling equipment. The fluids will be pumped directly into suitable storage containers (e.g., labeled 55-gallon drums), which will be located at satellite accumulation areas until the fluids are disposed in the refinery wastewater treatment system upstream of the API separator. The solids captured in the decontamination pad will be shoveled into 55-gallon drums and stored at the designated satellite accumulation area pending proper waste characterization for off-site disposal.

Drill cuttings generated during installation of soil borings will be placed directly into 55-gallon drums and staged in the satellite accumulation area pending results of the waste characterization sampling. The portion of soil cores, which are not retained for analytical testing, will be placed into the same 55-gallon drums used to store the associated drill cuttings.

The solids (e.g., drill cuttings and used soil cores) will be characterized by testing to determine if there are any hazardous characteristics in accordance with 40 Code of Federal Regulations (CFR) Part 261. This includes tests for ignitability, corrosivity, reactivity, and toxicity. If the materials are not characteristically hazardous, then further testing will be performed pursuant to the requirements of the facility to which the materials will be transported. Depending upon the results of analyses for individual investigation soil samples, additional analyses may include VOCs, TPH and polynuclear aromatic hydrocarbons (PAHs).

Appendix C

2016 Site Investigation

Aerial Map Source: Google Map, 01/05/2014.

N

0 160
SCALE IN FEET

LEGEND

TK 568-1 SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-14 ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

NEW MEXICO

GALLUP SITE LOCATION

MARATHON

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 1/20/19	FILE: Mathon–dB147

FIGURE 3
LOCATION OF SOIL BORINGS AND WELLS

DiSorbo
Environmental Consulting Firm

8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759

Soil Analytical Results Summary Marathon
Petroleum Company - Gallup Refinery Gallup,
New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	TK-568-1 (12-14')	TK-568-1 (30-32')	TK-568-1 (48-49')	TK 568-2 (22-24')	TK 568-2 (28-30')	TK 568-2 (36-37')	TK569-1(18-20')	TK569-1(24-26')	TK569-1(36-38')	TK569-1(40-42')	TK569-2(16-18')	TK569-2(29-31')	TK569-2(36-38')	TK 569-3 (16-18')	TK 569-3 (24-26')	TK 569-3 (38-39')	TK 570-1 (10-12')	TK 570-1 (32-34')	TK 570-1 (44-45')
					1609E26-008	1609E26-009	1609E26-010	1609G64-001	1609G64-002	1609G64-003	1610238-004	1610238-005	1610238-006	1610238-007	1610238-001	1610238-002	1610238-003	1609G64-008	1609G64-009	1609G64-010	1609G64-005	1609G64-006	1609G64-007
					9/23/2016	9/23/2016	9/23/2016	9/27/2016	9/27/2016	9/27/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	9/28/2016	9/28/2016	9/28/2016	9/27/2016	9/27/2016	9/27/2016
Metals (mg/kg)																							
Antimony	3.13E+01	(1)	1.42E+02	(5)	< 0.9918 u	< 0.9808 u	< 1.0019 u	< 10.0348 u	< 0.9926 u	1.4 J	< 0.9919 u	< 0.9825 u	< 1.0132 u	< 2.0134 u	< 0.9951 u	< 1.0069 u	< 0.9847 u	1 J	< 1.0059 u	< 1.0114 u	< 0.9961 u	< 1.0019 u	2.2 J
Arsenic	7.07E+00	(1)	3.59E+01	(4)	1.8 J	1.6 J	2.7 v	< 8.8622 u	1.6 J	2.1 J	1.4 J	1.6 J	2.4 J	3.3 J	1.6 J	1.3 J	2.7 v	1.3 J	1.8 J	2.2 J	1.7 J	1.6 J	2.1 J
Barium	1.56E+04	(1)	4.39E+03	(5)	130 v	180 v	35 v	590 v	230 v	130 v	120 v	410 v	1500 v	380 v	200 v	170 v	300 v	320 v	300 v	340 v	440 v	180 v	300 v
Beryllium	1.56E+02	(1)	1.48E+02	(5)	0.82 v	0.74 v	0.74 v	< 0.3453 u	0.58 v	0.74 v	0.69 v	0.57 v	0.26 v	0.26 J	0.64 v	0.45 v	0.58 v	0.58 v	0.52 v	0.9 v	0.57 v	0.64 v	1.1 v
Cadmium	7.05E+01	(1)	7.21E+01	(5)	< 0.0625 u	< 0.0618 u	< 0.0631 u	< 0.6324 u	< 0.0626 u	< 0.0633 u	< 0.0625 u	< 0.0619 u	< 0.0639 u	< 0.1269 u	< 0.0627 u	< 0.0635 u	< 0.0621 u	< 0.0631 u	< 0.0634 u	< 0.0637 u	< 0.0628 u	< 0.0631 u	< 0.0624 u
Chromium	9.66E+01	(1)	1.34E+02	(5)	8.9 v	7.6 v	8.3 v	2.5 J	5.6 v	8.3 v	5.9 v	5.1 v	3.6 v	3 v	6.4 v	5 v	6.6 v	6.6 v	4.7 v	9 v	6.4 v	6.8 v	9.5 v
Cobalt	2.34E+01	(1)	3.67E+01	(5)	3.6 v	3.3 v	5.7 v	2.6 J	2.7 v	2.4 v	3 v	2.8 v	2.2 v	1.2 v	3.2 v	2.3 v	2.1 v	3.2 v	3.2 v	4.5 v	2.9 v	3.4 v	4.9 v
Cyanide	1.11E+01	(1)	1.20E+01	(5)	< 0.25 u	< 0.25 u	< 0.25 u	< 0.254 u	< 0.208 u	< 0.225 u	0.24 v	< 0.281 u	< 0.28 u	< 0.156 u	< 0.271 u	< 0.237 u	< 0.269 u	< 0.283 u	< 0.269 u	< 0.284 u	0.59 v	< 0.23 u	0.37 v
Iron	5.48E+04	(1)	2.48E+05	(5)	14000 v	12000 v	9300 v	4900 v	9100 v	14000 v	12000 v	9800 v	7900 v	4400 v	12000 v	9600 v	11000 v	11000 v	10000 v	7500 v	10000 v	10000 v	20000 v
Lead	-	(2)	8.00E+02	(6)	7.2 v	3.9 v	0.54 v	5.9 v	1.8 v	1.6 v	2.7 v	3.2 v	1.2 v	1.1 v	3.5 v	1.6 v	1.1 v	2.8 v	2.3 v	< 0.1747 u	3.4 v	2.7 v	4.7 v
Manganese	1.05E+04	(1)	4.64E+02	(5)	220 v	290 v	120 v	2300 v	200 v	330 v	190 v	190 v	710 v	1500 v	210 v	370 v	450 v	230 v	300 v	130 v	390 v	200 v	300 v
Mercury	2.36E+01	(1)	2.05E+01	(5)	0.0045 J	0.0028 J	0.00089 J	0.0028 J	0.0021 J	< 0.0006 u	0.0019 u	0.0015 J	0.0042 J	< 0.0006 u	0.0042 J	0.002 J	< 0.0006 u	0.0019 J	0.002 J	< 0.0006 u	0.0033 J	0.0021 J	< 0.0006 u
Nickel	1.56E+03	(1)	7.53E+02	(5)	7.1 v	5.9 v	8.6 v	3.1 J	4.7 v	5.7 v	5.4 v	5 v	3.2 v	3.3 v	5.5 v	4.5 v	6.1 v	5.7 v	4.7 v	11 v	4.6 v	5.5 v	9 v
Selenium	3.91E+02	(1)	1.75E+03	(5)	< 1.7933 u	< 1.7733 u	< 1.8115 u	< 18.1434 u	< 1.7947 u	< 1.8162 u	< 1.7934 u	< 1.7765 u	< 1.8319 u	< 3.6403 u	< 1.7993 u	< 1.8205 u	< 1.7804 u	< 1.8104 u	< 1.8187 u	< 1.8287 u	< 1.8011 u	< 1.8115 u	< 1.7897 u
Silver	3.91E+02	(1)	1.77E+03	(5)	< 0.0617 u	< 0.061 u	< 0.0623 u	< 0.6244 u	< 0.0618 u	< 0.0625 u	< 0.0617 u	< 0.0611 u	< 0.063 u	< 0.1253 u	< 0.0619 u	< 0.0626 u	< 0.0613 u	< 0.0623 u	< 0.0626 u	< 0.0629 u	< 0.062 u	< 0.0623 u	< 0.0616 u
Vanadium	3.94E+02	(1)	6.14E+02	(5)	14 v	14 v	26 v	58 v	10 v	6.4 v	9.8 v	10 v	14 v	9.4 v	12 v	10 v	3.5 v	13 v	13 v	25 v	14 v	13 v	13 v
Zinc	2.35E+04	(1)	1.06E+05	(5)	13 v	11 v	27 v	6.3 J	9.3 v	9 v	9.8 v	8.3 v	7.6 v	4.8 J	9.6 v	8.5 v	7 v	9.3 v	9.9 v	20 v	11 v	10 v	22 v
Volatiles (mg/kg)																							
1,1,1,2-Tetrachloroethane	2.78E+01	(1)	1.36E+02	(4)	< 0.12 u	< 0.0288 u	< 0.003 u	<0.0017 u	< 0.0622 u	<0.0017 u	<0.0017 u	< 0.0025 u	< 0.009 u	< 0.0031 u	< 0.0056 u	< 0.0121 u	<0.0019 u	< 0.0031 u	< 0.5838 u	< 0.003 u	< 0.0445 u	< 0.1195 u	< 0.0064 u
1,1,1-Trichloroethane	1.43E+04	(1)	1.35E+04	(5)	< 0.0765 u	< 0.0184 u	< 0.0019 u	<0.0017 u	< 0.0397 u	<0.0017 u	<0.0017 u	< 0.0016 u	< 0.0057 u	< 0.002 u	< 0.0035 u	< 0.0077 u	<0.0019 u	< 0.002 u	< 0.3722 u	< 0.0019 u	< 0.0284 u	< 0.0762 u	< 0.0041 u
1,1,2,2-Tetrachloroethane	7.93E+00	(1)	3.91E+01	(4)	< 0.2031 u	< 0.0487 u	< 0.0051 u	<0.0017 u	< 0.1054 u	<0.0017 u	<0.0017 u	< 0.0043 u	< 0.0153 u	< 0.0053 u	< 0.0094 u	< 0.0204 u	<0.0019 u	< 0.0053 u	< 0.9885 u	< 0.0051 u	< 0.0753 u	< 0.2023 u	< 0.0108 u
1,1,2-Trichloroethane	2.59E+00	(1)	2.28E+00	(5)	< 0.1477 u	< 0.0355 u	< 0.0037 u	<0.0017 u	< 0.0766 u	<0.0017 u	<0.0017 u	< 0.0031 u	< 0.0111 u	< 0.0038 u	< 0.0068 u	< 0.0148 u	<0.0019 u	< 0.0039 u	< 0.7189 u	< 0.0037 u	< 0.0548 u	< 0.1471 u	< 0.0078 u
1,1-Dichloroethane	7.79E+01	(1)	3.80E+02	(4)	< 0.0678 u	< 0.0163 u	< 0.0017 u	<0.0017 u	< 0.0351 u	<0.0017 u	<0.0017 u	< 0.0014 u	< 0.0051 u	< 0.0018 u	< 0.0031 u	< 0.0068 u	<0.0019 u	< 0.0018 u	< 0.3297 u	< 0.0017 u	< 0.0251 u	< 0.0675 u	< 0.0036 u
1,1-Dichloroethene	4.36E+02	(1)	4.20E+02	(5)	< 0.4105 u	< 0.0985 u	< 0.0102 u	<0.0003 u	< 0.2129 u	<0.0003 u	<0.0003 u	< 0.0086 u	< 0.0308 u	< 0.0107 u	< 0.019 u	< 0.0412 u	<0.0003 u	< 0.0107 u	< 1.9977 u	< 0.0104 u	< 0.1522 u	< 0.4089 u	< 0.0218 u
1,1-Dichloropropene	-	-	-	-	< 0.0994 u	< 0.0239 u	< 0.0025 u	<0.0017 u	< 0.0516 u	<0.0017 u	<0.0017 u	< 0.0021 u	< 0.0075 u	< 0.0026 u	< 0.0046 u	< 0.01 u	<0.0019 u	< 0.0026 u	< 0.4838 u	< 0.0025 u	< 0.0369 u	< 0.099 u	< 0.0053 u
1,2,3-Trichlorobenzene	6.30E+01	(2)	9.30E+02	(6)	< 0.1875 u	< 0.045 u	< 0.0047 u	<0.0004 u	< 0.0973 u	<0.0004 u	<0.0004 u	< 0.0039 u	< 0.0141 u	< 0.0049 u	< 0.0087 u	< 0.0188 u	<0.0005 u	< 0.0049 u	< 0.9126 u	< 0.0047 u	< 0.0695 u	< 0.1868 u	< 0.01 u
1,2,3-Trichloropropane	5.10E-02	(1)	1.21E+00	(4)	< 0.2168 u	< 0.052 u	< 0.0054 u	<0.0017 u	< 0.1124 u	<0.0017 u	<0.0017 u	< 0.0045 u	< 0.0163 u	< 0.0056 u	< 0.01 u	< 0.0218 u	<0.0019 u	< 0.0057 u	< 1.055 u	< 0.0055 u	< 0.0804 u	< 0.2159 u	< 0.0115 u
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 0.1341 u	< 0.0322 u	< 0.0033 u	<0.0005 u	< 0.0695 u	<0.0005 u	<0.0005 u	< 0.0028 u	< 0.0101 u	< 0.0035 u	< 0.0062 u	< 0.0135 u	<0.0006 u	< 0.0035 u	< 0.6524 u	< 0.0034 u	< 0.0497 u	< 0.1335 u	< 0.0071 u
1,2,4-Trimethylbenzene	3.00E+02	(2)	1.80E+03	(6)	32 v	5.5 v	0.011 J	0.0003 J	18 v	0.0006 J	<0.0003 u	1.6 v	3.8 v	0.22 v	2.2 v	8.5 v	0.0055 v	0.012 J	140 v	0.23 v	19 v	35 v	2.4 v
1,2-Dibromo-3-chloropropane	8.51E-02	(1)	1.17E+00	(4)	< 0.3839 u	< 0.0921 u	< 0.0096 u	<0.0002 u	< 0.1991 u	<0.0002 u	<0.0002 u	< 0.008 u	< 0.0288 u	< 0.01 u	< 0.0178 u	< 0.0386 u	<0.0002 u	< 0.01 u	< 1.8683 u	< 0.0097 u	< 0.1423 u	< 0.3824 u	< 0.0204 u
1,2-Dibromoethane (EDB)	6.68E-01	(1)	3.28E+00	(4)	< 0.0892 u	< 0.0214 u	< 0.0022 u	<0.0017 u	< 0.0462 u	<0.0017 u	<0.0017 u	< 0.0019 u	< 0.0067 u	< 0.0023 u	< 0.0041 u	< 0.009 u	<0.0019 u	< 0.0023 u	< 0.4339 u	< 0.0023 u	< 0.033 u	< 0.0888 u	< 0.0047 u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.1094 u	< 0.0262 u	< 0.0027 u	<0.0002 u	< 0.0567 u	<0.0002 u	<0.0002 u	< 0.0023 u	< 0.0082 u	< 0.0028 u	< 0.0051 u	< 0.011 u	<0.0003 u	< 0.0029 u	< 0.5323 u	< 0.0028 u	< 0.0405 u	< 0.109 u	< 0.0058 u
1,2-Dichloroethane (EDC)	8.25E+00	(1)	4.03E+01	(4)	< 0.3268 u	< 0.0784 u	< 0.0081 u	<0.0017 u	< 0.1695 u	<0.0017 u	<0.0017 u	< 0.0068 u	< 0.0245 u	< 0.0085 u	< 0.0151 u	< 0.0328 u	<0.0019 u	< 0.0085 u	< 1.5904 u	< 0.0083 u	< 0.1211 u	< 0.3255 u	< 0.0174 u
1,2-Dichloropropane	1.76E+01	(1)	2.52E+01	(5)	< 0.1051 u	< 0.0252 u	< 0.0026 u	<0.0017 u	< 0.0545 u	<0.0017 u	<0.0017 u	< 0.0022 u	< 0.0079 u	< 0.0027 u	< 0.0049 u	< 0.0106 u	<0.0019 u	< 0.0027 u	< 0.5116 u	< 0.0027 u	< 0.039 u	< 0.1047 u	< 0.0056 u
1,3,5-Trimethylbenzene	2.70E+02	(2)	1.50E+03	(6)	11 v	1.9 v	0.0025 J	<0.0003 u	5.6 v	<0.0003 u	<0.0003 u	0.6 v	1.3 v	0.076 v	0.69 v	2.8 v	0.0029 v	0.0026 J	51 v	0.083 v	5.8 v	13 v	0.87 v
1,3-Dichlorobenzene	-	-	-	-	< 0.1028 u	< 0.0247 u	< 0.0026 u	<0.0003 u	< 0.0533 u	<0.0003 u	<0.0003 u	< 0.0022 u	< 0.0077 u	< 0.0027 u	< 0.0048 u	< 0.0103 u	<0.0003 u	< 0.0027 u	< 0.5002 u	< 0.0026 u	< 0.0381 u	< 0.1024 u	< 0.0055 u
1,3-Dichloropropane	1.60E+03	(2)	2.30E+04	(6)	< 0.1422 u	< 0.0341 u	< 0.0035 u	<0.0017 u	< 0.0738 u	<0.0017 u	<0.0017 u	< 0.003 u	< 0.0107 u	< 0.0037 u	< 0.0066 u	< 0.0143 u	<0.0019 u	< 0.0037 u	< 0.6921 u	< 0.0036 u	< 0.0527 u	< 0.1417 u	< 0.0076 u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.1553 u	< 0.0373 u	< 0.0039 u	<0.0003 u	< 0.0806 u	<0.0003 u	<0.0003 u	< 0.0033 u	< 0.0117 u	< 0.004 u	< 0.0072 u	< 0.0156 u	<0.0003 u	< 0.004 u	< 0.7558 u	< 0.0039 u	< 0.0576 u	< 0.1547 u	< 0.0082 u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	0.59 J	0.23 J	< 0.0069 u	0.0002 J	0.86 J	0.0003 J	0.0002 J	0.028 J	0.17 J	< 0.0073 u	0.32 v	0.21 J	0.0004 J	< 0.0073 u	< 1.3563 u	< 0.0071 u	0.73 J	0.49 J	0.023 J
2,2-Dichloropropane	-	-	-	-	< 0.0718 u	< 0.0172 u	< 0.0018 u	<0.0002 u	< 0.0372 u	<0.0002 u	<0.0002 u	< 0.0015 u	< 0.0054 u	< 0.0019 u	< 0.0033 u	< 0.0072 u	<0.0002 u	< 0.0019 u	< 0.3493 u	< 0.0018 u	< 0.0266 u	< 0.0715 u	< 0.0038 u
2-Butanone	3.73E+04	(1)	9.12E+04	(5)	< 0.7163 u	< 0.1719 u	< 0.0178 u	<0.0006 u	< 0.3715 u	<0.0006 u	0.002 J	< 0.015 u	< 0.0538 u	< 0.0186 u	< 0.0332 u	< 0.072 u	0.0009 J	< 0.0187 u	< 3.4856 u	< 0.0181 u	< 0.2655 u	< 0.7134 u	< 0.038 u
2-Chlorotoluene	1.56E+03	(1)	7.08E+03	(5)	< 0.0925 u	< 0.0222 u	< 0.0023 u	<0.0003 u	< 0.048 u	<0.0003 u	<0.0003 u	< 0.0019 u	< 0.0069 u	< 0.0024 u	< 0.0043 u	< 0.0093 u	<0.0003 u	< 0.0024 u	< 0.45 u	< 0.0023 u	< 0.0343 u	< 0.0921 u	< 0.0049 u
2-Hexanone	2.00E+02	(2)	1.30E+03	(6)	< 0.6821 u	< 0.1637 u	< 0.017 u	<0.0004 u	< 0.3537 u	<0.0004 u	<0.0004 u	< 0.0143 u	< 0.0512 u	< 0.0177 u	< 0.0316 u	< 0.0685 u	<0.0005 u	< 0.0178 u	< 3.319 u	< 0.0173 u	< 0.2528 u	< 0.6793 u	< 0.0362 u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	1.6 J	0.55 J	< 0.0067 u	<0.0004 u	1.9 J	<0.0004 u	<0.0004 u	0.041 J	0.3 J	0.0092 J	0.61 v	0.46 J	<0.0005 u	0.0075 J	< 1.3065 u	< 0.0068 u	1.6 J	1.1 J	0.045 J
4-Chlorotoluene	1.60E+03	(2)	2.30E+04	(6)	< 0.1109 u	< 0.0266 u	< 0.0028 u	<0.0003 u	< 0.0575 u	<0.0003 u	<0.0003 u	< 0.0023 u	< 0.0083 u	< 0.0029 u	< 0.0051 u	< 0.0111 u	<0.0003 u	< 0.0029 u	< 0.5395 u	< 0.0028 u	< 0.0411 u	< 0.1104 u	< 0.0059 u
4-Isopropyltoluene	-	-	-	-	< 0.1125 u	< 0.027 u	< 0.0028 u	<0.0003 u	0.13 J	<0.0003 u	<0.0003 u	0.12 v	0.035 J	< 0.0029 u	0.03 J	0.049 J	0.0004 J	< 0.0029 u	8.5 v	0.01 J	0.22 J	1.5 v	0.17 v
4-Methyl-2-pentanone	5.81E+03	(1)	2.02E+04	(5)	< 0.3653 u	< 0.0877 u	< 0.0091 u	<0.0033 u	< 0.1894 u	<0.0034 u	<0.0034 u	< 0.0077 u	< 0.0274 u	< 0.0095 u	< 0.0169 u	< 0.0367 u	<0.0037 u	< 0.0095 u	< 1.7775 u	< 0.0092 u	< 0.1354 u	< 0.3638 u	< 0.0194 u
Acetone	6.63E+04	(1)	2.41E+05	(5)	< 1.6217 u	< 0.3892 u	< 0.0404 u	0.0085 v	< 0.841 u	0.0053 J	0.0046 J	< 0.034 u	< 0.1218 u	< 0.0422 u	< 0.0752 u	< 0.1629 u	0.0044 J	< 0.0423 u	< 7.8917 u	< 0.041 u	< 0.6011 u	< 1.6153 u	< 0.0861 u
Benzene	1.77E+01	(1)	8.65E+01	(4)	3.8 v	0.26 v	0.041 v	0.0054 v	5.2 v	0.0077 v	0.0172 v	0.29 v	0.12 v	0.026 v	0.067 v	6.3 v	0.0134 v	0.014 J	**44** v	0.06 v	< 0.1859 u	11 v	0.25 v
Bromobenzene	2.90E+02	(2)	1.80E+03	(6)	< 0.101 u	< 0.0242 u	< 0.0025 u	<0.0002 u	< 0.0524 u	<0.0002 u	<0.0002 u	< 0.0021 u	< 0.0076 u	< 0.0026 u	< 0.0047 u	< 0.0101 u	<0.0002 u	< 0.0026 u	< 0.4917 u	< 0.0026 u	< 0.0374 u	< 0.1006 u	< 0.0054 u
Bromodichloromethane	6.14E+00	(1)	2.99E+01	(4)	< 0.073 u	< 0.0175 u	< 0.0018 u	<0.0017 u	< 0.0379 u	<0.0017 u	<0.0017 u	< 0.0015 u	< 0.0055 u	< 0.0019 u	< 0.0034 u	< 0.0073 u	<0.0019 u	< 0.0019 u	< 0.3554 u	< 0.0018 u	< 0.0271 u	< 0.0727 u	< 0.0039 u
Bromoform	6.74E+02	(1)	1.75E+03	(4)	< 0.1527 u	< 0.0366 u	< 0.0038 u	<0.0017 u	< 0.0792 u	<0.0017 u	<0.0017 u	< 0.0032 u	< 0.0115 u	< 0.004 u	< 0.0071 u	< 0.0153 u	<0.0019 u	< 0.004 u	< 0.7429 u	< 0.0039 u	< 0.0566 u	< 0.1521 u	< 0.0081 u
Bromomethane	1.76E+01	(1)	1.77E+01	(5)	< 0.4618 u	< 0.1108 u	0.012 J	<0.0003 u	< 0.2395 u	<0.0003 u	<0.0003 u	< 0.0097 u	< 0.0347 u	< 0.012 u	< 0.0214 u	< 0.0464 u	<0.0003 u	< 0.012 u	< 2.247 u	< 0.0117 u	< 0.1711 u	< 0.4599 u	< 0.0245 u
Carbon disulfide	1.54E+03	(1)	1.61E+03	(5)	< 0.4138 u	< 0.0993 u	< 0.0103 u	<0.0006 u	< 0.2146 u	<0.0006 u	<0.0006 u	< 0.0087 u	< 0.0311 u	< 0.0108 u	< 0.0192 u	< 0.0416 u	<0.0007 u	< 0.0108 u	< 2.0138 u	< 0.0105 u	< 0.1534 u	< 0.4122 u	< 0.022 u
Carbon tetrachloride	1.06E+01	(1)	5.21E+01	(4)	< 0.0823 u	< 0.0197 u	< 0.0021 u	<0.0017 u	< 0.0427 u	<0.0017 u	<0.0017 u	< 0.0017 u	< 0.0062 u	< 0.0021 u	< 0.0038 u	< 0.0083 u	<0.0019 u	< 0.0021 u	< 0.4005 u	< 0.0021 u	< 0.0305 u	< 0.082 u	< 0.0044 u
Chlorobenzene	3.76E+02	(1)	4.08E+02	(5)	< 0.102 u	< 0.0245 u	< 0.0025 u	<0.0002 u	< 0.0529 u	<0.0002 u	<0.0002 u	< 0.0021 u	< 0.0077 u	< 0.0027 u	< 0.0047 u	< 0.0103 u	<0.0002 u	< 0.0027 u	< 0.4966 u	< 0.0026 u	< 0.0378 u	< 0.1016 u	< 0.0054 u
Chloroethane	1.88E+04	(1)	1.65E+04	(5)	< 0.2502 u	< 0.06 u	< 0.0062 u	<0.0003 u	< 0.1297 u	<0.0003 u	<0.0003 u	< 0.0052 u	< 0.0188 u	< 0.0065 u	< 0.0116 u	< 0.0251 u	<0.0003 u	< 0.0065 u	< 1.2174 u	< 0.0063 u	< 0.0927 u	< 0.2492 u	< 0.0133 u
Chloroform	5.85E+00	(1)	2.84E+01	(4)	< 0.0946 u	< 0.0227 u	< 0.0024 u	<0.0017 u	< 0.049 u	<0.0017 u	<0.0017 u	< 0.002 u	< 0.0071 u	< 0.0025 u	< 0.0044 u	< 0.0095 u	<0.0019 u	< 0.0025 u	< 0.4602 u	< 0.0024 u	< 0.0351 u	< 0.0942 u	< 0.005 u
Chloromethane	4.08E+01	(1)	1.99E+02	(4)	< 0.1116 u	< 0.0268 u	< 0.0028 u	<0.0004 u	< 0.0579 u	<0.0004 u	<0.0004 u	< 0.0023 u	< 0.0084 u	< 0.0029 u	< 0.0052 u	< 0.0112 u	<0.0005 u	< 0.0029 u	< 0.5429 u	< 0.0028 u	< 0.0414 u	< 0.1111 u	< 0.0059 u
cis-1,2-DCE	1.56E+02	(1)	7.08E+02	(5)	< 0.0729 u	< 0.0175 u	< 0.0018 u	<0.0017 u	< 0.0378 u	<0.0017 u	<0.0017 u	< 0.0015 u	< 0.0055 u	< 0.0019 u	< 0.0034 u	< 0.0073 u	<0.0019 u	< 0.0019 u	< 0.3547 u	< 0.0018 u	< 0.027 u	< 0.0726 u	< 0.0039 u
cis-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.1156 u	< 0.0277 u	< 0.0029 u	<0.0017 u	< 0.0599 u	<0.0017 u	<0.0017 u	< 0.0024 u	< 0.0087 u	< 0.003 u	< 0.0054 u	< 0.0116 u	<0.0019 u	< 0.003 u	< 0.5624 u	< 0.0029 u	< 0.0428 u	< 0.1151 u	< 0.0061 u
Dibromochloromethane	1.38E+01	(1)	6.69E+01	(4)	< 0.1132 u	< 0.0272 u	< 0.0028 u	<0.0017 u	< 0.0587 u	<0.0017 u	<0.0017 u	< 0.0024 u	< 0.0085 u	< 0.0029 u	< 0.0052 u	< 0.0114 u	<0.0019 u	< 0.003 u	< 0.5511 u	< 0.0029 u	< 0.042 u	< 0.1128 u	< 0.006 u
Dibromomethane	5.74E+01	(1)	5.34E+01	(5)	< 0.1086 u	< 0.0261 u	< 0.0027 u	<0.0017 u	< 0.0563 u	<0.0017 u	<0.0017 u	< 0.0023 u	< 0.0082 u	< 0.0028 u	< 0.005 u	< 0.0109 u	<0.0019 u	< 0.0028 u	< 0.5284 u	< 0.0027 u	< 0.0402 u	< 0.1081 u	< 0.0058 u
Dichlorodifluoromethane	1.80E+02	(1)	1.59E+02	(5)	< 0.3878 u	< 0.0931 u	< 0.0097 u	<0.001 u	< 0.2011 u	<0.001 u	<0.001 u	< 0.0081 u	< 0.0291 u	< 0.0101 u	< 0.018 u	< 0.039 u	<0.0011 u	< 0.0101 u	< 1.8873 u	< 0.0098 u	< 0.1437 u	< 0.3863 u	< 0.0206 u
Ethylbenzene	7.45E+01	(1)	3.65E+02	(4)	19 v	1.5 v	< 0.0026 u	<0.0002 u	7 v	0.0007 J	0.0004 J	0.73 v	1.2 v	0.086 v	0.41 v	4.8 v	0.0041 v	< 0.0027 u	**88** v	0.086 v	6.6 v	19 v	1 v

Soil Analytical Results Summary Marathon
Petroleum Company - Gallup Refinery Gallup,
New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	TK-568-1 (12-14')	TK-568-1 (30-32')	TK-568-1 (48-49')	TK 568-2 (22-24')	TK 568-2 (28-30')	TK 568-2 (36-37')	TK569-1(18-20')	TK569-1(24-26')	TK569-1(36-38')	TK569-1(40-42')	TK569-2(16-18')	TK569-2(29-31')	TK569-2(36-38')	TK 569-3 (16-18')	TK 569-3 (24-26')	TK 569-3 (38-39')	TK 570-1 (10-12')	TK 570-1 (32-34')	TK 570-1 (44-45')
					1609E26-008	1609E26-009	1609E26-010	1609G64-001	1609G64-002	1609G64-003	1610238-004	1610238-005	1610238-006	1610238-007	1610238-001	1610238-002	1610238-003	1609G64-008	1609G64-009	1609G64-010	1609G64-005	1609G64-006	1609G64-007
					9/23/2016	9/23/2016	9/23/2016	9/27/2016	9/27/2016	9/27/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	9/28/2016	9/28/2016	9/28/2016	9/27/2016	9/27/2016	9/27/2016
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 0.1533 u	< 0.0368 u	< 0.0038 u	<0.0004 u	< 0.0795 u	<0.0004 u	<0.0004 u	< 0.0032 u	< 0.0115 u	< 0.004 u	< 0.0071 u	< 0.0154 u	<0.0004 u	< 0.004 u	< 0.7459 u	< 0.0039 u	< 0.0568 u	< 0.1527 u	< 0.0081 u
Isopropylbenzene	2.35E+03	(1)	2.71E+03	(5)	0.94 J	0.11 J	< 0.0027 u	<0.0002 u	0.34 J	<0.0002 u	<0.0002 u	0.23 v	0.089 J	0.0031 J	0.071 v	0.21 v	0.001 J	< 0.0028 u	23 v	0.02 J	0.64 v	3.8 v	0.32 v
Methyl tert-butyl ether (MTBE)	9.68E+02	(1)	4.78E+03	(4)	< 0.3939 u	1 v	0.014 J	0.0006 J	< 0.2043 u	0.0124 v	<0.0003 u	< 0.0083 u	< 0.0296 u	< 0.0102 u	< 0.0183 u	0.1 J	0.0025 v	< 0.0103 u	< 1.9168 u	< 0.01 u	< 0.146 u	< 0.3923 u	< 0.0209 u
Methylene chloride	4.09E+02	(1)	1.20E+03	(5)	< 0.3614 u	< 0.0867 u	< 0.009 u	<0.0017 u	< 0.1874 u	<0.0017 u	<0.0017 u	< 0.0076 u	< 0.0271 u	< 0.0094 u	< 0.0168 u	< 0.0363 u	<0.0019 u	< 0.0094 u	< 1.7587 u	< 0.0091 u	< 0.134 u	< 0.36 u	< 0.0192 u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	3 v	0.61 v	< 0.0049 u	<0.0017 u	2.6 v	<0.0017 u	<0.0017 u	0.044 J	0.32 v	< 0.0051 u	0.58 v	0.75 v	<0.0019 u	< 0.0051 u	1.2 J	< 0.005 u	2.8 v	2.1 J	0.079 J
n-Butylbenzene	3.90E+03	(2)	5.80E+04	(6)	1.3 J	0.37 J	< 0.0028 u	<0.0004 u	0.87 J	<0.0004 u	<0.0004 u	0.14 v	0.21 J	0.013 J	0.23 v	0.35 J	0.0005 J	< 0.0029 u	9.9 J	0.019 J	1.4 v	2.6 J	0.24 v
n-Propylbenzene	3.80E+03	(2)	2.40E+04	(6)	5.2 v	0.83 v	< 0.0024 u	<0.0003 u	2.4 v	<0.0003 u	<0.0003 u	0.37 v	0.6 v	0.037 v	0.34 v	1.3 v	0.0016 J	< 0.0025 u	33 v	0.048 v	2.9 v	7.4 v	0.53 v
sec-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	0.49 J	0.11 J	< 0.0043 u	<0.0003 u	0.31 J	<0.0003 u	<0.0003 u	0.12 v	0.076 J	0.0073 J	0.072 v	0.1 J	0.0006 J	< 0.0045 u	11 v	0.017 J	0.42 J	1.8 v	0.19 v
Styrene	7.23E+03	(1)	1.01E+04	(5)	< 0.1119 u	< 0.0269 u	< 0.0028 u	<0.0002 u	< 0.058 u	<0.0002 u	<0.0002 u	< 0.0023 u	< 0.0084 u	< 0.0029 u	< 0.0052 u	< 0.0112 u	<0.0002 u	< 0.0029 u	< 0.5446 u	< 0.0028 u	< 0.0415 u	< 0.1115 u	< 0.0059 u
tert-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	< 0.1039 u	< 0.0249 u	< 0.0026 u	<0.0002 u	< 0.0539 u	<0.0002 u	<0.0002 u	0.0084 J	< 0.0078 u	< 0.0027 u	< 0.0048 u	< 0.0104 u	<0.0003 u	< 0.0027 u	< 0.5057 u	< 0.0026 u	< 0.0385 u	< 0.1035 u	< 0.0055 u
Tetrachloroethene (PCE)	1.10E+02	(1)	1.19E+02	(5)	< 0.104 u	< 0.0249 u	< 0.0026 u	<0.0002 u	< 0.0539 u	<0.0002 u	<0.0002 u	< 0.0022 u	< 0.0078 u	< 0.0027 u	< 0.0048 u	< 0.0104 u	<0.0002 u	< 0.0027 u	< 0.5059 u	< 0.0026 u	< 0.0385 u	< 0.1035 u	< 0.0055 u
Toluene	5.22E+03	(1)	1.40E+04	(5)	76 v	0.4 v	< 0.0018 u	0.0009 J	28 v	0.0013 J	0.0004 J	1.6 v	2.5 v	0.26 v	0.7 v	32 v	0.0111 v	0.011 J	310 v	0.21 v	16 v	73 v	2.3 v
trans-1,2-DCE	2.93E+02	(1)	3.03E+02	(5)	< 0.3509 u	< 0.0842 u	< 0.0087 u	<0.0002 u	< 0.182 u	<0.0002 u	<0.0002 u	< 0.0074 u	< 0.0264 u	< 0.0091 u	< 0.0163 u	< 0.0352 u	<0.0002 u	< 0.0091 u	< 1.7074 u	< 0.0089 u	< 0.13 u	< 0.3495 u	< 0.0186 u
trans-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.1835 u	< 0.044 u	< 0.0046 u	<0.0002 u	< 0.0951 u	<0.0002 u	<0.0002 u	< 0.0038 u	< 0.0138 u	< 0.0048 u	< 0.0085 u	< 0.0184 u	<0.0002 u	< 0.0048 u	< 0.8927 u	< 0.0046 u	< 0.068 u	< 0.1827 u	< 0.0097 u
Trichloroethene (TCE)	6.72E+00	(1)	6.84E+00	(5)	< 0.1344 u	< 0.0322 u	< 0.0033 u	<0.0017 u	< 0.0697 u	<0.0017 u	<0.0017 u	< 0.0028 u	< 0.0101 u	< 0.0035 u	< 0.0062 u	< 0.0135 u	<0.0019 u	< 0.0035 u	< 0.6539 u	< 0.0034 u	< 0.0498 u	< 0.1338 u	< 0.0071 u
Trichlorofluoromethane	1.22E+03	(1)	1.12E+03	(5)	< 0.0937 u	< 0.0225 u	< 0.0023 u	<0.0002 u	< 0.0486 u	<0.0002 u	<0.0002 u	< 0.002 u	< 0.007 u	< 0.0024 u	< 0.0043 u	< 0.0094 u	<0.0002 u	< 0.0024 u	< 0.4561 u	< 0.0024 u	< 0.0347 u	< 0.0933 u	< 0.005 u
Vinyl chloride	7.41E-01	(1)	2.83E+01	(4)	< 0.1025 u	< 0.0246 u	< 0.0026 u	<0.0004 u	< 0.0532 u	<0.0004 u	<0.0004 u	< 0.0021 u	< 0.0077 u	< 0.0027 u	< 0.0048 u	< 0.0103 u	<0.0005 u	< 0.0027 u	< 0.4988 u	< 0.0026 u	< 0.038 u	< 0.1021 u	< 0.0054 u
Xylenes, Total	8.63E+02	(1)	7.91E+02	(5)	120 v	9.1 v	< 0.0059 u	0.001 J	46 v	0.002 v	<0.0007 u	4.2 v	7.7 v	0.51 v	2.5 v	30 v	0.019 v	0.015 J	500 v	0.5 v	42 v	110 v	6 v
Semi-volatiles (mg/kg)																							
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 1.0571 u	< 0.1076 u	< 0.1083 u	< 0.1074 u	< 0.1079 u	< 0.1063 u	< 0.1073 u	< 0.1048 u	< 0.1075 u	< 0.1076 u	< 0.1077 u	< 0.1051 u	< 0.1088 u	< 0.1074 u	< 1.0818 u	< 0.1081 u	< 0.1087 u	< 0.1071 u	< 0.1075 u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.7485 u	< 0.0762 u	< 0.0766 u	< 0.076 u	< 0.0764 u	< 0.0753 u	< 0.0759 u	< 0.0742 u	< 0.0761 u	< 0.0762 u	< 0.0763 u	< 0.0744 u	< 0.077 u	< 0.076 u	< 0.766 u	< 0.0765 u	< 0.0769 u	< 0.0759 u	< 0.0761 u
1,3-Dichlorobenzene	-	-	-	-	< 0.7553 u	< 0.0769 u	< 0.0773 u	< 0.0767 u	< 0.0771 u	< 0.076 u	< 0.0766 u	< 0.0748 u	< 0.0768 u	< 0.0769 u	< 0.077 u	< 0.0751 u	< 0.0777 u	< 0.0767 u	< 0.773 u	< 0.0772 u	< 0.0776 u	< 0.0766 u	< 0.0768 u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.8262 u	< 0.0841 u	< 0.0846 u	< 0.0839 u	< 0.0843 u	< 0.0831 u	< 0.0838 u	< 0.0819 u	< 0.084 u	< 0.0841 u	< 0.0842 u	< 0.0821 u	< 0.085 u	< 0.0839 u	< 0.8455 u	< 0.0845 u	< 0.0849 u	< 0.0837 u	< 0.084 u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	1.5 J	< 0.1 u	< 0.1006 u	< 0.0997 u	0.66 v	< 0.0987 u	< 0.0996 u	< 0.0973 u	< 0.0999 u	< 0.1 u	0.13 J	< 0.0976 u	< 0.1011 u	< 0.0998 u	< 1.0049 u	< 0.1004 u	0.15 J	1.3 v	< 0.0999 u
2,4,5-Trichlorophenol	6.16E+03	(1)	2.69E+04	(5)	< 0.978 u	< 0.0996 u	< 0.1002 u	< 0.0993 u	< 0.0998 u	< 0.0983 u	< 0.0992 u	< 0.0969 u	< 0.0995 u	< 0.0996 u	< 0.0997 u	< 0.0972 u	< 0.1007 u	< 0.0994 u	< 1.0008 u	< 0.1 u	< 0.1005 u	< 0.0991 u	< 0.0995 u
2,4,6-Trichlorophenol	6.16E+01	(1)	2.69E+02	(5)	< 0.8108 u	< 0.0826 u	< 0.083 u	< 0.0823 u	< 0.0827 u	< 0.0815 u	< 0.0823 u	< 0.0803 u	< 0.0824 u	< 0.0825 u	< 0.0826 u	< 0.0806 u	< 0.0834 u	< 0.0824 u	< 0.8297 u	< 0.0829 u	< 0.0833 u	< 0.0822 u	< 0.0825 u
2,4-Dichlorophenol	1.85E+02	(1)	8.07E+02	(5)	< 0.9116 u	< 0.0928 u	< 0.0934 u	< 0.0926 u	< 0.093 u	< 0.0917 u	< 0.0925 u	< 0.0903 u	< 0.0927 u	< 0.0928 u	< 0.0929 u	< 0.0906 u	< 0.0938 u	< 0.0926 u	< 0.9329 u	< 0.0932 u	< 0.0937 u	< 0.0924 u	< 0.0927 u
2,4-Dimethylphenol	1.23E+03	(1)	5.38E+03	(5)	< 1.0613 u	< 0.1081 u	< 0.1087 u	< 0.1078 u	< 0.1083 u	< 0.1067 u	< 0.1077 u	< 0.1052 u	< 0.1079 u	< 0.108 u	< 0.1081 u	< 0.1055 u	< 0.1092 u	< 0.1078 u	< 1.086 u	< 0.1085 u	< 0.1091 u	0.27 J	< 0.108 u
2,4-Dinitrophenol	1.23E+02	(1)	5.38E+02	(5)	< 0.6482 u	< 0.066 u	< 0.0664 u	< 0.0658 u	< 0.0662 u	< 0.0652 u	< 0.0658 u	< 0.0642 u	< 0.0659 u	< 0.066 u	< 0.066 u	< 0.0644 u	< 0.0667 u	< 0.0658 u	< 0.6633 u	< 0.0663 u	< 0.0666 u	< 0.0657 u	< 0.0659 u
2,4-Dinitrotoluene	1.71E+01	(1)	8.23E+01	(4)	< 0.8727 u	< 0.0889 u	< 0.0894 u	< 0.0886 u	< 0.0891 u	< 0.0878 u	< 0.0885 u	< 0.0865 u	< 0.0887 u	< 0.0888 u	< 0.0889 u	< 0.0868 u	< 0.0898 u	< 0.0887 u	< 0.8931 u	< 0.0892 u	< 0.0897 u	< 0.0885 u	< 0.0888 u
2,6-Dinitrotoluene	3.56E+00	(1)	1.72E+01	(4)	< 1.034 u	< 0.1053 u	< 0.1059 u	< 0.105 u	< 0.1055 u	< 0.104 u	< 0.1049 u	< 0.1025 u	< 0.1052 u	< 0.1053 u	< 0.1054 u	< 0.1028 u	< 0.1064 u	< 0.105 u	< 1.0582 u	< 0.1057 u	< 0.1063 u	< 0.1048 u	< 0.1052 u
2-Chloronaphthalene	6.26E+03	(1)	2.83E+04	(5)	< 0.7693 u	< 0.0783 u	< 0.0788 u	< 0.0781 u	< 0.0785 u	< 0.0774 u	< 0.0781 u	< 0.0762 u	< 0.0782 u	< 0.0783 u	< 0.0784 u	< 0.0765 u	< 0.0792 u	< 0.0782 u	< 0.7873 u	< 0.0787 u	< 0.0791 u	< 0.078 u	< 0.0783 u
2-Chlorophenol	3.91E+02	(1)	1.77E+03	(5)	< 0.7704 u	< 0.0784 u	< 0.0789 u	< 0.0782 u	< 0.0786 u	< 0.0775 u	< 0.0782 u	< 0.0763 u	< 0.0783 u	< 0.0784 u	< 0.0785 u	< 0.0766 u	< 0.0793 u	< 0.0783 u	< 0.7883 u	< 0.0788 u	< 0.0792 u	< 0.0781 u	< 0.0784 u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	3.3 Z	< 0.1181 u	< 0.1187 u	< 0.1178 u	1.3 v	< 0.1166 u	< 0.1176 u	< 0.1149 u	< 0.1179 u	< 0.118 u	0.28 v	< 0.1153 u	< 0.1193 u	< 0.1178 u	< 1.1867 u	< 0.1185 u	0.31 v	2.9 v	< 0.118 u
'2-Methylphenol (cresol,o-)	3.20E+03	(2)	4.10E+04	(6)	< 0.8169 u	< 0.0832 u	< 0.0836 u	< 0.083 u	0.14 J	< 0.0821 u	< 0.0829 u	< 0.0809 u	< 0.0831 u	< 0.0831 u	< 0.0832 u	0.13 J	< 0.0841 u	< 0.083 u	< 0.8359 u	< 0.0835 u	0.13 J	< 0.0828 u	< 0.0831 u
2-Nitroaniline	6.30E+02	(2)	8.00E+03	(6)	< 1.0533 u	< 0.1073 u	< 0.1079 u	< 0.107 u	< 0.1075 u	< 0.1059 u	< 0.1069 u	< 0.1044 u	< 0.1071 u	< 0.1072 u	< 0.1073 u	< 0.1047 u	< 0.1084 u	< 0.107 u	< 1.0779 u	< 0.1077 u	< 0.1083 u	< 0.1068 u	< 0.1071 u
2-Nitrophenol	-	-	-	-	< 0.9695 u	< 0.0987 u	< 0.0993 u	< 0.0985 u	< 0.099 u	< 0.0975 u	< 0.0984 u	< 0.0961 u	< 0.0986 u	< 0.0987 u	< 0.0988 u	< 0.0964 u	< 0.0998 u	< 0.0985 u	< 0.9922 u	< 0.0991 u	< 0.0996 u	< 0.0983 u	< 0.0986 u
3,3´-Dichlorobenzidine	1.18E+01	(1)	5.70E+01	(4)	< 0.7195 u	< 0.0733 u	< 0.0737 u	< 0.0731 u	< 0.0734 u	< 0.0724 u	< 0.073 u	< 0.0713 u	< 0.0732 u	< 0.0732 u	< 0.0733 u	< 0.0715 u	< 0.0741 u	< 0.0731 u	< 0.7363 u	< 0.0736 u	< 0.074 u	< 0.0729 u	< 0.0732 u
3+4-Methylphenol	-	-	-	-	< 0.7075 u	< 0.072 u	< 0.0724 u	< 0.0718 u	0.15 J	< 0.0711 u	< 0.0718 u	< 0.0701 u	< 0.0719 u	< 0.072 u	< 0.0721 u	0.14 J	< 0.0728 u	< 0.0719 u	< 0.724 u	< 0.0723 u	0.11 J	0.44 v	< 0.072 u
3-Nitroaniline	-	-	-	-	< 0.8615 u	< 0.0877 u	< 0.0882 u	< 0.0875 u	< 0.0879 u	< 0.0866 u	< 0.0874 u	< 0.0854 u	< 0.0876 u	< 0.0877 u	< 0.0878 u	< 0.0856 u	< 0.0887 u	< 0.0875 u	< 0.8816 u	< 0.0881 u	< 0.0885 u	< 0.0873 u	< 0.0876 u
4,6-Dinitro-2-methylphenol	4.93E+00	(1)	2.15E+01	(5)	< 0.5909 u	< 0.0602 u	< 0.0605 u	< 0.06 u	< 0.0603 u	< 0.0594 u	< 0.06 u	< 0.0586 u	< 0.0601 u	< 0.0602 u	< 0.0602 u	< 0.0588 u	< 0.0608 u	< 0.06 u	< 0.6047 u	< 0.0604 u	< 0.0607 u	< 0.0599 u	< 0.0601 u
4-Bromophenyl phenyl ether	-	-	-	-	< 0.9343 u	< 0.0951 u	< 0.0957 u	< 0.0949 u	< 0.0954 u	< 0.0939 u	< 0.0948 u	< 0.0926 u	< 0.095 u	< 0.0951 u	< 0.0952 u	< 0.0929 u	< 0.0962 u	< 0.0949 u	< 0.9561 u	< 0.0955 u	< 0.096 u	< 0.0947 u	< 0.095 u
4-Chloro-3-methylphenol	-	-	-	-	< 1.1659 u	< 0.1187 u	< 0.1194 u	< 0.1184 u	< 0.119 u	< 0.1172 u	< 0.1183 u	< 0.1155 u	< 0.1186 u	< 0.1187 u	< 0.1188 u	< 0.1159 u	< 0.12 u	< 0.1184 u	< 1.1931 u	< 0.1192 u	< 0.1198 u	< 0.1182 u	< 0.1186 u
4-Chloroaniline	2.70E+01	(3)	1.10E+02	(7)	< 1.0624 u	< 0.1082 u	< 0.1088 u	< 0.1079 u	< 0.1084 u	< 0.1068 u	< 0.1078 u	< 0.1053 u	< 0.108 u	< 0.1081 u	< 0.1083 u	< 0.1056 u	< 0.1093 u	< 0.1079 u	< 1.0872 u	< 0.1086 u	< 0.1092 u	< 0.1077 u	< 0.1081 u
4-Chlorophenyl phenyl ether	-	-	-	-	< 1.1165 u	< 0.1137 u	< 0.1143 u	< 0.1134 u	< 0.114 u	< 0.1123 u	< 0.1133 u	< 0.1106 u	< 0.1135 u	< 0.1137 u	< 0.1138 u	< 0.111 u	< 0.1149 u	< 0.1134 u	< 1.1426 u	< 0.1141 u	< 0.1148 u	< 0.1132 u	< 0.1136 u
4-Nitroaniline	2.70E+02	(3)	1.10E+03	(7)	< 0.689 u	< 0.0702 u	< 0.0706 u	< 0.07 u	< 0.0703 u	< 0.0693 u	< 0.0699 u	< 0.0683 u	< 0.0701 u	< 0.0701 u	< 0.0702 u	< 0.0685 u	< 0.0709 u	< 0.07 u	< 0.7051 u	< 0.0704 u	< 0.0708 u	< 0.0698 u	< 0.0701 u
4-Nitrophenol	-	-	-	-	< 0.7444 u	< 0.0758 u	< 0.0762 u	< 0.0756 u	< 0.076 u	< 0.0749 u	< 0.0755 u	< 0.0738 u	< 0.0757 u	< 0.0758 u	< 0.0759 u	< 0.074 u	< 0.0766 u	< 0.0756 u	< 0.7618 u	< 0.0761 u	< 0.0765 u	< 0.0755 u	< 0.0757 u
Acenaphthene	3.48E+03	(1)	1.51E+04	(5)	< 0.8379 u	< 0.0853 u	< 0.0858 u	< 0.0851 u	< 0.0855 u	< 0.0843 u	< 0.085 u	< 0.083 u	< 0.0852 u	< 0.0853 u	< 0.0854 u	< 0.0833 u	< 0.0862 u	< 0.0851 u	< 0.8575 u	< 0.0857 u	< 0.0861 u	< 0.0849 u	< 0.0852 u
Acenaphthylene	-	-	-	-	< 0.7952 u	< 0.081 u	< 0.0814 u	< 0.0808 u	< 0.0812 u	< 0.08 u	< 0.0807 u	< 0.0788 u	< 0.0809 u	< 0.0809 u	< 0.081 u	< 0.0791 u	< 0.0818 u	< 0.0808 u	< 0.8138 u	< 0.0813 u	< 0.0817 u	< 0.0806 u	< 0.0809 u
Aniline	9.50E+02	(3)	4.00E+03	(7)	< 0.9233 u	< 0.094 u	< 0.0946 u	< 0.0938 u	< 0.0942 u	< 0.0928 u	< 0.0937 u	< 0.0915 u	< 0.0939 u	< 0.094 u	< 0.0941 u	< 0.0918 u	< 0.095 u	< 0.0938 u	< 0.9449 u	< 0.0944 u	< 0.0949 u	< 0.0936 u	< 0.0939 u
Anthracene	1.74E+04	(1)	7.53E+04	(5)	< 0.6487 u	< 0.0661 u	< 0.0664 u	< 0.0659 u	< 0.0662 u	< 0.0652 u	< 0.0658 u	< 0.0643 u	< 0.066 u	< 0.066 u	< 0.0661 u	< 0.0645 u	< 0.0668 u	< 0.0659 u	< 0.6638 u	< 0.0663 u	< 0.0667 u	< 0.0657 u	< 0.066 u
Azobenzene	5.60E+01	(3)	2.60E+02	(7)	< 1.1908 u	< 0.1213 u	< 0.1219 u	< 0.1209 u	< 0.1215 u	< 0.1197 u	< 0.1208 u	< 0.118 u	< 0.1211 u	< 0.1212 u	< 0.1213 u	< 0.1184 u	< 0.1226 u	< 0.121 u	< 1.2186 u	< 0.1217 u	< 0.1224 u	< 0.1207 u	< 0.1211 u
Benz(a)anthracene	1.53E+00	(1)	3.23E+01	(4)	< 0.8412 u	< 0.0857 u	< 0.0861 u	< 0.0854 u	< 0.0859 u	< 0.0846 u	< 0.0853 u	< 0.0834 u	< 0.0855 u	< 0.0856 u	< 0.0857 u	< 0.0836 u	< 0.0866 u	< 0.0855 u	< 0.8609 u	< 0.086 u	< 0.0865 u	< 0.0853 u	< 0.0856 u
Benzo(a)pyrene	1.12E+00	(1)	2.36E+01	(4)	< 0.74 u	< 0.0753 u	< 0.0758 u	< 0.0751 u	< 0.0755 u	< 0.0744 u	< 0.0751 u	< 0.0733 u	< 0.0752 u	< 0.0753 u	< 0.0754 u	< 0.0736 u	< 0.0762 u	< 0.0752 u	< 0.7572 u	< 0.0756 u	< 0.0761 u	< 0.075 u	< 0.0753 u
Benzo(b)fluoranthene	1.53E+00	(1)	3.23E+01	(4)	< 0.8826 u	< 0.0899 u	< 0.0904 u	< 0.0896 u	< 0.0901 u	< 0.0887 u	< 0.0895 u	< 0.0875 u	< 0.0897 u	< 0.0898 u	< 0.0899 u	< 0.0877 u	< 0.0908 u	< 0.0897 u	< 0.9032 u	< 0.0902 u	< 0.0907 u	< 0.0895 u	< 0.0898 u
Benzo(g,h,i)perylene	-	-	-	-	< 0.8617 u	< 0.0877 u	< 0.0882 u	< 0.0875 u	< 0.0879 u	< 0.0866 u	< 0.0874 u	< 0.0854 u	< 0.0876 u	< 0.0877 u	< 0.0878 u	< 0.0857 u	< 0.0887 u	< 0.0875 u	< 0.8818 u	< 0.0881 u	< 0.0886 u	< 0.0873 u	< 0.0877 u
Benzo(k)fluoranthene	1.53E+01	(1)	3.23E+02	(4)	< 0.8609 u	< 0.0877 u	< 0.0882 u	< 0.0874 u	< 0.0879 u	< 0.0866 u	< 0.0873 u	< 0.0853 u	< 0.0875 u	< 0.0876 u	< 0.0877 u	< 0.0856 u	< 0.0886 u	< 0.0875 u	< 0.881 u	< 0.088 u	< 0.0885 u	< 0.0873 u	< 0.0876 u
Benzoic acid	2.50E+05	(2)	3.30E+06	(6)	2.1 J	< 0.0825 u	< 0.083 u	< 0.0823 u	< 0.0827 u	< 0.0815 u	< 0.0822 u	0.081 J	< 0.0824 u	< 0.0825 u	0.11 J	< 0.0805 u	< 0.0834 u	< 0.0823 u	2 J	< 0.0828 u	0.17 J	< 0.0821 u	0.13 J
Benzyl alcohol	6.30E+03	(2)	8.20E+04	(6)	< 0.765 u	< 0.0779 u	< 0.0783 u	< 0.0777 u	< 0.0781 u	< 0.0769 u	< 0.0776 u	< 0.0758 u	< 0.0778 u	< 0.0779 u	< 0.0779 u	< 0.0761 u	< 0.0787 u	< 0.0777 u	< 0.7828 u	< 0.0782 u	< 0.0786 u	< 0.0775 u	< 0.0778 u
Bis(2-chloroethoxy)methane	1.90E+02	(2)	2.50E+03	(6)	< 1.0604 u	< 0.108 u	< 0.1086 u	< 0.1077 u	< 0.1082 u	< 0.1066 u	< 0.1076 u	< 0.1051 u	< 0.1078 u	< 0.1079 u	< 0.108 u	< 0.1054 u	< 0.1091 u	< 0.1077 u	< 1.0851 u	< 0.1084 u	< 0.109 u	< 0.1075 u	< 0.1079 u
Bis(2-chloroethyl)ether	3.10E+00	(1)	1.93E+00	(5)	< 0.718 u	< 0.0731 u	< 0.0735 u	< 0.0729 u	< 0.0733 u	< 0.0722 u	< 0.0728 u	< 0.0712 u	< 0.073 u	< 0.0731 u	< 0.0732 u	< 0.0714 u	< 0.0739 u	< 0.0729 u	< 0.7348 u	< 0.0734 u	< 0.0738 u	< 0.0728 u	< 0.073 u
Bis(2-chloroisopropyl)ether	9.93E+01	(1)	5.19E+02	(4)	< 0.8725 u	< 0.0888 u	< 0.0894 u	< 0.0886 u	< 0.0891 u	< 0.0877 u	< 0.0885 u	< 0.0865 u	< 0.0887 u	< 0.0888 u	< 0.0889 u	< 0.0867 u	< 0.0898 u	< 0.0886 u	< 0.8929 u	< 0.0892 u	< 0.0897 u	< 0.0884 u	< 0.0888 u
Bis(2-ethylhexyl)phthalate	3.80E+02	(1)	1.83E+03	(4)	< 0.7962 u	0.12 J	0.14 J	< 0.0809 u	0.1 J	0.12 J	0.13 J	< 0.0789 u	0.096 J	0.14 J	0.12 J	0.1 J	0.096 J	0.11 J	< 0.8148 u	0.12 J	0.11 J	0.14 J	0.12 J
Butyl benzyl phthalate	2.90E+03	(3)	1.20E+04	(7)	< 0.8651 u	< 0.0881 u	< 0.0886 u	< 0.0879 u	< 0.0883 u	< 0.087 u	< 0.0878 u	< 0.0857 u	< 0.088 u	< 0.0881 u	< 0.0882 u	< 0.086 u	< 0.089 u	< 0.0879 u	< 0.8853 u	< 0.0884 u	< 0.0889 u	< 0.0877 u	< 0.088 u
Carbazole	-	-	-	-	< 0.6599 u	< 0.0672 u	< 0.0676 u	< 0.067 u	< 0.0674 u	< 0.0664 u	< 0.067 u	< 0.0654 u	< 0.0671 u	< 0.0672 u	< 0.0672 u	< 0.0656 u	< 0.0679 u	< 0.067 u	< 0.6753 u	< 0.0675 u	< 0.0678 u	< 0.0669 u	< 0.0671 u
Chrysene	1.53E+02	(1)	3.23E+03	(4)	< 0.8321 u	< 0.0847 u	< 0.0852 u	< 0.0845 u	< 0.0849 u	< 0.0837 u	< 0.0844 u	< 0.0825 u	< 0.0846 u	< 0.0847 u	< 0.0848 u	< 0.0827 u	< 0.0856 u	< 0.0845 u	< 0.8516 u	< 0.0851 u	< 0.0855 u	< 0.0843 u	< 0.0846 u

Soil Analytical Results Summary Marathon
Petroleum Company - Gallup Refinery Gallup,
New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	TK-568-1 (12-14')		TK-568-1 (30-32')		TK-568-1 (48-49')		TK 568-2 (22-24')		TK 568-2 (28-30')		TK 568-2 (36-37')		TK569-1(18-20')		TK569-1(24-26')		TK569-1(36-38')	
					1609E26-008		1609E26-009		1609E26-010		1609G64-001		1609G64-002		1609G64-003		1610238-004		1610238-005		1610238-006	
					9/23/2016		9/23/2016		9/23/2016		9/27/2016		9/27/2016		9/27/2016		10/4/2016		10/4/2016		10/4/2016	
Dibenz(a,h)anthracene	1.53E-01	(1)	3.23E+00	(4)	< 0.7902	u	< 0.0805	u	< 0.0809	u	< 0.0802	u	< 0.0806	u	< 0.0795	u	< 0.0802	u	< 0.0783	u	< 0.0804	u
Dibenzofuran	-	-	-	-	< 0.9829	u	< 0.1001	u	< 0.1006	u	< 0.0998	u	< 0.1003	u	< 0.0988	u	< 0.0997	u	< 0.0974	u	< 0.0999	u
Diethyl phthalate	4.93E+04	(1)	2.15E+05	(5)	< 0.991	u	0.16	J	0.16	J	< 0.1006	u	0.12	J	0.14	J	0.13	J	< 0.0982	u	< 0.1008	u
Dimethyl phthalate	6.16E+04	(1)	2.69E+05	(5)	< 0.9559	u	< 0.0973	u	< 0.0979	u	< 0.0971	u	< 0.0976	u	< 0.0961	u	< 0.097	u	< 0.0947	u	< 0.0972	u
Di-n-butyl phthalate	6.16E+03	(1)	2.69E+04	(5)	< 0.7307	u	0.15	J	0.2	J	0.094	J	0.12	J	0.14	J	0.24	J	0.18	J	0.087	J
Di-n-octyl phthalate	-	-	-	-	< 0.8336	u	< 0.0849	u	< 0.0854	u	< 0.0847	u	< 0.0851	u	< 0.0838	u	< 0.0846	u	< 0.0826	u	< 0.0848	u
Fluoranthene	2.32E+03	(1)	1.00E+04	(5)	< 0.5629	u	< 0.0573	u	< 0.0576	u	< 0.0572	u	< 0.0574	u	< 0.0566	u	< 0.0571	u	< 0.0558	u	< 0.0572	u
Fluorene	2.32E+03	(1)	1.00E+04	(5)	< 0.8945	u	< 0.0911	u	< 0.0916	u	< 0.0908	u	< 0.0913	u	< 0.0899	u	< 0.0907	u	< 0.0886	u	< 0.091	u
Hexachlorobenzene	3.33E+00	(1)	1.60E+01	(4)	< 0.7705	u	< 0.0785	u	< 0.0789	u	< 0.0783	u	< 0.0786	u	< 0.0775	u	< 0.0782	u	< 0.0764	u	< 0.0784	u
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 1.1012	u	< 0.1121	u	< 0.1128	u	< 0.1118	u	< 0.1124	u	< 0.1107	u	< 0.1117	u	< 0.1091	u	< 0.112	u
Hexachlorocyclopentadiene	2.28E+00	(1)	8.67E+02	(5)	< 1.1173	u	< 0.1138	u	< 0.1144	u	< 0.1135	u	< 0.114	u	< 0.1123	u	< 0.1134	u	< 0.1107	u	< 0.1136	u
Hexachloroethane	4.31E+01	(1)	1.88E+02	(5)	< 0.8395	u	< 0.0855	u	< 0.086	u	< 0.0853	u	< 0.0857	u	< 0.0844	u	< 0.0852	u	< 0.0832	u	< 0.0854	u
Indeno(1,2,3-cd)pyrene	1.53E+00	(1)	3.23E+01	(4)	< 0.7631	u	< 0.0777	u	< 0.0781	u	< 0.0775	u	< 0.0779	u	< 0.0767	u	< 0.0774	u	< 0.0756	u	< 0.0776	u
Isophorone	5.61E+03	(1)	2.70E+04		< 1.0804	u	< 0.11	u	< 0.1106	u	< 0.1097	u	< 0.1103	u	< 0.1086	u	< 0.1096	u	< 0.1071	u	< 0.1099	u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	4.2	Z	< 0.0955	u	< 0.0961	u	< 0.0953	u	1.4	v	< 0.0943	u	< 0.0952	u	< 0.093	u	< 0.0954	u
Nitrobenzene	5.99E+01	(1)	2.91E+02	(4)	< 1.0084	u	< 0.1027	u	< 0.1033	u	< 0.1024	u	< 0.1029	u	< 0.1014	u	< 0.1023	u	< 0.0999	u	< 0.1025	u
N-Nitrosodi-n-propylamine	7.80E-01	(3)	3.30E+00	(7)	< 0.9391	u	< 0.0956	u	< 0.0962	u	< 0.0954	u	< 0.0959	u	< 0.0944	u	< 0.0953	u	< 0.0931	u	< 0.0955	u
N-Nitrosodiphenylamine	1.09E+03	(1)	5.24E+03	(4)	< 0.9543	u	< 0.0972	u	< 0.0977	u	< 0.0969	u	< 0.0974	u	< 0.096	u	< 0.0968	u	< 0.0946	u	< 0.097	u
Pentachlorophenol	9.85E+00	(1)	4.45E+01	(4)	< 0.628	u	< 0.064	u	< 0.0643	u	< 0.0638	u	< 0.0641	u	< 0.0632	u	< 0.0637	u	< 0.0622	u	< 0.0639	u
Phenanthrene	1.74E+03	(1)	7.53E+03	(5)	< 0.6638	u	< 0.0676	u	< 0.068	u	< 0.0674	u	0.07	J	< 0.0668	u	< 0.0673	u	< 0.0658	u	< 0.0675	u
Phenol	1.85E+04	(1)	7.74E+04	(5)	< 0.736	u	< 0.0749	u	< 0.0754	u	< 0.0747	u	0.14	J	< 0.074	u	< 0.0747	u	< 0.0729	u	< 0.0748	u
Pyrene	1.74E+03	(1)	7.53E+03	(5)	< 0.7385	u	< 0.0752	u	< 0.0756	u	< 0.075	u	< 0.0754	u	< 0.0743	u	< 0.0749	u	< 0.0732	u	< 0.0751	u
Pyridine	7.80E+01	(2)	1.20E+03	(6)	< 0.7746	u	< 0.0789	u	< 0.0793	u	< 0.0787	u	< 0.0791	u	< 0.0779	u	< 0.0786	u	< 0.0768	u	< 0.0788	u
Total Petroleum Hydrocarbons (mg/kg)																						
Gasoline Range Organics (GRO)	1.00E+03	(8)	3.80E+03	(8)	**2700**	v	330	v	1.3	J	< 0.48	u	740	v	< 0.4837	u	< 0.6286	u	190	v	140	v
Diesel Range Organics (DRO)	1.00E+03	(8)	3.80E+03	(8)	300	v	11	v	8.4	J	< 1.8137	u	300	v	2.4	J	5.2	J	15	v	61	v
Motor Oil Range Organics (MRO)	1.00E+03	(8)	3.80E+03	(8)	< 487	u	< 48	u	< 49	u	< 49	u	< 46	u	< 49	u	< 50	u	< 48	u	< 48	u

	TK569-1(40-42')		TK569-2(16-18')		TK569-2(29-31')		TK569-2(36-38')		TK 569-3 (16-18')		TK 569-3 (24-26')		TK 569-3 (38-39')		TK 570-1 (10-12')		TK 570-1 (32-34')		TK 570-1 (44-45')	
	1610238-007		1610238-001		1610238-002		1610238-003		1609G64-008		1609G64-009		1609G64-010		1609G64-005		1609G64-006		1609G64-007	
	10/4/2016		10/4/2016		10/4/2016		10/4/2016		9/28/2016		9/28/2016		9/28/2016		9/27/2016		9/27/2016		9/27/2016	
Dibenz(a,h)anthracene	< 0.0804	u	< 0.0805	u	< 0.0786	u	< 0.0813	u	< 0.0803	u	< 0.8086	u	< 0.0808	u	< 0.0812	u	< 0.0801	u	< 0.0804	u
Dibenzofuran	< 0.1	u	< 0.1001	u	< 0.0977	u	< 0.1012	u	< 0.0998	u	< 1.0058	u	< 0.1005	u	< 0.101	u	< 0.0996	u	< 0.1	u
Diethyl phthalate	0.12	J	0.13	J	0.12	J	0.13	J	0.12	J	< 1.0141	u	0.17	J	0.11	J	0.15	J	0.17	J
Dimethyl phthalate	< 0.0973	u	< 0.0974	u	< 0.095	u	< 0.0984	u	< 0.0971	u	< 0.9782	u	< 0.0977	u	< 0.0983	u	< 0.0969	u	< 0.0972	u
Di-n-butyl phthalate	0.27	J	0.27	J	0.21	J	0.1	J	0.22	J	< 0.7478	u	0.23	J	0.13	J	0.24	J	0.24	J
Di-n-octyl phthalate	< 0.0849	u	< 0.0849	u	< 0.0829	u	< 0.0858	u	< 0.0847	u	< 0.8531	u	< 0.0852	u	< 0.0857	u	< 0.0845	u	< 0.0848	u
Fluoranthene	< 0.0573	u	< 0.0574	u	< 0.056	u	< 0.0579	u	< 0.0572	u	< 0.576	u	< 0.0575	u	< 0.0579	u	< 0.057	u	< 0.0573	u
Fluorene	< 0.091	u	< 0.0911	u	< 0.0889	u	< 0.0921	u	< 0.0909	u	< 0.9153	u	< 0.0914	u	< 0.0919	u	< 0.0907	u	< 0.091	u
Hexachlorobenzene	< 0.0784	u	< 0.0785	u	< 0.0766	u	< 0.0793	u	< 0.0783	u	< 0.7885	u	< 0.0788	u	< 0.0792	u	< 0.0781	u	< 0.0784	u
Hexachlorobutadiene	< 0.1121	u	< 0.1122	u	< 0.1095	u	< 0.1133	u	< 0.1119	u	< 1.127	u	< 0.1126	u	< 0.1132	u	< 0.1116	u	< 0.112	u
Hexachlorocyclopentadiene	< 0.1137	u	< 0.1138	u	< 0.1111	u	< 0.115	u	< 0.1135	u	< 1.1433	u	< 0.1142	u	< 0.1148	u	< 0.1132	u	< 0.1137	u
Hexachloroethane	< 0.0855	u	< 0.0855	u	< 0.0835	u	< 0.0864	u	< 0.0853	u	< 0.8591	u	< 0.0858	u	< 0.0863	u	< 0.0851	u	< 0.0854	u
Indeno(1,2,3-cd)pyrene	< 0.0777	u	< 0.0778	u	< 0.0759	u	< 0.0785	u	< 0.0775	u	< 0.7809	u	< 0.078	u	< 0.0784	u	< 0.0773	u	< 0.0776	u
Isophorone	< 0.11	u	< 0.1101	u	< 0.1074	u	< 0.1112	u	< 0.1098	u	< 1.1056	u	< 0.1104	u	< 0.111	u	< 0.1095	u	< 0.1099	u
Naphthalene	< 0.0955	u	0.17	J	0.12	J	< 0.0966	u	< 0.0953	u	1.2	J	< 0.0959	u	0.52	v	3.6	v	< 0.0954	u
Nitrobenzene	< 0.1027	u	< 0.1028	u	< 0.1003	u	< 0.1038	u	< 0.1024	u	< 1.032	u	< 0.1031	u	< 0.1036	u	< 0.1022	u	< 0.1026	u
N-Nitrosodi-n-propylamine	< 0.0956	u	< 0.0957	u	< 0.0934	u	< 0.0967	u	< 0.0954	u	< 0.9611	u	< 0.096	u	< 0.0965	u	< 0.0952	u	< 0.0955	u
N-Nitrosodiphenylamine	< 0.0971	u	< 0.0972	u	< 0.0949	u	< 0.0982	u	< 0.0969	u	< 0.9766	u	< 0.0976	u	< 0.0981	u	< 0.0967	u	< 0.0971	u
Pentachlorophenol	< 0.0639	u	< 0.064	u	< 0.0624	u	< 0.0646	u	< 0.0638	u	< 0.6427	u	< 0.0642	u	< 0.0646	u	< 0.0637	u	< 0.0639	u
Phenanthrene	< 0.0676	u	< 0.0676	u	< 0.066	u	< 0.0683	u	< 0.0674	u	< 0.6793	u	< 0.0679	u	< 0.0682	u	< 0.0673	u	< 0.0675	u
Phenol	< 0.0749	u	< 0.075	u	0.13	J	< 0.0757	u	< 0.0748	u	< 0.7532	u	< 0.0752	u	< 0.0756	u	0.44	v	< 0.0749	u
Pyrene	< 0.0752	u	< 0.0752	u	< 0.0734	u	< 0.076	u	< 0.075	u	< 0.7557	u	< 0.0755	u	< 0.0759	u	< 0.0748	u	< 0.0751	u
Pyridine	< 0.0788	u	< 0.0789	u	< 0.077	u	< 0.0797	u	< 0.0787	u	< 0.7927	u	< 0.0792	u	< 0.0796	u	< 0.0785	u	< 0.0788	u
Total Petroleum Hydrocarbons (mg/kg)																				
Gasoline Range Organics (GRO)	13	v	31	v	450	v	2.9	J	2.7	J	**13000**	v	27	v	540	v	**2500**	v	170	v
Diesel Range Organics (DRO)	19	v	17	v	13	v	4.4	J	1.7	J	**1500**	v	5.3	J	52	v	350	v	23	v
Motor Oil Range Organics (MRO)	< 48	u	< 48	u	< 48	u	< 48	u	< 47	u	< 502	u	< 47	u	< 49	u	< 467	u	< 50	u

- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (March 2017)

EPA - Regional Screening Levels (June 2017)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels

(7) EPA Industrial - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(8) NMED Table 6-2 TPH Soil Screening Levels "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Residential Soil Screening Level
Yellow highlight represents value above Non-Residential Soil Screening Level
Bold with yellow highlight value exceeds Residential Soil Screening Level and Non-Residential Soil Screening Level

v = reportable detection above the Practical quantitation limit (PQL)
u - result is not detected at method detection limit (MDL)
j - estimated result at concentration above MDL but less than PQL

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	OW-57 (16-18')		OW-57 (25-27')		OW-58 (10-12)		OW-58 (22-24')		OW-58 (28-29')		OW-58 (48-48.5')	
					1609E26-001		1609E26-002		1609E26-004		1609E26-005		1609E26-006		1609E26-007	
					9/21/2016		9/21/2016		9/22/2016		9/22/2016		9/22/2016		9/22/2016	
Metals (mg/kg)																
Antimony	3.13E+01	(1)	1.42E+02	(5)	< 0.9801	u	< 0.985	u	< 1.0176	u	< 0.9768	u	< 0.992	u	< 1.0049	u
Arsenic	7.07E+00	(1)	3.59E+01	(4)	1.8	J	2.8	v	2.2	J	2	J	2.7	v	1.8	J
Barium	1.56E+04	(1)	4.39E+03	(5)	180	v	1200	v	320	v	160	v	360	v	45	v
Beryllium	1.56E+02	(1)	1.48E+02	(5)	0.52	v	0.83	v	0.88	v	1.1	v	0.66	v	0.58	v
Cadmium	7.05E+01	(1)	7.21E+01	(5)	< 0.0618	u	< 0.0621	u	< 0.0641	u	< 0.0616	u	< 0.0625	u	< 0.0633	u
Chromium	9.66E+01	(1)	1.34E+02	(5)	8.8	v	9.4	v	10	v	13	v	9.4	v	7.3	v
Cobalt	2.34E+01	(1)	3.67E+01	(5)	4	v	3.4	v	4.1	v	4.7	v	4.4	v	3.7	v
Cyanide	1.11E+01	(1)	1.20E+01	(5)	< 0.25	u	< 0.25	u	< 0.25	u	< 0.25	u	< 0.25	u	< 0.25	u
Iron	5.48E+04	(1)	2.48E+05	(5)	12000	v	15000	v	15000	v	18000	v	14000	v	11000	v
Lead	-	(2)	8.00E+02	(6)	2.8	v	2.8	v	2.8	v	2.6	v	3.8	v	1.5	v
Manganese	1.05E+04	(1)	4.64E+02	(5)	510	v	1700	v	270	v	280	v	180	v	97	v
Mercury	2.36E+01	(1)	2.05E+01	(5)	0.0055	J	0.0026	J	0.0038	J	0.0056	J	0.0047	J	0.0014	J
Nickel	1.56E+03	(1)	7.53E+02	(5)	6.3	v	7.9	v	7.6	v	9.2	v	7.1	v	6.1	v
Selenium	3.91E+02	(1)	1.75E+03	(5)	< 1.7721	u	< 1.781	u	< 1.8398	u	< 1.7661	u	< 1.7936	u	< 1.8169	u
Silver	3.91E+02	(1)	1.77E+03	(5)	< 0.061	u	< 0.0613	u	< 0.0633	u	< 0.0608	u	< 0.0617	u	< 0.0625	u
Vanadium	3.94E+02	(1)	6.14E+02	(5)	17	v	23	v	18	v	19	v	21	v	14	v
Zinc	2.35E+04	(1)	1.06E+05	(5)	15	v	9.6	v	13	v	16	v	19	v	17	v
Volatiles (mg/kg)																
1,1,1,2-Tetrachloroethane	2.78E+01	(1)	1.36E+02	(4)	< 0.0031	u	<0.0019	u	< 0.0024	u	< 0.0662	u	< 0.0509	u	< 0.0151	u
1,1,1-Trichloroethane	1.43E+04	(1)	1.35E+04	(5)	< 0.002	u	<0.0019	u	< 0.0016	u	< 0.0422	u	< 0.0325	u	< 0.0097	u
1,1,2,2-Tetrachloroethane	7.93E+00	(1)	3.91E+01	(4)	< 0.0052	u	<0.0019	u	< 0.0041	u	< 0.1121	u	< 0.0862	u	< 0.0256	u
1,1,2-Trichloroethane	2.59E+00	(1)	2.28E+00	(5)	< 0.0038	u	<0.0019	u	< 0.003	u	< 0.0815	u	< 0.0627	u	< 0.0186	u
1,1-Dichloroethane	7.79E+01	(1)	3.80E+02	(4)	< 0.0017	u	<0.0019	u	< 0.0014	u	< 0.0374	u	< 0.0288	u	< 0.0086	u
1,1-Dichloroethene	4.36E+02	(1)	4.20E+02	(5)	< 0.0105	u	<0.0003	u	< 0.0084	u	< 0.2266	u	< 0.1743	u	< 0.0518	u
1,1-Dichloropropene	-	-	-	-	< 0.0025	u	<0.0019	u	< 0.002	u	< 0.0549	u	< 0.0422	u	< 0.0125	u
1,2,3-Trichlorobenzene	6.30E+01	(2)	9.30E+02	(6)	< 0.0048	u	<0.0005	u	< 0.0038	u	< 0.1035	u	< 0.0796	u	< 0.0237	u
1,2,3-Trichloropropane	5.10E-02	(1)	1.21E+00	(4)	< 0.0055	u	<0.0019	u	< 0.0044	u	< 0.1197	u	< 0.092	u	< 0.0274	u
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 0.0034	u	<0.0006	u	< 0.0027	u	< 0.074	u	< 0.0569	u	< 0.0169	u
1,2,4-Trimethylbenzene	3.00E+02	(2)	1.80E+03	(6)	< 0.0024	u	<0.0003	u	< 0.0019	u	23	v	30	v	1.4	v
1,2-Dibromo-3-chloropropane	8.51E-02	(1)	1.17E+00	(4)	< 0.0098	u	<0.0002	u	< 0.0078	u	< 0.2119	u	< 0.163	u	< 0.0485	u
1,2-Dibromoethane (EDB)	6.68E-01	(1)	3.28E+00	(4)	< 0.0023	u	<0.0019	u	< 0.0018	u	< 0.0492	u	< 0.0378	u	< 0.0113	u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.0028	u	<0.0003	u	< 0.0022	u	< 0.0604	u	< 0.0464	u	< 0.0138	u
1,2-Dichloroethane (EDC)	8.25E+00	(1)	4.03E+01	(4)	< 0.0083	u	<0.0019	u	< 0.0067	u	< 0.1804	u	< 0.1387	u	< 0.0412	u
1,2-Dichloropropane	1.76E+01	(1)	2.52E+01	(5)	< 0.0027	u	<0.0019	u	< 0.0021	u	< 0.058	u	< 0.0446	u	< 0.0133	u
1,3,5-Trimethylbenzene	2.70E+02	(2)	1.50E+03	(6)	< 0.0023	u	<0.0003	u	< 0.0019	u	7.7	v	9.9	v	0.5	v
1,3-Dichlorobenzene	-	-	-	-	< 0.0026	u	<0.0003	u	< 0.0021	u	< 0.0567	u	< 0.0436	u	< 0.013	u
1,3-Dichloropropane	1.60E+03	(2)	2.30E+04	(6)	< 0.0036	u	<0.0019	u	< 0.0029	u	< 0.0785	u	< 0.0604	u	< 0.0179	u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.004	u	<0.0004	u	< 0.0032	u	< 0.0857	u	< 0.0659	u	< 0.0196	u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	< 0.0071	u	0.0003	J	< 0.0057	u	2.8	v	1.6	J	0.083	J
2,2-Dichloropropane	-	-	-	-	< 0.0018	u	<0.0002	u	< 0.0015	u	< 0.0396	u	< 0.0305	u	< 0.0091	u
2-Butanone	3.73E+04	(1)	9.12E+04	(5)	< 0.0183	u	0.0023	J	0.055	J	< 0.3953	u	< 0.3041	u	< 0.0904	u
2-Chlorotoluene	1.56E+03	(1)	7.08E+03	(5)	< 0.0024	u	<0.0003	u	< 0.0019	u	< 0.051	u	< 0.0393	u	< 0.0117	u
2-Hexanone	2.00E+02	(2)	1.30E+03	(6)	< 0.0174	u	<0.0005	u	< 0.0139	u	< 0.3765	u	< 0.2895	u	< 0.0861	u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	< 0.0068	u	<0.0005	u	< 0.0055	u	4.9	v	3.2	v	0.14	J
4-Chlorotoluene	1.60E+03	(2)	2.30E+04	(6)	< 0.0028	u	<0.0003	u	< 0.0023	u	< 0.0612	u	< 0.0471	u	< 0.014	u
4-Isopropyltoluene	-	-	-	-	< 0.0029	u	<0.0004	u	< 0.0023	u	0.24	J	0.27	J	0.048	J
4-Methyl-2-pentanone	5.81E+03	(1)	2.02E+04	(5)	< 0.0093	u	<0.0037	u	< 0.0074	u	< 0.2016	u	< 0.1551	u	< 0.0461	u
Acetone	6.63E+04	(1)	2.41E+05	(5)	< 0.0414	u	0.0191	v	0.65	v	< 0.8951	u	< 0.6884	u	< 0.2047	u
Benzene	1.77E+01	(1)	8.65E+01	(4)	0.076	v	0.0147	v	0.068	v	7.3	v	16	v	0.077	J
Bromobenzene	2.90E+02	(2)	1.80E+03	(6)	< 0.0026	u	<0.0002	u	< 0.0021	u	< 0.0558	u	< 0.0429	u	< 0.0128	u
Bromodichloromethane	6.14E+00	(1)	2.99E+01	(4)	< 0.0019	u	<0.0019	u	< 0.0015	u	< 0.0403	u	< 0.031	u	< 0.0092	u
Bromoform	6.74E+02	(1)	1.75E+03	(4)	< 0.0039	u	<0.0019	u	< 0.0031	u	< 0.0843	u	< 0.0648	u	< 0.0193	u
Bromomethane	1.76E+01	(1)	1.77E+01	(5)	0.016	J	<0.0003	u	< 0.0094	u	< 0.2549	u	< 0.196	u	< 0.0583	u
Carbon disulfide	1.54E+03	(1)	1.61E+03	(5)	< 0.0106	u	<0.0007	u	< 0.0084	u	< 0.2284	u	< 0.1757	u	< 0.0522	u
Carbon tetrachloride	1.06E+01	(1)	5.21E+01	(4)	< 0.0021	u	<0.0019	u	< 0.0017	u	< 0.0454	u	< 0.0349	u	< 0.0104	u
Chlorobenzene	3.76E+02	(1)	4.08E+02	(5)	< 0.0026	u	<0.0002	u	< 0.0021	u	< 0.0563	u	< 0.0433	u	< 0.0129	u
Chloroethane	1.88E+04	(1)	1.65E+04	(5)	< 0.0064	u	<0.0003	u	< 0.0051	u	< 0.1381	u	< 0.1062	u	< 0.0316	u
Chloroform	5.85E+00	(1)	2.84E+01	(4)	< 0.0024	u	<0.0019	u	< 0.0019	u	< 0.0522	u	< 0.0401	u	< 0.0119	u
Chloromethane	4.08E+01	(1)	1.99E+02	(4)	< 0.0028	u	<0.0005	u	0.0085	J	< 0.0616	u	< 0.0474	u	< 0.0141	u
cis-1,2-DCE	1.56E+02	(1)	7.08E+02	(5)	< 0.0019	u	<0.0019	u	< 0.0015	u	< 0.0402	u	< 0.0309	u	< 0.0092	u
cis-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.0029	u	<0.0019	u	< 0.0024	u	< 0.0638	u	< 0.0491	u	< 0.0146	u
Dibromochloromethane	1.38E+01	(1)	6.69E+01	(4)	< 0.0029	u	<0.0019	u	< 0.0023	u	< 0.0625	u	< 0.0481	u	< 0.0143	u
Dibromomethane	5.74E+01	(1)	5.34E+01	(5)	< 0.0028	u	<0.0019	u	< 0.0022	u	< 0.0599	u	< 0.0461	u	< 0.0137	u
Dichlorodifluoromethane	1.80E+02	(1)	1.59E+02	(5)	< 0.0099	u	<0.0011	u	< 0.0079	u	< 0.2141	u	< 0.1646	u	< 0.0489	u
Ethylbenzene	7.45E+01	(1)	3.65E+02	(4)	< 0.0026	u	<0.0003	u	< 0.0021	u	9.3	v	15	v	0.51	v

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	OW-57 (16-18')		OW-57 (25-27')		OW-58 (10-12)		OW-58 (22-24')		OW-58 (28-29')		OW-58 (48-48.5')	
					1609E26-001		1609E26-002		1609E26-004		1609E26-005		1609E26-006		1609E26-007	
					9/21/2016		9/21/2016		9/22/2016		9/22/2016		9/22/2016		9/22/2016	
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 0.0039	u	<0.0004	u	< 0.0031	u	< 0.0846	u	< 0.0651	u	< 0.0193	u
Isopropylbenzene	2.35E+03	(1)	2.71E+03	(5)	< 0.0027	u	<0.0002	u	< 0.0022	u	0.57	J	0.82	v	0.09	J
Methyl tert-butyl ether (MTBE)	9.68E+02	(1)	4.78E+03	(4)	< 0.01	u	0.0008	J	< 0.008	u	< 0.2174	u	0.39	J	< 0.0497	u
Methylene chloride	4.09E+02	(1)	1.20E+03	(5)	< 0.0092	u	<0.0019	u	0.01	J	< 0.1995	u	< 0.1534	u	< 0.0456	u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	< 0.005	u	<0.0019	u	< 0.004	u	3	v	3.6	v	0.085	J
n-Butylbenzene	3.90E+03	(2)	5.80E+04	(6)	< 0.0028	u	<0.0005	u	< 0.0023	u	1.4	J	1.3	J	0.11	J
n-Propylbenzene	3.80E+03	(2)	2.40E+04	(6)	< 0.0025	u	<0.0003	u	< 0.002	u	3.4	v	4.7	v	0.28	v
sec-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	< 0.0044	u	<0.0003	u	< 0.0035	u	0.43	J	0.48	J	0.091	J
Styrene	7.23E+03	(1)	1.01E+04	(5)	< 0.0029	u	<0.0002	u	< 0.0023	u	< 0.0618	u	< 0.0475	u	< 0.0141	u
tert-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	< 0.0026	u	<0.0003	u	< 0.0021	u	< 0.0574	u	< 0.0441	u	< 0.0131	u
Tetrachloroethene (PCE)	1.10E+02	(1)	1.19E+02	(5)	< 0.0027	u	<0.0002	u	< 0.0021	u	< 0.0574	u	< 0.0441	u	< 0.0131	u
Toluene	5.22E+03	(1)	1.40E+04	(5)	< 0.0019	u	<0.0002	u	< 0.0015	u	45	v	77	v	1.1	v
trans-1,2-DCE	2.93E+02	(1)	3.03E+02	(5)	< 0.0089	u	<0.0002	u	< 0.0071	u	< 0.1937	u	< 0.1489	u	< 0.0443	u
trans-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.0047	u	<0.0002	u	< 0.0037	u	< 0.1013	u	< 0.0779	u	< 0.0232	u
Trichloroethene (TCE)	6.72E+00	(1)	6.84E+00	(5)	< 0.0034	u	<0.0019	u	< 0.0027	u	< 0.0742	u	< 0.057	u	< 0.017	u
Trichlorofluoromethane	1.22E+03	(1)	1.12E+03	(5)	< 0.0024	u	<0.0002	u	< 0.0019	u	< 0.0517	u	< 0.0398	u	< 0.0118	u
Vinyl chloride	7.41E-01	(1)	2.83E+01	(4)	< 0.0026	u	<0.0005	u	< 0.0021	u	< 0.0566	u	< 0.0435	u	< 0.0129	u
Xylenes, Total	8.63E+02	(1)	7.91E+02	(5)	< 0.0061	u	<0.0007	u	0.0063	J	55	v	92	v	3.1	v
Semi-volatiles (mg/kg)																
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 0.1085	u	< 0.1062	u	< 0.1074	u	< 0.1078	u	< 0.1078	u	< 0.1088	u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.0769	u	< 0.0752	u	< 0.076	u	< 0.0763	u	< 0.0763	u	< 0.077	u
1,3-Dichlorobenzene	-	-	-	-	< 0.0776	u	< 0.0759	u	< 0.0767	u	< 0.077	u	< 0.077	u	< 0.0777	u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.0848	u	< 0.083	u	< 0.0839	u	< 0.0843	u	< 0.0842	u	< 0.085	u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	< 0.1008	u	< 0.0986	u	< 0.0997	u	0.12	J	1.2	v	< 0.101	u
2,4,5-Trichlorophenol	6.16E+03	(1)	2.69E+04	(5)	< 0.1004	u	< 0.0982	u	< 0.0993	u	< 0.0998	u	< 0.0997	u	< 0.1006	u
2,4,6-Trichlorophenol	6.16E+01	(1)	2.69E+02	(5)	< 0.0832	u	< 0.0814	u	< 0.0823	u	< 0.0827	u	< 0.0826	u	< 0.0834	u
2,4-Dichlorophenol	1.85E+02	(1)	8.07E+02	(5)	< 0.0936	u	< 0.0916	u	< 0.0926	u	< 0.093	u	< 0.0929	u	< 0.0938	u
2,4-Dimethylphenol	1.23E+03	(1)	5.38E+03	(5)	< 0.109	u	< 0.1066	u	< 0.1078	u	< 0.1082	u	0.19	J	< 0.1092	u
2,4-Dinitrophenol	1.23E+02	(1)	5.38E+02	(5)	< 0.0666	u	< 0.0651	u	< 0.0658	u	< 0.0661	u	< 0.0661	u	< 0.0667	u
2,4-Dinitrotoluene	1.71E+01	(1)	8.23E+01	(4)	< 0.0896	u	< 0.0877	u	< 0.0886	u	< 0.089	u	< 0.089	u	< 0.0898	u
2,6-Dinitrotoluene	3.56E+00	(1)	1.72E+01	(4)	< 0.1062	u	< 0.1039	u	< 0.105	u	< 0.1055	u	< 0.1054	u	< 0.1064	u
2-Chloronaphthalene	6.26E+03	(1)	2.83E+04	(5)	< 0.079	u	< 0.0773	u	< 0.0781	u	< 0.0785	u	< 0.0784	u	< 0.0792	u
2-Chlorophenol	3.91E+02	(1)	1.77E+03	(5)	< 0.0791	u	< 0.0774	u	< 0.0782	u	< 0.0786	u	< 0.0785	u	< 0.0793	u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	< 0.1191	u	< 0.1165	u	< 0.1178	u	0.22	v	2.1	v	< 0.1193	u
'2-Methylphenol (cresol,o-)	3.20E+03	(2)	4.10E+04	(6)	< 0.0839	u	< 0.0821	u	< 0.083	u	< 0.0833	u	0.26	J	< 0.084	u
2-Nitroaniline	6.30E+02	(2)	8.00E+03	(6)	< 0.1081	u	< 0.1058	u	< 0.107	u	< 0.1074	u	< 0.1074	u	< 0.1084	u
2-Nitrophenol	-	-	-	-	< 0.0995	u	< 0.0974	u	< 0.0985	u	< 0.0989	u	< 0.0988	u	< 0.0997	u
3,3´-Dichlorobenzidine	1.18E+01	(1)	5.70E+01	(4)	< 0.0739	u	< 0.0723	u	< 0.0731	u	< 0.0734	u	< 0.0733	u	< 0.074	u
3+4-Methylphenol	-	-	-	-	< 0.0726	u	< 0.0711	u	< 0.0718	u	< 0.0722	u	0.26	v	< 0.0728	u
3-Nitroaniline	-	-	-	-	< 0.0885	u	< 0.0865	u	< 0.0875	u	< 0.0879	u	< 0.0878	u	< 0.0886	u
4,6-Dinitro-2-methylphenol	4.93E+00	(1)	2.15E+01	(5)	< 0.0607	u	< 0.0594	u	< 0.06	u	< 0.0603	u	< 0.0602	u	< 0.0608	u
4-Bromophenyl phenyl ether	-	-	-	-	< 0.0959	u	< 0.0939	u	< 0.0949	u	< 0.0953	u	< 0.0952	u	< 0.0961	u
4-Chloro-3-methylphenol	-	-	-	-	< 0.1197	u	< 0.1171	u	< 0.1184	u	< 0.1189	u	< 0.1188	u	< 0.12	u
4-Chloroaniline	2.70E+01	(3)	1.10E+02	(7)	< 0.1091	u	< 0.1067	u	< 0.1079	u	< 0.1084	u	< 0.1083	u	< 0.1093	u
4-Chlorophenyl phenyl ether	-	-	-	-	< 0.1146	u	< 0.1122	u	< 0.1134	u	< 0.1139	u	< 0.1138	u	< 0.1149	u
4-Nitroaniline	2.70E+02	(3)	1.10E+03	(7)	< 0.0707	u	< 0.0692	u	< 0.07	u	< 0.0703	u	< 0.0702	u	< 0.0709	u
4-Nitrophenol	-	-	-	-	< 0.0764	u	< 0.0748	u	< 0.0756	u	< 0.0759	u	< 0.0759	u	< 0.0766	u
Acenaphthene	3.48E+03	(1)	1.51E+04	(5)	< 0.086	u	< 0.0842	u	< 0.0851	u	< 0.0855	u	< 0.0854	u	< 0.0862	u
Acenaphthylene	-	-	-	-	< 0.0817	u	< 0.0799	u	< 0.0808	u	< 0.0811	u	< 0.0811	u	< 0.0818	u
Aniline	9.50E+02	(3)	4.00E+03	(7)	< 0.0948	u	< 0.0928	u	< 0.0938	u	< 0.0942	u	< 0.0941	u	< 0.095	u
Anthracene	1.74E+04	(1)	7.53E+04	(5)	< 0.0666	u	< 0.0652	u	< 0.0659	u	< 0.0662	u	< 0.0661	u	< 0.0667	u
Azobenzene	5.60E+01	(3)	2.60E+02	(7)	< 0.1223	u	< 0.1196	u	< 0.1209	u	< 0.1215	u	< 0.1214	u	< 0.1225	u
Benz(a)anthracene	1.53E+00	(1)	3.23E+01	(4)	< 0.0864	u	< 0.0845	u	< 0.0854	u	< 0.0858	u	< 0.0857	u	< 0.0865	u
Benzo(a)pyrene	1.12E+00	(1)	2.36E+01	(4)	< 0.076	u	< 0.0743	u	< 0.0751	u	< 0.0755	u	< 0.0754	u	< 0.0761	u
Benzo(b)fluoranthene	1.53E+00	(1)	3.23E+01	(4)	< 0.0906	u	< 0.0887	u	< 0.0896	u	< 0.09	u	< 0.09	u	< 0.0908	u
Benzo(g,h,i)perylene	-	-	-	-	< 0.0885	u	< 0.0866	u	< 0.0875	u	< 0.0879	u	< 0.0878	u	< 0.0887	u
Benzo(k)fluoranthene	1.53E+01	(1)	3.23E+02	(4)	< 0.0884	u	< 0.0865	u	< 0.0874	u	< 0.0878	u	< 0.0877	u	< 0.0886	u
Benzoic acid	2.50E+05	(2)	3.30E+06	(6)	< 0.0832	u	< 0.0814	u	< 0.0823	u	< 0.0826	u	< 0.0826	u	< 0.0834	u
Benzyl alcohol	6.30E+03	(2)	8.20E+04	(6)	< 0.0785	u	< 0.0768	u	< 0.0777	u	< 0.078	u	< 0.078	u	< 0.0787	u
Bis(2-chloroethoxy)methane	1.90E+02	(2)	2.50E+03	(6)	< 0.1089	u	< 0.1065	u	< 0.1077	u	< 0.1082	u	< 0.1081	u	< 0.1091	u
Bis(2-chloroethyl)ether	3.10E+00	(1)	1.93E+00	(5)	< 0.0737	u	< 0.0721	u	< 0.0729	u	< 0.0732	u	< 0.0732	u	< 0.0739	u
Bis(2-chloroisopropyl)ether	9.93E+01	(1)	5.19E+02	(4)	< 0.0896	u	< 0.0877	u	< 0.0886	u	< 0.089	u	< 0.0889	u	< 0.0898	u
Bis(2-ethylhexyl)phthalate	3.80E+02	(1)	1.83E+03	(4)	0.13	J	0.11	J	0.12	J	0.12	J	0.14	J	0.12	J
Butyl benzyl phthalate	2.90E+03	(3)	1.20E+04	(7)	< 0.0888	u	< 0.0869	u	< 0.0879	u	< 0.0882	u	< 0.0882	u	< 0.089	u
Carbazole	-	-	-	-	< 0.0678	u	< 0.0663	u	< 0.067	u	< 0.0673	u	< 0.0673	u	< 0.0679	u
Chrysene	1.53E+02	(1)	3.23E+03	(4)	< 0.0854	u	< 0.0836	u	< 0.0845	u	< 0.0849	u	< 0.0848	u	< 0.0856	u

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	OW-57 (16-18')		OW-57 (25-27')		OW-58 (10-12)		OW-58 (22-24')		OW-58 (28-29')		OW-58 (48-48.5')	
					1609E26-001		1609E26-002		1609E26-004		1609E26-005		1609E26-006		1609E26-007	
					9/21/2016		9/21/2016		9/22/2016		9/22/2016		9/22/2016		9/22/2016	
Dibenz(a,h)anthracene	1.53E-01	(1)	3.23E+00	(4)	< 0.0811	u	< 0.0794	u	< 0.0802	u	< 0.0806	u	< 0.0805	u	< 0.0813	u
Dibenzofuran	-	-	-	-	< 0.1009	u	< 0.0987	u	< 0.0998	u	< 0.1002	u	< 0.1002	u	< 0.1011	u
Diethyl phthalate	4.93E+04	(1)	2.15E+05	(5)	0.14	J	0.17	J	0.12	J	0.14	J	0.21	v	0.16	J
Dimethyl phthalate	6.16E+04	(1)	2.69E+05	(5)	< 0.0982	u	< 0.096	u	< 0.0971	u	< 0.0975	u	< 0.0974	u	< 0.0983	u
Di-n-butyl phthalate	6.16E+03	(1)	2.69E+04	(5)	0.16	J	0.15	J	0.14	J	0.15	J	0.25	J	0.15	J
Di-n-octyl phthalate	-	-	-	-	< 0.0856	u	< 0.0837	u	< 0.0847	u	< 0.085	u	< 0.085	u	< 0.0858	u
Fluoranthene	2.32E+03	(1)	1.00E+04	(5)	< 0.0578	u	< 0.0565	u	< 0.0572	u	< 0.0574	u	< 0.0574	u	< 0.0579	u
Fluorene	2.32E+03	(1)	1.00E+04	(5)	< 0.0918	u	< 0.0899	u	< 0.0908	u	< 0.0912	u	0.12	J	< 0.092	u
Hexachlorobenzene	3.33E+00	(1)	1.60E+01	(4)	< 0.0791	u	< 0.0774	u	< 0.0783	u	< 0.0786	u	< 0.0785	u	< 0.0793	u
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 0.1131	u	< 0.1106	u	< 0.1118	u	< 0.1123	u	< 0.1122	u	< 0.1133	u
Hexachlorocyclopentadiene	2.28E+00	(1)	8.67E+02	(5)	< 0.1147	u	< 0.1122	u	< 0.1135	u	< 0.114	u	< 0.1139	u	< 0.1149	u
Hexachloroethane	4.31E+01	(1)	1.88E+02	(5)	< 0.0862	u	< 0.0843	u	< 0.0853	u	< 0.0856	u	< 0.0856	u	< 0.0864	u
Indeno(1,2,3-cd)pyrene	1.53E+00	(1)	3.23E+01	(4)	< 0.0784	u	< 0.0767	u	< 0.0775	u	< 0.0778	u	< 0.0778	u	< 0.0785	u
Isophorone	5.61E+03	(1)	2.70E+04		< 0.1109	u	< 0.1085	u	< 0.1097	u	< 0.1102	u	< 0.1101	u	< 0.1112	u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	< 0.0963	u	< 0.0942	u	< 0.0953	u	0.11	J	1.3	v	< 0.0965	u
Nitrobenzene	5.99E+01	(1)	2.91E+02	(4)	< 0.1035	u	< 0.1013	u	< 0.1024	u	< 0.1029	u	< 0.1028	u	< 0.1038	u
N-Nitrosodi-n-propylamine	7.80E-01	(3)	3.30E+00	(7)	< 0.0964	u	< 0.0943	u	< 0.0954	u	< 0.0958	u	< 0.0957	u	< 0.0966	u
N-Nitrosodiphenylamine	1.09E+03	(1)	5.24E+03	(4)	< 0.098	u	< 0.0959	u	< 0.0969	u	< 0.0973	u	< 0.0973	u	< 0.0982	u
Pentachlorophenol	9.85E+00	(1)	4.45E+01	(4)	< 0.0645	u	< 0.0631	u	< 0.0638	u	< 0.0641	u	< 0.064	u	< 0.0646	u
Phenanthrene	1.74E+03	(1)	7.53E+03	(5)	< 0.0682	u	< 0.0667	u	< 0.0674	u	< 0.0677	u	0.27	v	< 0.0683	u
Phenol	1.85E+04	(1)	7.74E+04	(5)	< 0.0756	u	< 0.0739	u	< 0.0747	u	< 0.0751	u	0.31	v	< 0.0757	u
Pyrene	1.74E+03	(1)	7.53E+03	(5)	< 0.0758	u	< 0.0742	u	< 0.075	u	< 0.0753	u	< 0.0753	u	< 0.076	u
Pyridine	7.80E+01	(2)	1.20E+03	(6)	< 0.0795	u	< 0.0778	u	< 0.0787	u	< 0.079	u	< 0.079	u	< 0.0797	u
Total Petroleum Hydrocarbons (mg/kg)																
Gasoline Range Organics (GRO)	1.00E+03	(8)	3.80E+03	(8)	< 0.4812	u	< 0.5599	u	3.2	v	**1500**	v	**1700**	v	130	v
Diesel Range Organics (DRO)	1.00E+03	(8)	3.80E+03	(8)	< 1.7306	u	5.9	J	< 1.713	u	22	v	320	v	33	v
Motor Oil Range Organics (MRO)	1.00E+03	(8)	3.80E+03	(8)	< 47	u	< 48	u	< 46	u	< 48	u	< 49	u	< 47	u

- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (March 2017)

EPA - Regional Screening Levels (June 2017)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels

(7) EPA Industrial - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(8) NMED Table 6-2 TPH Soil Screening Levels "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Residential Soil Screening Level
Yellow highlight represents value above Non-Residential Soil Screening Level
Bold with yellow highlight value exceeds Residential Soil Screening Level and Non-Residential Soil Screening Level

v = reportable detection above the Practical quantitation limit (PQL)

u - result is not detected at method detection limit (MDL)

j - estimated result at concentration above MDL but less than PQL

Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
Metals (ug/l) TOTAL																						
Antimony	6	(2)	<0.47	u	<0.47	u	<2.36	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	-		-	
Arsenic	10	(2)	7.7	v	4.9	J	16	Z	10	Z	8	J	16	Z	8.7	J	9.4	v	-		7.6	J
Barium	2000	(2)	2000	Z	3800	Z	8700	Z	4900	Z	4200	Z	8500	Z	3000	Z	5200	Z	-		2100	Z
Beryllium	4	(2)	0.71	J	<0.36	u	1.7	J	0.43	J	<0.36	u	6.4	Z	0.51	J	3.7	v	-		-	
Cadmium	5	(2)	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	-		<1.484	u
Chromium	50	(3)	11	v	<2.66	u	14	v	14	v	<2.66	u	31	v	4.5	J	17	v	-		<2.656	u
Cobalt	6	(1)	4.6	J	<1.7	u	9.4	v	7.6	v	4.4	J	20	v	12	v	13	v	-		-	
Cyanide	200	(3)	<10	u	<10	u	<10	u	11.5	v	<10	u	<10	u	<10	u	27.3	v	-		-	
Iron	13800	(4)	10000	Z	3500	Z	28000	Z	17000	Z	8200	Z	36000	Z	9100	Z	27000	Z	-		4900	Z
Lead	15	(2)	12	v	0.31	J	21	Z	3.5	v	1.9	v	64	Z	9.3	v	36	Z	-		0.14	J
Manganese	2020	(4)	1800	Z	1800	Z	4200	Z	3400	Z	1900	Z	7200	Z	3500	Z	4100	Z	-		2200	Z
Mercury	2	(3)	0.16	J	0.15	J	0.21	v	0.16	J	0.12	J	0.18	J	0.14	J	0.13	J	-		-	
Nickel	372	(4)	34	v	70	v	57	v	54	v	82	v	100	Z	84	v	35	v	-		-	
Selenium	50	(3)	13	v	11	v	14	J	16	v	10	v	9.2	v	13	v	12	v	-		14	v
Silver	50	(3)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	-		<1.548	u
Vanadium	63.1	(4)	16	J	3.8	J	31	J	8.6	J	7.4	J	65	v	17	J	43	J	-		-	
Zinc	10000	(3)	30	v	8.2	J	61	v	15	v	13	v	64	v	17	v	48	v	-		15	v
Chloride	250000	(3)	130000	v	150000	v	140000	v	170000	v	140000	v	94000	v	180000	v	160000	v	-		-	
Fluoride	1600	(3)	240	v	370	v	<250	u	<250	u	440	v	<250	u	220	v	250	v	-		-	
Sulfate	600000	(3)	35000	v	5800	v	990	J	960	J	3100	v	4100	v	6200	v	1200	v	-		-	
Metals (ug/l) DISSOLVED																						
Antimony (D)	6	(2)	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	-		-	
Arsenic (D)	10	(2)	7.8	J	2.9	J	14	Z	10	Z	3.4	v	9.3	v	4.1	J	4.1	J	-		8.6	v
Barium (D)	1000	(3)	1800	v	3600	Z	6300	Z	5100	Z	3200	Z	3100	Z	2100	Z	3000	Z	-		2200	Z
Beryllium (D)	4	(2)	<0.31	u	<0.31	u	<0.31	u	<0.00031	u	<0.31	u	<0.31	u	<0.31	u	<0.31	u	-		-	
Cadmium (D)	5	(2)	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	-		<0.746	u
Chromium (D)	50	(3)	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	-		<1.754	u
Cobalt (D)	50	(3)	2.6	J	1.4	J	3.5	J	6.8	v	5.2	J	5.1	J	7.4	v	2.2	J	-		-	
Iron (D)	1000	(3)	4700	Z	920	Z	7900	Z	550	Z	3900	Z	7600	Z	740	Z	6600	Z	-		-	
Lead (D)	15	(2)	0.41	J	<0.00013	u	<0.00013	J	<0.17	u	<0.17	u	1.2	v	<0.17	u	1.1	v	-		<0.168	u
Manganese (D)	200	(3)	1600	Z	1700	Z	2600	Z	3100	Z	1600	Z	3100	Z	2100	Z	2100	Z	-		2200	Z
Nickel (D)	372	(4)	31	v	69	v	50	v	61	v	74	v	88	v	80	v	15	v	-		-	
Selenium (D)	50	(3)	7.4	J	5.6	J	9.7	J	11	J	5.2	J	4.2	J	8.2	J	6.4	J	-		12	J
Silver (D)	50	(3)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	-		<2.751	u
Vanadium (D)	63.1	(4)	1.7	J	4.7	J	4.8	J	4.4	J	4.8	J	7.8	J	4.9	J	4.6	J	-		-	
Zinc (D)	10000	(3)	4.9	J	9.3	J	22	v	6.9	J	9.5	J	10	v	5.3	J	3	J	-		28	v
Volatiles (ug/l)																						
1,1,1,2-Tetrachloroethane	5.74	(4)	<2.23	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<22.3	u	<0.557	u
1,1,1-Trichloroethane	60	(3)	<1.83	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<18.3	u	<0.457	u
1,1,2,2-Tetrachloroethane	10	(3)	<2.56	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<25.6	u	<0.641	u
1,1,2-Trichloroethane	5	(2)	<2.55	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<25.5	u	<0.637	u
1,1-Dichloroethane	25	(3)	<2.16	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<21.6	u	<0.54	u
1,1-Dichloroethene	5	(3)	<2.14	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<21.4	u	<0.536	u
1,1-Dichloropropene	-		<2.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<26.6	u	<0.666	u
1,2,3-Trichlorobenzene	7	(1)	<2.26	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<22.6	u	<0.564	u
1,2,3-Trichloropropane	0.01	(4)	<4.04	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<40.4	u	<1.01	u
1,2,4-Trichlorobenzene (V)	70	(2)	<2.66	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<26.6	u	<0.664	u
1,2,4-Trimethylbenzene	56	(1)	1300	v	850	v	1500	v	1000	v	930	v	1400	v	7.3	J	690	v	210	v	7.1	v
1,2-Dibromo-3-chloropropane	0.2	(2)	<4.69	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<46.9	u	<1.172	u
1,2-Dibromoethane (EDB)	0.05	(2)	57	v	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<22.4	u	<0.559	u

Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
1,2-Dichlorobenzene (V)	600	(2)	<8	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<80	u	<2	u
1,2-Dichloroethane (EDC)	5	(2)	<2.3	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<23	u	<0.575	u
1,2-Dichloropropane	5	(2)	**32**	v	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<22	u	<0.549	u
1,3,5-Trimethylbenzene	60	(1)	**350**	v	**190**	v	**410**	v	**300**	v	**270**	v	**430**	v	<5.77	u	**210**	v	44	J	0.82	J
1,3-Dichlorobenzene (V)	-		<2.86	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<28.6	u	<0.716	u
1,3-Dichloropropane	370	(1)	<3.11	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<31.1	u	<0.779	u
1,4-Dichlorobenzene (V)	75	(2)	<2.85	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<28.5	u	<0.713	u
1-Methylnaphthalene (V)	1.10	(1)	**40**	J	**67**	J	**61**	J	**26**	J	**24**	J	**24**	J	**150**	J	**89**	J	**88**	J	**34**	v
2,2-Dichloropropane	-		<3.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<33.3	u	<0.833	u
2-Butanone	5565	(4)	77	J	<36.85	u	830	v	740	v	<36.85	u	110	J	<36.85	u	<36.85	u	<147.4	u	<3.685	u
2-Chlorotoluene	240	(1)	<8	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<80	u	<2	u
2-Hexanone	38	(1)	<16.8	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<168	u	<4.199	u
2-Methylnaphthalene (V)	36	(1)	**59**	J	**76**	J	**82**	J	31	J	28	J	33	J	**140**	J	**97**	J	<31.7	u	<0.791	u
4-Chlorotoluene	250	(1)	<2.56	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<25.6	u	<0.641	u
4-Isopropyltoluene	-		6.4	J	16	J	9.7	J	26	J	21	J	47	J	<7.03	u	15	J	<28.1	u	<0.703	u
4-Methyl-2-pentanone	-		<8.55	u	<21.38	u	200	J	160	J	<21.38	u	240	J	<21.38	u	<21.38	u	<85.5	u	<2.138	u
Acetone	14100	(4)	140	J	<245.44	u	1500	v	770	v	<245.44	u	<245.44	u	<245.44	u	<245.44	u	<981.7	u	<24.544	u
Benzene	5	(2)	**16000**	v	**28000**	v	**34000**	v	**23000**	v	**24000**	v	**23000**	v	**11000**	v	**32000**	v	**38000**	v	**8100**	v
Bromobenzene	62	(1)	<1.95	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<19.5	u	<0.489	u
Bromodichloromethane	1.34	(4)	<2.8	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<28	u	<0.699	u
Bromoform	3.3	(1)	<2.04	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<20.4	u	<0.511	u
Bromomethane	7.54	(4)	<15.6	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<156	u	<3.899	u
Carbon disulfide	810	(4)	<11.95	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<119.5	u	<2.987	u
Carbon Tetrachloride	5	(2)	<2.16	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<21.6	u	<0.541	u
Chlorobenzene	100	(2)	<2.29	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<22.9	u	<0.572	u
Chloroethane	20857	(4)	<3.82	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<38.2	u	<0.955	u
Chloroform	100	(3)	<1.78	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<17.8	u	<0.444	u
Chloromethane	20.3	(4)	<4.26	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<42.6	u	<1.064	u
cis-1,2-DCE	70	(2)	<2.48	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<24.8	u	<0.621	u
cis-1,3-Dichloropropene	4.71	(4)	<2.13	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<21.3	u	<0.533	u
Dibromochloromethane	1.68	(4)	<1.73	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<17.3	u	<0.434	u
Dibromomethane	8.3	(1)	<2.38	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<23.8	u	<0.596	u
Dichlorodifluoromethane	197	(4)	<7.15	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<71.5	u	<1.787	u
Ethylbenzene	700	(2)	**1800**	v	**1600**	v	**2700**	v	**2000**	v	**1700**	v	**2100**	v	570	v	**1500**	v	**1200**	v	250	v
Hexachlorobutadiene (V)	1.39	(4)	<3.97	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<39.7	u	<0.993	u
Isopropylbenzene	447	(4)	43	v	74	v	53	v	160	v	140	v	220	v	22	J	72	v	30	J	8.5	v
Methyl tert-butyl ether (MTBE)	143	(4)	**10000**	v	140	v	**1100**	v	**1000**	v	**700**	v	74	v	**180**	v	**3300**	v	**1600**	v	**580**	v
Methylene Chloride	5	(2)	<3.75	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<37.5	u	<0.937	u
Naphthalene (V)	1.65	(4)	**280**	v	**220**	v	**320**	v	**88**	J	**82**	J	**92**	J	**220**	v	**240**	v	**140**	J	**18**	v
n-Butylbenzene	1000	(1)	14	J	18	J	20	J	22	J	17	J	47	J	9.1	J	21	J	<32.1	u	1.3	J
n-Propylbenzene	660		160	v	140	v	190	v	180	v	160	v	270	v	48	J	150	v	56	J	11	v
sec-Butylbenzene	2000	(1)	7.8	J	17	J	11	J	26	J	21	J	51	v	<6.15	u	18	J	<24.6	u	2.2	J
Styrene	100	(2)	<2.2	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<22	u	<0.55	u
tert-Butylbenzene	-		<2.3	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<23	u	<0.575	u
Tetrachloroethene (PCE)	5	(2)	<3.04	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<30.4	u	<0.76	u
Toluene	750	(3)	**10000**	v	**9300**	v	**41000**	v	**25000**	v	**20000**	v	**25000**	v	54	v	**6600**	v	**3800**	v	2.9	J
trans-1,2-DCE	100	(2)	<8	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<80	u	< 2	u
trans-1,3-Dichloropropene	4.71	(4)	<2.07	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<20.7	u	<0.516	u
Trichloroethene (TCE)	5	(2)	<3.5	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<35	u	<0.875	u
Trichlorofluoromethane	1137	(4)	<4.09	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<40.9	u	<1.022	u
Vinyl chloride	1	(3)	<3.91	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<39.1	u	<0.977	u

Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
Xylenes, Total	620	(3)	**10000**	v	**5900**	v	**15000**	v	**10000**	v	**9200**	v	**11000**	v	140	v	**4400**	v	**3100**	v	8	v
Semi-volatiles (ug/l)																						
1,2,4-Trichlorobenzene	70	(2)	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<26.2	u	<2.62	u	<2.62	u	-		-	
1,2-Dichlorobenzene	600	(2)	<2.29	u	<2.29	u	<2.29	u	<2.29	u	<2.29	u	<22.85	u	<2.29	u	<2.29	u	-		-	
1,3-Dichlorobenzene	-		<2.26	u	<2.26	u	<2.26	u	<2.26	u	<2.26	u	<22.57	u	<2.26	u	<2.26	u	-		-	
1,4-Dichlorobenzene	75	(2)	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<23.88	u	<2.39	u	<2.39	u	-		-	
1-Methylnaphthalene	1.1	(5)	**66**	v	**80**	v	**71**	v	**59**	v	**110**	v	**120**	v	**110**	v	**65**	v	-		-	
2,4,5-Trichlorophenol	1166	(4)	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<21.8	u	<2.18	u	<2.18	u	-		-	
2,4,6-Trichlorophenol	11.9	(4)	<2.45	u	<2.45	u	<2.45	u	<2.45	u	<2.45	u	<24.46	u	<2.45	u	<2.45	u	-		-	
2,4-Dichlorophenol	45.3	(4)	<2.33	u	<2.33	u	<2.33	u	<2.33	u	<2.33	u	<23.3	u	<2.33	u	<2.33	u	-		-	
2,4-Dimethylphenol	353.9	(4)	71	v	34	v	33	v	46	v	97	v	52	J	8.4	J	3.9	J	-		-	
2,4-Dinitrophenol	38.7	(4)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<27.53	u	<2.75	u	<2.75	u	-		-	
2,4-Dinitrotoluene	2.37	(4)	<3.13	u	<3.13	u	<3.13	u	<3.13	u	<3.13	u	<31.29	u	<3.13	u	<3.13	u	-		-	
2,6-Dinitrotoluene	0.485	(4)	<2.73	u	<2.73	u	<2.73	u	<2.73	u	<2.73	u	<27.34	u	<2.73	u	<2.73	u	-		-	
2-Chloronaphthalene	733	(4)	<2.25	u	<2.25	u	<2.25	u	<2.25	u	<2.25	u	<22.51	u	<2.25	u	<2.25	u	-		-	
2-Chlorophenol	91	(4)	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<21.84	u	<2.18	u	<2.18	u	-		-	
2-Methylnaphthalene	36	(1)	**57**	v	**49**	v	**76**	v	<2.89	v	<2.89	u	**110**	v	**98**	v	**71**	v	-		-	
2-Methylphenol	930	(1)	65	v	23	v	68	v	80	v	98	v	210	v	<2.54	u	5.2	J	-		-	
2-Nitroaniline	190	(1)	<2.76	u	<2.76	u	<2.76	u	<2.76	u	<2.76	u	<27.58	u	<2.76	u	<2.76	u	-		-	
2-Nitrophenol	-		<2.38	u	<2.38	u	<2.38	u	<2.38	u	<2.38	u	<23.78	u	<2.38	u	<2.38	u	-		-	
3,3´-Dichlorobenzidine	1.25	(4)	<2.4	u	<2.4	u	<2.4	u	<2.4	u	<2.4	u	<23.96	u	<2.4	u	<2.4	u	-		-	
3+4-Methylphenol	930	(1)	87	v	26	v	110	v	130	v	99	v	200	v	<2.3	u	7.9	J	-		-	
3-Nitroaniline	-		<2.95	u	<2.95	u	<2.95	u	<2.95	u	<2.95	u	<29.48	u	<2.95	u	<2.95	u	-		-	
4,6-Dinitro-2-methylphenol	1.52	(4)	<1.8	u	<1.8	u	<1.8	u	<1.8	u	<1.8	u	<17.97	u	<1.8	u	<1.8	u	-		-	
4-Bromophenyl phenyl ether	-		<2.64	u	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<26.37	u	<2.64	u	<2.64	u	-		-	
4-Chloro-3-methylphenol	-		<2.56	u	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<25.59	u	<2.56	u	<2.56	u	-		-	
4-Chloroaniline	0.37	(5)	<2.71	u	<2.71	u	<2.71	u	<2.71	u	<2.71	u	<27.12	u	<2.71	u	<2.71	u	-		-	
4-Chlorophenyl phenyl ether	-		<2.56	u	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<25.56	u	<2.56	u	<2.56	u	-		-	
4-Nitroaniline	3.8	(5)	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<25.59	u	<2.56	u	<2.56	u	-		-	
4-Nitrophenol	-		<2.55	u	<2.55	u	<2.55	u	<2.55	u	<2.55	u	<25.53	u	<2.55	u	<2.55	u	-		-	
Acenaphthene	535	(4)	<2.55	u	<2.55	u	<2.55	u	<2.55	u	<2.55	u	<25.53	u	<2.55	u	<2.55	u	-		-	
Acenaphthylene	-		<2.36	u	<2.36	u	<2.36	u	<2.36	u	<2.36	u	<23.57	u	<2.36	u	<2.36	u	-		-	
Aniline	13	(5)	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<24.41	u	<2.44	u	<2.44	u	-		-	
Anthracene	1720	(4)	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<24.86	u	<2.49	u	<2.49	u	-		-	
Azobenzene	0.12	(5)	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<26.68	u	<2.67	u	<2.67	u	-		-	
Benz(a)anthracene	0.12	(4)	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<26.39	u	<2.64	u	<2.64	u	-		-	
Benzo(a)pyrene	0.2	(2)	<2.72	u	<2.72	u	<2.72	u	<2.72	u	<2.72	u	<27.18	u	<2.72	u	<2.72	u	-		-	
Benzo(b)fluoranthene	0.343	(4)	<2.88	u	<2.88	u	<2.88	u	<2.88	u	<2.88	u	<28.8	u	<2.88	u	<2.88	u	-		-	
Benzo(g,h,i)perylene	-		<2.64	u	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<26.43	u	<2.64	u	<2.64	u	-		-	
Benzo(k)fluoranthene	3.43	(4)	<3	u	<3	u	<3	u	<3	u	<3	u	<29.98	u	<3	u	<3	u	-		-	
Benzoic acid	75000	(1)	41	v	45	v	43	v	43	v	68	v	450	v	32	v	16	J	-		-	
Benzyl alcohol	2000	(1)	<3.01	u	<3.01	u	<3.01	u	<3.01	u	<3.01	u	<30.12	u	<3.01	u	<3.01	u	-		-	
Bis(2-chloroethoxy)methane	59	(1)	<2.81	u	<2.81	u	<2.81	u	<2.81	u	<2.81	u	<28.14	u	<2.81	u	<2.81	u	-		-	
Bis(2-chloroethyl)ether	0.137	(4)	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<26.74	u	<2.67	u	<2.67	u	-		-	
Bis(2-chloroisopropyl)ether	9.81	(4)	<1.91	u	<1.91	u	<1.91	u	<1.91	u	<1.91	u	<19.09	u	<1.91	u	<1.91	u	-		-	
Bis(2-ethylhexyl)phthalate	6	(2)	6	J	<2.62	u	**12**	v	**7.1**	J	**7.8**	J	**66**	J	4.2	J	2.8	J	-		-	
Butyl benzyl phthalate	16	(5)	<2.48	u	<2.48	u	<2.48	u	<2.48	u	<2.48	u	<24.78	u	<2.48	u	<2.48	u	-		-	
Carbazole	-		2.6	J	5	J	<2.29	u	<2.29	u	<2.29	u	<22.87	u	4.2	J	2.8	J	-		-	
Chrysene	34.3	(4)	<2.78	u	<2.78	u	<2.78	u	<2.78	u	<2.78	u	<27.79	u	<2.78	u	<2.78	u	-		-	
Dibenz(a,h)anthracene	0.0343	(4)	<2.66	u	<2.66	u	<2.66	u	<2.66	u	<2.66	u	<26.61	u	<2.66	u	<2.66	u	-		-	
Dibenzofuran	7.9	(1)	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<24.93	u	<2.49	u	<2.49	u	-		-	

Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
Diethyl phthalate	14800	(4)	<2.71	u	<2.71	u	<2.71	u	<2.71	u	3.4	J	<27.15	u	<2.71	u	<2.71	u	-		-	
Dimethyl phthalate	-		3.1	J	3	J	26	v	18	v	31	v	<24.29	u	<2.43	u	<2.43	u	-		-	
Di-n-butyl phthalate	885	(4)	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<24.44	u	<2.44	u	<2.44	u	-		-	
Di-n-octyl phthalate	-		2	J	<1.98	u	6.8	J	6.8	J	<1.98	u	<19.83	u	<1.98	u	<1.98	u	-		-	
Fluoranthene	802	(4)	<2.61	u	<2.61	u	<2.61	u	<2.61	u	<2.61	u	<26.07	u	<2.61	u	<2.61	u	-		-	
Fluorene	288	(4)	<2.72	u	3.1	J	<2.72	u	<2.72	u	<2.72	u	<27.24	u	7.2	J	3.8	J	-		-	
Hexachlorobenzene	0.0976	(4)	<2.63	u	<2.63	u	<2.63	u	<2.63	u	<2.63	u	<26.33	u	<2.63	u	<2.63	u	-		-	
Hexachlorobutadiene	1.387	(4)	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<21.84	u	<2.18	u	<2.18	u	-		-	
Hexachlorocyclopentadiene	50	(4)	<2.28	u	<2.28	u	<2.28	u	<2.28	u	<2.28	u	<22.84	u	<2.28	u	<2.28	u	-		-	
Hexachloroethane	3.28	(4)	<2.37	u	<2.37	u	<2.37	u	<2.37	u	<2.37	u	<23.68	u	<2.37	u	<2.37	u	-		-	
Indeno(1,2,3-cd)pyrene	0.343	(4)	<2.96	u	<2.96	u	<2.96	u	<2.96	u	<2.96	u	<29.64	u	<2.96	u	<2.96	u	-		-	
Isophorone	781	(4)	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<26.15	u	<2.62	u	<2.62	u	-		-	
Naphthalene	1.65	(4)	**210**	v	**130**	v	**210**	v	**47**	v	**68**	v	**220**	v	**140**	v	**160**	v	-		-	
Nitrobenzene	1.4	(4)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<27.53	u	<2.75	u	<2.75	u	-		-	
N-Nitrosodimethylamine	0.0017	(4)	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<21.58	u	<2.16	u	<2.16	u	-		-	
N-Nitrosodi-n-propylamine	0.011	(5)	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<23.89	u	<2.39	u	<2.39	u	-		-	
N-Nitrosodiphenylamine	0.0049	(4)	<2.32	u	<2.32	u	<2.32	u	<2.32	u	<2.32	u	<23.2	u	<2.32	u	<2.32	u	-		-	
Phenanthrene	170	(4)	<2.59	u	<2.59	u	<2.59	u	<2.59	u	<2.59	u	<25.87	u	7.6	J	2.9	J	-		-	
Pentachlorophenol	1	(4)	<2.34	u	<2.34	u	<2.34	u	<2.34	u	<2.34	u	<23.42	u	<2.34	u	<2.34	u	-		-	
Phenol	5760	(4)	160	v	69	v	69	v	96	v	98	v	120	v	88	v	51	v	-		-	
Pyrene	117	(4)	<3.09	u	<3.09	u	<3.09	u	<3.09	u	<3.09	u	<30.94	u	<3.09	u	<3.09	u	-		-	
Pyridine	20	(1)	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<21.61	u	<2.16	u	<2.16	u	-		-	
TPH (mg/l)																						
Gasoline Range Organics (GRO	3.98E-02	(6)	**140**	v	**140**	v	**260**	v	**160**	v	**170**	v	**240**	v	**46**	v	**150**	v	**140000**	v	**31000**	v
Diesel Range Organics (DRO)	3.98E-02	(6)	**10**	v	**12**	v	**22**	v	**14**	v	**21**	v	**170**	v	**9.3**	v	**5.6**	v	**14000**	v	**4100**	v
Motor Oil Range Organics (MRO	3.98E-02	(6)	< 5	u	< 5	u	< 5	u	< 5	u	< 5	u	< 50	u	< 5	u	< 5	u	<5000	u	<5000	u

- No screening level or analytical result available

450 - bolded value exceeds screening level

(1) EPA - Regional Screening Levels (November 2018) - Tap Water

(2) EPA - Regional Screening Levels (November 2018) - MCL

(3) NMED WQCC standards - Title 20 Chapter 6, Part 2, - 20.6.2.3101 Standards for Ground Water of 10,000 mg/l TDS Concentration or less

(4) NMED Tap Water Screening Level - Risk Assessment Guidance for Site Investigations and Remediation (March 2017)

(5) EPA Screening Level - Tap Water x 10 for carcinogenic compounds

(6) NMED groundwater screening level for unknown oil

v = reportable detection above the Practical quantitation limit (PQL)

u - result is not detected at method detection limit (MDL)

j - estimated result at concentration above MDL but less than PQL

z - concentration exceeds MCL

DiSorbo
Environmental Consulting Firm

Western Refining SW, Inc.
Gallup Refinery - OW-14 Area Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc. / Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollw Stem Auger 7.5"
Sampling Method	: 2' Split Spoon - 2" Diameter
Comments	: N 35° 29.493' / W 108° 25.501'
Total Depth	: 27'
Ground Water	: 18'
Start Date	: 09/21/2016
Finish Date	: 09/21/2016

WELL NO. OW-57

Elev., TOC (ft.msl)	: 6933.10
Elev., PAD (ft. msl)	: 6930.64
Elev., GL (ft. msl)	:
Site Coordinates	:
N	: N 163475.52
E	: E 2546961.79

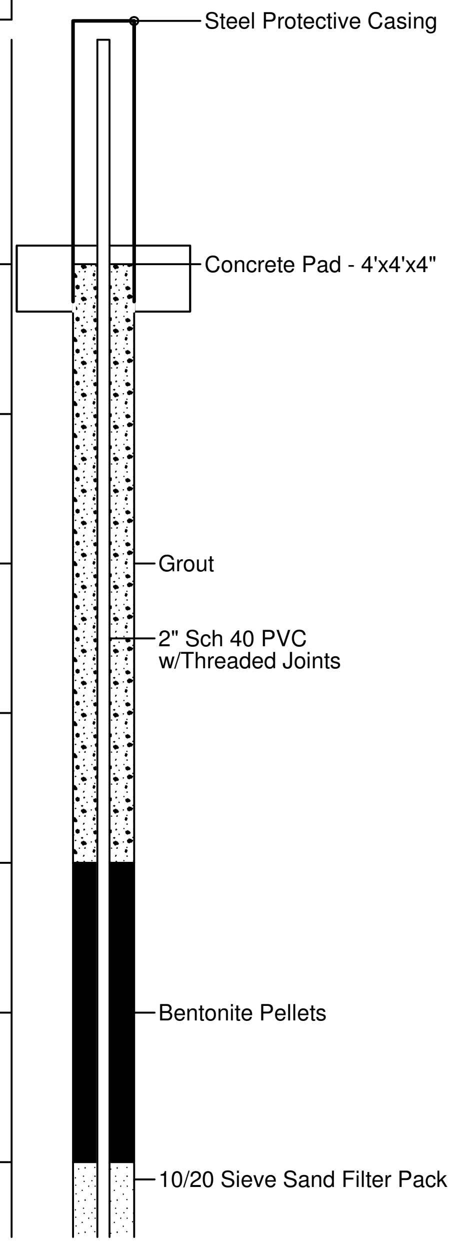
Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
-3							
-2							
-1							
0							SILTY CLAY, moderate, firm, damp, brown, no odor,
1	0.6			CL	100		
2							SILTY CLAY, SIMILAR TO ABOVE (STA),
3	0.6			CL	100		
4							SILTY CLAY, STA,
5	2.6			CL	100		
6							SILTY CLAY, STA, darker brown,
7	6.2			CL	100		
8							SILTY CLAY, STA, no odor,
9	23.7			CL	90		
10							SANDY CLAY, low, soft, damp, brown, odor,
11	118			CL	90		
12							SANDY CLAY, STA, brown/tan silt at base, odor,
	85			CL			
13							

Completion Results

OW-57



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DiSorbo
Environmental Consulting Firm

Western Refining SW, Inc.
Gallup Refinery - OW-14 Area Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc. / Cohagan
Drilling Rig	: CME 75
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Elev., GL (ft. msl)	:
Site Coordinates	:
N	: N 163475.52
E	: E 2546961.79

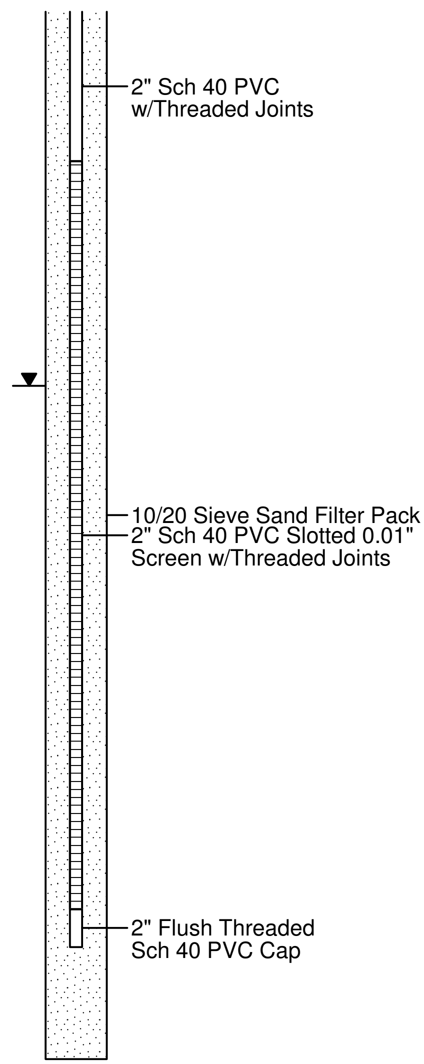
Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
13–14	85		▨	CL	80		
14–16	197			ML	90		CLAYEY SILT, very fine, soft, damp, brown and tan, odor,
16–18	205		▨	CL	60	☒	SILTY CLAY, low, firm, tan and brown, damp, odor,
18–20	58	▼	▨	CL	20		GRAVELLY CLAY, low, soft, damp to slightly moist to saturated, sandstone gravel, sandy, odor,
20–22	243			SS	10		SANDSTONE/SAND, fine, dense, llight greenish white,very moist to saturated,
22–24	846		▨	CL	70		GRAVELLY SANDY CLAY, low, soft, very moist to saturated, grey, green sandstone, calcareous, odor,
24–25			▨	CL	70		GRAVELLY SANDY CLAY, STA, odor,
25–26	44		■	CL/ST	70	☒	CLAYSTONE, very dense, dry, purple, grey at base, faint odor,
26–27	39		■	CL/ST	30		CLAYSTONE, STA, faint odor.

Completion Results

OW-57



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DiSorbo
Environmental Consulting Firm

Western Refining SW, Inc.
Gallup Refinery - OW-14 Area Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc. / Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollw Stem Auger 7.5"
Sampling Method	: 2' Split Spoon - 2" Diameter
Comments	: N 35° 29.500' / W 108° 28.410'
Total Depth	: 48.5'
Ground Water	: 29'
Start Date	: 09/22/2016
Finish Date	: 09/22/2016

WELL NO. OW-58

(Sheet 1 of 4)

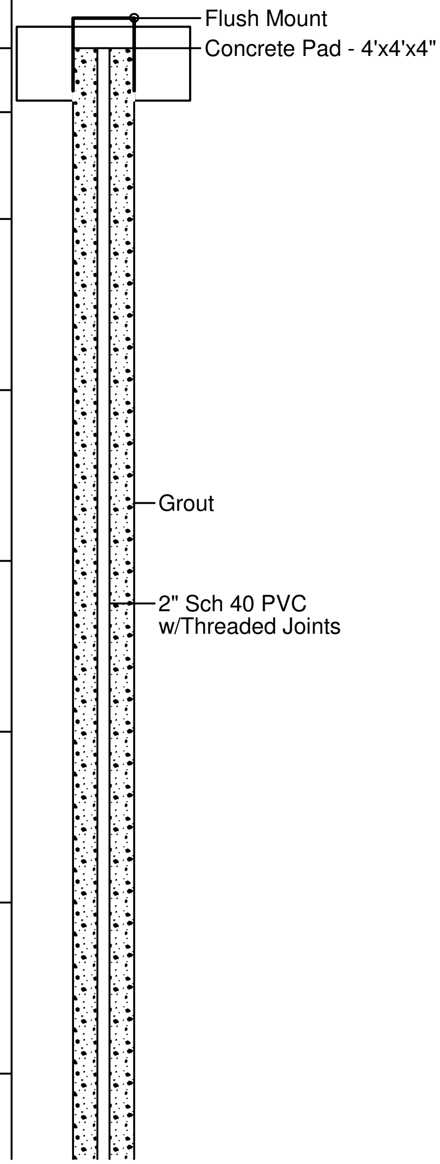
Elev., TOC (ft.msl)	: 6934.50
Elev., PAD (ft. msl)	: 6934.71
Elev., GL (ft. msl)	:
Site Coordinates	:
N	: N 1634800.15
E	: E 2547414.91

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0				AR	100		ASPHALT/BASE,
1	110			CL	100		SILTY CLAY, moderate, firm to stiff, damp, brown, odor,
2	40			CL	100		SILTY CLAY, SIMILAR TO ABOVE (STA),
4	11.2			CL	100		SILTY CLAY, STA, moist, faint odor,
6	2.2			CL	90		SILTY CLAY, low, soft, damp, brown, faint odor,
8	5.3			CL	60		SILTY CLAY, STA, no odor,
10	37			CL	80		SILTY CLAY, STA, sticky, black discoloration, odor,
12	42			CL			SILTY CLAY, STA,

Completion Results

OW-58



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Gallup Refinery - OW-14 Area Investigation
Job No. WEST16006

Geologist : Tracy Payne
Driller : Enviro-Drill, Inc. / Cohagan
Drilling Rig : CME 75
Drilling Method : Hollw Stem Auger 7.5"
Sampling Method : 2' Split Spoon - 2" Diameter
Comments : N 35° 29.500' / W 108° 28.410'
Total Depth : 48.5'
Ground Water : 29'
Start Date : 09/22/2016
Finish Date : 09/22/2016

WELL NO. OW-58

Elev., TOC (ft.msl) : 6934.50
Elev., PAD (ft. msl): 6934.71
Elev., GL (ft. msl) :
Site Coordinates :
N : N 1634800.15
E : E 2547414.91

Saturation
▼ Saturation
▽ Saturation

Completion Results

OW-58

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
13–14	42			CL	70		
14–16	25			CL	60		SILTY CLAY, low, stiff, damp, brown with black discoloration, faint odor,
16–18	226			CL	60		SANDY CLAY, low, stiff, very fine grain sand, damp, brown, odor,
18–20	240			CL	50		SANDY CLAY, STA, odor,
20–22	200			CL	60		SANDY CLAY, STA, odor,
22–24	2020			CL	90	X	SILTY CLAY, low, very stiff, damp, brown, tan silt pockets/seams present, odor,
24–26	1980			CL	90		SILTY CLAY, low, firm, soft/ crumbly, damp, brown, strong odor, outside of core is oily/phase separated hydrocarbon (PSH),
26–27	973			CL			SILTY CLAY, STA, firm to stiff, odor, outside of core is oily/PSH,

Grout

2" Sch 40 PVC w/Threaded Joints

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Job No. WEST16006

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WELL NO. OW-58

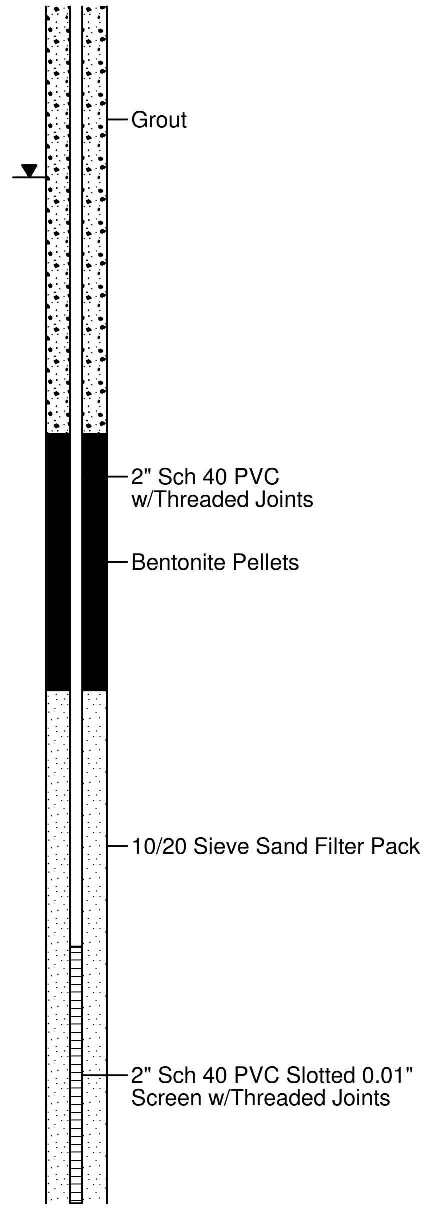
Elev., TOC (ft.msl)	: 6934.50
Elev., PAD (ft. msl)	: 6934.71
Elev., GL (ft. msl)	:
Site Coordinates	:
N	: N 1634800.15
E	: E 2547414.91

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
27–28	973			CL	90		
28–29				CL	90		SILTY CLAY, STA, damp to moist, odor,
29–30	2784	▼		CL/SC	90		SANDY CLAY/CLAYEY SAND, low, soft, very moist to saturated, dark brown, odor,
30–32	2350			CL	90		SANDY SILTY CLAY, low, firm, damp, saturated sand at base, grey/brown, odor,
32–33.5	1775			SM	90		SILTY SAND, fine, loose, saturated, grey/brown, odor,
33.5–34				CL	90		SILTY CLAY, low, soft, damp, greyish brown, odor,
34–36	575			CL	90		SILTY CLAY, STA, damp to very moist, odor,
36–38	227			CL	80		SILTY CLAY, low, firm, damp, greyish brown, odor,
38–40	545			CL	50		SILTY CLAY, STA, brown, odor,
40–41	531			CH			CLAY, high, firm, damp, brown, odor,

Completion Results

OW-58



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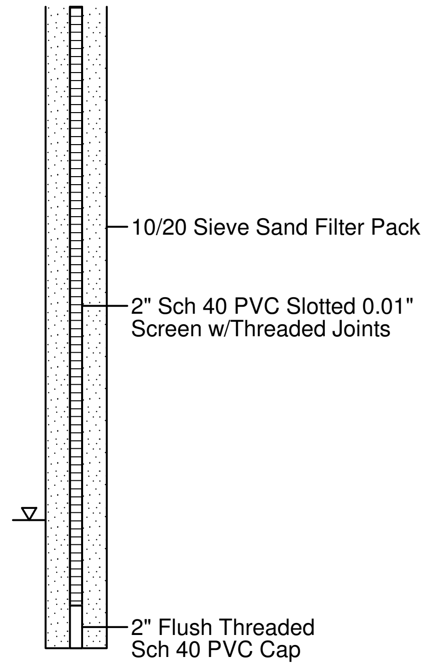
Elev., PAD (ft. msl)	: 6934.71
Elev., GL (ft. msl)	:
Site Coordinates	:
N	: N 1634800.15
E	: E 2547414.91

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
41–42	531			CH	50		
42–44	288			CH	50		CLAY, STA, odor,
44–46	357			CL	50		SILTY CLAY, low to moderate, firm, occasional gravel, damp, brown, odor,
46–47		▽		CL	50		SILTY CLAY, STA, odor,
47–48	204			SP	50		SANDY GRAVEL, medium to coarse sand with 1/4 to 1/2 inch gravel, very moist to saturated, trace silt/clay, brown, odor,
48–48.5	250			SH	10		SHALE, very dense/hard, dry, dark grey, odor.

Completion Results

OW-58



07-25-2018 C:\Users\cholmes\Documents\M-Tech\samples\Western Refinery\OW-14 Source Area\OW-58.bor

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Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 49'
Ground Water	: 32' BGL
Start Date	: 9/23/2016
Finish Date	: 9/23/2016

WELL NO. TK 568-1

(Sheet 1 of 3)

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6950.66
Site Coordinates	:
N	: N 35° 29.412'
E	: W 108° 25.430

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	0.8			CL	100		SANDY SILTY CLAY, low, soft, damp, brown, no odor,
2–4	3.1			CL	100		SANDY SILTY CLAY, SIMILAR TO ABOVE (STA), no odor,
4–6	15.9			CL	100		SANDY SILTY CLAY, STA, no odor,
6–8	66.9			CL	60		SANDY SILTY CLAY, STA, odor,
8–10	309			CL	60		SANDY SILTY CLAY, STA, odor,
10–12	2214			CL	80		SILTY CLAY, low, firm, damp, brown, odor,
12–14	1957			CL	80	X	SILTY CLAY, STA, trace very fine grain sand, damp, odor, inside of spoon oily,
14–16	976			ML	90		CLAYEY SANDY SILT, very fine grain, low, soft, damp to moist, brown, odor,
16–17	1243			ML			SANDY CLAYEY SILT, STA, moist in sand seams, odor,

Temporary Well

Temporary Well No. TK 568-1

Top of Casing 2' Above Ground Level

Open Borehole

2" Sch 40 PVC w/Threaded Joints

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Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 49'
Ground Water	: 32' BGL
Start Date	: 9/23/2016
Finish Date	: 9/23/2016

WELL NO. TK 568-1

(Sheet 2 of 3)

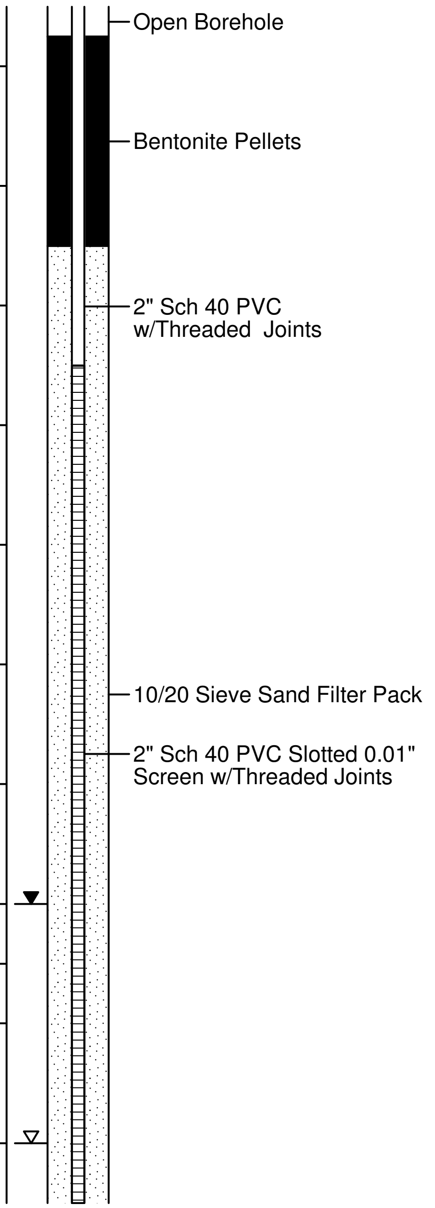
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6950.66
Site Coordinates	:
N	: N 35° 29.412'
E	: W 108° 25.430

Saturation
▼ Saturation
▽ Saturation

Temporary Well

Temporary Well No. TK 568-1

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
17–18	1243			ML	90		
18–20	1731			ML	90		SANDY CLAYEY SILT, STA, odor,
20–22	1780			ML	90		SANDY CLAYEY SILT, STA, odor,
22–24	1125			ML	90		CLAYEY SANDY SILT, very fine grain sand, soft, damp to moist, brown, odor,
24–26	1119			CL	90		SILTY SANDY CLAY, low, soft to firm, damp, brown, odor,
26–28	965			CL	90		SILTY SANDY CLAY, STA, odor,
28–30	970			CL	90		SILTY SANDY CLAY, STA, odor,
30–32	1308	▼ (32)		CL	90	X	SILTY SANDY CLAY, STA, black discoloration in sand at base, very moist, odor,
32–33	1680			SC	90		CLAYEY SAND, fine grain, loose, saturated, black, odor,
33–34	733			CL	90		SILTY CLAY, low, firm, damp, brown, odor,
34–36	1695	▽ (36)		CL	90		SILTY SANDY CLAY, low, soft, black discoloration, damp, brown, odor,
36–37	1282			SM			SILTY SAND, fine, loose, saturated, grey, odor, poor recovery,



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Comments	: Hand Augered to 6 Feet
Total Depth	: 49'
Ground Water	: 32' BGL
Start Date	: 9/23/2016
Finish Date	: 9/23/2016

WELL NO. TK 568-1

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6950.66
Site Coordinates	:
N	: N 35° 29.412'
E	: W 108° 25.430

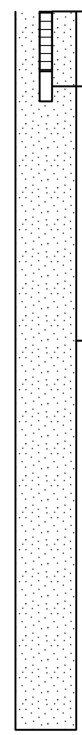
Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
37–38	1282			SM	10		
38–40	1078			CL	80		SANDY CLAY, low, firm, damp to moist, brown, odor, sheen on core,
40–42	383			CL	20		SANDY CLAY, STA, damp, odor,
42–44	476			CL	20		SANDY CLAY, STA, white clay at base, odor,
44–46	144			CL	50		CLAY, low, dense/crumbly, dry, dark reddish brown/grey, no odor,
46–48	80			CL	20		CLAY, STA,
48–49	41			SH	20	☒	SANDY SHALE, very dense, dry, grey, no odor.

Depth scale: 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57

Temporary Well

Temporary Well No. TK 568-1



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Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 37'
Ground Water	: 30'
Start Date	: 9/27/2016
Finish Date	: 9/27/2016

WELL NO. TK 568-2

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6950.66
Site Coordinates	:
N	: N 35° 29.396'
E	: W 108° 25.435'

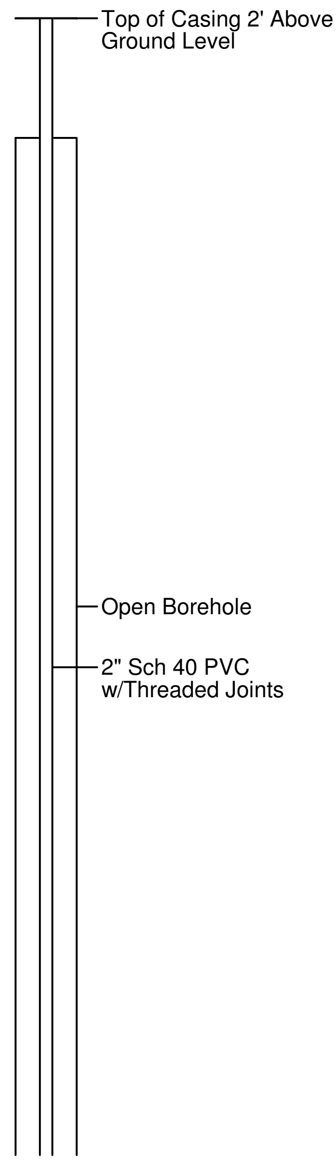
Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	0.2			CL	100		SILTY CLAY, low, firm, damp, brown,
2–4	0.5			CL	100		SILTY CLAY, SIMILAR TO ABOVE (STA), no odor,
4–6	4.3			CL	100		SILTY CLAY, STA, faint odor,
6–8	4.6			CL	40		SILTY CLAY, low, soft, damp, brown, no odor,
8–10	5.3			CL	40		SILTY CLAY, STA, no odor,
10–12	30.8			CL	40		SANDY CLAY, low, soft, damp, brown, no odor,
12–14	34.5			CL	40		SANDY CLAY, STA, no odor,
14–16	16.0			CL	40		SANDY CLAY, STA, trace gravel, faint odor,
16–17	-						No Recovery

Temporary Well

Temporary Well No. TK 568-2



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Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
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Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 37'
Ground Water	: 30'
Start Date	: 9/27/2016
Finish Date	: 9/27/2016

WELL NO. TK 568-2

(Sheet 2 of 2)

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6950.66
Site Coordinates	:
N	: N 35° 29.396'
E	: W 108° 25.435'

Saturation
▼ Saturation

Temporary Well

Temporary Well No. TK 568-2

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
17–18	-				-		
18–20	36.5			CL	40		SANDY CLAY, STA, faint odor,
20–22	29.6			CL	40		SANDY CLAY, STA, trace gravel, faint odor,
22–24	82			SC	60	X	CLAYEY SAND, fine grain, loose, trace gravel, damp, brown, odor,
24–26	-				-		No Recovery - white sandstone lodged in shoe
26–28	-				-		No Recovery - very dense hard sandstone in shoe
28–30	2803	▼		SC	90	X	CLAYEY SAND, very fine to fine, compact, moist to saturated at 30', brown, odor,
30–32	-			SC	90		CLAYEY SAND, STA, white sandstone lenses present, trace gravel, odor,
32–34	-			SP	90		GRAVELLY SAND, fine to medium, compact, gravel 1/4 to 1/2", saturated, brown, odor, sheen on sampler,
34–35	-			GP	90		SANDY GRAVEL, well rounded, loose, saturated, odor,
35–36	53			CLST	90		CLAYSTONE, very hard/dense, dry, dark reddish brown,
36–37	21			CLST	50	X	CLAYSTONE, STA, shaley at base.

Well construction:
Open Borehole
Bentonite Pellets
2" Sch 40 PVC w/Threaded Joints
10/20 Sieve Sand Filter Pack
2" Sch 40 PVC Slotted 0.01" Screen w/Threaded Joints
2" Flush Threaded Sch 40 PVC Cap

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Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 42'
Ground Water	: 24-26'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-1

(Sheet 1 of 3)

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.469'

Saturation
▼ Saturation
▽ Saturation

Temporary Well

Temporary Well No. TK 569-1

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0-2	7.3			CL	100		SILTY CLAY, low, firm, damp, brown, no odor,
2-4	6.6			CL	100		SILTY CLAY, SIMILAR TO ABOVE (STA),
4-6	4.1			CL	100		SILTY CLAY, STA,
6-8	0.5			CL	90		SILTY CLAY, STA,
8-10	0.5			CL	90		SILTY CLAY, STA,
10-12	2.3			CL	80		SILTY CLAY, STA,
12-14	4.2			CL	70		SILTY CLAY, STA, trace very fine grain sand,
14-15	13.6			CL			SANDY CLAY, low, firm to soft, very fine grain sand throughout, damp, brown,

Top of Casing 2.5' Above Ground Level

2" Sch 40 PVC w/Threaded Joints

Open Borehole

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Comments	: Hand Augered to 6 Feet
Total Depth	: 42'
Ground Water	: 24-26'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-1

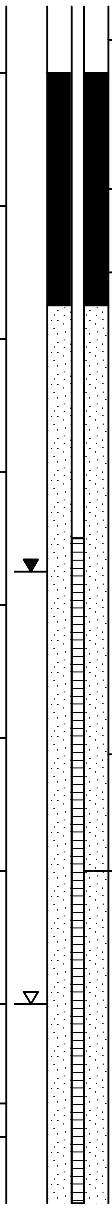
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.469'

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
15	13.6			CL	70		
16–18	32.6			CL	60		SANDY CLAY, STA, odor,
18–20	152			CL	70	X	SANDY CLAY, STA, odor,
20–22	41.6			SC/SM	90		CLAYEY SILTY SAND, fine to medium grain, compact, becomes more silty with depth, gravel at base, damp, odor,
22–24	92.2			SC/SM	90		CLAYEY SILTY SAND, STA, medium to coarse sand, occasional gravel, damp,
24–26	2158	▼		SC/SM	90	X	CLAYEY SILTY SAND, very fine grain, compact, moist to saturated in silty sand seams, brown, odor,
26–28	1147			CL	20		SANDY CLAY, STA with greater clay content, brown trace gravel at base, moist to saturated in silty sand seams,
28–30	1060			SM	50		GRAVELLY SILTY SAND, medium to coarse grain, compact, damp to moist in seams-not saturated throughtout core, brown, odor, sandstone gravel present,
30–31.5	1353	▽		GW	60		CLAYEY SANDY GRAVEL, 1/8" to 1/2" gravel with medium to coarse grain sand, compact to loose, saturated, brown, odor,
31.5–32				CL	60		SILTY CLAY, low, firm, damp, brown, odor,
32–33	1622			CL			SILTY CLAY, STA, odor,

Temporary Well

Temporary Well No. TK 569-1



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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 42'
Ground Water	: 24-26'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-1

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.469'

Saturation
▼ Saturation
▽ Saturation

Temporary Well

Temporary Well No. TK 569-1

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
33–34	1622			CL	50		
34–36	1292			CL	70		SILTY CLAY, STA, gravel present at base,
36–38	1621			CH	10	X	CLAY, high, firm, traces gravel, damp, reddish brown/gray,
38–40	1649			GW	50		CLAYEY GRAVEL, sandstone present, very hard, damp, odor,
40–42	95.6			CLST	20	X	CLAYSTONE, very dense, light reddish purple/grey, odor.

Depth scale: 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51

Well construction:
2" Sch 40 PVC Slotted 0.01" Screen w/Threaded Joints
10/20 Sieve Sand Filter Pack
2" Flush Threaded Sch 40 PVC Cap

1010 Travis Street
Houston, Texas 77002
713-955-1230

DiSorbo Consulting, LLC

8501 N. MoPac Expy, Suite 300
Austin, Texas 78759
512-693-4190

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Environmental Consulting Firm

Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 38'
Ground Water	: 31'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-2

(Sheet 1 of 3)

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.451'

Saturation

▼ Saturation

Temporary Well

Temporary Well No. TK 569-2

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
-3							
-2							
-1							
0							
1	0.3			CL	100		SILTY CLAY, low, firm, damp, brown, no odor,
3	0.1			CL	100		SILTY CLAY, SIMILAR TO ABOVE (STA),
5	0.0			SM	100		SILTY SAND, fine, compact, damp, brown, no odor,
7	0.0			SM	60		SILTY SAND, STA,
9	0.6			CL	60		SILTY CLAY, low, soft, damp, brown, no odor,
11	7.2			CL	10		SILTY CLAY, STA, poor recovery,
12	36.5			CL			SILTY CLAY, STA, very soft, poor recovery, faint odor,
13							

Top of Casing 2' Above Ground Level

Open Borehole

2" Sch 40 PVC w/Threaded Joints

DiSorbo
Environmental Consulting Firm

Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 38'
Ground Water	: 31'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-2

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.451'

Saturation
▼ Saturation

Temporary Well

Temporary Well No. TK 569-2

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
13–14	36.5			CL	10		
14–16	899			SC	70		CLAYEY SAND, very fine grain, compact, damp, brown, odor,
16–18	2332			SC	70	X	CLAYEY SAND, STA, odor,
18–20	702			SC/CL	90		CLAYEY SAND/SANDY CLAY, STA, odor,
20–22	833			SC	60		CLAYEY SAND, STA, sand/gravel lense from 21-21.5', loose, damp, grey,
22–23.5	398			SM	90		SILTY SAND, fine grain, loose, damp, brown, odor,
23.5–24				GW			SANDY GRAVEL, grey sandstone gravel with fine to coarse grain sand, damp, odor,
24–26	190			GW	10		SANDY GRAVEL, STA, white sandstone present,
26–28	1973			GW	10		SANDY GRAVEL, STA, white sandstone present,
28–29	1684			GW			SANDY GRAVEL, STA, poor recovery, very hard, trace clay, damp,

Well construction:
- Open Borehole
- Bentonite Pellets
- 2" Sch 40 PVC w/Threaded Joints
- 10/20 Sieve Sand Filter Pack
- 2" Sch 40 PVC Slotted 0.01" Screen w/Threaded Joints

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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
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Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 38'
Ground Water	: 31'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-2

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.451'

Saturation

▼ Saturation

Temporary Well

Temporary Well No. TK 569-2

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
29–30				GW	10		
30–32	1145 / 1420	▼ 31		SC	90		SILTY CLAY, low, firm to soft, damp, moist to saturated, silty sand seams throughout, dark brown, odor,
32–34	1390			CH	80		CLAY, high, stiff, damp, brown, odor,
34–36	1210			GW	20		CLAYEY GRAVEL, very hard with 4-6" sandstone (grey) at base, odor,
36–38	405			CLST	90		CLAYSTONE, very hard, dry, reddish purple and grey.

Depth scale: 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45

2" Sch 40 PVC Slotted 0.01" Screen w/Threaded Joints

10/20 Sieve Sand Filter Pack

2" Flush Threaded Sch 40 PVC Cap

DiSorbo
Environmental Consulting Firm

Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 39'
Ground Water	: 26'
Start Date	: 9/28/2016
Finish Date	: 9/28/2016

WELL NO. TK 569-3

(Sheet 1 of 2)

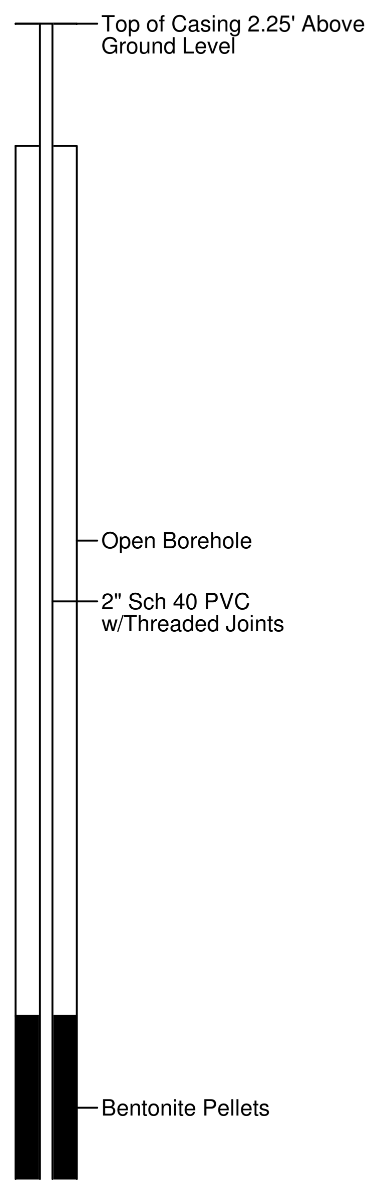
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.390'
E	: W 108° 25.459'

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
-3							
-2							
-1							
0							
1	8.9			CL	100		SILTY CLAY, low, firm, damp, brown, no odor,
2							
3	10.4			CL	100		SILTY CLAY, SIMILAR TO ABOVE (STA),
4							
5	12.4			CL	100		SILTY CLAY, STA,
6							
7	31.8			CL	60		SILTY CLAY, STA,
8							
9	27.6			CL	50		SILTY CLAY, STA, soft,
10							
11	50.9			CL	70		SILTY CLAY, low, firm, damp, brown, odor,
12							
13	63.9			CL	60		SILTY CLAY, STA, trace very fine grain sand, odor,
14							
15	303			SC	70		CLAYEY SAND, very fine, compact, damp, brown, odor,
16							
17	377			SC	70		CLAYEY SAND, STA, odor,
18							
18.5	250			SC/CL			CLAYEY SAND/SANDY CLAY, STA, odor,
19							

Temporary Well

Temporary Well No. TK 569-3



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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 39'
Ground Water	: 26'
Start Date	: 9/28/2016
Finish Date	: 9/28/2016

WELL NO. TK 569-3

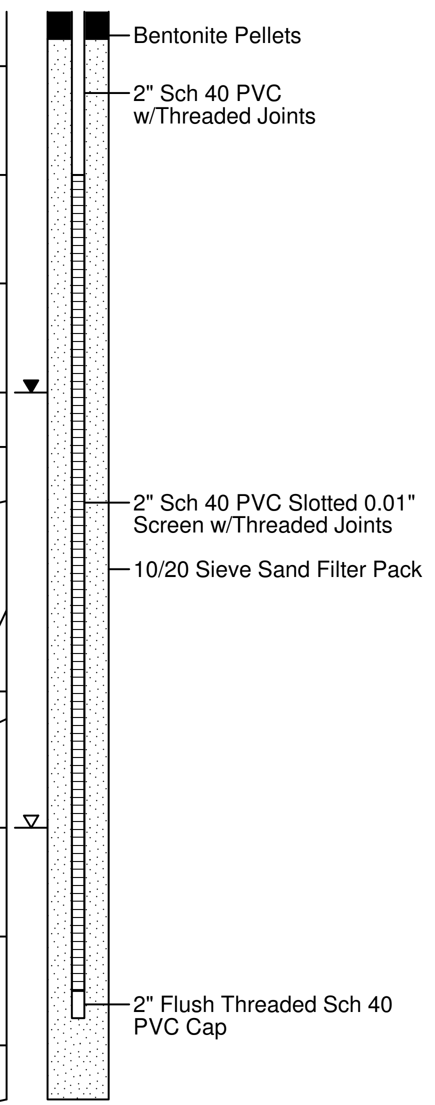
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.390'
E	: W 108° 25.459'

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	USCS	Recovery (%)	DESCRIPTION
19–20	250	SC/CL	80	
20–22	387	CL	80	SANDY CLAY, low, firm, damp, brown, odor,
22–24	405	CL	60	SANDY CLAY, STA, odor,
24–26	955	SM	70	SILTY SAND, fine grain, loose, very moist, brown, odor, phase separated hydrocarbon (PSH),
26–27		SM	90	SILTY SAND, STA, saturated, odor, PSH,
27–28	sat	GW	90	SANDY GRAVEL, compact, 1/2"-1" gravel, medium to coarse sand, saturated, odor, PSH,
28–30	sat	GW	80	SANDY CLAYEY GRAVEL, STA, clay present, very moist to saturated in seams, pockets, sandstone (white) present, very dense, greenish grey sandstone at base, strong odor, ,
30–31.5		GW	50	SANDY CLAYEY GRAVEL, STA, saturated, odor,
31.5–32	1620	CL	50	SILTY CLAY, low, firm, damp, brown, odor,
32–34	1950	CL	90	SILTY CLAY, STA, moderate, grey streaks, odor,
34–36		GW	90	SANDY GRAVEL, compact, 1/4"-1/2" gravel, coarse sand, saturated, odor,
36–38	239	GW	20	SANDY CLAYEY GRAVEL, very hard, 1/4" gravel with clay and sand, damp, grey and brown, odor,
38–39	258	CLST	30	CLAYSTONE, very hard, dry, reddish purple and grey.

Temporary Well

Temporary Well No. TK 569-3



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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 45'
Ground Water	: 33' BGL
Start Date	: 9/27/2016
Finish Date	: 9/27/2016

WELL NO. TK 570-1

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6958.88
Site Coordinates	:
N	: N 35° 29.377'
E	: W 108° 25.459'

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	5.3			FILL	100		FILL-SILT/GRAVEL, damp, brown, no odor,
2–4	14.9			FILL	100		FILL-SILT/GRAVEL, SIMILAR TO ABOVE (STA), faint odor,
4–6	15.8			FILL	100		FILL-SILT/GRAVEL, STA, faint odor,
6–8	24.1			SW	90		GRAVELLY SAND, medium to coarse, loose, damp, odor,
8–10	1775			GM	90		CLAYEY GRAVEL, 1/4" to 1/2" gravel in low plastic, brown, damp clay, odor,
10–12	3445			ML	10	X	SANDY SILT, low, very soft, damp, dark brown, odor,
12–13	2408			ML			SANDY SILT, STA, odor,

Temporary Well

Temporary Well No. TK 570-1

Top of Casing 2' Above Ground Level

2" Sch 40 PVC w/Threaded Joints

Open Borehole

DiSorbo Consulting, LLC

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Environmental Consulting Firm

Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 45'
Ground Water	: 33' BGL
Start Date	: 9/27/2016
Finish Date	: 9/27/2016

WELL NO. TK 570-1

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6958.88
Site Coordinates	:
N	: N 35° 29.377'
E	: W 108° 25.459'

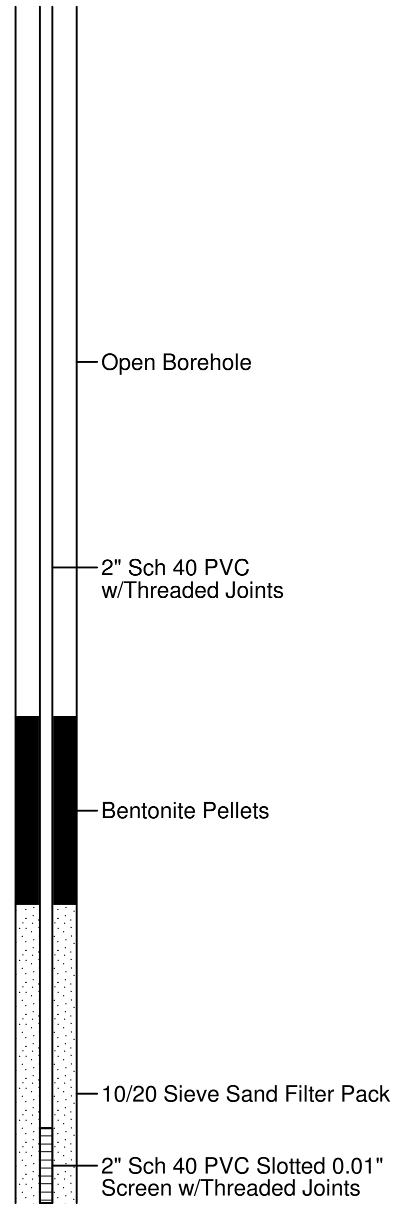
Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
13	2408			ML	10		
14	2350			CL	90		SANDY CLAY, low, firm to soft, damp, sandy at base, brown, odor,
16	1139			CL	90		SILTY CLAY, low, firm, damp, ocassional sandy clay lenses, brown, odor,
18	1250			CL	90		SILTY CLAY, STA, odor,
20	1460			CL	90		SILTY CLAY, STA, odor,
21				SC	90		CLAYEY SAND, fine, compact to loose, damp, brown, odor,
22	399			SC	90		CLAYEY SAND, STA, decrease in clay with depth, odor,
24	695			SC	100		CLAYEY SAND, STA, odor,
26	952			SM	90		SILTY SAND, very fine, soft/compact, damp, brown, odor,
28	1441			SC			CLAYEY SAND, very fine, compact, damp, brown, odor,
29							

Temporary Well

Temporary Well No. TK 570-1



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Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
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Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 45'
Ground Water	: 33' BGL
Start Date	: 9/27/2016
Finish Date	: 9/27/2016

WELL NO. TK 570-1

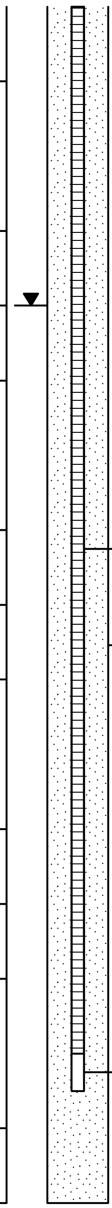
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6958.88
Site Coordinates	:
N	: N 35° 29.377'
E	: W 108° 25.459'

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	USCS	Recovery (%)	DESCRIPTION
29–30	1441	SC	90	
30–32	968	SM	90	SILTY SAND, very fine, soft/loose, damp, brown, odor,
32–33	804	SM	60	SILTY SAND, STA, damper than above,
33–34		SW	60	GRAVELLY SAND, medium to coarse, loose, very moist to saturated, grey, odor,
34–36		GW	90	SANDY GRAVEL, 1/2" to 1" gravel with sand, fine to coarse, saturated, brown, odor,
36–37		GW	90	SANDY GRAVEL, STA,
37–38	676	CH	90	CLAY, high, firm to stiff, brown, odor,
38–40	1392	CH	90	CLAY, STA, sandstone present,
40–41		CH	60	CLAY, STA,
41–42	1117	GW	60	CLAYEY SANDY GRAVEL, compact, moist to very moist, brown, odor,
42–44	555	CL	50	GRAVELLY CLAY, low, stiff, damp to dry, reddish brown,
44–45	165	CLST	70	CLAYSTONE, very stiff, dry, purple/reddish brown, odor.

Temporary Well

Temporary Well No. TK 570-1



Appendix D

2019 Site Investigation

Aerial Map Source: Google Map, 01/05/2014.

N

0 160
SCALE IN FEET

LEGEND

TK 568-1 SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-14 ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

GALLUP SITE LOCATION

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 08/10/19	FILE: Mathon–dB224

2019 SITE INVESTIGATION
LOCATION OF SOIL BORINGS AND WELLS

DiSorbo
Environmental Consulting Firm

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Suite 300
Austin, Texas 78759

Tank 570 WELLS FLUID LEVEL MEASUREMENTS
MARATHON - GALLUP REFINERY
Gallup, New Mexico

Well ID	Date	DTP (ft-btoc)	DTW (ft-btoc)	PSH thickness (ft)	Total Depth (ft-btoc)	Screen Interval (ft-bgl)	Stickup (ft)
TK570-1	9/30/2016	33.75	35.63	1.88	44.35	28 - 43	2.0
TK570-2	8/13/2019	33.52	33.53	0.01	45.39	24 - 44	3.0
TK570-3	8/13/2019	33.65	33.96	0.31	47.34	24 - 44	3.0
TK570-4	8/13/2019	ND	29.45	0	45.03	24 - 44	3.0
TK570-5	8/13/2019	33.92	34.38	0.46	47.32	24 - 44	3.0
RW-1	8/9/2019	27.46	28.12	0.66	NM	25 - 40	3.2

btoc - below top of casing   bgl - below ground level

ft - feet

PSH - phase-separated hydrocarbon

ND - not detected

NM - not measured

DTP - depth to product

DTW - depth to water

DiSorbo
Environmental Consulting Firm

Marathon Petroleum Company LP
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Driller Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" Diam.
Total Depth	: 48'
Saturation Depth	: 32' & 38' BGL
Start Date/Time	: 7-31-19 / 12:00
Finish Date/Time	: 7-31-19 / 17:00

WELL NO. TK 570-2

(Sheet 1 of 4)

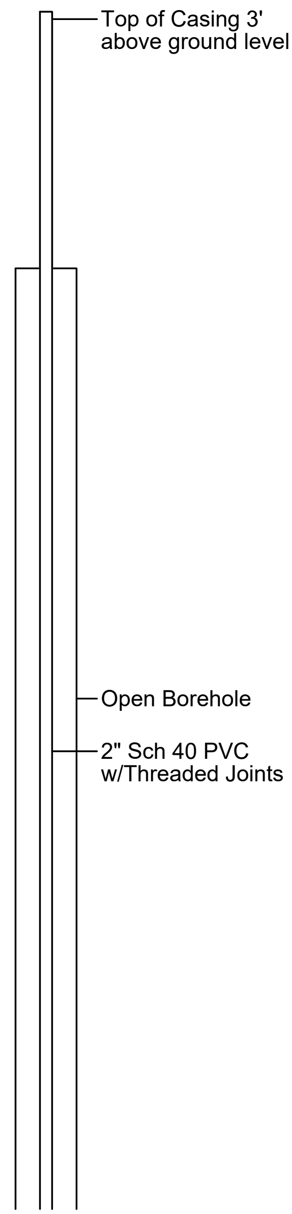
N	: N35° 29' 22.6"
E	: W108° 25' 27.7"
Comments	: Hand augered to 6' BGL
Air Temp. (F)	: High 87, Low 80

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
-3 to 0							
0–2	33.3			FILL	100		FILL - SAND/SILT/GRAVEL, dry to damp, brown, no odor.
2–4	7.8			SW	100	X	GRAVELLY SAND - medium, loose, brown, damp, no odor.
4–6	79.2			SW	100		GRAVELLY SAND - Similar to above (STA), odor at 5.5 feet becomes black, donned respirator per safety permit - no olfactory observations.
6–8	15,000			SW	100		GRAVELLY SAND - STA, black, damp.
8–10				--	0		No recovery, gravel in shoe.
10–11	15,000			CL			SILTY CLAY - moderate, soft, damp, brown.

Completion Results

TK 570-2



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Austin, Texas 78759
512-693-4190

DiSorbo
Environmental Consulting Firm

Marathon Petroleum Company LP
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Driller Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" Diam.
Total Depth	: 48'
Saturation Depth	: 32' & 38' BGL
Start Date/Time	: 7-31-19 / 12:00
Finish Date/Time	: 7-31-19 / 17:00

WELL NO. TK 570-2

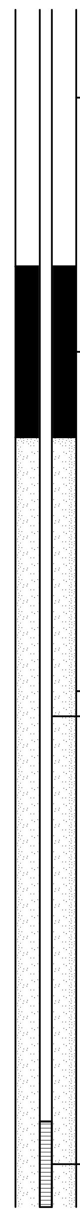
N	: N35° 29' 22.6"
E	: W108° 25' 27.7"
Comments	: Hand augered to 6' BGL
Air Temp. (F)	: High 87, Low 80

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
11–12	15,000			CL	90		
12–14	15,000			CL	90		SANDY SILTY CLAY - low, soft, damp, brown, trace fine grain sand.
14–16	15,000			CL	90		SANDY SILTY CLAY - STA.
16–17.75	15,000			SC	90		CLAYEY SAND - very fine grain, compact, dark brown, moist to very moist, brown.
17.75–18				CH	90		CLAY - high, firm, damp, brown.
18–20	15,000			SC/CL	90		CLAYEY SAND / SANDY CLAY - soft, low plasticity, damp, brown.
20–22	15,000			CL	90		SILTY CLAY - low, firm, damp, brown.
22–24	15,000			SC	90		CLAYEY SAND - fine, soft/compact, damp, light brown to brown.
24–25	15,000			SC			CLAYEY SAND - STA.

Completion Results

TK 570-2



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DiSorbo Environmental Consulting Firm

Marathon Petroleum Company LP
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Driller Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" Diam.
Total Depth	: 48'
Saturation Depth	: 32' & 38' BGL
Start Date/Time	: 7-31-19 / 12:00
Finish Date/Time	: 7-31-19 / 17:00

WELL NO. TK 570-2

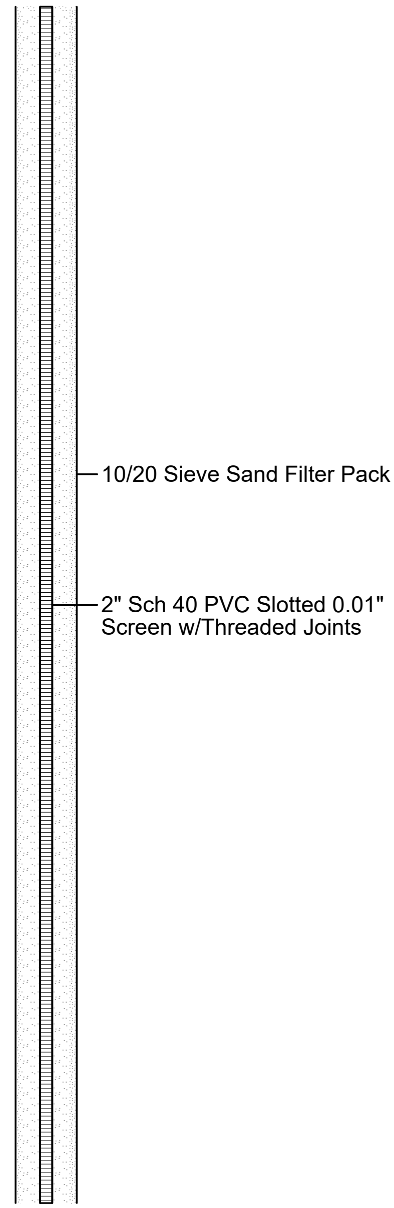
N	: N35° 29' 22.6"
E	: W108° 25' 27.7"
Comments	: Hand augered to 6' BGL
Air Temp. (F)	: High 87, Low 80

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
25–26	15,000			SC	30		
26–28	15,000			SM	90		SILTY SAND - very fine, soft/compact, moist/oily, brown.
28–30	15,000			CL	90		SILTY CLAY - low, soft, damp, brown, trace very fine grain sand.
30–32	15,000	▼ (32)		CL	90		SILTY CLAY - STA.
32–34	15,000			SM	90		SILTY SAND - very fine, soft, very moist to saturated, greyish brown.
34–36	15,000			SM	90		SILTY SAND - STA, brown-grey at base (35.75-36'), trace gravel
36–38	15,000	▼ (38)		CH	90		CLAY - high, firm to firm, brown.
38–39	15,000			GW			CLAYEY SANDY GRAVEL - compact, brown, saturated, 10-80mm gravel.

Completion Results

TK 570-2



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Marathon Petroleum Company LP
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Driller Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" Diam.
Total Depth	: 48'
Saturation Depth	: 32' & 38' BGL
Start Date/Time	: 7-31-19 / 12:00
Finish Date/Time	: 7-31-19 / 17:00

WELL NO. TK 570-2

N	: N35° 29' 22.6"
E	: W108° 25' 27.7"
Comments	: Hand augered to 6' BGL
Air Temp. (F)	: High 87, Low 80

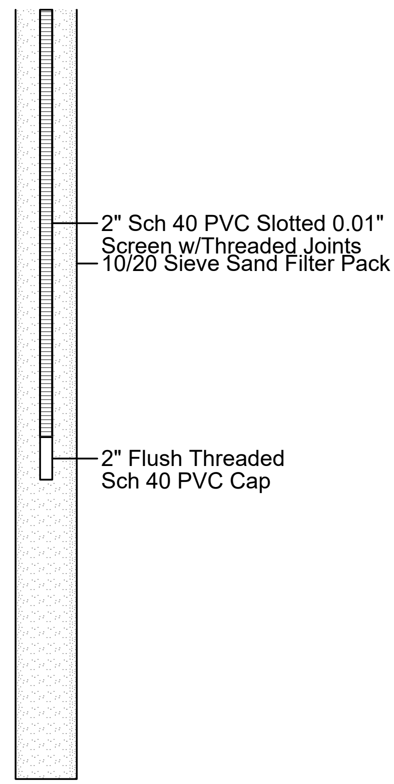
Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
39	15,000			GW	90		
40–42	15,000			CL	70		SILTY CLAY - low to moderate, stiff, brown, pockets of light tan silt throughout
42–44	15,000			CL	30		GRAVELLY CLAY - low, stiff, damp, brown, STA @ gravel.
44–46	2,810			CLST	25		CLAY/CLAYSTONE - low, very stiff, reddish brown and grey, damp, shaley.
46–48	822			CLST	25		CLAYSTONE - STA.

Depth scale: 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53

Completion Results

TK 570-2



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 33.5' BGL
Start Date/Time	: 8-1-2019 / 14:30
Finish Date/Time	: 8-5-2019 / 17:20

WELL NO. TK 570-3

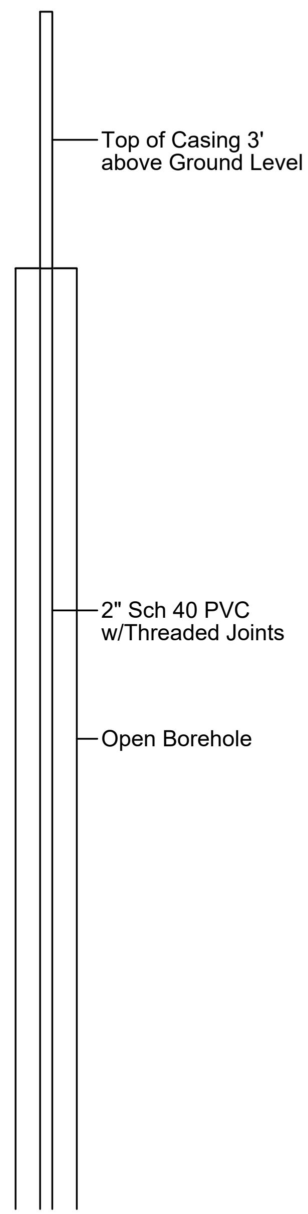
N	: N35° 29' 22.2"
E	: W108° 25' 28.1"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 86, Low 70

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	15,000			Fill	100	X	FILL - SILT/SAND/GRAVEL, dry to damp, brown, no odor. (Respirator donned - no olfactory observations.)
2–4	15,000			CL	80	X	SANDY CLAY - low, firm, damp, brown, calcareous, very fine grain sand.
4–6	15,000			CL	70		SANDY CLAY - Similar to above (STA), damp.
6–8	15,000			CL	60		SANDY CLAY - STA, damp.
8–9.75	15,000			CL	70		SANDY CLAY - STA, damp.
9.75–10				SM	70		SILTY SAND - fine, angular, compact, damp brown.
10–11	15,000			CL			SANDY CLAY - low, firm, damp, brown.

Completion Results

TK 570-3



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 33.5' BGL
Start Date/Time	: 8-1-2019 / 14:30
Finish Date/Time	: 8-5-2019 / 17:20

WELL NO. TK 570-3

N	: N35° 29' 22.2"
E	: W108° 25' 28.1"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 86, Low 70

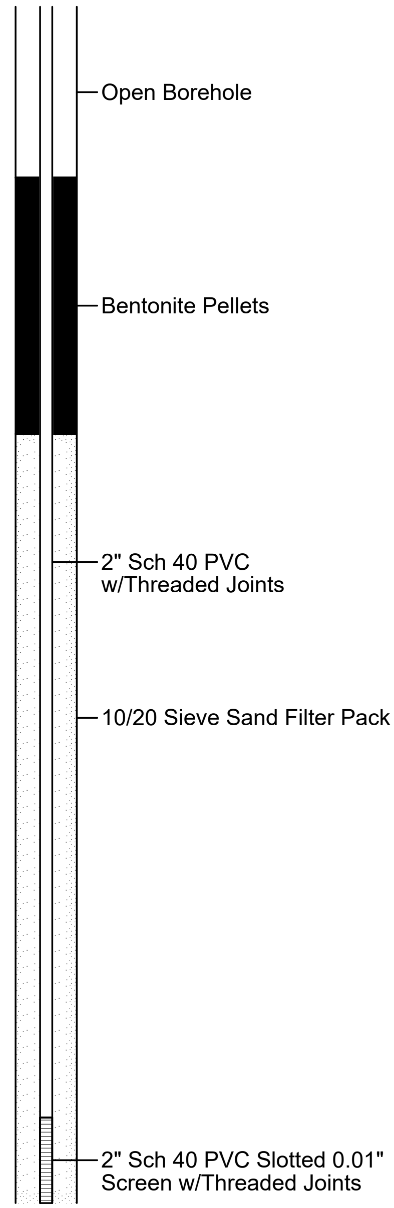
Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
11–12	15,000			CL	70		
12–14	15,000			CH	80		SILTY CLAY - high, soft, damp, brown, trace very fine grain sand.
14–16	15,000			CL	80		SANDY SILTY CLAY - low to moderate, soft, damp, brown, very fine grain sand.
16–18	15,000			SM	40		SILTY SAND - fine to medium, subangular, loose, damp, brown, trace gravel.
18–20	15,000			CL	50		SANDY SILTY CLAY - low to moderate, firm to soft, damp, brown.
20–22	15,000			CL	90		SILTY CLAY - low, firm, damp, brown.
22–24	15,000			CL	90		SANDY SILTY CLAY - low, firm, damp, brown, very fine grain sand.
24–25	15,000			CL			SANDY SILTY CLAY - STA, damp.

Completion Results

TK 570-3



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 33.5' BGL
Start Date/Time	: 8-1-2019 / 14:30
Finish Date/Time	: 8-5-2019 / 17:20

WELL NO. TK 570-3

N	: N35° 29' 22.2"
E	: W108° 25' 28.1"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 86, Low 70

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
25	15,000			CL	90		
26–28	15,000			CL	90		SANDY SILTY CLAY - STA, sand lenses throughout, damp.
28–30	15,000			CL	90		SANDY SILTY CLAY - low, firm, damp, brown.
30–32	15,000			CL	100		SILTY CLAY - moderate to low, firm to soft, damp, brown.
32–33.5	15,000	▼		CL	100	X	SILTY CLAY - STA.
33.5–34	15,000			SM	100		SILTY SAND - fine to medium, loose, very moist, brown.
34–36	15,000			SP	100		SAND - medium, loose, saturated, brown.
36–38	15,000			SP	100		SAND - STA.
38–39	15,000			SP	100		SAND - STA.

Completion Results

TK 570-3

- 10/20 Sieve Sand Filter Pack
- 2" Sch 40 PVC Slotted 0.01" Screen w/Threaded Joints

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WEST19038-03

Geologist	: Tracy Payne
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Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 33.5' BGL
Start Date/Time	: 8-1-2019 / 14:30
Finish Date/Time	: 8-5-2019 / 17:20

WELL NO. TK 570-3

N	: N35° 29' 22.2"
E	: W108° 25' 28.1"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 86, Low 70

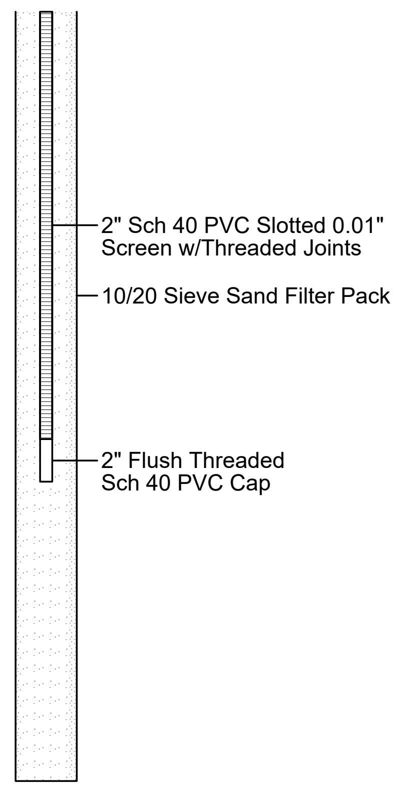
Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
39–40	15,000			CL	100		CLAY - high, very stiff, damp, brown, dark olive brown sandstone at base.
40–42	15,000			CL	80		SILTY CLAY - low, stiff, damp, dark brown, pockets of light tan silt throughout.
42–44	2810			CL	80		SILTY CLAY - low, firm to soft, damp, moist in sand seams, gravel at base.
44–46	4494			CLST	50		CLAY/CLAYSTONE - low, very stiff, dark reddish brown-trace gray, damp, shaley.
46–48	116			CLST	40		CLAYSTONE - STA.

Depth scale: 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53

Completion Results

TK 570-3



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TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagen
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 26' and 42' BGL
Start Date/Time	: 8-7-2019 / 19:50
Finish Date/Time	: 8-7-2019 / 13:00

WELL NO. TK 570-4

N	: N35° 29' 21.7"
E	: W108° 25' 27.5"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 75, Low 72

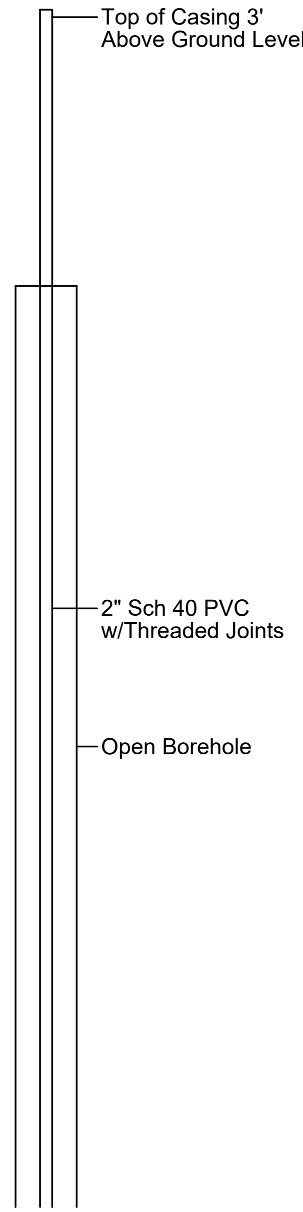
Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
-3							
-2							
-1							
0							
1	95.2			FILL	100	X	FILL - SILT/SAND/GRAVEL, dry to damp, brown. (Respirator donned - no olfactory observations.)
2							
3	28.2			CL	100	X	SANDY CLAY - low, firm, damp, brown, very fine grain sand.
4							
5	82.9			CL	70		SANDY CLAY - Similar to above (STA), damp.
6							
7	15,000			CL	70	X	GRAVELLY CLAY - low, soft, damp, brown, 10mm gravel.
8							
9	15,000			CL	80		SANDY SILTY CLAY - low, soft, damp, brown, very fine grain sand.
10							

Completion Results

TK 570-4



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagen
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 26' and 42' BGL
Start Date/Time	: 8-7-2019 / 19:50
Finish Date/Time	: 8-7-2019 / 13:00

WELL NO. TK 570-4

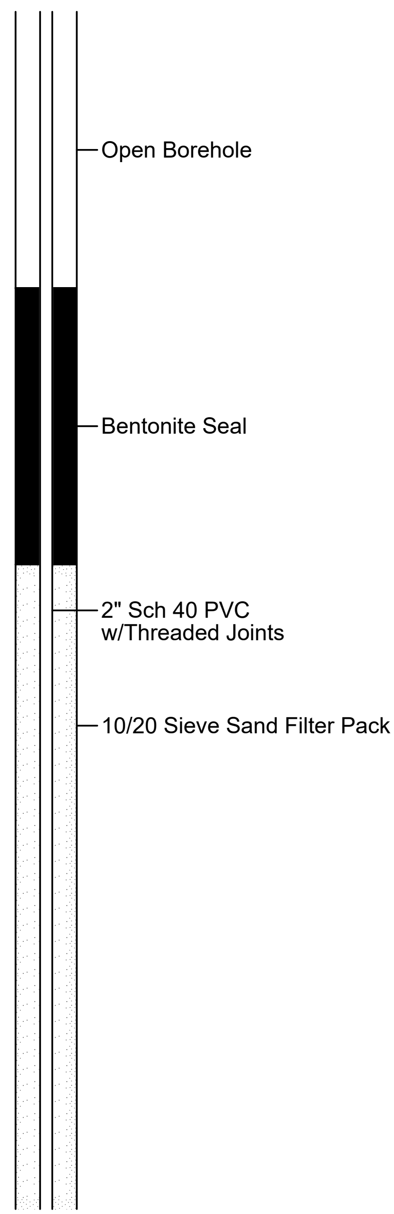
N	: N35° 29' 21.7"
E	: W108° 25' 27.5"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 75, Low 72

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
10–12	15,000			CL	25		SILTY CLAY - low, very soft, damp, greyish brown.
12–14	15,000			CL	25		SILTY CLAY - STA, damp.
14–16	15,000			CL	90		SILTY SANDY CLAY - low, very soft, damp, brown - sand in matrix and in lenses.
16–17	15,000			CL	90		SILTY SANDY CLAY - STA, damper than above.
17–18				CH	90		CLAY - high, very stiff, damp, brown.
18–20	15,000			CL	90		SILTY CLAY - low, very soft, damp, brown.
20–22	15,000			CL	90		SILTY CLAY - low, firm to soft, damp, brown, trace very fine grain sand.
22–23	15,000			CL			SILTY SANDY CLAY - low, soft/crumbly, damp, fine grain sand, calcareous at base.

Completion Results

TK 570-4



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TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagen
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 26' and 42' BGL
Start Date/Time	: 8-7-2019 / 19:50
Finish Date/Time	: 8-7-2019 / 13:00

WELL NO. TK 570-4

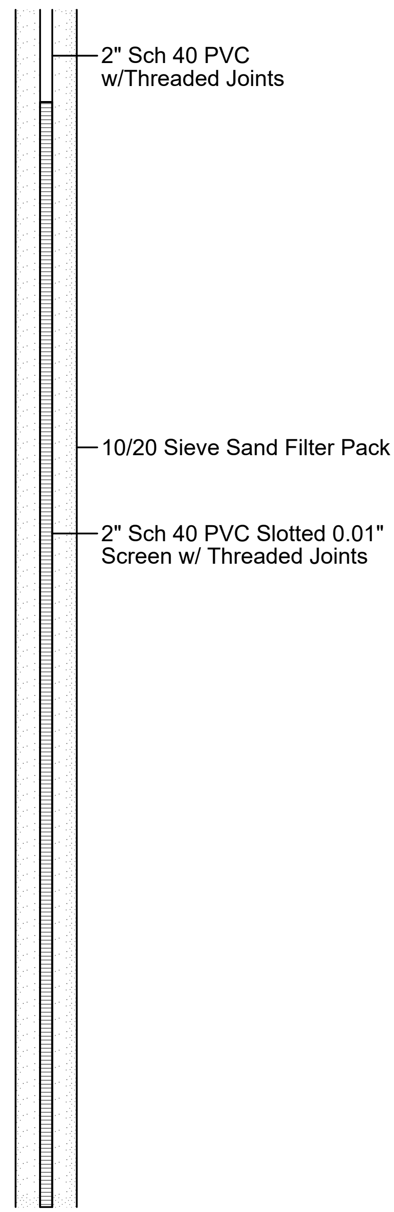
N	: N35° 29' 21.7"
E	: W108° 25' 27.5"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 75, Low 72

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
23	15,000			CL	80		
24–26	15,000			CL	90	X	SANDY SILTY CLAY - STA, damp, brown.
26–28	15,000	▼		SM	60		SILTY SAND - fine to medium, compact to loose, very moist, brown.
28–29	15,000			SM	90		SILTY SAND - STA, saturated, gravelly at base.
29–30	15,000			CH	90		CLAY - moderate to high, stiff, damp brown.
30–32	1404			SC/SM	40		CLAYEY SILT/SAND - low, very fine, damp to sc. moist, brown.
32–34	1711			CL	40		SANDY CLAY / CLAYEY SAND - fine grain, soft, damp, brown.
34–35				CL	90		CLAYEY SAND - STA.
35–36	1550			CH	90		SILTY CLAY / CLAY - high, stiff, damp, brown.

Completion Results

TK 570-4



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TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagen
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 26' and 42' BGL
Start Date/Time	: 8-7-2019 / 19:50
Finish Date/Time	: 8-7-2019 / 13:00

WELL NO. TK 570-4

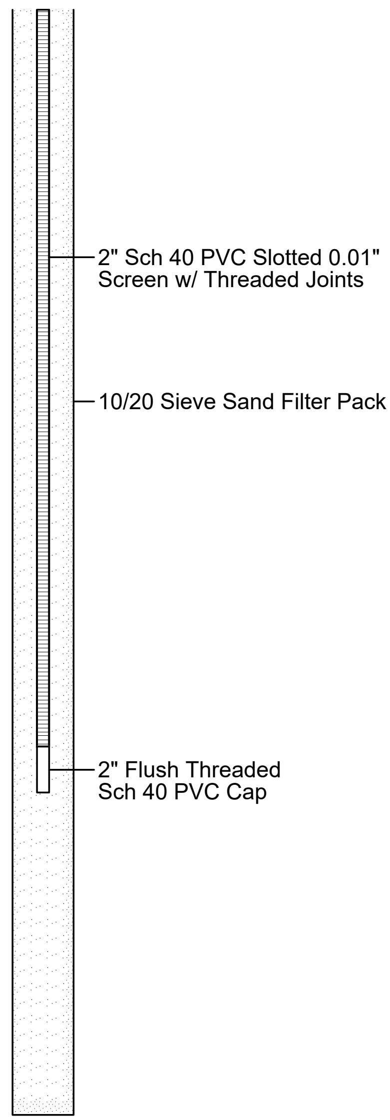
N	: N35° 29' 21.7"
E	: W108° 25' 27.5"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 75, Low 72

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
36–38	834			CH	100		SILTY CLAY / CLAY - high, stiff, damp, brown, calcareous nodules present.
38–40	989			CH	70		SILTY CLAY / CLAY - STA, dark brown, pockets of tan / light tansilt present.
40–42	607	▼ (42)		CH	90	X	SILTY CLAY / CLAY - high, very stiff, damp, dark brown, pockets of light tan silt present, very calcareous (10mm gravel).
42–44	2686			GC	80		CLAYEY SANDY GRAVEL - Angular 20mm gravel, brown clay, medium grain sand, moist to saturated.
44–46	624			CLST	50		CLAY/CLAYSTONE - low, very stiff, dark reddish brown, damp, shaley at base.
46–48	99			CLST	40	X	CLAYSTONE - STA.

Completion Results

TK 570-4



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TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 46'
Saturation Depth	: 32', 36', & 40' BGL
Start Date/Time	: 8-8-2019 / 10:30
Finish Date/Time	: 8-8-2019 / 14:20

WELL NO. TK 570-5

(Sheet 1 of 4)

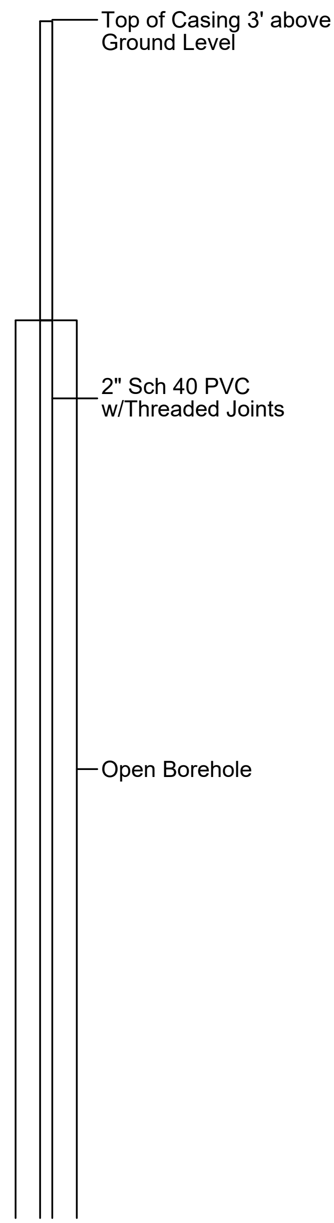
N : N35° 29' 22.0"
E : W108° 25' 27.0"
Comments : Hand augered to 2' - refusal in gravel.
Air Temp.(F) High 81, Low 77

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
-3							
-2							
-1							
0							FILL - SILT/SAND/GRAVEL, dry to damp, brown. (Respirator donned - no olfactory observations)
1	24			FILL	100		
2							NO RECOVERY - gravel rock in split spoon shoe.
3	--			--	--		
4							GRAVELLY SAND - loose, medium grain, dry to damp, light brown.
5	28			SW	60		
6							GRAVELLY SAND - Similar to above (STA).
7	18			SW	70		
8							CLAYEY SAND / SANDY CLAY - low crumbly, dry to damp, light brown.
	1			SC/CL			
9							

Completion Results

TK 570-5



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 46'
Saturation Depth	: 32', 36', & 40' BGL
Start Date/Time	: 8-8-2019 / 10:30
Finish Date/Time	: 8-8-2019 / 14:20

WELL NO. TK 570-5

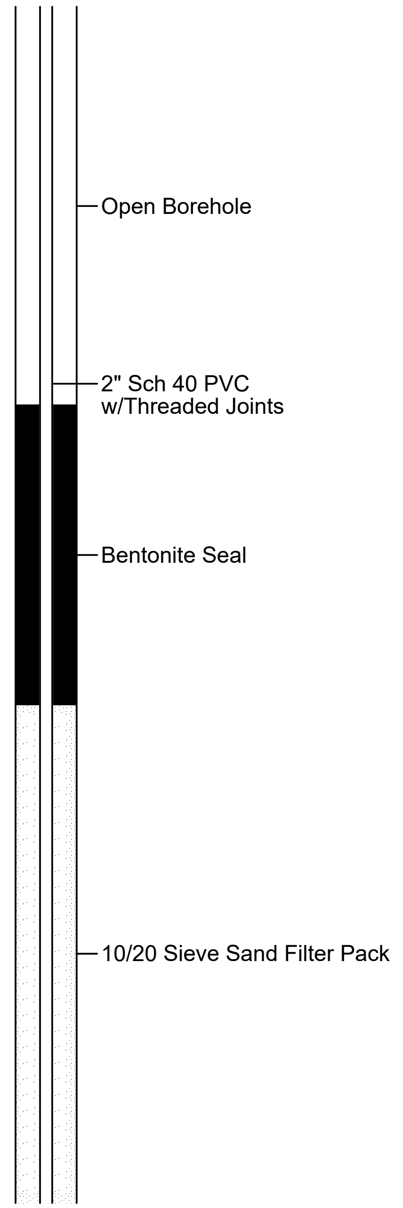
N	: N35° 29' 22.0"
E	: W108° 25' 27.0"
Comments	: Hand augered to 2' - refusal in gravel.
Air Temp.(F)	High 81, Low 77

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
9–10	1			SC/CL	70		
10–12	98.5			CL	70		SILTY SANDY CLAY - low, soft/crumbly, dry to damp, brown, fine to medium grain sand.
12–14	324			CL	40		SILTY CLAY - low, soft, damp, brown, trace fine grain sand.
14–16	855			CL	80		SILTY CLAY - STA, dark brown, damper than above.
16–18	1515			CH	90		SILTY CLAY - high, stiff, damp, dark brown.
18–19				CH	90		SILTY CLAY - STA.
19–20	1285			ML	90		CLAYEY SILT - low, soft, moist, brown, trace fine grain sand.
20–21	5210			CH			SILTY CLAY - high, stiff, damp, brown, sandy at base.

Completion Results

TK 570-5



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WEST19038-03

Geologist : Tracy Payne
Drilling Company : Enviro-Drill, Inc.
Driller : Cohagan
Drilling Rig : CME 75
Drilling Method : Hollow-Stem Augers
Sampling Method : 2' Split Spoon - 2" diamet.
Total Depth : 46'
Saturation Depth : 32', 36', & 40' BGL
Start Date/Time : 8-8-2019 / 10:30
Finish Date/Time : 8-8-2019 / 14:20

WELL NO. TK 570-5

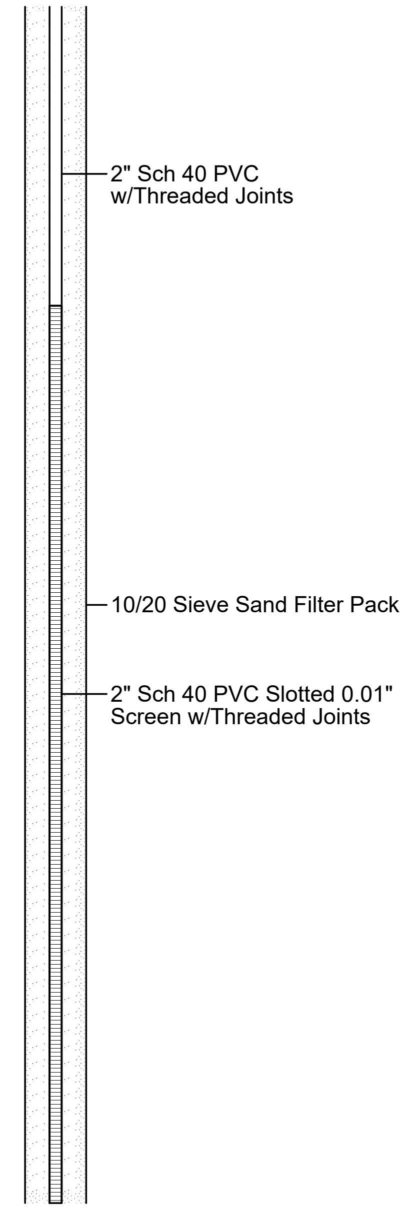
N : N35° 29' 22.0"
E : W108° 25' 27.0"
Comments : Hand augered to 2' - refusal in gravel.
Air Temp.(F) High 81, Low 77

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
21–22	5210			CH	90		
22–24	15,000			SC/CL	90		CLAYEY SAND / SANDY CLAY - low, soft, crumbly, damp, brown, fine grain sand.
24–26	15,000			CL	90		SANDY CLAY - moderate, stiff, damp, brown, fine grain sand.
26–28	15,000			CL	60		SANDY CLAY - low, firm, damp, brown, fine grain sand in matrix and lense.
28–30	7549			CH	90		CLAY - high, stiff, damp, brown.
30–32	15,000			CL	90		SANDY CLAY - low, firm to soft, damp, brown.
32–33	15,000	▼		SM			SILTY SAND - fine, medium, compact, very moist, seperate-phase hydrocarbon present, greyish brown.

Completion Results

TK 570-5



DiSorbo Environmental Consulting Firm

Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 46'
Saturation Depth	: 32', 36', & 40' BGL
Start Date/Time	: 8-8-2019 / 10:30
Finish Date/Time	: 8-8-2019 / 14:20

WELL NO. TK 570-5

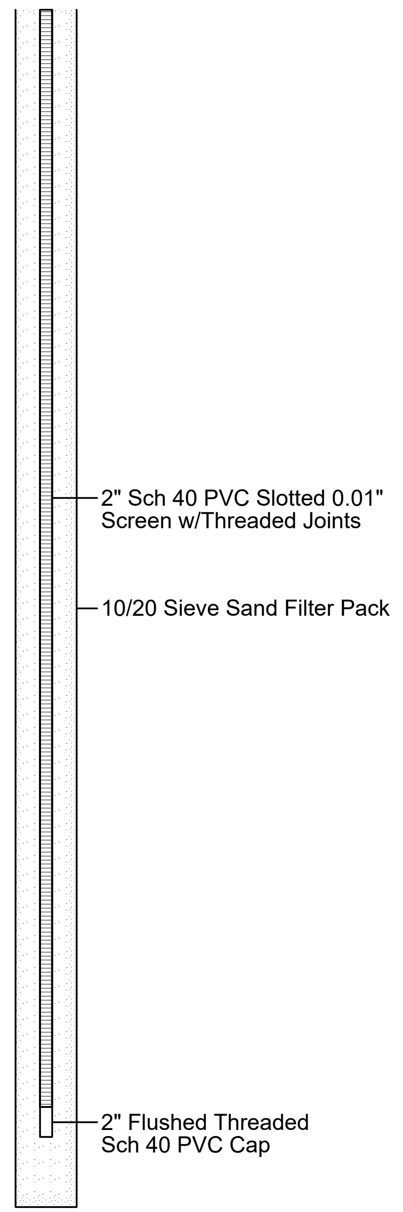
N	: N35° 29' 22.0"
E	: W108° 25' 27.0"
Comments	: Hand augered to 2' - refusal in gravel.
Air Temp.(F)	High 81, Low 77

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
33–34	15,000			SM	90		
34–36	15,000	▼ (36)		CL	60		GRAVELLY SAND - low, soft, damp, grey to brown, sandstone present.
36–37.5	--			SW	90		GRAVELLY SAND - medium to coarse, loose, grey, saturated, sheen present.
37.5–38	4650			CH	90		CLAY - high, very stiff, damp, brown/reddish brown, calcareous.
38–40	5110	▼ (40)		CL	30		GRAVELLY CLAY - STA, gravelly sandstone present.
40–42	--			GW	30		SANDY GRAVEL - medium to coarse, compact, sandstone, very moist to saturated.
42–44	--			GW	40		SANDY GRAVEL - STA, clay present, very moist.
44–45	110			CLST			CLAYSTONE - low, very stiff, reddish brown and grey, damp, shaley.

Completion Results

TK 570-5



DiSorbo Consulting, LLC

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Houston, Texas 77002
713-955-1230

8501 N. Mopac Expy, Suite 300
Austin, Texas 78759
512-693-4190

Appendix E

Well Development and Purging Procedures

Well Development

All monitoring wells will be developed to create an effective filter pack around the well screen, correct damage to the formation caused by drilling, remove fine particles from the formation near the borehole, and assist in restoring the natural water quality of the aquifer in the vicinity of the well. Newly installed monitoring wells will not be developed for at least 48 hours after the surface pad and outer protective casing are installed. This will allow sufficient time for the well materials to cure before the development procedures are initiated. A new monitoring well will be developed until the column of water in the well is free of visible sediment, and the pH, temperature, turbidity, and specific conductivity have stabilized. In most cases, the above requirements can be satisfied. However, in some cases, the pH, temperature, and specific conductivity may stabilize but the water remains turbid. In this case, continuous flushing may be necessary to complete the well development. If the well is pumped dry, the water level will be allowed to sufficiently recover before the next development period is initiated. The common methods used for developing wells include:

(1) pumping and over-pumping;

(2) backwashing;

(3) surging (with a surge block);

(4) bailing;

(5) jetting; and

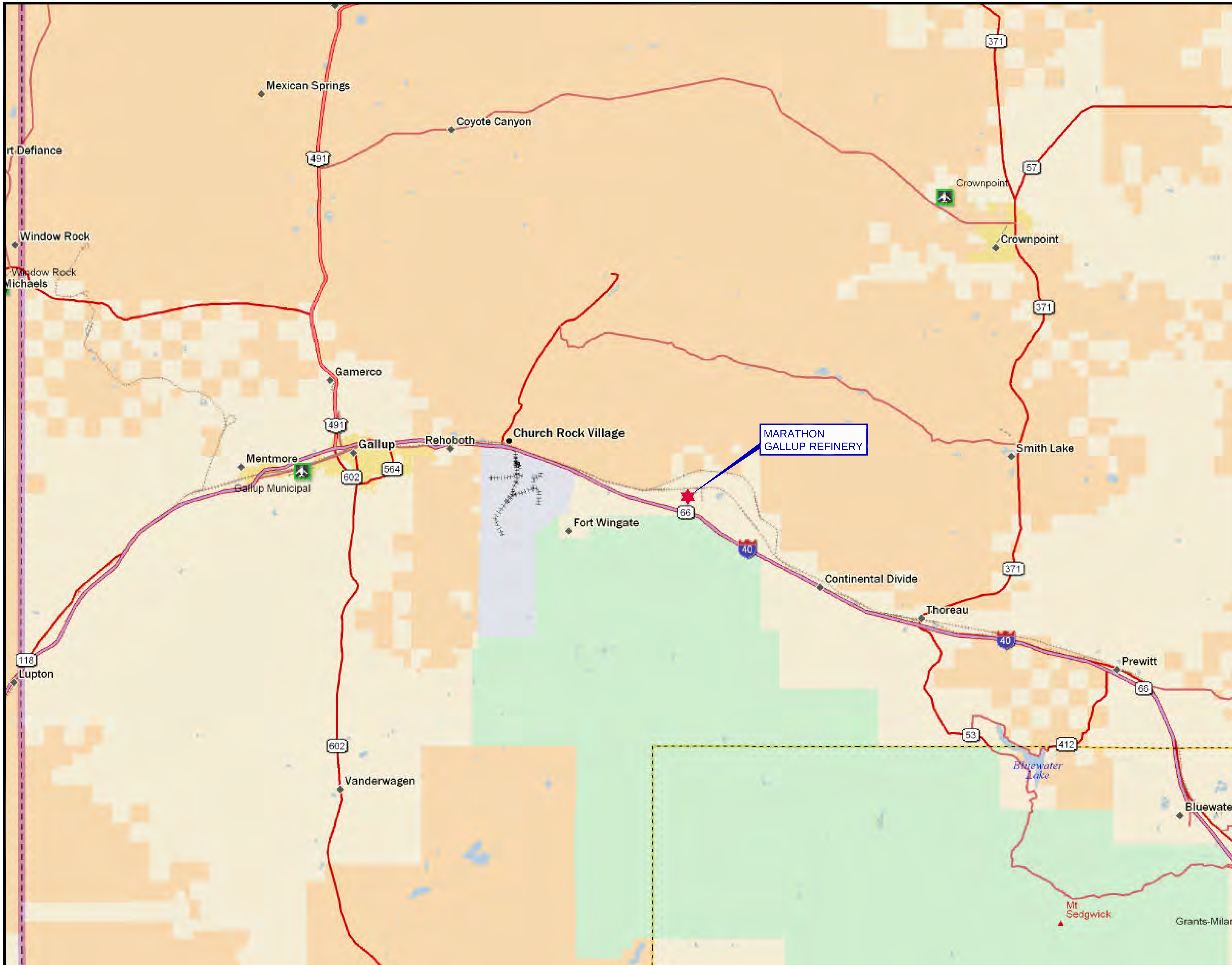
(6) airlift pumping.

These development procedures will be used, either individually or in combination, to achieve the most effective well development. However, the most favorable well development methods include pumping, over-pumping, bailing, surging, or a combination of these methods. Well development methods and equipment that alter the chemical composition of the groundwater will not be used.

Development methods that involve adding water or other fluids to the well or borehole, or that use air to accomplish well development will be avoided, if possible. Approval will be obtained from the NMED prior to introducing air, water, or other fluids into the well for the purpose of well development. If water is introduced to a borehole during well drilling and completion, then the same or greater volume of water will be removed from the well during development. In addition, the volume of water withdrawn from a well during development will be recorded, and best efforts will be used to avoid pumping wells dry during development activities.

Well Purging

All zones in each monitoring well will be purged by removing groundwater prior to sampling and in order to ensure that formation water is being sampled. Purge volumes will be determined by monitoring, at a minimum, groundwater pH, specific conductance, dissolved oxygen concentrations, turbidity, redox potential, and temperature during purging of volumes and at measurement intervals of not less than ¼ the pre-purge well volume. The groundwater quality parameters and fluid levels will be measured using a YSI Professional Plus Multiparameter Meter, YSI Water Quality Sonde, Hach Portable Turbidimeter, and a Geotech Interface Meter. The volume of groundwater purged, the instruments used, and the readings obtained at each interval will be recorded on the field monitoring log. In general, water samples may be obtained from the well after the measured parameters of the purge water have stabilized to within ten percent for three consecutive measurements. Well purging may also be conducted in accordance with the NMED's Position Paper "Use of Low-Flow and other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring" (October 30, 2001). If necessary, a written request for a variance from the described methods of well purging for individual wells may be submitted to NMED no later than 90 days prior to scheduled sampling activities.



Map Source: DeLorme Street Atlas USA 2007 Plus.

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 12/09/18	FILE: Mathon–dB206

FIGURE 1
SITE LOCATION MAP
GALLUP REFINERY

DiSorbo
Environmental Consulting Firm

8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759

Aerial Map Source: Google Map, 01/05/2014.

N

0 160
SCALE IN FEET

LEGEND

PROPOSED MONITORING WELL LOCATION

TK 568-1 SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-14 ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

GALLUP SITE LOCATION

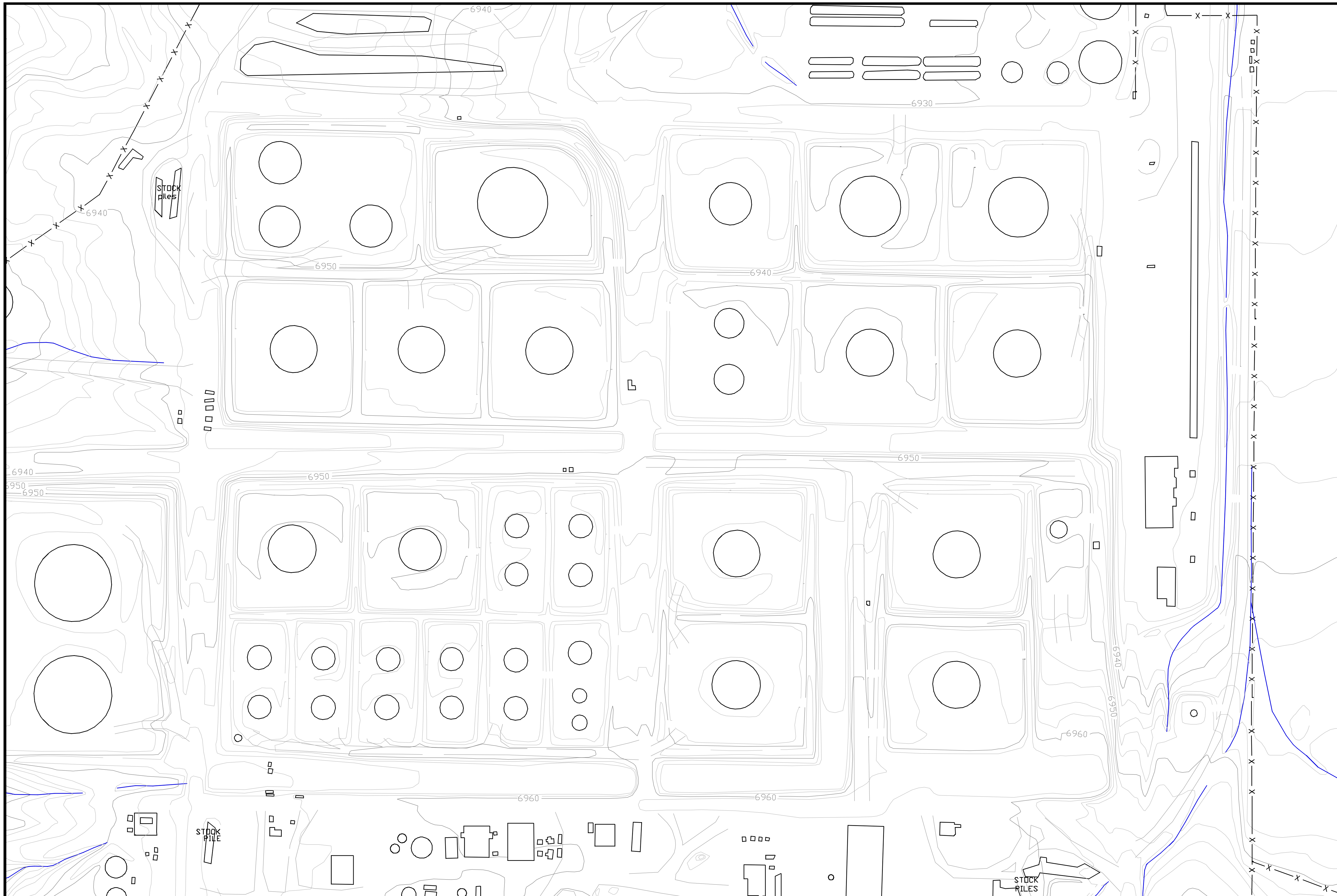
MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 09/01/19	FILE: Mathon–dB228

FIGURE 2
SITE MAP

DiSorbo
Environmental Consulting Firm

8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759



Map Source: Compiled by Photogrammetric Methods from Photography Acquired on March 1, 1998.

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.:Marathon | DATE: 09/01/19 | FILE: Mathon–dB229

FIGURE 3
TOPOGRAPHIC MAP

DiSorbo
Environmental Consulting Firm

8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759

Aerial Map Source: Google Map, 01/05/2014.

0 160
SCALE IN FEET

LEGEND

TK 568-1	SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER
OW-14	ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
6921.78	WATER LEVEL ELEVATION MEASURED SEPTEMBER 2016 (ABOVE MSL)
6915.29	WATER LEVEL ELEVATION MEASURED AUGUST 2018 (ABOVE MSL)
6910	POTENTIOMETRIC CONTOUR (FT)
	GROUNDWATER FLOW DIRECTION

GALLUP SITE LOCATION

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.:Marathon | DATE: 09/01/19 | FILE:Mathon-dB207

FIGURE 4
AUGUST 2018
POTENTIOMETRIC SURFACE MAP

DiSorbo
Environmental Consulting Firm

8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759

Table 1 - RW-1 Recovery Volumes
Western Refining Southwest, Inc. - Gallup Refinery

Year	Product Recovered (gallons)	Water Recovered (gallons)
2005	431.5	1,210.5
2006	23.52	1,107.0
2007	1.72	148.5
2008	3.99	152.0
2009	1.78	338.0
2010	0.66	128.0
2011	0.42	165.0
2012	0.97	137.0
2013	2.328	86.0
2014	2.37	83.0
2015	2	54.0
2016	8.5	53.0
2017	11	42.0
2018	1	1.5
total	491.758	3,705.5

recovery volumes are field estimates for RW-1

Table 2 - Groundwater Analyses
Western Refining Southwest, Inc. - Gallup Refinery

		Benzene (mg/L)	Toluene (mg/L)	Ethyl Benzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)	1,2,4-Trimethyl benzene (mg/L)	1,3,5-Trimethylbenzene (mg/L)	Naphthalene (mg/L)	1-Methyl naphthalene (mg/L)	n-Propylbenzene (mg/L)	Sec-butylbenzene (mg/L)
WQCC 20NMAC 6.2.3103 (Dec. 2018)		**0.005**	**1**	**0.7**	**0.62**	**0.1**	NE	NE	**0.03**	NE	NE	NE
40 CFR 141.62 MCL		0.005	1.0	0.7	10	NE	NE	NE	NE	NE	NE	NE
NMED Tap Water (March 2019)		0.00455	1.09	0.0149	0.193	0.143	NE	NE	0.00165	**0.0114**	NE	NE
EPA RSL for Tap Water (Nov 2018)		0.00046	1.1	0.0015	0.19	0.014	**0.056**	**0.060**	0.00017	0.0011	**0.66**	**2**
Well ID	DATE SAMPLED											
OW-14	11/09/18	**13**	<0.05	0.64	<0.05	**0.6**	<0.05	<0.05	<0.1	<0.2	<0.05	<0.05
	09/11/18	**17**	<0.05	0.66	0.042	**0.74**	<0.05	<0.05	0.027	**0.026**	0.03	<0.05
	05/15/18	**15**	0.0088	**0.71**	<0.15	**0.67**	<0.1	<0.1	0.017	<4.0	0.027	<0.1
	02/27/18	**14**	0.0065	0.61	<0.15	**0.66**	<0.1	<0.1	**0.044**	**0.059**	0.032	<0.1
	12/11/17	**13**	0.013	0.64	0.052	**0.63**	0.013	0.0021	**0.037**	**0.033**	0.028	0.0032
	09/06/17	**12**	0.0091	0.54	0.033	**0.66**	0.012	0.0016	**0.038**	**0.038**	0.025	0.0027
	05/30/17	**13**	0.004	0.47	0.02	**0.7**	0.011	<0.05	0.028	**0.037**	0.021	<0.05
	02/27/17	**12**	0.0062	0.39	<0.075	**0.81**	0.0074	<0.05	0.024	**0.035**	0.014	<0.05
	11/15/16	**8.7**	0.0057	0.3	0.013	**0.5**	0.0084	0.0015	0.02	**0.03**	0.013	0.0041
	08/31/16	**8.1**	0.0029	0.25	0.008	**0.58**	0.0071	0.00082	0.018	**0.034**	0.011	0.0022
	06/06/16	**7.8**	0.0026	0.23	0.012	**0.62**	0.008	0.0017	0.019	**0.033**	0.011	0.0031
	03/04/16	**6.5**	<0.05	0.23	<0.075	**0.68**	<0.05	NA	0.017	**0.03**	<0.05	<0.05
	10/27/15	**6.2**	<0.02	0.15	<0.03	**0.57**	<0.02	NA	<0.04	<0.08	<0.02	<0.02
	08/10/15	**5.4**	<0.01	0.16	<0.015	**0.78**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	6/1/2015	**4.6**	<0.02	0.16	<0.03	**0.74**	<0.02	NA	<0.04	<0.08	<0.02	<0.02
	3/9/2015	**3.9**	<0.02	0.16	<0.03	**0.76**	<0.02	NA	<0.04	<0.08	<0.02	<0.02
	11/10/2014	**3.6**	0.015	0.17	<0.015	**0.81**	<0.01	NA	<0.02	**0.044**	<0.01	<0.01
	9/15/2014	**3.8**	<0.02	0.16	<0.03	**0.82**	<0.02	NA	<0.04	**0.016**	<0.02	<0.02
	6/3/2014	**3.7**	<0.02	0.12	<0.03	**0.93**	<0.02	NA	<0.04	<0.08	<0.02	<0.02
	3/7/2014	**4.0**	0.026	0.14	0.032	**1.1**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	11/11/2013	**3.3**	0.046	0.13	0.019	**1.1**	<0.005	NA	<0.01	**0.027**	<0.005	<0.005
	9/4/2013 [2]	**2.6**	<0.005	0.063	<0.0075	**0.94**	<0.005	NA	<0.01	**0.024**	<0.005	<0.005
	6/13/2013	**3.4**	<0.01	0.073	<0.015	**1.3**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	3/19/2013	**2.8**	<0.01	0.065	<0.015	**1.3**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	11/27/2012	**2.7**	<0.01	0.056	<0.015	**1.4**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	8/23/2012	**2.1**	<0.01	0.037	<0.015	**1.6**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	6/14/2012	**2.6**	<0.01	0.053	<0.015	**1.2**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	3/21/2012	**2.3**	<0.01	0.051	<0.015	**1.4**	<0.01	NA	<0.02	<0.04	<0.01	<0.01
	12/13/2011	**1.5**	<0.005	0.036	<0.0075	**1.3**	<0.005	NA	<0.01	**0.021**	<0.005	<0.005
	10/24/2011	**1.4**	<0.005	0.045	<0.0075	**1.4**	<0.005	NA	<0.01	**0.022**	<0.005	<0.005
	6/20/2011	**1.8**	0.0015	0.0610	<0.0015	**1.6**	0.001	NA	0.002	**0.020**	0.002	0.002
	2/24/2011	**1.3**	0.0019	0.0420	<0.0015	**1.4**	0.001	NA	<0.002	**0.019**	0.001	0.003
	11/8/2010	**0.63**	<0.001	0.0180	<0.0015	**1.3**	0.001	NA	<0.002	**0.022**	<0.001	0.003
	9/22/2010	**0.47**	<0.001	0.0083	<0.0015	**1.4**	<0.001	NA	<0.002	**0.022**	<0.001	0.003
	6/7/2010	**0.33**	0.0018	0.0085	<0.0015	**1.4**	0.001	NA	<0.002	**0.020**	<0.001	0.002
	3/24/2010	**0.25**	<0.005	0.0100	<0.0075	**1.5**	<0.005	<0.005	<0.01	<0.02	<0.005	<0.005

Table 2 - Groundwater Analyses
Western Refining Southwest, Inc. - Gallup Refinery

		Benzene (mg/L)	Toluene (mg/L)	Ethyl Benzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)	1,2,4-Trimethyl benzene (mg/L)	1,3,5-Trimethylbe nzene (mg/L)	Naphthalene (mg/L)	1-Methyl naphthalene (mg/L)	n-Propylbenzene (mg/L)	Sec-butylbenzene (mg/L)
WQCC 20NMAC 6.2.3103 (Dec. 2018)		**0.005**	**1**	**0.7**	**0.62**	**0.1**	NE	NE	**0.03**	NE	NE	NE
40 CFR 141.62 MCL		0.005	1.0	0.7	10	NE	NE	NE	NE	NE	NE	NE
NMED Tap Water (March 2019)		0.00455	1.09	0.0149	0.193	0.143	NE	NE	0.00165	**0.0114**	NE	NE
EPA RSL for Tap Water (Nov 2018)		0.00046	1.1	0.0015	0.19	0.014	**0.056**	**0.060**	0.00017	0.0011	**0.66**	**2**
Well ID	DATE SAMPLED											
-	9/18/2014	37	35.0	1.8	10	1.2	<1.0	<1.0	<2.0	<4.0	<1.0	<1.0
RW 1	9/16/2013	54	35	2.4	13	2.2	1.3	<1.0	<2.0	<4.0	<1.0	<1.0
	8/23/2012	45	82	4.9	31	3.1	2.8	<1.0	<2.0	<4.0	<0.01	NA
	10/3/2011	51	37	3.7	23	2.9	5.8	0.98	0.6	0.15	0.4	NA
	08/28/18	**48**	**4**	**1.5**	**3.8**	**1.1**	**0.31**	0.043	**0.1**	**0.04**	0.056	NA
	05/08/18	**46**	**5**	**1.5**	**4.2**	**1.2**	**0.34**	0.031	**0.095**	<0.8	0.042	NA
	02/20/18	**42**	**3.7**	**1.5**	**3.8**	**1.2**	**0.32**	0.038	**0.14**	**0.076**	0.059	NA
	12/06/17	**38**	**2.9**	**1.5**	**3.6**	**1.3**	**0.28**	0.026	**0.069**	**0.021**	0.042	NA
	09/19/17	**37**	**6.7**	**1.2**	**4**	**1.3**	**0.27**	0.046	**0.11**	**0.055**	0.037	NA
	06/20/17	**47**	**9**	**1.4**	**4.6**	**1.7**	**0.28**	0.058	**0.11**	**0.063**	0.043	NA
-	03/16/17	**37**	**2.3**	**1.3**	**3.1**	**1.6**	**0.2**	0.04	**0.15**	**0.13**	0.044	NA
RW 2	11/16/16	**38**	**3.4**	**1.2**	**3.2**	**1.7**	**0.2**	0.049	**0.15**	**0.13**	0.063	NA
	09/13/16	**38**	**3.8**	**1.2**	**3.1**	**1.6**	**0.21**	0.044	**0.14**	**0.088**	0.056	NA
	06/08/16	**36**	**2.9**	**1.1**	**3.1**	**1.7**	**0.23**	**0.12**	**0.18**	**0.17**	0.071	NA
	03/07/16	**46**	**4.1**	**1.2**	**3.5**	**1.9**	**0.18**	0.028	**0.1**	**0.069**	0.045	NA
	08/23/15	**42**	**6.9**	**1.1**	**3.7**	**1.8**	**0.21**	<0.2	<0.4	<0.8	<0.6	NA
	9/18/2014	40	4.5	0.86	2.5	1.9	0.15	<0.1	<0.2	<0.4	<0.1	NA
	9/16/2013	48	3.4	0.87	2.3	2.8	0.13	<0.1	<0.2	<0.4	<0.1	NA
	8/23/2012	42	2.6	0.59	1.7	3.3	<0.1	<0.1	<0.2	<0.4	<0.1	NA
	10/3/2011	39	5.3	0.57	1.5	3.7	0.098	0.024	0.057	0.054	0.036	NA

All values expressed in milligrams per liter

DEFINITIONS

NE = Not established

NA = Not analyzed

Bold and highlighted values represent values above the applicable standards

Bold screening level is applicable screening under RCRA Permit

STANDARDS

WQCC 20 NMAC 6.2.3103 - Standards for Ground Water of 10,000 mg/l TDS Concentration or Less.

a) Human Health Standards; b) Other Standards for Domestic Water

40 CFR 141.62 Maximum Contaminant Levels (MCL)

EPA Regional Screening Level (RSL) Summary Table

TABLE 3
FLUID LEVEL MEASUREMENTS

Date of Installation	Well ID Number	Inspection or Sample Date	Casing Diameter (Inch)	Ground Level Elevation (ft)	Well Casing Rim Elevation (ft)	2011 Survey [1] Ground Elevation Inside Steel Sleeve (ft)	Stick-up length (ft)	Well Casing Bottom Elevation (ft)	Total Well Depth (ft)	Depth to SPH (ft)	SPH Column Thickness (ft)	Depth to Water (ft)	Ground water Elevation (ft)	Corrected Water Table [1] Elevation (ft)	Screened Interval Depth Top to Bottom (ft)
12/17/80	OW-14	03/07/14	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	24.12	6,902.53	NA	35 - 45
		06/03/14	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	24.15	6,902.50	NA	35 - 45
		09/15/14	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	24.40	6,902.25	NA	35 - 45
		11/10/14	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	24.25	6,902.40	NA	35 - 45
		03/09/15	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.95	6,902.70	NA	35 - 45
		06/01/15	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.88	6,902.77	NA	35 - 45
		08/10/15	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.96	6,902.69	NA	35 - 45
		10/27/15	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.69	6,902.96	NA	35 - 45
		03/04/16	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.20	6,903.45	NA	35 - 45
		06/06/16	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.18	6,903.47	NA	35 - 45
		08/31/16	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.50	6,903.15	NA	35 - 45
		11/15/16	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.28	6,903.37	NA	35 - 45
		02/27/17	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	22.83	6,903.82	NA	35 - 45
		05/30/17	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	23.18	6,903.47	NA	35 - 45
		09/06/17	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	22.56	6,904.09	NA	35 - 45
		12/11/17	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	22.20	6,904.45	NA	35 - 45
		02/27/18	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	21.80	6,904.85	NA	35 - 45
		04/26/18	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.75	ND	NA	21.75	6,904.90	NA	35 - 45
		08/14/18	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.78	ND	NA	21.95	6,904.70	NA	35 - 45
		11/06/18	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	ND	NA	21.82	6,904.83	NA	35 - 45
03/28/95	RW-1	03/14/14	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.11	3.54	31.65	6,914.41	6,917.24	25 - 40
		06/09/14	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.05	5.01	33.06	6,913.00	6,917.01	25 - 40
		09/18/14	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.31	NA	NA	NA	NA	25 - 40
		11/13/14	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.15	4.89	33.04	6,913.02	6,916.93	25 - 40
		03/23/15	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.10	4.70	32.80	6,913.26	6,917.02	25 - 40
		06/09/15	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.70	4.40	32.10	6,913.96	6,917.48	25 - 40
		08/23/15	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.08	1.94	30.02	6,916.04	6,917.59	25 - 40
		10/29/15	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.65	2.45	30.10	6,915.96	6,917.92	25 - 40
		03/04/16	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.05	2.50	30.55	6,915.51	6,917.51	25 - 40
		06/08/16	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.98	3.82	31.80	6,914.26	6,917.32	25 - 40
		09/13/16	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.90	4.14	32.04	6,914.02	6,917.33	25 - 40
		11/16/16	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.80	3.10	30.90	6,915.16	6,917.64	25 - 40
		03/16/17	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	27.05	3.50	30.55	6,915.51	6,918.31	25 - 40
		06/20/17	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	26.77	1.65	28.42	6,917.64	6,918.96	25 - 40
		09/19/17	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	26.52	1.08	27.60	6,918.46	6,919.32	25 - 40

TABLE 3
FLUID LEVEL MEASUREMENTS

Date of Installation	Well ID Number	Inspection or Sample Date	Casing Diameter (Inch)	Ground Level Elevation (ft)	Well Casing Rim Elevation (ft)	2011 Survey [1] Ground Elevation Inside Steel Sleeve (ft)	Stick-up length (ft)	Well Casing Bottom Elevation (ft)	Total Well Depth (ft)	Depth to SPH (ft)	SPH Column Thickness (ft)	Depth to Water (ft)	Ground water Elevation (ft)	Corrected Water Table [1] Elevation (ft)	Screened Interval Depth Top to Bottom (ft)
		12/12/17	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	26.50	1.00	27.50	6,918.56	6,919.36	25 - 40
		02/13/18	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	26.94	0.28	27.22	6,918.84	6,919.06	25 - 40
		04/25/18	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.35	26.94	0.27	27.21	6,918.85	6,919.07	25 - 40
		08/16/18	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.45	27.44	0.26	27.70	6,918.36	6,918.57	25 - 40
03/29/95	RW-2	03/17/14	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	24.59	6,903.94	NA	26.1 - 36.1
		06/09/14	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.79	6,904.74	NA	26.1 - 36.1
		09/18/14	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.95	6,904.58	NA	26.1 - 36.1
		11/13/14	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.90	6,904.63	NA	26.1 - 36.1
		03/23/15	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.52	6,905.01	NA	26.1 - 36.1
		06/09/15	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.02	6,905.51	NA	26.1 - 36.1
		08/23/15	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	23.37	6,905.16	NA	26.1 - 36.1
		10/29/15	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	22.80	6,905.73	NA	26.1 - 36.1
		03/04/16	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	22.45	6,906.08	NA	26.1 - 36.1
		06/08/16	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	22.31	6,906.22	NA	26.1 - 36.1
		09/13/16	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	22.47	6,906.06	NA	26.1 - 36.1
		11/16/16	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	22.22	6,906.31	NA	26.1 - 36.1
		03/16/17	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	21.65	6,906.88	NA	26.1 - 36.1
		06/20/17	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	21.19	6,907.34	NA	26.1 - 36.1
		09/19/17	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	ND	NA	20.71	6,907.82	NA	26.1 - 36.1
		12/05/17	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	40.00	ND	NA	20.34	6,908.19	NA	26.1 - 36.1
		02/19/18	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	40.00	ND	NA	20.00	6,908.53	NA	26.1 - 36.1
		04/25/18	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.99	ND	NA	20.03	6,908.50	NA	26.1 - 36.1
		08/16/18	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	40.00	ND	NA	20.10	6,908.43	NA	26.1 - 36.1

DEFINITIONS:

DTB - Depth to Bottom — NA = Not Applicable — ND = Not Detected

DTW - Depth to Water — Negative number in Stick up Length column indicates well is flushmount and located at or below ground level.

SPH = Separate Phase Hydrocarbons — Depth to Water Column - if 0.00 is indicated - means water is at top of casing (full) under artesian flow conditions.

NOTES:

1. Corrected Water Table Elevation applies only if SPH thickness column measurement exists. (0.8 X SPH thickness + Groundwater Elevation)

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

PROJECT: Tank 569
LOCATION: See Boring Plan

FILE #: 95-018
ELEVATION: 6943.7
TOTAL DEPTH: 48.5
LOGGED BY: WHK
DATE: 3-28-95
STATIC WATER: 28.0
BORING ID: BG4
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-0.3	*********		C	**Sand**, fine, dry, brown, loose	
0.3-0.4	xxxxxxxxx	1.0	C	**Asphalt Cement Concrete**	11.0
0.4-5.0	///***///		C	**Clay**, sandy, wet, brown, firm, (fill), odor below 3.9', water saturated @ 4.8'	>1438
	///***///		C	bottom of fill is at 4.8'	
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
5.0-11.8	///--+///	5.0	C	**Clay**, silty, blocky, wet, brown, firm, scattered carbonate filaments, some	0.0
	///--+///		C	nodules, native, no odor, redder >10'	
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///	11	C		
	///--+///		C		
11.8-13.0	///***///	12	C	**Clay**, sandy, very fine, wet, red brown to brown, soft	0.0
	///***///		C		
13.0-14.1	////+++//	13	C	**Clay**, stiff, fissured, wet, brown, some carbonate nodules	0.0
	////+++//		C		
14.1-14.6	*********	14	C	**Sand**, fine, clean, damp, white, loose	0.0
14.6-15.0	///**O*//		C	**Clay**, sandy, slightly gravelly, wet, brown, very stiff to hard	0.0
15.0-16.9	///**////	15	C	**Clay**, very fine sandy, laminar bedded, wet, brown, soft	0.0
	///**////		C		
	///**////		C		
	///**////		C		
16.9-18.1	///*/////	17	C	**Clay**, very fine sandy, slightly less than above, slightly blocky, wet, brown, firm	0.0
	///*/////		C		
	///*/////	18	C		
18.1-19.8	****//***		C	**Sand**, some clay, sandy in bands, moist to wet, brown, moderately dense to soft	0.0
	****//***		C	interbedded with finer soil	
19.8-21.3	OOO***OOO		C	**Gravel**, sandy, moist, light grey to white, dense, subrounded	0.0
	OOO***OOO	20	C		
	OOO***OOO		C		
	OOO***OOO	21	C		
21.3-21.8	///***///		C	**Clay**, sandy, wet, brown, soft	
21.8-25.5	OOO**/OOO	22	C	**Gravel**, slightly sandy, some clay as binder, moist, grey to brown, dense	
	OOO**/OOO		C	odor @ 24.4'	20 @ 22.5'
	OOO**/OOO		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6943.7
TOTAL DEPTH: 48.5
LOGGED BY: WHK
DATE: 3-28-95
STATIC WATER: 28.0
BORING ID: BG4
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	000**/000		C	continued from page 1	
	000**/000	24	C		
	000**/000		C		160 @ 24.4'
	000**/000	25	C		
25.5-29.4	*********		C	**Sand**, fine, clean of silt and clay, moist, brown, loose	45.0
	*********	26	C		
	*********		C		
	*********		C		
	*********		C		
	*********		C		
	*********		C		
	*********	29	C		
29.4-30.5	*********		C	**Sand** as above but **very weakly water bearing @ 29.4'**, grey to black, strong odor	1100
	*********	30	C		
30.5-31.2	///***///		C	**Clay**, sandy, wet, brown, soft, odor	770
	///***///	31	C		
31.2-34.0	///+++///		C	**Clay**, blocky, wet, very stiff, numerous carbonate filaments, brown, slightly	770
	///+++///		C	fissured, odor	
	///+++///		C		
	///+++///		C		
	///+++///		C		
34.0-35.0	***---***	34	C	**Sand**, silty, very fine, does not appear water bearing, but sample covered with	700
	---		C	water from above, very dark brown to black, soft, strong odor	
35.0-37.3	***///***	35	C	**Sand**, very fine, clayey, **saturated, water bearing zones--2" thick**, gradational to	1000
	///		C	clay below, brown, strong odor	
	///		C		
	///		C		
	///	37	C		
37.3-39.2	///+++///		C	**Clay**, wet, brown, stiff, carbonate filaments, soft to firm, not blocky or fissured	320
	///+++///		C		
	///+++///		C		
	///+++///	39	C		
39.2-40.9	000**/000		C	**Gravel**, sandy, slightly clayey, **water bearing**, brown, dense, rounded to subrounded	800
	000**/000		C	odor	
	000**/000		C		
40.9-45.0	----*----	41	C	**CHINLE FORMATION**	
	----*----		C	**Shale**, slightly sandy, fissle, fissured, slightly blocky, moist, red brown, hard	2.0
	----*----		C	some grey green banding, no odor	
	----*----		C		
	----*----		C		
	----*----		C		
	----*----		C		
	----*----		C		
45.0-48.5	----**---	45	C	**Shale**, sandy, fissle, moist to damp, hard, water from above runs into fissle	
	----**---		C	partings (dry on interior of sample) difficult to obtain uncontaminated sample	
	----**---		C	dark red brown, suspect samples taken may be contaminated by water from above	

LOGGED BY: WHK

IZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569

LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6943.7
TOTAL DEPTH: 48.5
LOGGED BY: WHK
DATE: 3-28-95
STATIC WATER: 28'-7"
BORING ID: BG4
PAGE: 3

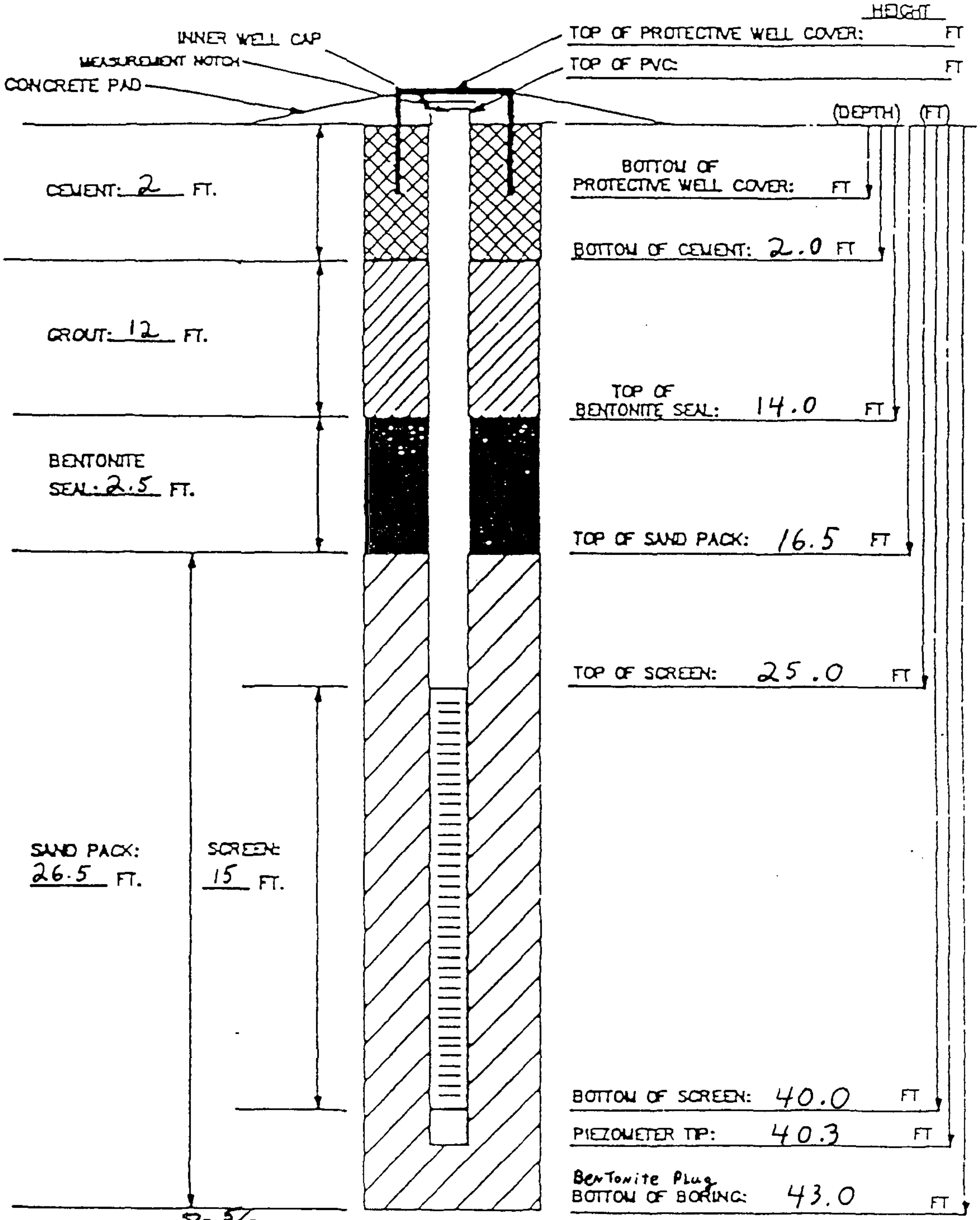
DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	----**---		C	continued from page 2	
	----**---	47	C		23 @ 47.0'
	----**---		C		
	----**---	48	C		
	----**---		C		12 @ 48.5'
TD				stop drilling 11:05a	
				water @ 18.8' @ 11:30a -- 8" of hydrocarbon on water @ 2:00p water level @ 28'-7"	
				completed 4" well, screened from 25' to 40'	
				(see attached completion diagram)	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

INSTALLATION DATE: 032895

INSTALLATION DIAGRAM
MONITORING WELL NO.
B6-4



MATERIALS USED:

SAND TYPE AND QUANTITY: 20-40
BENTONITE PELLETS (5-GALLON BUCKETS): 1
BAGS OF GROUT: 1
AMOUNT OF CEMENT: 8-94# Bags+75#Gel
AMOUNT OF WATER USED: 8 gal
OTHER:

Bottom Cap Used? YES
Screen Lengths: 15'
Riser Used: 30'
Top Cap Used?
Well Size: 4" Dia.

J-Plug Used? YES
Flush Mount Vault
Avove Ground Vault YES
Bollards, No.& Size:

TASK: Tank 569 GEOLOGIST/ENGINEER: WHK

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

PROJECT: Tank 569
LOCATION: See Boring Plan
Tank 576

FILE #: 95-018
ELEVATION: 6927.3
TOTAL DEPTH: 38.0
LOGGED BY: WHK
DATE: 3-29-95
STATIC WATER: 24'-3"
BORING ID: B2
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-5.0	///-*////		C	start at 10:00a	
	///-*////		C	**Clay**, slightly silty, little sand, wet, brown, soft to firm, no odor	0.0
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////	5.0	C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////	8.0	C		
8.4-10.6	///***///		C	**Clay**, fine sandy, gradational fine above and to below, wet, brown, firm, no odor	0.0
	///***///		C		
	///***///		C		
	///***///	10	C		
10.6-12.0	***---***		C	**Sand**, silty, fine, moist, light red brown, loose, no odor	0.0
	---		C		
	---		C		
12.0-12.5	***OOO***	12	C	**Sand**, very gravelly, to 2", moist, light red brown, dense, slightly rounded rock	0.0
12.5-13.1	***---***		C	**Sand**, silty, moist, light red brown, loose, no odor	0.0
13.1-15.0	///**--//	13	C	**Clay**, sandy, silty, moist, red brown, firm to stiff, some root filaments	0.0
	///**--//		C		
	///**--//		C		
	///**--//		C		
15.0-16.8	***///***	15	C	**Sand**, clayey, fine, moist, red brown, moderately dense, no odor	0.0
	///		C		
	///		C		
	///		C		
16.8-19.1	//*++-///	17	C	**Clay**, silty grading to very fine sandy, moist to wet, red brown, stiff, no odor	0.0
	//*++-///		C	carbonate filaments common	
	//*++-///		C		
	//*++-///		C		
	//*++-///	19	C		
19.1-20.0	//--OO++/		C	**Clay**, silty, large gravel present (2"), wet, dark brown, hard, no odor	0.0
	//--OO++/	20	C	numerous carbonate filaments	
20.0-23.6	//--++///		C	**Clay**, silty, brown, stiff, slightly blocky, no odor, carbonate filaments	0.0
	//--++///		C		
	//--++///		C		
	//--++///		C		
	//--++///		C		540 @ 22.6'
	//--++///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

PROJECT: Tank 569
LOCATION: See Boring Plan

FILE #: 95-018
ELEVATION: 6927.3
TOTAL DEPTH: 38.0
LOGGED BY: WHK
DATE: 3-29-95
STATIC WATER: 24'-3"
BORING ID: B2
PAGE: 2

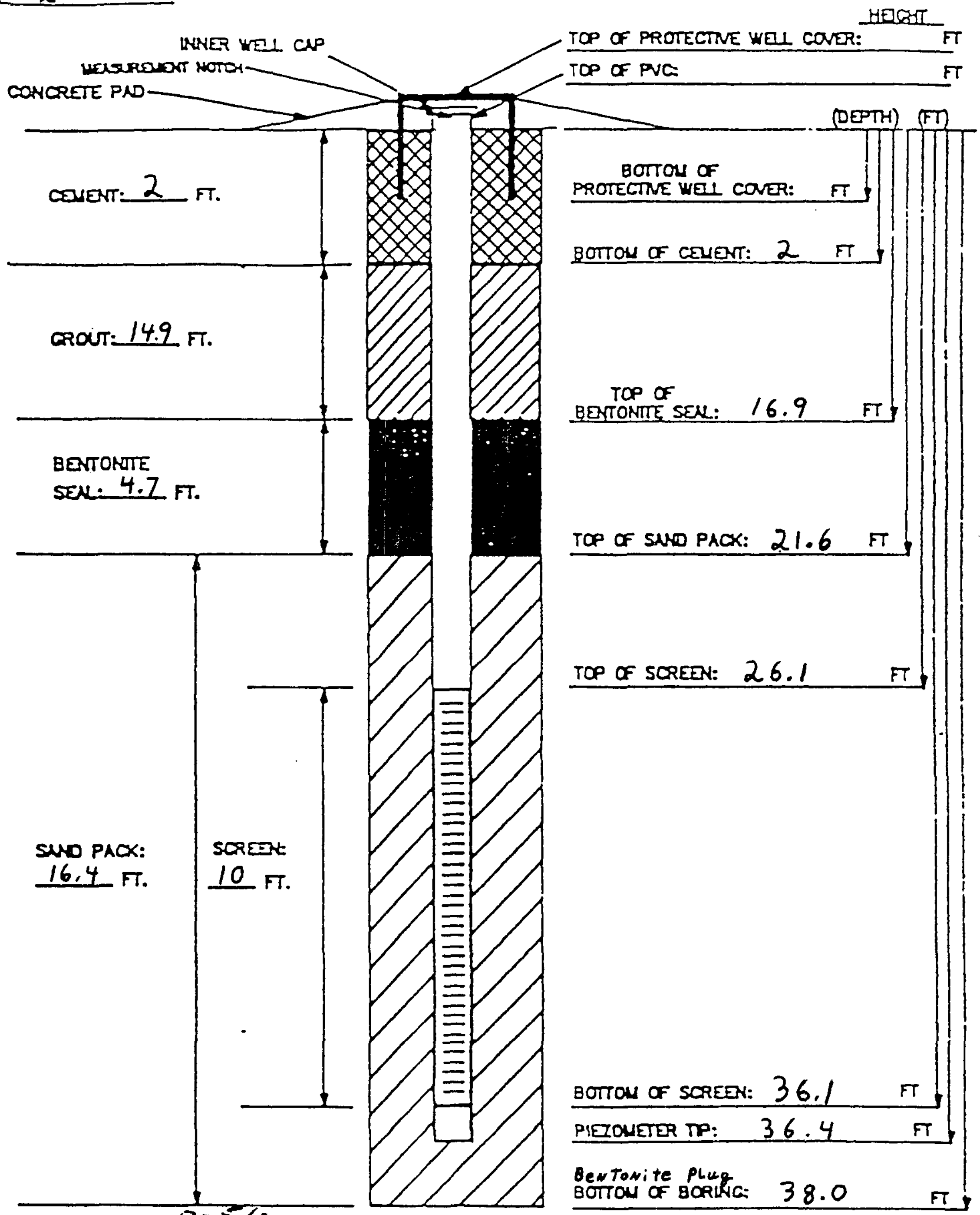
DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
23.6-24.2	***OO****		C	**Sand**, coarse, some fine gravel, saturated but does not appear water bearing, brown	1000
	OO*	24	C	dense, hydrocarbon odor	
24.2-25.5	/////////		C	**Clay**, wet, not water bearing, brown, stiff, hydrocarbon odor	1060
	/////////	25	C		
25.5-27.1	***///***		C	**Sand**, clayey, **water bearing**, brown, odor	610
	///		C		
	///		C		
27.1-28.5	/////////	27	C	**Clay**, some sand @ 28'-28.5', wet, brown, soft, slightly blocky, hydrocarbon odor	
	/////////		C	saturated but not water bearing	
	/////////	28	C		
28.5-30.9	///***///		C	**Clay**, sandy, some laminations, wet, brown, stiff	60
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
30.9-32.9	000**0000	31	C	**Gravel**, some sand, silica rock, **water bearing**, brown, dense, rounded to subrounded	1030
	000**0000		C		
	000**0000		C		
	000**0000		C		
32.9-35.0	---------	33	C	**CHINLE FORMATION**	
	---------		C	**Shale**, weathered, wet to moist, some green mottling, red brown overall, stiff	20
	---------		C	weak odor	
	---------		C		
35.0-38.0	----*----	35	C	**Shale**, as above, slightly more sand, blocky, dark red brown, wet to moist	57
	----*----		C	suspect contamination by water flowing from gravel above--gravel produces more	
	----*----		C	water at this location than previous drilling	
	----*----		C		
	----*----		C		
	----*----		C		
	----*----	38	C		
TD				stop drilling 11:25a	
				completed 4" well - see attached well completion diagram	
				24'-3" to water	
				2" product on water	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

INSTALLATION DATE: 032995

INSTALLATION DIAGRAM
MONITORING WELL NO.
B-2



BOREHOLE DIAMETER: 8 - 5/8 INCHES

MATERIALS USED:

SAND TYPE AND QUANTITY: 20-40
BENTONITE PELLETS (5-GALLON BUCKETS): 2
BAGS OF GROUT: -
AMOUNT OF CEMENT: 8 - 94# Bags + 75# Gal
AMOUNT OF WATER USED: 8 Gal
OTHER:

Bottom Cap Used? YES
Screen Lengths: 10'
Riser Used: 30'
Top Cap Used? ______
Well Size: 4" Dia.

J-Plug Used? YES
Flush Mount Vault ______
Avove Ground Vault YES
Bollards, No.& Size:

TASK: Tank 569 GEOLOGIST/ENGINEER: WHK

Investigation Derived Waste (IDW) Management Plan

All IDW will be properly characterized and disposed of in accordance with all federal, State, and local rules and regulations for storage, labeling, handling, transport, and disposal of waste. The IDW may be characterized for disposal based on the known or suspected contaminants potentially present in the waste.

A dedicated decontamination area will be setup prior to any sample collection activities. The decontamination pad will be constructed so as to capture and contain all decontamination fluids (e.g., wash water and rinse water) and foreign materials washed off the sampling equipment. The fluids will be pumped directly into suitable storage containers (e.g., labeled 55-gallon drums), which will be located at satellite accumulation areas until the fluids are disposed in the refinery wastewater treatment system upstream of the API separator. The solids captured in the decontamination pad will be shoveled into 55-gallon drums and stored at the designated satellite accumulation area pending proper waste characterization for off-site disposal.

Drill cuttings generated during installation of soil borings will be placed directly into 55-gallon drums and staged in the satellite accumulation area pending results of the waste characterization sampling. The portion of soil cores, which are not retained for analytical testing, will be placed into the same 55-gallon drums used to store the associated drill cuttings.

The solids (e.g., drill cuttings and used soil cores) will be characterized by testing to determine if there are any hazardous characteristics in accordance with 40 Code of Federal Regulations (CFR) Part 261. This includes tests for ignitability, corrosivity, reactivity, and toxicity. If the materials are not characteristically hazardous, then further testing will be performed pursuant to the requirements of the facility to which the materials will be transported. Depending upon the results of analyses for individual investigation soil samples, additional analyses may include VOCs, TPH and polynuclear aromatic hydrocarbons (PAHs).

Aerial Map Source: Google Map, 01/05/2014.

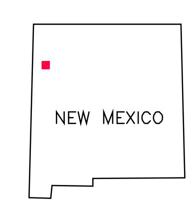
N

0 160
SCALE IN FEET

LEGEND

TK 568-1 SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-14 ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER



GALLUP SITE LOCATION

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon	DATE: 1/20/19	FILE: Mathon−dB147

FIGURE 3
LOCATION OF SOIL BORINGS AND WELLS

DiSorbo
Environmental Consulting Firm

8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759

Soil Analytical Results Summary Marathon
Petroleum Company - Gallup Refinery Gallup,
New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	TK-568-1 (12-14')		TK-568-1 (30-32')		TK-568-1 (48-49')		TK 568-2 (22-24')		TK 568-2 (28-30')		TK 568-2 (36-37')		TK569-1(18-20')		TK569-1(24-26')	
					1609E26-008		1609E26-009		1609E26-010		1609G64-001		1609G64-002		1609G64-003		1610238-004		1610238-005	
					9/23/2016		9/23/2016		9/23/2016		9/27/2016		9/27/2016		9/27/2016		10/4/2016		10/4/2016	
Metals (mg/kg)																				
Antimony	3.13E+01	(1)	1.42E+02	(5)	< 0.9918	u	< 0.9808	u	< 1.0019	u	< 10.0348	u	< 0.9926	u	1.4	J	< 0.9919	u	< 0.9825	u
Arsenic	7.07E+00	(1)	3.59E+01	(4)	1.8	J	1.6	J	2.7	v	< 8.8622	u	1.6	J	2.1	J	1.4	J	1.6	J
Barium	1.56E+04	(1)	4.39E+03	(5)	130	v	180	v	35	v	590	v	230	v	130	v	120	v	410	v
Beryllium	1.56E+02	(1)	1.48E+02	(5)	0.82	v	0.74	v	0.74	v	< 0.3453	u	0.58	v	0.74	v	0.69	v	0.57	v
Cadmium	7.05E+01	(1)	7.21E+01	(5)	< 0.0625	u	< 0.0618	u	< 0.0631	u	< 0.6324	u	< 0.0626	u	< 0.0633	u	< 0.0625	u	< 0.0619	u
Chromium	9.66E+01	(1)	1.34E+02	(5)	8.9	v	7.6	v	8.3	v	2.5	J	5.6	v	8.3	v	5.9	v	5.1	v
Cobalt	2.34E+01	(1)	3.67E+01	(5)	3.6	v	3.3	v	5.7	v	2.6	J	2.7	v	2.4	v	3	v	2.8	v
Cyanide	1.11E+01	(1)	1.20E+01	(5)	< 0.25	u	< 0.25	u	< 0.25	u	< 0.254	u	< 0.208	u	< 0.225	u	0.24	v	< 0.281	u
Iron	5.48E+04	(1)	2.48E+05	(5)	14000	v	12000	v	9300	v	4900	v	9100	v	14000	v	12000	v	9800	v
Lead	-	(2)	8.00E+02	(6)	7.2	v	3.9	v	0.54	v	5.9	v	1.8	v	1.6	v	2.7	v	3.2	v
Manganese	1.05E+04	(1)	4.64E+02	(5)	220	v	290	v	120	v	2300	v	200	v	330	v	190	v	190	v
Mercury	2.36E+01	(1)	2.05E+01	(5)	0.0045	J	0.0028	J	0.00089	J	0.0028	J	0.0021	J	< 0.0006	u	0.0019	J	0.0015	J
Nickel	1.56E+03	(1)	7.53E+02	(5)	7.1	v	5.9	v	8.6	v	3.1	J	4.7	v	5.7	v	5.4	v	5	v
Selenium	3.91E+02	(1)	1.75E+03	(5)	< 1.7933	u	< 1.7733	u	< 1.8115	u	< 18.1434	u	< 1.7947	u	< 1.8162	u	< 1.7934	u	< 1.7765	u
Silver	3.91E+02	(1)	1.77E+03	(5)	< 0.0617	u	< 0.061	u	< 0.0623	u	< 0.6244	u	< 0.0618	u	< 0.0625	u	< 0.0617	u	< 0.0611	u
Vanadium	3.94E+02	(1)	6.14E+02	(5)	14	v	14	v	26	v	58	v	10	v	6.4	v	9.8	v	10	v
Zinc	2.35E+04	(1)	1.06E+05	(5)	13	v	11	v	27	v	6.3	J	9.3	v	9	v	9.8	v	8.3	v
Volatiles (mg/kg)																				
1,1,1,2-Tetrachloroethane	2.78E+01	(1)	1.36E+02	(4)	< 0.12	u	< 0.0288	u	< 0.003	u	<0.0017	u	< 0.0622	u	<0.0017	u	<0.0017	u	< 0.0025	u
1,1,1-Trichloroethane	1.43E+04	(1)	1.35E+04	(5)	< 0.0765	u	< 0.0184	u	< 0.0019	u	<0.0017	u	< 0.0397	u	<0.0017	u	<0.0017	u	< 0.0016	u
1,1,2,2-Tetrachloroethane	7.93E+00	(1)	3.91E+01	(4)	< 0.2031	u	< 0.0487	u	< 0.0051	u	<0.0017	u	< 0.1054	u	<0.0017	u	<0.0017	u	< 0.0043	u
1,1,2-Trichloroethane	2.59E+00	(1)	2.28E+00	(5)	< 0.1477	u	< 0.0355	u	< 0.0037	u	<0.0017	u	< 0.0766	u	<0.0017	u	<0.0017	u	< 0.0031	u
1,1-Dichloroethane	7.79E+01	(1)	3.80E+02	(4)	< 0.0678	u	< 0.0163	u	< 0.0017	u	<0.0017	u	< 0.0351	u	<0.0017	u	<0.0017	u	< 0.0014	u
1,1-Dichloroethene	4.36E+02	(1)	4.20E+02	(5)	< 0.4105	u	< 0.0985	u	< 0.0102	u	<0.0003	u	< 0.2129	u	<0.0003	u	<0.0003	u	< 0.0086	u
1,1-Dichloropropene	-	-	-	-	< 0.0994	u	< 0.0239	u	< 0.0025	u	<0.0017	u	< 0.0516	u	<0.0017	u	<0.0017	u	< 0.0021	u
1,2,3-Trichlorobenzene	6.30E+01	(2)	9.30E+02	(6)	< 0.1875	u	< 0.045	u	< 0.0047	u	<0.0004	u	< 0.0973	u	<0.0004	u	<0.0004	u	< 0.0039	u
1,2,3-Trichloropropane	5.10E-02	(1)	1.21E+00	(4)	< 0.2168	u	< 0.052	u	< 0.0054	u	<0.0017	u	< 0.1124	u	<0.0017	u	<0.0017	u	< 0.0045	u
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 0.1341	u	< 0.0322	u	< 0.0033	u	<0.0005	u	< 0.0695	u	<0.0005	u	<0.0005	u	< 0.0028	u
1,2,4-Trimethylbenzene	3.00E+02	(2)	1.80E+03	(6)	32	v	5.5	v	0.011	J	0.0003	J	18	v	0.0006	J	<0.0003	u	1.6	v
1,2-Dibromo-3-chloropropane	8.51E-02	(1)	1.17E+00	(4)	< 0.3839	u	< 0.0921	u	< 0.0096	u	<0.0002	u	< 0.1991	u	<0.0002	u	<0.0002	u	< 0.008	u
1,2-Dibromoethane (EDB)	6.68E-01	(1)	3.28E+00	(4)	< 0.0892	u	< 0.0214	u	< 0.0022	u	<0.0017	u	< 0.0462	u	<0.0017	u	<0.0017	u	< 0.0019	u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.1094	u	< 0.0262	u	< 0.0027	u	<0.0002	u	< 0.0567	u	<0.0002	u	<0.0002	u	< 0.0023	u
1,2-Dichloroethane (EDC)	8.25E+00	(1)	4.03E+01	(4)	< 0.3268	u	< 0.0784	u	< 0.0081	u	<0.0017	u	< 0.1695	u	<0.0017	u	<0.0017	u	< 0.0068	u
1,2-Dichloropropane	1.76E+01	(1)	2.52E+01	(5)	< 0.1051	u	< 0.0252	u	< 0.0026	u	<0.0017	u	< 0.0545	u	<0.0017	u	<0.0017	u	< 0.0022	u
1,3,5-Trimethylbenzene	2.70E+02	(2)	1.50E+03	(6)	11	v	1.9	v	0.0025	J	<0.0003	u	5.6	v	<0.0003	u	<0.0003	u	0.6	v
1,3-Dichlorobenzene	-	-	-	-	< 0.1028	u	< 0.0247	u	< 0.0026	u	<0.0003	u	< 0.0533	u	<0.0003	u	<0.0003	u	< 0.0022	u
1,3-Dichloropropane	1.60E+03	(2)	2.30E+04	(6)	< 0.1422	u	< 0.0341	u	< 0.0035	u	<0.0017	u	< 0.0738	u	<0.0017	u	<0.0017	u	< 0.003	u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.1553	u	< 0.0373	u	< 0.0039	u	<0.0003	u	< 0.0806	u	<0.0003	u	<0.0003	u	< 0.0033	u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	0.59	J	0.23	J	< 0.0069	u	0.0002	J	0.86	J	0.0003	J	0.0002	J	0.028	J
2,2-Dichloropropane	-	-	-	-	< 0.0718	u	< 0.0172	u	< 0.0018	u	<0.0002	u	< 0.0372	u	<0.0002	u	<0.0002	u	< 0.0015	u
2-Butanone	3.73E+04	(1)	9.12E+04	(5)	< 0.7163	u	< 0.1719	u	< 0.0178	u	<0.0006	u	< 0.3715	u	<0.0006	u	0.002	J	< 0.015	u
2-Chlorotoluene	1.56E+03	(1)	7.08E+03	(5)	< 0.0925	u	< 0.0222	u	< 0.0023	u	<0.0003	u	< 0.048	u	<0.0003	u	<0.0003	u	< 0.0019	u
2-Hexanone	2.00E+02	(2)	1.30E+03	(6)	< 0.6821	u	< 0.1637	u	< 0.017	u	<0.0004	u	< 0.3537	u	<0.0004	u	<0.0004	u	< 0.0143	u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	1.6	J	0.55	J	< 0.0067	u	<0.0004	u	1.9	J	<0.0004	u	<0.0004	u	0.041	J
4-Chlorotoluene	1.60E+03	(2)	2.30E+04	(6)	< 0.1109	u	< 0.0266	u	< 0.0028	u	<0.0003	u	< 0.0575	u	<0.0003	u	<0.0003	u	< 0.0023	u
4-Isopropyltoluene	-	-	-	-	< 0.1125	u	< 0.027	u	< 0.0028	u	<0.0003	u	0.13	J	<0.0003	u	<0.0003	u	0.12	v
4-Methyl-2-pentanone	5.81E+03	(1)	2.02E+04	(5)	< 0.3653	u	< 0.0877	u	< 0.0091	u	<0.0033	u	< 0.1894	u	<0.0034	u	<0.0034	u	< 0.0077	u
Acetone	6.63E+04	(1)	2.41E+05	(5)	< 1.6217	u	< 0.3892	u	< 0.0404	u	0.0085	v	< 0.841	u	0.0053	J	0.0046	J	< 0.034	u
Benzene	1.77E+01	(1)	8.65E+01	(4)	3.8	v	0.26	v	0.041	v	0.0054	v	5.2	v	0.0077	v	0.0172	v	0.29	v
Bromobenzene	2.90E+02	(2)	1.80E+03	(6)	< 0.101	u	< 0.0242	u	< 0.0025	u	<0.0002	u	< 0.0524	u	<0.0002	u	<0.0002	u	< 0.0021	u
Bromodichloromethane	6.14E+00	(1)	2.99E+01	(4)	< 0.073	u	< 0.0175	u	< 0.0018	u	<0.0017	u	< 0.0379	u	<0.0017	u	<0.0017	u	< 0.0015	u
Bromoform	6.74E+02	(1)	1.75E+03	(4)	< 0.1527	u	< 0.0366	u	< 0.0038	u	<0.0017	u	< 0.0792	u	<0.0017	u	<0.0017	u	< 0.0032	u
Bromomethane	1.76E+01	(1)	1.77E+01	(5)	< 0.4618	u	< 0.1108	u	0.012	J	<0.0003	u	< 0.2395	u	<0.0003	u	<0.0003	u	< 0.0097	u
Carbon disulfide	1.54E+03	(1)	1.61E+03	(5)	< 0.4138	u	< 0.0993	u	< 0.0103	u	<0.0006	u	< 0.2146	u	<0.0006	u	<0.0006	u	< 0.0087	u
Carbon tetrachloride	1.06E+01	(1)	5.21E+01	(4)	< 0.0823	u	< 0.0197	u	< 0.0021	u	<0.0017	u	< 0.0427	u	<0.0017	u	<0.0017	u	< 0.0017	u
Chlorobenzene	3.76E+02	(1)	4.08E+02	(5)	< 0.102	u	< 0.0245	u	< 0.0025	u	<0.0002	u	< 0.0529	u	<0.0002	u	<0.0002	u	< 0.0021	u
Chloroethane	1.88E+04	(1)	1.65E+04	(5)	< 0.2502	u	< 0.06	u	< 0.0062	u	<0.0003	u	< 0.1297	u	<0.0003	u	<0.0003	u	< 0.0052	u
Chloroform	5.85E+00	(1)	2.84E+01	(4)	< 0.0946	u	< 0.0227	u	< 0.0024	u	<0.0017	u	< 0.049	u	<0.0017	u	<0.0017	u	< 0.002	u
Chloromethane	4.08E+01	(1)	1.99E+02	(4)	< 0.1116	u	< 0.0268	u	< 0.0028	u	<0.0004	u	< 0.0579	u	<0.0004	u	<0.0004	u	< 0.0023	u
cis-1,2-DCE	1.56E+02	(1)	7.08E+02	(5)	< 0.0729	u	< 0.0175	u	< 0.0018	u	<0.0017	u	< 0.0378	u	<0.0017	u	<0.0017	u	< 0.0015	u
cis-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.1156	u	< 0.0277	u	< 0.0029	u	<0.0017	u	< 0.0599	u	<0.0017	u	<0.0017	u	< 0.0024	u
Dibromochloromethane	1.38E+01	(1)	6.69E+01	(4)	< 0.1132	u	< 0.0272	u	< 0.0028	u	<0.0017	u	< 0.0587	u	<0.0017	u	<0.0017	u	< 0.0024	u
Dibromomethane	5.74E+01	(1)	5.34E+01	(5)	< 0.1086	u	< 0.0261	u	< 0.0027	u	<0.0017	u	< 0.0563	u	<0.0017	u	<0.0017	u	< 0.0023	u
Dichlorodifluoromethane	1.80E+02	(1)	1.59E+02	(5)	< 0.3878	u	< 0.0931	u	< 0.0097	u	<0.001	u	< 0.2011	u	<0.001	u	<0.001	u	< 0.0081	u
Ethylbenzene	7.45E+01	(1)	3.65E+02	(4)	19	v	1.5	v	< 0.0026	u	<0.0002	u	7	v	0.0007	J	0.0004	J	0.73	v

	TK569-1(36-38')		TK569-1(40-42')		TK569-2(16-18')		TK569-2(29-31')		TK569-2(36-38')		TK 569-3 (16-18')		TK 569-3 (24-26')		TK 569-3 (38-39')		TK 570-1 (10-12')		TK 570-1 (32-34')		TK 570-1 (44-45')	
	1610238-006		1610238-007		1610238-001		1610238-002		1610238-003		1609G64-008		1609G64-009		1609G64-010		1609G64-005		1609G64-006		1609G64-007	
	10/4/2016		10/4/2016		10/4/2016		10/4/2016		10/4/2016		9/28/2016		9/28/2016		9/28/2016		9/27/2016		9/27/2016		9/27/2016	
Metals (mg/kg)																						
Antimony	< 1.0132	u	< 2.0134	u	< 0.9951	u	< 1.0069	u	< 0.9847	u	1	J	< 1.0059	u	< 1.0114	u	< 0.9961	u	< 1.0019	u	2.2	J
Arsenic	2.4	J	3.3	J	1.6	J	1.3	J	2.7	v	1.3	J	1.8	J	2.2	J	1.7	J	1.6	J	2.1	J
Barium	1500	v	380	v	200	v	170	v	300	v	320	v	300	v	340	v	440	v	180	v	300	v
Beryllium	0.26	v	0.26	J	0.64	v	0.45	v	0.58	v	0.58	v	0.52	v	0.9	v	0.57	v	0.64	v	1.1	v
Cadmium	< 0.0639	u	< 0.1269	u	< 0.0627	u	< 0.0635	u	< 0.0621	u	< 0.0631	u	< 0.0634	u	< 0.0637	u	< 0.0628	u	< 0.0631	u	< 0.0624	u
Chromium	3.6	v	3	v	6.4	v	5	v	6.6	v	6.6	v	4.7	v	9	v	6.4	v	6.8	v	9.5	v
Cobalt	2.2	v	1.2	v	3.2	v	2.3	v	2.1	v	3.2	v	3.2	v	4.5	v	2.9	v	3.4	v	4.9	v
Cyanide	< 0.28	u	< 0.156	u	< 0.271	u	< 0.237	u	< 0.269	u	< 0.283	u	< 0.269	u	< 0.284	u	0.59	v	< 0.23	u	0.37	v
Iron	7900	v	4400	v	12000	v	9600	v	11000	v	11000	v	10000	v	7500	v	10000	v	10000	v	20000	v
Lead	1.2	v	1.1	v	3.5	v	1.6	v	1.1	v	2.8	v	2.3	v	< 0.1747	u	3.4	v	2.7	v	4.7	v
Manganese	710	v	1500	v	210	v	370	v	450	v	230	v	300	v	130	v	390	v	200	v	300	v
Mercury	0.0042	J	< 0.0006	u	0.0042	J	0.002	J	< 0.0006	u	0.0019	J	0.002	J	< 0.0006	u	0.0033	J	0.0021	J	< 0.0006	u
Nickel	3.2	v	3.3	v	5.5	v	4.5	v	6.1	v	5.7	v	4.7	v	11	v	4.6	v	5.5	v	9	v
Selenium	< 1.8319	u	< 3.6403	u	< 1.7993	u	< 1.8205	u	< 1.7804	u	< 1.8104	u	< 1.8187	u	< 1.8287	u	< 1.8011	u	< 1.8115	u	< 1.7897	u
Silver	< 0.063	u	< 0.1253	u	< 0.0619	u	< 0.0626	u	< 0.0613	u	< 0.0623	u	< 0.0626	u	< 0.0629	u	< 0.062	u	< 0.0623	u	< 0.0616	u
Vanadium	14	v	9.4	v	12	v	10	v	3.5	v	13	v	13	v	25	v	14	v	13	v	13	v
Zinc	7.6	v	4.8	J	9.6	v	8.5	v	7	v	9.3	v	9.9	v	20	v	11	v	10	v	22	v
Volatiles (mg/kg)																						
1,1,1,2-Tetrachloroethane	< 0.009	u	< 0.0031	u	< 0.0056	u	< 0.0121	u	<0.0019	u	< 0.0031	u	< 0.5838	u	< 0.003	u	< 0.0445	u	< 0.1195	u	< 0.0064	u
1,1,1-Trichloroethane	< 0.0057	u	< 0.002	u	< 0.0035	u	< 0.0077	u	<0.0019	u	< 0.002	u	< 0.3722	u	< 0.0019	u	< 0.0284	u	< 0.0762	u	< 0.0041	u
1,1,2,2-Tetrachloroethane	< 0.0153	u	< 0.0053	u	< 0.0094	u	< 0.0204	u	<0.0019	u	< 0.0053	u	< 0.9885	u	< 0.0051	u	< 0.0753	u	< 0.2023	u	< 0.0108	u
1,1,2-Trichloroethane	< 0.0111	u	< 0.0038	u	< 0.0068	u	< 0.0148	u	<0.0019	u	< 0.0039	u	< 0.7189	u	< 0.0037	u	< 0.0548	u	< 0.1471	u	< 0.0078	u
1,1-Dichloroethane	< 0.0051	u	< 0.0018	u	< 0.0031	u	< 0.0068	u	<0.0019	u	< 0.0018	u	< 0.3297	u	< 0.0017	u	< 0.0251	u	< 0.0675	u	< 0.0036	u
1,1-Dichloroethene	< 0.0308	u	< 0.0107	u	< 0.019	u	< 0.0412	u	<0.0003	u	< 0.0107	u	< 1.9977	u	< 0.0104	u	< 0.1522	u	< 0.4089	u	< 0.0218	u
1,1-Dichloropropene	< 0.0075	u	< 0.0026	u	< 0.0046	u	< 0.01	u	<0.0019	u	< 0.0026	u	< 0.4838	u	< 0.0025	u	< 0.0369	u	< 0.099	u	< 0.0053	u
1,2,3-Trichlorobenzene	< 0.0141	u	< 0.0049	u	< 0.0087	u	< 0.0188	u	<0.0005	u	< 0.0049	u	< 0.9126	u	< 0.0047	u	< 0.0695	u	< 0.1868	u	< 0.01	u
1,2,3-Trichloropropane	< 0.0163	u	< 0.0056	u	< 0.01	u	< 0.0218	u	<0.0019	u	< 0.0057	u	< 1.055	u	< 0.0055	u	< 0.0804	u	< 0.2159	u	< 0.0115	u
1,2,4-Trichlorobenzene	< 0.0101	u	< 0.0035	u	< 0.0062	u	< 0.0135	u	<0.0006	u	< 0.0035	u	< 0.6524	u	< 0.0034	u	< 0.0497	u	< 0.1335	u	< 0.0071	u
1,2,4-Trimethylbenzene	3.8	v	0.22	v	2.2	v	8.5	v	0.0055	v	0.012	J	140	v	0.23	v	19	v	35	v	2.4	v
1,2-Dibromo-3-chloropropane	< 0.0288	u	< 0.01	u	< 0.0178	u	< 0.0386	u	<0.0002	u	< 0.01	u	< 1.8683	u	< 0.0097	u	< 0.1423	u	< 0.3824	u	< 0.0204	u
1,2-Dibromoethane (EDB)	< 0.0067	u	< 0.0023	u	< 0.0041	u	< 0.009	u	<0.0019	u	< 0.0023	u	< 0.4339	u	< 0.0023	u	< 0.033	u	< 0.0888	u	< 0.0047	u
1,2-Dichlorobenzene	< 0.0082	u	< 0.0028	u	< 0.0051	u	< 0.011	u	<0.0003	u	< 0.0029	u	< 0.5323	u	< 0.0028	u	< 0.0405	u	< 0.109	u	< 0.0058	u
1,2-Dichloroethane (EDC)	< 0.0245	u	< 0.0085	u	< 0.0151	u	< 0.0328	u	<0.0019	u	< 0.0085	u	< 1.5904	u	< 0.0083	u	< 0.1211	u	< 0.3255	u	< 0.0174	u
1,2-Dichloropropane	< 0.0079	u	< 0.0027	u	< 0.0049	u	< 0.0106	u	<0.0019	u	< 0.0027	u	< 0.5116	u	< 0.0027	u	< 0.039	u	< 0.1047	u	< 0.0056	u
1,3,5-Trimethylbenzene	1.3	v	0.076	v	0.69	v	2.8	v	0.0029	v	0.0026	J	51	v	0.083	v	5.8	v	13	v	0.87	v
1,3-Dichlorobenzene	< 0.0077	u	< 0.0027	u	< 0.0048	u	< 0.0103	u	<0.0003	u	< 0.0027	u	< 0.5002	u	< 0.0026	u	< 0.0381	u	< 0.1024	u	< 0.0055	u
1,3-Dichloropropane	< 0.0107	u	< 0.0037	u	< 0.0066	u	< 0.0143	u	<0.0019	u	< 0.0037	u	< 0.6921	u	< 0.0036	u	< 0.0527	u	< 0.1417	u	< 0.0076	u
1,4-Dichlorobenzene	< 0.0117	u	< 0.004	u	< 0.0072	u	< 0.0156	u	<0.0003	u	< 0.004	u	< 0.7558	u	< 0.0039	u	< 0.0576	u	< 0.1547	u	< 0.0082	u
1-Methylnaphthalene	0.17	J	< 0.0073	u	0.32	v	0.21	J	0.0004	J	< 0.0073	u	< 1.3563	u	< 0.0071	u	0.73	J	0.49	J	0.023	J
2,2-Dichloropropane	< 0.0054	u	< 0.0019	u	< 0.0033	u	< 0.0072	u	<0.0002	u	< 0.0019	u	< 0.3493	u	< 0.0018	u	< 0.0266	u	< 0.0715	u	< 0.0038	u
2-Butanone	< 0.0538	u	< 0.0186	u	< 0.0332	u	< 0.072	u	0.0009	J	< 0.0187	u	< 3.4856	u	< 0.0181	u	< 0.2655	u	< 0.7134	u	< 0.038	u
2-Chlorotoluene	< 0.0069	u	< 0.0024	u	< 0.0043	u	< 0.0093	u	<0.0003	u	< 0.0024	u	< 0.45	u	< 0.0023	u	< 0.0343	u	< 0.0921	u	< 0.0049	u
2-Hexanone	< 0.0512	u	< 0.0177	u	< 0.0316	u	< 0.0685	u	<0.0005	u	< 0.0178	u	< 3.319	u	< 0.0173	u	< 0.2528	u	< 0.6793	u	< 0.0362	u
2-Methylnaphthalene	0.3	J	0.0092	J	0.61	v	0.46	J	<0.0005	u	0.0075	J	< 1.3065	u	< 0.0068	u	1.6	J	1.1	J	0.045	J
4-Chlorotoluene	< 0.0083	u	< 0.0029	u	< 0.0051	u	< 0.0111	u	<0.0003	u	< 0.0029	u	< 0.5395	u	< 0.0028	u	< 0.0411	u	< 0.1104	u	< 0.0059	u
4-Isopropyltoluene	0.035	J	< 0.0029	u	0.03	J	0.049	J	0.0004	J	< 0.0029	u	8.5	v	0.01	J	0.22	J	1.5	v	0.17	v
4-Methyl-2-pentanone	< 0.0274	u	< 0.0095	u	< 0.0169	u	< 0.0367	u	<0.0037	u	< 0.0095	u	< 1.7775	u	< 0.0092	u	< 0.1354	u	< 0.3638	u	< 0.0194	u
Acetone	< 0.1218	u	< 0.0422	u	< 0.0752	u	< 0.1629	u	0.0044	J	< 0.0423	u	< 7.8917	u	< 0.041	u	< 0.6011	u	< 1.6153	u	< 0.0861	u
Benzene	0.12	v	0.026	v	0.067	v	6.3	v	0.0134	v	0.014	J	**44**	v	0.06	v	< 0.1859	u	11	v	0.25	v
Bromobenzene	< 0.0076	u	< 0.0026	u	< 0.0047	u	< 0.0101	u	<0.0002	u	< 0.0026	u	< 0.4917	u	< 0.0026	u	< 0.0374	u	< 0.1006	u	< 0.0054	u
Bromodichloromethane	< 0.0055	u	< 0.0019	u	< 0.0034	u	< 0.0073	u	<0.0019	u	< 0.0019	u	< 0.3554	u	< 0.0018	u	< 0.0271	u	< 0.0727	u	< 0.0039	u
Bromoform	< 0.0115	u	< 0.004	u	< 0.0071	u	< 0.0153	u	<0.0019	u	< 0.004	u	< 0.7429	u	< 0.0039	u	< 0.0566	u	< 0.1521	u	< 0.0081	u
Bromomethane	< 0.0347	u	< 0.012	u	< 0.0214	u	< 0.0464	u	<0.0003	u	< 0.012	u	< 2.247	u	< 0.0117	u	< 0.1711	u	< 0.4599	u	< 0.0245	u
Carbon disulfide	< 0.0311	u	< 0.0108	u	< 0.0192	u	< 0.0416	u	<0.0007	u	< 0.0108	u	< 2.0138	u	< 0.0105	u	< 0.1534	u	< 0.4122	u	< 0.022	u
Carbon tetrachloride	< 0.0062	u	< 0.0021	u	< 0.0038	u	< 0.0083	u	<0.0019	u	< 0.0021	u	< 0.4005	u	< 0.0021	u	< 0.0305	u	< 0.082	u	< 0.0044	u
Chlorobenzene	< 0.0077	u	< 0.0027	u	< 0.0047	u	< 0.0103	u	<0.0002	u	< 0.0027	u	< 0.4966	u	< 0.0026	u	< 0.0378	u	< 0.1016	u	< 0.0054	u
Chloroethane	< 0.0188	u	< 0.0065	u	< 0.0116	u	< 0.0251	u	<0.0003	u	< 0.0065	u	< 1.2174	u	< 0.0063	u	< 0.0927	u	< 0.2492	u	< 0.0133	u
Chloroform	< 0.0071	u	< 0.0025	u	< 0.0044	u	< 0.0095	u	<0.0019	u	< 0.0025	u	< 0.4602	u	< 0.0024	u	< 0.0351	u	< 0.0942	u	< 0.005	u
Chloromethane	< 0.0084	u	< 0.0029	u	< 0.0052	u	< 0.0112	u	<0.0005	u	< 0.0029	u	< 0.5429	u	< 0.0028	u	< 0.0414	u	< 0.1111	u	< 0.0059	u
cis-1,2-DCE	< 0.0055	u	< 0.0019	u	< 0.0034	u	< 0.0073	u	<0.0019	u	< 0.0019	u	< 0.3547	u	< 0.0018	u	< 0.027	u	< 0.0726	u	< 0.0039	u
cis-1,3-Dichloropropene	< 0.0087	u	< 0.003	u	< 0.0054	u	< 0.0116	u	<0.0019	u	< 0.003	u	< 0.5624	u	< 0.0029	u	< 0.0428	u	< 0.1151	u	< 0.0061	u
Dibromochloromethane	< 0.0085	u	< 0.0029	u	< 0.0052	u	< 0.0114	u	<0.0019	u	< 0.003	u	< 0.5511	u	< 0.0029	u	< 0.042	u	< 0.1128	u	< 0.006	u
Dibromomethane	< 0.0082	u	< 0.0028	u	< 0.005	u	< 0.0109	u	<0.0019	u	< 0.0028	u	< 0.5284	u	< 0.0027	u	< 0.0402	u	< 0.1081	u	< 0.0058	u
Dichlorodifluoromethane	< 0.0291	u	< 0.0101	u	< 0.018	u	< 0.039	u	<0.0011	u	< 0.0101	u	< 1.8873	u	< 0.0098	u	< 0.1437	u	< 0.3863	u	< 0.0206	u
Ethylbenzene	1.2	v	0.086	v	0.41	v	4.8	v	0.0041	v	< 0.0027	u	**88**	v	0.086	v	6.6	v	19	v	1	v

Soil Analytical Results Summary Marathon
Petroleum Company - Gallup Refinery Gallup,
New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	TK-568-1 (12-14')	TK-568-1 (30-32')	TK-568-1 (48-49')	TK 568-2 (22-24')	TK 568-2 (28-30')	TK 568-2 (36-37')	TK569-1(18-20')	TK569-1(24-26')	TK569-1(36-38')	TK569-1(40-42')	TK569-2(16-18')	TK569-2(29-31')	TK569-2(36-38')	TK 569-3 (16-18')	TK 569-3 (24-26')	TK 569-3 (38-39')	TK 570-1 (10-12')	TK 570-1 (32-34')	TK 570-1 (44-45')
					1609E26-008	1609E26-009	1609E26-010	1609G64-001	1609G64-002	1609G64-003	1610238-004	1610238-005	1610238-006	1610238-007	1610238-001	1610238-002	1610238-003	1609G64-008	1609G64-009	1609G64-010	1609G64-005	1609G64-006	1609G64-007
					9/23/2016	9/23/2016	9/23/2016	9/27/2016	9/27/2016	9/27/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016	9/28/2016	9/28/2016	9/28/2016	9/27/2016	9/27/2016	9/27/2016
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 0.1533 u	< 0.0368 u	< 0.0038 u	<0.0004 u	< 0.0795 u	<0.0004 u	<0.0004 u	< 0.0032 u	< 0.0115 u	< 0.004 u	< 0.0071 u	< 0.0154 u	<0.0004 u	< 0.004 u	< 0.7459 u	< 0.0039 u	< 0.0568 u	< 0.1527 u	< 0.0081 u
Isopropylbenzene	2.35E+03	(1)	2.71E+03	(5)	0.94 J	0.11 J	< 0.0027 u	<0.0002 u	0.34 J	<0.0002 u	<0.0002 u	0.23 v	0.089 J	0.0031 J	0.071 v	0.21 v	0.001 J	< 0.0028 u	23 v	0.02 J	0.64 v	3.8 v	0.32 v
Methyl tert-butyl ether (MTBE)	9.68E+02	(1)	4.78E+03	(4)	< 0.3939 u	1 v	0.014 J	0.0006 J	< 0.2043 u	0.0124 v	<0.0003 u	< 0.0083 u	< 0.0296 u	< 0.0102 u	< 0.0183 u	0.1 J	0.0025 v	< 0.0103 u	< 1.9168 u	< 0.01 u	< 0.146 u	< 0.3923 u	< 0.0209 u
Methylene chloride	4.09E+02	(1)	1.20E+03	(5)	< 0.3614 u	< 0.0867 u	< 0.009 u	<0.0017 u	< 0.1874 u	<0.0017 u	<0.0017 u	< 0.0076 u	< 0.0271 u	< 0.0094 u	< 0.0168 u	< 0.0363 u	<0.0019 u	< 0.0094 u	< 1.7587 u	< 0.0091 u	< 0.134 u	< 0.36 u	< 0.0192 u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	3 v	0.61 v	< 0.0049 u	<0.0017 u	2.6 v	<0.0017 u	<0.0017 u	0.044 J	0.32 v	< 0.0051 u	0.58 v	0.75 v	<0.0019 u	< 0.0051 u	1.2 J	< 0.005 u	2.8 v	2.1 J	0.079 J
n-Butylbenzene	3.90E+03	(2)	5.80E+04	(6)	1.3 J	0.37 J	< 0.0028 u	<0.0004 u	0.87 J	<0.0004 u	<0.0004 u	0.14 v	0.21 J	0.013 J	0.23 v	0.35 J	0.0005 J	< 0.0029 u	9.9 J	0.019 J	1.4 v	2.6 J	0.24 v
n-Propylbenzene	3.80E+03	(2)	2.40E+04	(6)	5.2 v	0.83 v	< 0.0024 u	<0.0003 u	2.4 v	<0.0003 u	<0.0003 u	0.37 v	0.6 v	0.037 v	0.34 v	1.3 v	0.0016 J	< 0.0025 u	33 v	0.048 v	2.9 v	7.4 v	0.53 v
sec-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	0.49 J	0.11 J	< 0.0043 u	<0.0003 u	0.31 J	<0.0003 u	<0.0003 u	0.12 v	0.076 J	0.0073 J	0.072 v	0.1 J	0.0006 J	< 0.0045 u	11 v	0.017 J	0.42 J	1.8 v	0.19 v
Styrene	7.23E+03	(1)	1.01E+04	(5)	< 0.1119 u	< 0.0269 u	< 0.0028 u	<0.0002 u	< 0.058 u	<0.0002 u	<0.0002 u	< 0.0023 u	< 0.0084 u	< 0.0029 u	< 0.0052 u	< 0.0112 u	<0.0002 u	< 0.0029 u	< 0.5446 u	< 0.0028 u	< 0.0415 u	< 0.1115 u	< 0.0059 u
tert-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	< 0.1039 u	< 0.0249 u	< 0.0026 u	<0.0002 u	< 0.0539 u	<0.0002 u	<0.0002 u	0.0084 J	< 0.0078 u	< 0.0027 u	< 0.0048 u	< 0.0104 u	<0.0003 u	< 0.0027 u	< 0.5057 u	< 0.0026 u	< 0.0385 u	< 0.1035 u	< 0.0055 u
Tetrachloroethene (PCE)	1.10E+02	(1)	1.19E+02	(5)	< 0.104 u	< 0.0249 u	< 0.0026 u	<0.0002 u	< 0.0539 u	<0.0002 u	<0.0002 u	< 0.0022 u	< 0.0078 u	< 0.0027 u	< 0.0048 u	< 0.0104 u	<0.0002 u	< 0.0027 u	< 0.5059 u	< 0.0026 u	< 0.0385 u	< 0.1035 u	< 0.0055 u
Toluene	5.22E+03	(1)	1.40E+04	(5)	76 v	0.4 v	< 0.0018 u	0.0009 J	28 v	0.0013 J	0.0004 J	1.6 v	2.5 v	0.26 v	0.7 v	32 v	0.0111 v	0.011 J	310 v	0.21 v	16 v	73 v	2.3 v
trans-1,2-DCE	2.93E+02	(1)	3.03E+02	(5)	< 0.3509 u	< 0.0842 u	< 0.0087 u	<0.0002 u	< 0.182 u	<0.0002 u	<0.0002 u	< 0.0074 u	< 0.0264 u	< 0.0091 u	< 0.0163 u	< 0.0352 u	<0.0002 u	< 0.0091 u	< 1.7074 u	< 0.0089 u	< 0.13 u	< 0.3495 u	< 0.0186 u
trans-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.1835 u	< 0.044 u	< 0.0046 u	<0.0002 u	< 0.0951 u	<0.0002 u	<0.0002 u	< 0.0038 u	< 0.0138 u	< 0.0048 u	< 0.0085 u	< 0.0184 u	<0.0002 u	< 0.0048 u	< 0.8927 u	< 0.0046 u	< 0.068 u	< 0.1827 u	< 0.0097 u
Trichloroethene (TCE)	6.72E+00	(1)	6.84E+00	(5)	< 0.1344 u	< 0.0322 u	< 0.0033 u	<0.0017 u	< 0.0697 u	<0.0017 u	<0.0017 u	< 0.0028 u	< 0.0101 u	< 0.0035 u	< 0.0062 u	< 0.0135 u	<0.0019 u	< 0.0035 u	< 0.6539 u	< 0.0034 u	< 0.0498 u	< 0.1338 u	< 0.0071 u
Trichlorofluoromethane	1.22E+03	(1)	1.12E+03	(5)	< 0.0937 u	< 0.0225 u	< 0.0023 u	<0.0002 u	< 0.0486 u	<0.0002 u	<0.0002 u	< 0.002 u	< 0.007 u	< 0.0024 u	< 0.0043 u	< 0.0094 u	<0.0002 u	< 0.0024 u	< 0.4561 u	< 0.0024 u	< 0.0347 u	< 0.0933 u	< 0.005 u
Vinyl chloride	7.41E-01	(1)	2.83E+01	(4)	< 0.1025 u	< 0.0246 u	< 0.0026 u	<0.0004 u	< 0.0532 u	<0.0004 u	<0.0004 u	< 0.0021 u	< 0.0077 u	< 0.0027 u	< 0.0048 u	< 0.0103 u	<0.0005 u	< 0.0027 u	< 0.4988 u	< 0.0026 u	< 0.038 u	< 0.1021 u	< 0.0054 u
Xylenes, Total	8.63E+02	(1)	7.91E+02	(5)	120 v	9.1 v	< 0.0059 u	0.001 J	46 v	0.002 v	<0.0007 u	4.2 v	7.7 v	0.51 v	2.5 v	30 v	0.019 v	0.015 J	500 v	0.5 v	42 v	110 v	6 v
Semi-volatiles (mg/kg)																							
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 1.0571 u	< 0.1076 u	< 0.1083 u	< 0.1074 u	< 0.1079 u	< 0.1063 u	< 0.1073 u	< 0.1048 u	< 0.1075 u	< 0.1076 u	< 0.1077 u	< 0.1051 u	< 0.1088 u	< 0.1074 u	< 1.0818 u	< 0.1081 u	< 0.1087 u	< 0.1071 u	< 0.1075 u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.7485 u	< 0.0762 u	< 0.0766 u	< 0.076 u	< 0.0764 u	< 0.0753 u	< 0.0759 u	< 0.0742 u	< 0.0761 u	< 0.0762 u	< 0.0763 u	< 0.0744 u	< 0.077 u	< 0.076 u	< 0.766 u	< 0.0765 u	< 0.0769 u	< 0.0759 u	< 0.0761 u
1,3-Dichlorobenzene	-	-	-	-	< 0.7553 u	< 0.0769 u	< 0.0773 u	< 0.0767 u	< 0.0771 u	< 0.076 u	< 0.0766 u	< 0.0748 u	< 0.0768 u	< 0.0769 u	< 0.077 u	< 0.0751 u	< 0.0777 u	< 0.0767 u	< 0.773 u	< 0.0772 u	< 0.0776 u	< 0.0766 u	< 0.0768 u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.8262 u	< 0.0841 u	< 0.0846 u	< 0.0839 u	< 0.0843 u	< 0.0831 u	< 0.0838 u	< 0.0819 u	< 0.084 u	< 0.0841 u	< 0.0842 u	< 0.0821 u	< 0.085 u	< 0.0839 u	< 0.8455 u	< 0.0845 u	< 0.0849 u	< 0.0837 u	< 0.084 u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	1.5 J	< 0.1 u	< 0.1006 u	< 0.0997 u	0.66 v	< 0.0987 u	< 0.0996 u	< 0.0973 u	< 0.0999 u	< 0.1 u	0.13 J	< 0.0976 u	< 0.1011 u	< 0.0998 u	< 1.0049 u	< 0.1004 u	0.15 J	1.3 v	< 0.0999 u
2,4,5-Trichlorophenol	6.16E+03	(1)	2.69E+04	(5)	< 0.978 u	< 0.0996 u	< 0.1002 u	< 0.0993 u	< 0.0998 u	< 0.0983 u	< 0.0992 u	< 0.0969 u	< 0.0995 u	< 0.0996 u	< 0.0997 u	< 0.0972 u	< 0.1007 u	< 0.0994 u	< 1.0008 u	< 0.1 u	< 0.1005 u	< 0.0991 u	< 0.0995 u
2,4,6-Trichlorophenol	6.16E+01	(1)	2.69E+02	(5)	< 0.8108 u	< 0.0826 u	< 0.083 u	< 0.0823 u	< 0.0827 u	< 0.0815 u	< 0.0823 u	< 0.0803 u	< 0.0824 u	< 0.0825 u	< 0.0826 u	< 0.0806 u	< 0.0834 u	< 0.0824 u	< 0.8297 u	< 0.0829 u	< 0.0833 u	< 0.0822 u	< 0.0825 u
2,4-Dichlorophenol	1.85E+02	(1)	8.07E+02	(5)	< 0.9116 u	< 0.0928 u	< 0.0934 u	< 0.0926 u	< 0.093 u	< 0.0917 u	< 0.0925 u	< 0.0903 u	< 0.0927 u	< 0.0928 u	< 0.0929 u	< 0.0906 u	< 0.0938 u	< 0.0926 u	< 0.9329 u	< 0.0932 u	< 0.0937 u	< 0.0924 u	< 0.0927 u
2,4-Dimethylphenol	1.23E+03	(1)	5.38E+03	(5)	< 1.0613 u	< 0.1081 u	< 0.1087 u	< 0.1078 u	< 0.1083 u	< 0.1067 u	< 0.1077 u	< 0.1052 u	< 0.1079 u	< 0.108 u	< 0.1081 u	< 0.1055 u	< 0.1092 u	< 0.1078 u	< 1.086 u	< 0.1085 u	< 0.1091 u	0.27 J	< 0.108 u
2,4-Dinitrophenol	1.23E+02	(1)	5.38E+02	(5)	< 0.6482 u	< 0.066 u	< 0.0664 u	< 0.0658 u	< 0.0662 u	< 0.0652 u	< 0.0658 u	< 0.0642 u	< 0.0659 u	< 0.066 u	< 0.066 u	< 0.0644 u	< 0.0667 u	< 0.0658 u	< 0.6633 u	< 0.0663 u	< 0.0666 u	< 0.0657 u	< 0.0659 u
2,4-Dinitrotoluene	1.71E+01	(1)	8.23E+01	(4)	< 0.8727 u	< 0.0889 u	< 0.0894 u	< 0.0886 u	< 0.0891 u	< 0.0878 u	< 0.0885 u	< 0.0865 u	< 0.0887 u	< 0.0888 u	< 0.0889 u	< 0.0868 u	< 0.0898 u	< 0.0887 u	< 0.8931 u	< 0.0892 u	< 0.0897 u	< 0.0885 u	< 0.0888 u
2,6-Dinitrotoluene	3.56E+00	(1)	1.72E+01	(4)	< 1.034 u	< 0.1053 u	< 0.1059 u	< 0.105 u	< 0.1055 u	< 0.104 u	< 0.1049 u	< 0.1025 u	< 0.1052 u	< 0.1053 u	< 0.1054 u	< 0.1028 u	< 0.1064 u	< 0.105 u	< 1.0582 u	< 0.1057 u	< 0.1063 u	< 0.1048 u	< 0.1052 u
2-Chloronaphthalene	6.26E+03	(1)	2.83E+04	(5)	< 0.7693 u	< 0.0783 u	< 0.0788 u	< 0.0781 u	< 0.0785 u	< 0.0774 u	< 0.0781 u	< 0.0762 u	< 0.0782 u	< 0.0783 u	< 0.0784 u	< 0.0765 u	< 0.0792 u	< 0.0782 u	< 0.7873 u	< 0.0787 u	< 0.0791 u	< 0.078 u	< 0.0783 u
2-Chlorophenol	3.91E+02	(1)	1.77E+03	(5)	< 0.7704 u	< 0.0784 u	< 0.0789 u	< 0.0782 u	< 0.0786 u	< 0.0775 u	< 0.0782 u	< 0.0763 u	< 0.0783 u	< 0.0784 u	< 0.0785 u	< 0.0766 u	< 0.0793 u	< 0.0783 u	< 0.7883 u	< 0.0788 u	< 0.0792 u	< 0.0781 u	< 0.0784 u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	3.3 Z	< 0.1181 u	< 0.1187 u	< 0.1178 u	1.3 v	< 0.1166 u	< 0.1176 u	< 0.1149 u	< 0.1179 u	< 0.118 u	0.28 v	< 0.1153 u	< 0.1193 u	< 0.1178 u	< 1.1867 u	< 0.1185 u	0.31 v	2.9 v	< 0.118 u
'2-Methylphenol (cresol,o-)	3.20E+03	(2)	4.10E+04	(6)	< 0.8169 u	< 0.0832 u	< 0.0836 u	< 0.083 u	0.14 J	< 0.0821 u	< 0.0829 u	< 0.0809 u	< 0.0831 u	< 0.0831 u	< 0.0832 u	0.13 J	< 0.0841 u	< 0.083 u	< 0.8359 u	< 0.0835 u	0.13 J	< 0.0828 u	< 0.0831 u
2-Nitroaniline	6.30E+02	(2)	8.00E+03	(6)	< 1.0533 u	< 0.1073 u	< 0.1079 u	< 0.107 u	< 0.1075 u	< 0.1059 u	< 0.1069 u	< 0.1044 u	< 0.1071 u	< 0.1072 u	< 0.1073 u	< 0.1047 u	< 0.1084 u	< 0.107 u	< 1.0779 u	< 0.1077 u	< 0.1083 u	< 0.1068 u	< 0.1071 u
2-Nitrophenol	-	-	-	-	< 0.9695 u	< 0.0987 u	< 0.0993 u	< 0.0985 u	< 0.099 u	< 0.0975 u	< 0.0984 u	< 0.0961 u	< 0.0986 u	< 0.0987 u	< 0.0988 u	< 0.0964 u	< 0.0998 u	< 0.0985 u	< 0.9922 u	< 0.0991 u	< 0.0996 u	< 0.0983 u	< 0.0986 u
3,3´-Dichlorobenzidine	1.18E+01	(1)	5.70E+01	(4)	< 0.7195 u	< 0.0733 u	< 0.0737 u	< 0.0731 u	< 0.0734 u	< 0.0724 u	< 0.073 u	< 0.0713 u	< 0.0732 u	< 0.0732 u	< 0.0733 u	< 0.0715 u	< 0.0741 u	< 0.0731 u	< 0.7363 u	< 0.0736 u	< 0.074 u	< 0.0729 u	< 0.0732 u
3+4-Methylphenol	-	-	-	-	< 0.7075 u	< 0.072 u	< 0.0724 u	< 0.0718 u	0.15 J	< 0.0711 u	< 0.0718 u	< 0.0701 u	< 0.0719 u	< 0.072 u	< 0.0721 u	0.14 J	< 0.0728 u	< 0.0719 u	< 0.724 u	< 0.0723 u	0.11 J	0.44 v	< 0.072 u
3-Nitroaniline	-	-	-	-	< 0.8615 u	< 0.0877 u	< 0.0882 u	< 0.0875 u	< 0.0879 u	< 0.0866 u	< 0.0874 u	< 0.0854 u	< 0.0876 u	< 0.0877 u	< 0.0878 u	< 0.0856 u	< 0.0887 u	< 0.0875 u	< 0.8816 u	< 0.0881 u	< 0.0885 u	< 0.0873 u	< 0.0876 u
4,6-Dinitro-2-methylphenol	4.93E+00	(1)	2.15E+01	(5)	< 0.5909 u	< 0.0602 u	< 0.0605 u	< 0.06 u	< 0.0603 u	< 0.0594 u	< 0.06 u	< 0.0586 u	< 0.0601 u	< 0.0602 u	< 0.0602 u	< 0.0588 u	< 0.0608 u	< 0.06 u	< 0.6047 u	< 0.0604 u	< 0.0607 u	< 0.0599 u	< 0.0601 u
4-Bromophenyl phenyl ether	-	-	-	-	< 0.9343 u	< 0.0951 u	< 0.0957 u	< 0.0949 u	< 0.0954 u	< 0.0939 u	< 0.0948 u	< 0.0926 u	< 0.095 u	< 0.0951 u	< 0.0952 u	< 0.0929 u	< 0.0962 u	< 0.0949 u	< 0.9561 u	< 0.0955 u	< 0.096 u	< 0.0947 u	< 0.095 u
4-Chloro-3-methylphenol	-	-	-	-	< 1.1659 u	< 0.1187 u	< 0.1194 u	< 0.1184 u	< 0.119 u	< 0.1172 u	< 0.1183 u	< 0.1155 u	< 0.1186 u	< 0.1187 u	< 0.1188 u	< 0.1159 u	< 0.12 u	< 0.1184 u	< 1.1931 u	< 0.1192 u	< 0.1198 u	< 0.1182 u	< 0.1186 u
4-Chloroaniline	2.70E+01	(3)	1.10E+02	(7)	< 1.0624 u	< 0.1082 u	< 0.1088 u	< 0.1079 u	< 0.1084 u	< 0.1068 u	< 0.1078 u	< 0.1053 u	< 0.108 u	< 0.1081 u	< 0.1083 u	< 0.1056 u	< 0.1093 u	< 0.1079 u	< 1.0872 u	< 0.1086 u	< 0.1092 u	< 0.1077 u	< 0.1081 u
4-Chlorophenyl phenyl ether	-	-	-	-	< 1.1165 u	< 0.1137 u	< 0.1143 u	< 0.1134 u	< 0.114 u	< 0.1123 u	< 0.1133 u	< 0.1106 u	< 0.1135 u	< 0.1137 u	< 0.1138 u	< 0.111 u	< 0.1149 u	< 0.1134 u	< 1.1426 u	< 0.1141 u	< 0.1148 u	< 0.1132 u	< 0.1136 u
4-Nitroaniline	2.70E+02	(3)	1.10E+03	(7)	< 0.689 u	< 0.0702 u	< 0.0706 u	< 0.07 u	< 0.0703 u	< 0.0693 u	< 0.0699 u	< 0.0683 u	< 0.0701 u	< 0.0701 u	< 0.0702 u	< 0.0685 u	< 0.0709 u	< 0.07 u	< 0.7051 u	< 0.0704 u	< 0.0708 u	< 0.0698 u	< 0.0701 u
4-Nitrophenol	-	-	-	-	< 0.7444 u	< 0.0758 u	< 0.0762 u	< 0.0756 u	< 0.076 u	< 0.0749 u	< 0.0755 u	< 0.0738 u	< 0.0757 u	< 0.0758 u	< 0.0759 u	< 0.074 u	< 0.0766 u	< 0.0756 u	< 0.7618 u	< 0.0761 u	< 0.0765 u	< 0.0755 u	< 0.0757 u
Acenaphthene	3.48E+03	(1)	1.51E+04	(5)	< 0.8379 u	< 0.0853 u	< 0.0858 u	< 0.0851 u	< 0.0855 u	< 0.0843 u	< 0.085 u	< 0.083 u	< 0.0852 u	< 0.0853 u	< 0.0854 u	< 0.0833 u	< 0.0862 u	< 0.0851 u	< 0.8575 u	< 0.0857 u	< 0.0861 u	< 0.0849 u	< 0.0852 u
Acenaphthylene	-	-	-	-	< 0.7952 u	< 0.081 u	< 0.0814 u	< 0.0808 u	< 0.0812 u	< 0.08 u	< 0.0807 u	< 0.0788 u	< 0.0809 u	< 0.0809 u	< 0.081 u	< 0.0791 u	< 0.0818 u	< 0.0808 u	< 0.8138 u	< 0.0813 u	< 0.0817 u	< 0.0806 u	< 0.0809 u
Aniline	9.50E+02	(3)	4.00E+03	(7)	< 0.9233 u	< 0.094 u	< 0.0946 u	< 0.0938 u	< 0.0942 u	< 0.0928 u	< 0.0937 u	< 0.0915 u	< 0.0939 u	< 0.094 u	< 0.0941 u	< 0.0918 u	< 0.095 u	< 0.0938 u	< 0.9449 u	< 0.0944 u	< 0.0949 u	< 0.0936 u	< 0.0939 u
Anthracene	1.74E+04	(1)	7.53E+04	(5)	< 0.6487 u	< 0.0661 u	< 0.0664 u	< 0.0659 u	< 0.0662 u	< 0.0652 u	< 0.0658 u	< 0.0643 u	< 0.066 u	< 0.066 u	< 0.0661 u	< 0.0645 u	< 0.0668 u	< 0.0659 u	< 0.6638 u	< 0.0663 u	< 0.0667 u	< 0.0657 u	< 0.066 u
Azobenzene	5.60E+01	(3)	2.60E+02	(7)	< 1.1908 u	< 0.1213 u	< 0.1219 u	< 0.1209 u	< 0.1215 u	< 0.1197 u	< 0.1208 u	< 0.118 u	< 0.1211 u	< 0.1212 u	< 0.1213 u	< 0.1184 u	< 0.1226 u	< 0.121 u	< 1.2186 u	< 0.1217 u	< 0.1224 u	< 0.1207 u	< 0.1211 u
Benz(a)anthracene	1.53E+00	(1)	3.23E+01	(4)	< 0.8412 u	< 0.0857 u	< 0.0861 u	< 0.0854 u	< 0.0859 u	< 0.0846 u	< 0.0853 u	< 0.0834 u	< 0.0855 u	< 0.0856 u	< 0.0857 u	< 0.0836 u	< 0.0866 u	< 0.0855 u	< 0.8609 u	< 0.086 u	< 0.0865 u	< 0.0853 u	< 0.0856 u
Benzo(a)pyrene	1.12E+00	(1)	2.36E+01	(4)	< 0.74 u	< 0.0753 u	< 0.0758 u	< 0.0751 u	< 0.0755 u	< 0.0744 u	< 0.0751 u	< 0.0733 u	< 0.0752 u	< 0.0753 u	< 0.0754 u	< 0.0736 u	< 0.0762 u	< 0.0752 u	< 0.7572 u	< 0.0756 u	< 0.0761 u	< 0.075 u	< 0.0753 u
Benzo(b)fluoranthene	1.53E+00	(1)	3.23E+01	(4)	< 0.8826 u	< 0.0899 u	< 0.0904 u	< 0.0896 u	< 0.0901 u	< 0.0887 u	< 0.0895 u	< 0.0875 u	< 0.0897 u	< 0.0898 u	< 0.0899 u	< 0.0877 u	< 0.0908 u	< 0.0897 u	< 0.9032 u	< 0.0902 u	< 0.0907 u	< 0.0895 u	< 0.0898 u
Benzo(g,h,i)perylene	-	-	-	-	< 0.8617 u	< 0.0877 u	< 0.0882 u	< 0.0875 u	< 0.0879 u	< 0.0866 u	< 0.0874 u	< 0.0854 u	< 0.0876 u	< 0.0877 u	< 0.0878 u	< 0.0857 u	< 0.0887 u	< 0.0875 u	< 0.8818 u	< 0.0881 u	< 0.0886 u	< 0.0873 u	< 0.0877 u
Benzo(k)fluoranthene	1.53E+01	(1)	3.23E+02	(4)	< 0.8609 u	< 0.0877 u	< 0.0882 u	< 0.0874 u	< 0.0879 u	< 0.0866 u	< 0.0873 u	< 0.0853 u	< 0.0875 u	< 0.0876 u	< 0.0877 u	< 0.0856 u	< 0.0886 u	< 0.0875 u	< 0.881 u	< 0.088 u	< 0.0885 u	< 0.0873 u	< 0.0876 u
Benzoic acid	2.50E+05	(2)	3.30E+06	(6)	2.1 J	< 0.0825 u	< 0.083 u	< 0.0823 u	< 0.0827 u	< 0.0815 u	< 0.0822 u	0.081 J	< 0.0824 u	< 0.0825 u	0.11 J	< 0.0805 u	< 0.0834 u	< 0.0823 u	2 J	< 0.0828 u	0.17 J	< 0.0821 u	0.13 J
Benzyl alcohol	6.30E+03	(2)	8.20E+04	(6)	< 0.765 u	< 0.0779 u	< 0.0783 u	< 0.0777 u	< 0.0781 u	< 0.0769 u	< 0.0776 u	< 0.0758 u	< 0.0778 u	< 0.0779 u	< 0.0779 u	< 0.0761 u	< 0.0787 u	< 0.0777 u	< 0.7828 u	< 0.0782 u	< 0.0786 u	< 0.0775 u	< 0.0778 u
Bis(2-chloroethoxy)methane	1.90E+02	(2)	2.50E+03	(6)	< 1.0604 u	< 0.108 u	< 0.1086 u	< 0.1077 u	< 0.1082 u	< 0.1066 u	< 0.1076 u	< 0.1051 u	< 0.1078 u	< 0.1079 u	< 0.108 u	< 0.1054 u	< 0.1091 u	< 0.1077 u	< 1.0851 u	< 0.1084 u	< 0.109 u	< 0.1075 u	< 0.1079 u
Bis(2-chloroethyl)ether	3.10E+00	(1)	1.93E+00	(5)	< 0.718 u	< 0.0731 u	< 0.0735 u	< 0.0729 u	< 0.0733 u	< 0.0722 u	< 0.0728 u	< 0.0712 u	< 0.073 u	< 0.0731 u	< 0.0732 u	< 0.0714 u	< 0.0739 u	< 0.0729 u	< 0.7348 u	< 0.0734 u	< 0.0738 u	< 0.0728 u	< 0.073 u
Bis(2-chloroisopropyl)ether	9.93E+01	(1)	5.19E+02	(4)	< 0.8725 u	< 0.0888 u	< 0.0894 u	< 0.0886 u	< 0.0891 u	< 0.0877 u	< 0.0885 u	< 0.0865 u	< 0.0887 u	< 0.0888 u	< 0.0889 u	< 0.0867 u	< 0.0898 u	< 0.0886 u	< 0.8929 u	< 0.0892 u	< 0.0897 u	< 0.0884 u	< 0.0888 u
Bis(2-ethylhexyl)phthalate	3.80E+02	(1)	1.83E+03	(4)	< 0.7962 u	0.12 J	0.14 J	< 0.0809 u	0.1 J	0.12 J	0.13 J	< 0.0789 u	0.096 J	0.14 J	0.12 J	0.1 J	0.096 J	0.11 J	< 0.8148 u	0.12 J	0.11 J	0.14 J	0.12 J
Butyl benzyl phthalate	2.90E+03	(3)	1.20E+04	(7)	< 0.8651 u	< 0.0881 u	< 0.0886 u	< 0.0879 u	< 0.0883 u	< 0.087 u	< 0.0878 u	< 0.0857 u	< 0.088 u	< 0.0881 u	< 0.0882 u	< 0.086 u	< 0.089 u	< 0.0879 u	< 0.8853 u	< 0.0884 u	< 0.0889 u	< 0.0877 u	< 0.088 u
Carbazole	-	-	-	-	< 0.6599 u	< 0.0672 u	< 0.0676 u	< 0.067 u	< 0.0674 u	< 0.0664 u	< 0.067 u	< 0.0654 u	< 0.0671 u	< 0.0672 u	< 0.0672 u	< 0.0656 u	< 0.0679 u	< 0.067 u	< 0.6753 u	< 0.0675 u	< 0.0678 u	< 0.0669 u	< 0.0671 u
Chrysene	1.53E+02	(1)	3.23E+03	(4)	< 0.8321 u	< 0.0847 u	< 0.0852 u	< 0.0845 u	< 0.0849 u	< 0.0837 u	< 0.0844 u	< 0.0825 u	< 0.0846 u	< 0.0847 u	< 0.0848 u	< 0.0827 u	< 0.0856 u	< 0.0845 u	< 0.8516 u	< 0.0851 u	< 0.0855 u	< 0.0843 u	< 0.0846 u

Soil Analytical Results Summary Marathon
Petroleum Company - Gallup Refinery Gallup,
New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	TK-568-1 (12-14')		TK-568-1 (30-32')		TK-568-1 (48-49')		TK 568-2 (22-24')		TK 568-2 (28-30')		TK 568-2 (36-37')		TK569-1(18-20')		TK569-1(24-26')		TK569-1(36-38')	
					1609E26-008		1609E26-009		1609E26-010		1609G64-001		1609G64-002		1609G64-003		1610238-004		1610238-005		1610238-006	
					9/23/2016		9/23/2016		9/23/2016		9/27/2016		9/27/2016		9/27/2016		10/4/2016		10/4/2016		10/4/2016	
Dibenz(a,h)anthracene	1.53E-01	(1)	3.23E+00	(4)	< 0.7902	u	< 0.0805	u	< 0.0809	u	< 0.0802	u	< 0.0806	u	< 0.0795	u	< 0.0802	u	< 0.0783	u	< 0.0804	u
Dibenzofuran	-	-	-	-	< 0.9829	u	< 0.1001	u	< 0.1006	u	< 0.0998	u	< 0.1003	u	< 0.0988	u	< 0.0997	u	< 0.0974	u	< 0.0999	u
Diethyl phthalate	4.93E+04	(1)	2.15E+05	(5)	< 0.991	u	0.16	J	0.16	J	< 0.1006	u	0.12	J	0.14	J	0.13	J	< 0.0982	u	< 0.1008	u
Dimethyl phthalate	6.16E+04	(1)	2.69E+05	(5)	< 0.9559	u	< 0.0973	u	< 0.0979	u	< 0.0971	u	< 0.0976	u	< 0.0961	u	< 0.097	u	< 0.0947	u	< 0.0972	u
Di-n-butyl phthalate	6.16E+03	(1)	2.69E+04	(5)	< 0.7307	u	0.15	J	0.2	J	0.094	J	0.12	J	0.14	J	0.24	J	0.18	J	0.087	J
Di-n-octyl phthalate	-	-	-	-	< 0.8336	u	< 0.0849	u	< 0.0854	u	< 0.0847	u	< 0.0851	u	< 0.0838	u	< 0.0846	u	< 0.0826	u	< 0.0848	u
Fluoranthene	2.32E+03	(1)	1.00E+04	(5)	< 0.5629	u	< 0.0573	u	< 0.0576	u	< 0.0572	u	< 0.0574	u	< 0.0566	u	< 0.0571	u	< 0.0558	u	< 0.0572	u
Fluorene	2.32E+03	(1)	1.00E+04	(5)	< 0.8945	u	< 0.0911	u	< 0.0916	u	< 0.0908	u	< 0.0913	u	< 0.0899	u	< 0.0907	u	< 0.0886	u	< 0.091	u
Hexachlorobenzene	3.33E+00	(1)	1.60E+01	(4)	< 0.7705	u	< 0.0785	u	< 0.0789	u	< 0.0783	u	< 0.0786	u	< 0.0775	u	< 0.0782	u	< 0.0764	u	< 0.0784	u
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 1.1012	u	< 0.1121	u	< 0.1128	u	< 0.1118	u	< 0.1124	u	< 0.1107	u	< 0.1117	u	< 0.1091	u	< 0.112	u
Hexachlorocyclopentadiene	2.28E+00	(1)	8.67E+02	(5)	< 1.1173	u	< 0.1138	u	< 0.1144	u	< 0.1135	u	< 0.114	u	< 0.1123	u	< 0.1134	u	< 0.1107	u	< 0.1136	u
Hexachloroethane	4.31E+01	(1)	1.88E+02	(5)	< 0.8395	u	< 0.0855	u	< 0.086	u	< 0.0853	u	< 0.0857	u	< 0.0844	u	< 0.0852	u	< 0.0832	u	< 0.0854	u
Indeno(1,2,3-cd)pyrene	1.53E+00	(1)	3.23E+01	(4)	< 0.7631	u	< 0.0777	u	< 0.0781	u	< 0.0775	u	< 0.0779	u	< 0.0767	u	< 0.0774	u	< 0.0756	u	< 0.0776	u
Isophorone	5.61E+03	(1)	2.70E+04		< 1.0804	u	< 0.11	u	< 0.1106	u	< 0.1097	u	< 0.1103	u	< 0.1086	u	< 0.1096	u	< 0.1071	u	< 0.1099	u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	4.2	Z	< 0.0955	u	< 0.0961	u	< 0.0953	u	1.4	v	< 0.0943	u	< 0.0952	u	< 0.093	u	< 0.0954	u
Nitrobenzene	5.99E+01	(1)	2.91E+02	(4)	< 1.0084	u	< 0.1027	u	< 0.1033	u	< 0.1024	u	< 0.1029	u	< 0.1014	u	< 0.1023	u	< 0.0999	u	< 0.1025	u
N-Nitrosodi-n-propylamine	7.80E-01	(3)	3.30E+00	(7)	< 0.9391	u	< 0.0956	u	< 0.0962	u	< 0.0954	u	< 0.0959	u	< 0.0944	u	< 0.0953	u	< 0.0931	u	< 0.0955	u
N-Nitrosodiphenylamine	1.09E+03	(1)	5.24E+03	(4)	< 0.9543	u	< 0.0972	u	< 0.0977	u	< 0.0969	u	< 0.0974	u	< 0.096	u	< 0.0968	u	< 0.0946	u	< 0.097	u
Pentachlorophenol	9.85E+00	(1)	4.45E+01	(4)	< 0.628	u	< 0.064	u	< 0.0643	u	< 0.0638	u	< 0.0641	u	< 0.0632	u	< 0.0637	u	< 0.0622	u	< 0.0639	u
Phenanthrene	1.74E+03	(1)	7.53E+03	(5)	< 0.6638	u	< 0.0676	u	< 0.068	u	< 0.0674	u	0.07	J	< 0.0668	u	< 0.0673	u	< 0.0658	u	< 0.0675	u
Phenol	1.85E+04	(1)	7.74E+04	(5)	< 0.736	u	< 0.0749	u	< 0.0754	u	< 0.0747	u	0.14	J	< 0.074	u	< 0.0747	u	< 0.0729	u	< 0.0748	u
Pyrene	1.74E+03	(1)	7.53E+03	(5)	< 0.7385	u	< 0.0752	u	< 0.0756	u	< 0.075	u	< 0.0754	u	< 0.0743	u	< 0.0749	u	< 0.0732	u	< 0.0751	u
Pyridine	7.80E+01	(2)	1.20E+03	(6)	< 0.7746	u	< 0.0789	u	< 0.0793	u	< 0.0787	u	< 0.0791	u	< 0.0779	u	< 0.0786	u	< 0.0768	u	< 0.0788	u
Total Petroleum Hydrocarbons (mg/kg)																						
Gasoline Range Organics (GRO)	1.00E+03	(8)	3.80E+03	(8)	**2700**	v	330	v	1.3	J	< 0.48	u	740	v	< 0.4837	u	< 0.6286	u	190	v	140	v
Diesel Range Organics (DRO)	1.00E+03	(8)	3.80E+03	(8)	300	v	11	v	8.4	J	< 1.8137	u	300	v	2.4	J	5.2	J	15	v	61	v
Motor Oil Range Organics (MRO)	1.00E+03	(8)	3.80E+03	(8)	< 487	u	< 48	u	< 49	u	< 49	u	< 46	u	< 49	u	< 50	u	< 48	u	< 48	u

	TK569-1(40-42')		TK569-2(16-18')		TK569-2(29-31')		TK569-2(36-38')		TK 569-3 (16-18')		TK 569-3 (24-26')		TK 569-3 (38-39')		TK 570-1 (10-12')		TK 570-1 (32-34')		TK 570-1 (44-45')	
	1610238-007		1610238-001		1610238-002		1610238-003		1609G64-008		1609G64-009		1609G64-010		1609G64-005		1609G64-006		1609G64-007	
	10/4/2016		10/4/2016		10/4/2016		10/4/2016		9/28/2016		9/28/2016		9/28/2016		9/27/2016		9/27/2016		9/27/2016	
Dibenz(a,h)anthracene	< 0.0804	u	< 0.0805	u	< 0.0786	u	< 0.0813	u	< 0.0803	u	< 0.8086	u	< 0.0808	u	< 0.0812	u	< 0.0801	u	< 0.0804	u
Dibenzofuran	< 0.1	u	< 0.1001	u	< 0.0977	u	< 0.1012	u	< 0.0998	u	< 1.0058	u	< 0.1005	u	< 0.101	u	< 0.0996	u	< 0.1	u
Diethyl phthalate	0.12	J	0.13	J	0.12	J	0.13	J	0.12	J	< 1.0141	u	0.17	J	0.11	J	0.15	J	0.17	J
Dimethyl phthalate	< 0.0973	u	< 0.0974	u	< 0.095	u	< 0.0984	u	< 0.0971	u	< 0.9782	u	< 0.0977	u	< 0.0983	u	< 0.0969	u	< 0.0972	u
Di-n-butyl phthalate	0.27	J	0.27	J	0.21	J	0.1	J	0.22	J	< 0.7478	u	0.23	J	0.13	J	0.24	J	0.24	J
Di-n-octyl phthalate	< 0.0849	u	< 0.0849	u	< 0.0829	u	< 0.0858	u	< 0.0847	u	< 0.8531	u	< 0.0852	u	< 0.0857	u	< 0.0845	u	< 0.0848	u
Fluoranthene	< 0.0573	u	< 0.0574	u	< 0.056	u	< 0.0579	u	< 0.0572	u	< 0.576	u	< 0.0575	u	< 0.0579	u	< 0.057	u	< 0.0573	u
Fluorene	< 0.091	u	< 0.0911	u	< 0.0889	u	< 0.0921	u	< 0.0909	u	< 0.9153	u	< 0.0914	u	< 0.0919	u	< 0.0907	u	< 0.091	u
Hexachlorobenzene	< 0.0784	u	< 0.0785	u	< 0.0766	u	< 0.0793	u	< 0.0783	u	< 0.7885	u	< 0.0788	u	< 0.0792	u	< 0.0781	u	< 0.0784	u
Hexachlorobutadiene	< 0.1121	u	< 0.1122	u	< 0.1095	u	< 0.1133	u	< 0.1119	u	< 1.127	u	< 0.1126	u	< 0.1132	u	< 0.1116	u	< 0.112	u
Hexachlorocyclopentadiene	< 0.1137	u	< 0.1138	u	< 0.1111	u	< 0.115	u	< 0.1135	u	< 1.1433	u	< 0.1142	u	< 0.1148	u	< 0.1132	u	< 0.1137	u
Hexachloroethane	< 0.0855	u	< 0.0855	u	< 0.0835	u	< 0.0864	u	< 0.0853	u	< 0.8591	u	< 0.0858	u	< 0.0863	u	< 0.0851	u	< 0.0854	u
Indeno(1,2,3-cd)pyrene	< 0.0777	u	< 0.0778	u	< 0.0759	u	< 0.0785	u	< 0.0775	u	< 0.7809	u	< 0.078	u	< 0.0784	u	< 0.0773	u	< 0.0776	u
Isophorone	< 0.11	u	< 0.1101	u	< 0.1074	u	< 0.1112	u	< 0.1098	u	< 1.1056	u	< 0.1104	u	< 0.111	u	< 0.1095	u	< 0.1099	u
Naphthalene	< 0.0955	u	0.17	J	0.12	J	< 0.0966	u	< 0.0953	u	1.2	J	< 0.0959	u	0.52	v	3.6	v	< 0.0954	u
Nitrobenzene	< 0.1027	u	< 0.1028	u	< 0.1003	u	< 0.1038	u	< 0.1024	u	< 1.032	u	< 0.1031	u	< 0.1036	u	< 0.1022	u	< 0.1026	u
N-Nitrosodi-n-propylamine	< 0.0956	u	< 0.0957	u	< 0.0934	u	< 0.0967	u	< 0.0954	u	< 0.9611	u	< 0.096	u	< 0.0965	u	< 0.0952	u	< 0.0955	u
N-Nitrosodiphenylamine	< 0.0971	u	< 0.0972	u	< 0.0949	u	< 0.0982	u	< 0.0969	u	< 0.9766	u	< 0.0976	u	< 0.0981	u	< 0.0967	u	< 0.0971	u
Pentachlorophenol	< 0.0639	u	< 0.064	u	< 0.0624	u	< 0.0646	u	< 0.0638	u	< 0.6427	u	< 0.0642	u	< 0.0646	u	< 0.0637	u	< 0.0639	u
Phenanthrene	< 0.0676	u	< 0.0676	u	< 0.066	u	< 0.0683	u	< 0.0674	u	< 0.6793	u	< 0.0679	u	< 0.0682	u	< 0.0673	u	< 0.0675	u
Phenol	< 0.0749	u	< 0.075	u	0.13	J	< 0.0757	u	< 0.0748	u	< 0.7532	u	< 0.0752	u	< 0.0756	u	0.44	v	< 0.0749	u
Pyrene	< 0.0752	u	< 0.0752	u	< 0.0734	u	< 0.076	u	< 0.075	u	< 0.7557	u	< 0.0755	u	< 0.0759	u	< 0.0748	u	< 0.0751	u
Pyridine	< 0.0788	u	< 0.0789	u	< 0.077	u	< 0.0797	u	< 0.0787	u	< 0.7927	u	< 0.0792	u	< 0.0796	u	< 0.0785	u	< 0.0788	u
Total Petroleum Hydrocarbons (mg/kg)																				
Gasoline Range Organics (GRO)	13	v	31	v	450	v	2.9	J	2.7	J	**13000**	v	27	v	540	v	**2500**	v	170	v
Diesel Range Organics (DRO)	19	v	17	v	13	v	4.4	J	1.7	J	**1500**	v	5.3	J	52	v	350	v	23	v
Motor Oil Range Organics (MRO)	< 48	u	< 48	u	< 48	u	< 48	u	< 47	u	< 502	u	< 47	u	< 49	u	< 467	u	< 50	u

- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (March 2017)

EPA - Regional Screening Levels (June 2017)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels

(7) EPA Industrial - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(8) NMED Table 6-2 TPH Soil Screening Levels "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Residential Soil Screening Level
Yellow highlight represents value above Non-Residential Soil Screening Level
Bold with yellow highlight value exceeds Residential Soil Screening Level and Non-Residential Soil Screening Level

v = reportable detection above the Practical quantitation limit (PQL)
u - result is not detected at method detection limit (MDL)
j - estimated result at concentration above MDL but less than PQL

Soil Analytical Results Summary Marathon Petroleum Company - Gallup Refinery Gallup, New Mexico

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	OW-57 (16-18')		OW-57 (25-27')		OW-58 (10-12)		OW-58 (22-24')		OW-58 (28-29')		OW-58 (48-48.5')	
					1609E26-001		1609E26-002		1609E26-004		1609E26-005		1609E26-006		1609E26-007	
					9/21/2016		9/21/2016		9/22/2016		9/22/2016		9/22/2016		9/22/2016	
Metals (mg/kg)																
Antimony	3.13E+01	(1)	1.42E+02	(5)	< 0.9801	u	< 0.985	u	< 1.0176	u	< 0.9768	u	< 0.992	u	< 1.0049	u
Arsenic	7.07E+00	(1)	3.59E+01	(4)	1.8	J	2.8	v	2.2	J	2	J	2.7	v	1.8	J
Barium	1.56E+04	(1)	4.39E+03	(5)	180	v	1200	v	320	v	160	v	360	v	45	v
Beryllium	1.56E+02	(1)	1.48E+02	(5)	0.52	v	0.83	v	0.88	v	1.1	v	0.66	v	0.58	v
Cadmium	7.05E+01	(1)	7.21E+01	(5)	< 0.0618	u	< 0.0621	u	< 0.0641	u	< 0.0616	u	< 0.0625	u	< 0.0633	u
Chromium	9.66E+01	(1)	1.34E+02	(5)	8.8	v	9.4	v	10	v	13	v	9.4	v	7.3	v
Cobalt	2.34E+01	(1)	3.67E+01	(5)	4	v	3.4	v	4.1	v	4.7	v	4.4	v	3.7	v
Cyanide	1.11E+01	(1)	1.20E+01	(5)	< 0.25	u	< 0.25	u	< 0.25	u	< 0.25	u	< 0.25	u	< 0.25	u
Iron	5.48E+04	(1)	2.48E+05	(5)	12000	v	15000	v	15000	v	18000	v	14000	v	11000	v
Lead	-	(2)	8.00E+02	(6)	2.8	v	2.8	v	2.8	v	2.6	v	3.8	v	1.5	v
Manganese	1.05E+04	(1)	4.64E+02	(5)	510	v	1700	v	270	v	280	v	180	v	97	v
Mercury	2.36E+01	(1)	2.05E+01	(5)	0.0055	J	0.0026	J	0.0038	J	0.0056	J	0.0047	J	0.0014	J
Nickel	1.56E+03	(1)	7.53E+02	(5)	6.3	v	7.9	v	7.6	v	9.2	v	7.1	v	6.1	v
Selenium	3.91E+02	(1)	1.75E+03	(5)	< 1.7721	u	< 1.781	u	< 1.8398	u	< 1.7661	u	< 1.7936	u	< 1.8169	u
Silver	3.91E+02	(1)	1.77E+03	(5)	< 0.061	u	< 0.0613	u	< 0.0633	u	< 0.0608	u	< 0.0617	u	< 0.0625	u
Vanadium	3.94E+02	(1)	6.14E+02	(5)	17	v	23	v	18	v	19	v	21	v	14	v
Zinc	2.35E+04	(1)	1.06E+05	(5)	15	v	9.6	v	13	v	16	v	19	v	17	v
Volatiles (mg/kg)																
1,1,1,2-Tetrachloroethane	2.78E+01	(1)	1.36E+02	(4)	< 0.0031	u	<0.0019	u	< 0.0024	u	< 0.0662	u	< 0.0509	u	< 0.0151	u
1,1,1-Trichloroethane	1.43E+04	(1)	1.35E+04	(5)	< 0.002	u	<0.0019	u	< 0.0016	u	< 0.0422	u	< 0.0325	u	< 0.0097	u
1,1,2,2-Tetrachloroethane	7.93E+00	(1)	3.91E+01	(4)	< 0.0052	u	<0.0019	u	< 0.0041	u	< 0.1121	u	< 0.0862	u	< 0.0256	u
1,1,2-Trichloroethane	2.59E+00	(1)	2.28E+00	(5)	< 0.0038	u	<0.0019	u	< 0.003	u	< 0.0815	u	< 0.0627	u	< 0.0186	u
1,1-Dichloroethane	7.79E+01	(1)	3.80E+02	(4)	< 0.0017	u	<0.0019	u	< 0.0014	u	< 0.0374	u	< 0.0288	u	< 0.0086	u
1,1-Dichloroethene	4.36E+02	(1)	4.20E+02	(5)	< 0.0105	u	<0.0003	u	< 0.0084	u	< 0.2266	u	< 0.1743	u	< 0.0518	u
1,1-Dichloropropene	-	-	-	-	< 0.0025	u	<0.0019	u	< 0.002	u	< 0.0549	u	< 0.0422	u	< 0.0125	u
1,2,3-Trichlorobenzene	6.30E+01	(2)	9.30E+02	(6)	< 0.0048	u	<0.0005	u	< 0.0038	u	< 0.1035	u	< 0.0796	u	< 0.0237	u
1,2,3-Trichloropropane	5.10E-02	(1)	1.21E+00	(4)	< 0.0055	u	<0.0019	u	< 0.0044	u	< 0.1197	u	< 0.092	u	< 0.0274	u
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 0.0034	u	<0.0006	u	< 0.0027	u	< 0.074	u	< 0.0569	u	< 0.0169	u
1,2,4-Trimethylbenzene	3.00E+02	(2)	1.80E+03	(6)	< 0.0024	u	<0.0003	u	< 0.0019	u	23	v	30	v	1.4	v
1,2-Dibromo-3-chloropropane	8.51E-02	(1)	1.17E+00	(4)	< 0.0098	u	<0.0002	u	< 0.0078	u	< 0.2119	u	< 0.163	u	< 0.0485	u
1,2-Dibromoethane (EDB)	6.68E-01	(1)	3.28E+00	(4)	< 0.0023	u	<0.0019	u	< 0.0018	u	< 0.0492	u	< 0.0378	u	< 0.0113	u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.0028	u	<0.0003	u	< 0.0022	u	< 0.0604	u	< 0.0464	u	< 0.0138	u
1,2-Dichloroethane (EDC)	8.25E+00	(1)	4.03E+01	(4)	< 0.0083	u	<0.0019	u	< 0.0067	u	< 0.1804	u	< 0.1387	u	< 0.0412	u
1,2-Dichloropropane	1.76E+01	(1)	2.52E+01	(5)	< 0.0027	u	<0.0019	u	< 0.0021	u	< 0.058	u	< 0.0446	u	< 0.0133	u
1,3,5-Trimethylbenzene	2.70E+02	(2)	1.50E+03	(6)	< 0.0023	u	<0.0003	u	< 0.0019	u	7.7	v	9.9	v	0.5	v
1,3-Dichlorobenzene	-	-	-	-	< 0.0026	u	<0.0003	u	< 0.0021	u	< 0.0567	u	< 0.0436	u	< 0.013	u
1,3-Dichloropropane	1.60E+03	(2)	2.30E+04	(6)	< 0.0036	u	<0.0019	u	< 0.0029	u	< 0.0785	u	< 0.0604	u	< 0.0179	u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.004	u	<0.0004	u	< 0.0032	u	< 0.0857	u	< 0.0659	u	< 0.0196	u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	< 0.0071	u	0.0003	J	< 0.0057	u	2.8	v	1.6	J	0.083	J
2,2-Dichloropropane	-	-	-	-	< 0.0018	u	<0.0002	u	< 0.0015	u	< 0.0396	u	< 0.0305	u	< 0.0091	u
2-Butanone	3.73E+04	(1)	9.12E+04	(5)	< 0.0183	u	0.0023	J	0.055	J	< 0.3953	u	< 0.3041	u	< 0.0904	u
2-Chlorotoluene	1.56E+03	(1)	7.08E+03	(5)	< 0.0024	u	<0.0003	u	< 0.0019	u	< 0.051	u	< 0.0393	u	< 0.0117	u
2-Hexanone	2.00E+02	(2)	1.30E+03	(6)	< 0.0174	u	<0.0005	u	< 0.0139	u	< 0.3765	u	< 0.2895	u	< 0.0861	u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	< 0.0068	u	<0.0005	u	< 0.0055	u	4.9	v	3.2	v	0.14	J
4-Chlorotoluene	1.60E+03	(2)	2.30E+04	(6)	< 0.0028	u	<0.0003	u	< 0.0023	u	< 0.0612	u	< 0.0471	u	< 0.014	u
4-Isopropyltoluene	-	-	-	-	< 0.0029	u	<0.0004	u	< 0.0023	u	0.24	J	0.27	J	0.048	J
4-Methyl-2-pentanone	5.81E+03	(1)	2.02E+04	(5)	< 0.0093	u	<0.0037	u	< 0.0074	u	< 0.2016	u	< 0.1551	u	< 0.0461	u
Acetone	6.63E+04	(1)	2.41E+05	(5)	< 0.0414	u	0.0191	v	0.65	v	< 0.8951	u	< 0.6884	u	< 0.2047	u
Benzene	1.77E+01	(1)	8.65E+01	(4)	0.076	v	0.0147	v	0.068	v	7.3	v	16	v	0.077	J
Bromobenzene	2.90E+02	(2)	1.80E+03	(6)	< 0.0026	u	<0.0002	u	< 0.0021	u	< 0.0558	u	< 0.0429	u	< 0.0128	u
Bromodichloromethane	6.14E+00	(1)	2.99E+01	(4)	< 0.0019	u	<0.0019	u	< 0.0015	u	< 0.0403	u	< 0.031	u	< 0.0092	u
Bromoform	6.74E+02	(1)	1.75E+03	(4)	< 0.0039	u	<0.0019	u	< 0.0031	u	< 0.0843	u	< 0.0648	u	< 0.0193	u
Bromomethane	1.76E+01	(1)	1.77E+01	(5)	0.016	J	<0.0003	u	< 0.0094	u	< 0.2549	u	< 0.196	u	< 0.0583	u
Carbon disulfide	1.54E+03	(1)	1.61E+03	(5)	< 0.0106	u	<0.0007	u	< 0.0084	u	< 0.2284	u	< 0.1757	u	< 0.0522	u
Carbon tetrachloride	1.06E+01	(1)	5.21E+01	(4)	< 0.0021	u	<0.0019	u	< 0.0017	u	< 0.0454	u	< 0.0349	u	< 0.0104	u
Chlorobenzene	3.76E+02	(1)	4.08E+02	(5)	< 0.0026	u	<0.0002	u	< 0.0021	u	< 0.0563	u	< 0.0433	u	< 0.0129	u
Chloroethane	1.88E+04	(1)	1.65E+04	(5)	< 0.0064	u	<0.0003	u	< 0.0051	u	< 0.1381	u	< 0.1062	u	< 0.0316	u
Chloroform	5.85E+00	(1)	2.84E+01	(4)	< 0.0024	u	<0.0019	u	< 0.0019	u	< 0.0522	u	< 0.0401	u	< 0.0119	u
Chloromethane	4.08E+01	(1)	1.99E+02	(4)	< 0.0028	u	<0.0005	u	0.0085	J	< 0.0616	u	< 0.0474	u	< 0.0141	u
cis-1,2-DCE	1.56E+02	(1)	7.08E+02	(5)	< 0.0019	u	<0.0019	u	< 0.0015	u	< 0.0402	u	< 0.0309	u	< 0.0092	u
cis-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.0029	u	<0.0019	u	< 0.0024	u	< 0.0638	u	< 0.0491	u	< 0.0146	u
Dibromochloromethane	1.38E+01	(1)	6.69E+01	(4)	< 0.0029	u	<0.0019	u	< 0.0023	u	< 0.0625	u	< 0.0481	u	< 0.0143	u
Dibromomethane	5.74E+01	(1)	5.34E+01	(5)	< 0.0028	u	<0.0019	u	< 0.0022	u	< 0.0599	u	< 0.0461	u	< 0.0137	u
Dichlorodifluoromethane	1.80E+02	(1)	1.59E+02	(5)	< 0.0099	u	<0.0011	u	< 0.0079	u	< 0.2141	u	< 0.1646	u	< 0.0489	u
Ethylbenzene	7.45E+01	(1)	3.65E+02	(4)	< 0.0026	u	<0.0003	u	< 0.0021	u	9.3	v	15	v	0.51	v

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	OW-57 (16-18')		OW-57 (25-27')		OW-58 (10-12)		OW-58 (22-24')		OW-58 (28-29')		OW-58 (48-48.5')	
					1609E26-001		1609E26-002		1609E26-004		1609E26-005		1609E26-006		1609E26-007	
					9/21/2016		9/21/2016		9/22/2016		9/22/2016		9/22/2016		9/22/2016	
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 0.0039	u	<0.0004	u	< 0.0031	u	< 0.0846	u	< 0.0651	u	< 0.0193	u
Isopropylbenzene	2.35E+03	(1)	2.71E+03	(5)	< 0.0027	u	<0.0002	u	< 0.0022	u	0.57	J	0.82	v	0.09	J
Methyl tert-butyl ether (MTBE)	9.68E+02	(1)	4.78E+03	(4)	< 0.01	u	0.0008	J	< 0.008	u	< 0.2174	u	0.39	J	< 0.0497	u
Methylene chloride	4.09E+02	(1)	1.20E+03	(5)	< 0.0092	u	<0.0019	u	0.01	J	< 0.1995	u	< 0.1534	u	< 0.0456	u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	< 0.005	u	<0.0019	u	< 0.004	u	3	v	3.6	v	0.085	J
n-Butylbenzene	3.90E+03	(2)	5.80E+04	(6)	< 0.0028	u	<0.0005	u	< 0.0023	u	1.4	J	1.3	J	0.11	J
n-Propylbenzene	3.80E+03	(2)	2.40E+04	(6)	< 0.0025	u	<0.0003	u	< 0.002	u	3.4	v	4.7	v	0.28	v
sec-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	< 0.0044	u	<0.0003	u	< 0.0035	u	0.43	J	0.48	J	0.091	J
Styrene	7.23E+03	(1)	1.01E+04	(5)	< 0.0029	u	<0.0002	u	< 0.0023	u	< 0.0618	u	< 0.0475	u	< 0.0141	u
tert-Butylbenzene	7.80E+03	(2)	1.20E+05	(6)	< 0.0026	u	<0.0003	u	< 0.0021	u	< 0.0574	u	< 0.0441	u	< 0.0131	u
Tetrachloroethene (PCE)	1.10E+02	(1)	1.19E+02	(5)	< 0.0027	u	<0.0002	u	< 0.0021	u	< 0.0574	u	< 0.0441	u	< 0.0131	u
Toluene	5.22E+03	(1)	1.40E+04	(5)	< 0.0019	u	<0.0002	u	< 0.0015	u	45	v	77	v	1.1	v
trans-1,2-DCE	2.93E+02	(1)	3.03E+02	(5)	< 0.0089	u	<0.0002	u	< 0.0071	u	< 0.1937	u	< 0.1489	u	< 0.0443	u
trans-1,3-Dichloropropene	2.91E+01	(1)	1.29E+02	(5)	< 0.0047	u	<0.0002	u	< 0.0037	u	< 0.1013	u	< 0.0779	u	< 0.0232	u
Trichloroethene (TCE)	6.72E+00	(1)	6.84E+00	(5)	< 0.0034	u	<0.0019	u	< 0.0027	u	< 0.0742	u	< 0.057	u	< 0.017	u
Trichlorofluoromethane	1.22E+03	(1)	1.12E+03	(5)	< 0.0024	u	<0.0002	u	< 0.0019	u	< 0.0517	u	< 0.0398	u	< 0.0118	u
Vinyl chloride	7.41E-01	(1)	2.83E+01	(4)	< 0.0026	u	<0.0005	u	< 0.0021	u	< 0.0566	u	< 0.0435	u	< 0.0129	u
Xylenes, Total	8.63E+02	(1)	7.91E+02	(5)	< 0.0061	u	<0.0007	u	0.0063	J	55	v	92	v	3.1	v
Semi-volatiles (mg/kg)																
1,2,4-Trichlorobenzene	8.22E+01	(1)	7.84E+01	(5)	< 0.1085	u	< 0.1062	u	< 0.1074	u	< 0.1078	u	< 0.1078	u	< 0.1088	u
1,2-Dichlorobenzene	2.14E+03	(1)	2.47E+03	(5)	< 0.0769	u	< 0.0752	u	< 0.076	u	< 0.0763	u	< 0.0763	u	< 0.077	u
1,3-Dichlorobenzene	-	-	-	-	< 0.0776	u	< 0.0759	u	< 0.0767	u	< 0.077	u	< 0.077	u	< 0.0777	u
1,4-Dichlorobenzene	1.29E+03	(1)	6.73E+03	(4)	< 0.0848	u	< 0.083	u	< 0.0839	u	< 0.0843	u	< 0.0842	u	< 0.085	u
1-Methylnaphthalene	1.72E+02	(1)	8.13E+02	(7)	< 0.1008	u	< 0.0986	u	< 0.0997	u	0.12	J	1.2	v	< 0.101	u
2,4,5-Trichlorophenol	6.16E+03	(1)	2.69E+04	(5)	< 0.1004	u	< 0.0982	u	< 0.0993	u	< 0.0998	u	< 0.0997	u	< 0.1006	u
2,4,6-Trichlorophenol	6.16E+01	(1)	2.69E+02	(5)	< 0.0832	u	< 0.0814	u	< 0.0823	u	< 0.0827	u	< 0.0826	u	< 0.0834	u
2,4-Dichlorophenol	1.85E+02	(1)	8.07E+02	(5)	< 0.0936	u	< 0.0916	u	< 0.0926	u	< 0.093	u	< 0.0929	u	< 0.0938	u
2,4-Dimethylphenol	1.23E+03	(1)	5.38E+03	(5)	< 0.109	u	< 0.1066	u	< 0.1078	u	< 0.1082	u	0.19	J	< 0.1092	u
2,4-Dinitrophenol	1.23E+02	(1)	5.38E+02	(5)	< 0.0666	u	< 0.0651	u	< 0.0658	u	< 0.0661	u	< 0.0661	u	< 0.0667	u
2,4-Dinitrotoluene	1.71E+01	(1)	8.23E+01	(4)	< 0.0896	u	< 0.0877	u	< 0.0886	u	< 0.089	u	< 0.089	u	< 0.0898	u
2,6-Dinitrotoluene	3.56E+00	(1)	1.72E+01	(4)	< 0.1062	u	< 0.1039	u	< 0.105	u	< 0.1055	u	< 0.1054	u	< 0.1064	u
2-Chloronaphthalene	6.26E+03	(1)	2.83E+04	(5)	< 0.079	u	< 0.0773	u	< 0.0781	u	< 0.0785	u	< 0.0784	u	< 0.0792	u
2-Chlorophenol	3.91E+02	(1)	1.77E+03	(5)	< 0.0791	u	< 0.0774	u	< 0.0782	u	< 0.0786	u	< 0.0785	u	< 0.0793	u
2-Methylnaphthalene	2.32E+02	(1)	1.00E+03	(5)	< 0.1191	u	< 0.1165	u	< 0.1178	u	0.22	v	2.1	v	< 0.1193	u
'2-Methylphenol (cresol,o-)	3.20E+03	(2)	4.10E+04	(6)	< 0.0839	u	< 0.0821	u	< 0.083	u	< 0.0833	u	0.26	J	< 0.084	u
2-Nitroaniline	6.30E+02	(2)	8.00E+03	(6)	< 0.1081	u	< 0.1058	u	< 0.107	u	< 0.1074	u	< 0.1074	u	< 0.1084	u
2-Nitrophenol	-	-	-	-	< 0.0995	u	< 0.0974	u	< 0.0985	u	< 0.0989	u	< 0.0988	u	< 0.0997	u
3,3´-Dichlorobenzidine	1.18E+01	(1)	5.70E+01	(4)	< 0.0739	u	< 0.0723	u	< 0.0731	u	< 0.0734	u	< 0.0733	u	< 0.074	u
3+4-Methylphenol	-	-	-	-	< 0.0726	u	< 0.0711	u	< 0.0718	u	< 0.0722	u	0.26	v	< 0.0728	u
3-Nitroaniline	-	-	-	-	< 0.0885	u	< 0.0865	u	< 0.0875	u	< 0.0879	u	< 0.0878	u	< 0.0886	u
4,6-Dinitro-2-methylphenol	4.93E+00	(1)	2.15E+01	(5)	< 0.0607	u	< 0.0594	u	< 0.06	u	< 0.0603	u	< 0.0602	u	< 0.0608	u
4-Bromophenyl phenyl ether	-	-	-	-	< 0.0959	u	< 0.0939	u	< 0.0949	u	< 0.0953	u	< 0.0952	u	< 0.0961	u
4-Chloro-3-methylphenol	-	-	-	-	< 0.1197	u	< 0.1171	u	< 0.1184	u	< 0.1189	u	< 0.1188	u	< 0.12	u
4-Chloroaniline	2.70E+01	(3)	1.10E+02	(7)	< 0.1091	u	< 0.1067	u	< 0.1079	u	< 0.1084	u	< 0.1083	u	< 0.1093	u
4-Chlorophenyl phenyl ether	-	-	-	-	< 0.1146	u	< 0.1122	u	< 0.1134	u	< 0.1139	u	< 0.1138	u	< 0.1149	u
4-Nitroaniline	2.70E+02	(3)	1.10E+03	(7)	< 0.0707	u	< 0.0692	u	< 0.07	u	< 0.0703	u	< 0.0702	u	< 0.0709	u
4-Nitrophenol	-	-	-	-	< 0.0764	u	< 0.0748	u	< 0.0756	u	< 0.0759	u	< 0.0759	u	< 0.0766	u
Acenaphthene	3.48E+03	(1)	1.51E+04	(5)	< 0.086	u	< 0.0842	u	< 0.0851	u	< 0.0855	u	< 0.0854	u	< 0.0862	u
Acenaphthylene	-	-	-	-	< 0.0817	u	< 0.0799	u	< 0.0808	u	< 0.0811	u	< 0.0811	u	< 0.0818	u
Aniline	9.50E+02	(3)	4.00E+03	(7)	< 0.0948	u	< 0.0928	u	< 0.0938	u	< 0.0942	u	< 0.0941	u	< 0.095	u
Anthracene	1.74E+04	(1)	7.53E+04	(5)	< 0.0666	u	< 0.0652	u	< 0.0659	u	< 0.0662	u	< 0.0661	u	< 0.0667	u
Azobenzene	5.60E+01	(3)	2.60E+02	(7)	< 0.1223	u	< 0.1196	u	< 0.1209	u	< 0.1215	u	< 0.1214	u	< 0.1225	u
Benz(a)anthracene	1.53E+00	(1)	3.23E+01	(4)	< 0.0864	u	< 0.0845	u	< 0.0854	u	< 0.0858	u	< 0.0857	u	< 0.0865	u
Benzo(a)pyrene	1.12E+00	(1)	2.36E+01	(4)	< 0.076	u	< 0.0743	u	< 0.0751	u	< 0.0755	u	< 0.0754	u	< 0.0761	u
Benzo(b)fluoranthene	1.53E+00	(1)	3.23E+01	(4)	< 0.0906	u	< 0.0887	u	< 0.0896	u	< 0.09	u	< 0.09	u	< 0.0908	u
Benzo(g,h,i)perylene	-	-	-	-	< 0.0885	u	< 0.0866	u	< 0.0875	u	< 0.0879	u	< 0.0878	u	< 0.0887	u
Benzo(k)fluoranthene	1.53E+01	(1)	3.23E+02	(4)	< 0.0884	u	< 0.0865	u	< 0.0874	u	< 0.0878	u	< 0.0877	u	< 0.0886	u
Benzoic acid	2.50E+05	(2)	3.30E+06	(6)	< 0.0832	u	< 0.0814	u	< 0.0823	u	< 0.0826	u	< 0.0826	u	< 0.0834	u
Benzyl alcohol	6.30E+03	(2)	8.20E+04	(6)	< 0.0785	u	< 0.0768	u	< 0.0777	u	< 0.078	u	< 0.078	u	< 0.0787	u
Bis(2-chloroethoxy)methane	1.90E+02	(2)	2.50E+03	(6)	< 0.1089	u	< 0.1065	u	< 0.1077	u	< 0.1082	u	< 0.1081	u	< 0.1091	u
Bis(2-chloroethyl)ether	3.10E+00	(1)	1.93E+00	(5)	< 0.0737	u	< 0.0721	u	< 0.0729	u	< 0.0732	u	< 0.0732	u	< 0.0739	u
Bis(2-chloroisopropyl)ether	9.93E+01	(1)	5.19E+02	(4)	< 0.0896	u	< 0.0877	u	< 0.0886	u	< 0.089	u	< 0.0889	u	< 0.0898	u
Bis(2-ethylhexyl)phthalate	3.80E+02	(1)	1.83E+03	(4)	0.13	J	0.11	J	0.12	J	0.12	J	0.14	J	0.12	J
Butyl benzyl phthalate	2.90E+03	(3)	1.20E+04	(7)	< 0.0888	u	< 0.0869	u	< 0.0879	u	< 0.0882	u	< 0.0882	u	< 0.089	u
Carbazole	-	-	-	-	< 0.0678	u	< 0.0663	u	< 0.067	u	< 0.0673	u	< 0.0673	u	< 0.0679	u
Chrysene	1.53E+02	(1)	3.23E+03	(4)	< 0.0854	u	< 0.0836	u	< 0.0845	u	< 0.0849	u	< 0.0848	u	< 0.0856	u

	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	OW-57 (16-18')		OW-57 (25-27')		OW-58 (10-12)		OW-58 (22-24')		OW-58 (28-29')		OW-58 (48-48.5')	
					1609E26-001		1609E26-002		1609E26-004		1609E26-005		1609E26-006		1609E26-007	
					9/21/2016		9/21/2016		9/22/2016		9/22/2016		9/22/2016		9/22/2016	
Dibenz(a,h)anthracene	1.53E-01	(1)	3.23E+00	(4)	< 0.0811	u	< 0.0794	u	< 0.0802	u	< 0.0806	u	< 0.0805	u	< 0.0813	u
Dibenzofuran	-	-	-	-	< 0.1009	u	< 0.0987	u	< 0.0998	u	< 0.1002	u	< 0.1002	u	< 0.1011	u
Diethyl phthalate	4.93E+04	(1)	2.15E+05	(5)	0.14	J	0.17	J	0.12	J	0.14	J	0.21	v	0.16	J
Dimethyl phthalate	6.16E+04	(1)	2.69E+05	(5)	< 0.0982	u	< 0.096	u	< 0.0971	u	< 0.0975	u	< 0.0974	u	< 0.0983	u
Di-n-butyl phthalate	6.16E+03	(1)	2.69E+04	(5)	0.16	J	0.15	J	0.14	J	0.15	J	0.25	J	0.15	J
Di-n-octyl phthalate	-	-	-	-	< 0.0856	u	< 0.0837	u	< 0.0847	u	< 0.085	u	< 0.085	u	< 0.0858	u
Fluoranthene	2.32E+03	(1)	1.00E+04	(5)	< 0.0578	u	< 0.0565	u	< 0.0572	u	< 0.0574	u	< 0.0574	u	< 0.0579	u
Fluorene	2.32E+03	(1)	1.00E+04	(5)	< 0.0918	u	< 0.0899	u	< 0.0908	u	< 0.0912	u	0.12	J	< 0.092	u
Hexachlorobenzene	3.33E+00	(1)	1.60E+01	(4)	< 0.0791	u	< 0.0774	u	< 0.0783	u	< 0.0786	u	< 0.0785	u	< 0.0793	u
Hexachlorobutadiene	6.16E+01	(1)	5.17E+01	(4)	< 0.1131	u	< 0.1106	u	< 0.1118	u	< 0.1123	u	< 0.1122	u	< 0.1133	u
Hexachlorocyclopentadiene	2.28E+00	(1)	8.67E+02	(5)	< 0.1147	u	< 0.1122	u	< 0.1135	u	< 0.114	u	< 0.1139	u	< 0.1149	u
Hexachloroethane	4.31E+01	(1)	1.88E+02	(5)	< 0.0862	u	< 0.0843	u	< 0.0853	u	< 0.0856	u	< 0.0856	u	< 0.0864	u
Indeno(1,2,3-cd)pyrene	1.53E+00	(1)	3.23E+01	(4)	< 0.0784	u	< 0.0767	u	< 0.0775	u	< 0.0778	u	< 0.0778	u	< 0.0785	u
Isophorone	5.61E+03	(1)	2.70E+04		< 0.1109	u	< 0.1085	u	< 0.1097	u	< 0.1102	u	< 0.1101	u	< 0.1112	u
Naphthalene	1.16E+03	(1)	5.02E+03	(5)	< 0.0963	u	< 0.0942	u	< 0.0953	u	0.11	J	1.3	v	< 0.0965	u
Nitrobenzene	5.99E+01	(1)	2.91E+02	(4)	< 0.1035	u	< 0.1013	u	< 0.1024	u	< 0.1029	u	< 0.1028	u	< 0.1038	u
N-Nitrosodi-n-propylamine	7.80E-01	(3)	3.30E+00	(7)	< 0.0964	u	< 0.0943	u	< 0.0954	u	< 0.0958	u	< 0.0957	u	< 0.0966	u
N-Nitrosodiphenylamine	1.09E+03	(1)	5.24E+03	(4)	< 0.098	u	< 0.0959	u	< 0.0969	u	< 0.0973	u	< 0.0973	u	< 0.0982	u
Pentachlorophenol	9.85E+00	(1)	4.45E+01	(4)	< 0.0645	u	< 0.0631	u	< 0.0638	u	< 0.0641	u	< 0.064	u	< 0.0646	u
Phenanthrene	1.74E+03	(1)	7.53E+03	(5)	< 0.0682	u	< 0.0667	u	< 0.0674	u	< 0.0677	u	0.27	v	< 0.0683	u
Phenol	1.85E+04	(1)	7.74E+04	(5)	< 0.0756	u	< 0.0739	u	< 0.0747	u	< 0.0751	u	0.31	v	< 0.0757	u
Pyrene	1.74E+03	(1)	7.53E+03	(5)	< 0.0758	u	< 0.0742	u	< 0.075	u	< 0.0753	u	< 0.0753	u	< 0.076	u
Pyridine	7.80E+01	(2)	1.20E+03	(6)	< 0.0795	u	< 0.0778	u	< 0.0787	u	< 0.079	u	< 0.079	u	< 0.0797	u
Total Petroleum Hydrocarbons (mg/kg)																
Gasoline Range Organics (GRO)	1.00E+03	(8)	3.80E+03	(8)	< 0.4812	u	< 0.5599	u	3.2	v	**1500**	v	**1700**	v	130	v
Diesel Range Organics (DRO)	1.00E+03	(8)	3.80E+03	(8)	< 1.7306	u	5.9	J	< 1.713	u	22	v	320	v	33	v
Motor Oil Range Organics (MRO)	1.00E+03	(8)	3.80E+03	(8)	< 47	u	< 48	u	< 46	u	< 48	u	< 49	u	< 47	u

- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (March 2017)

EPA - Regional Screening Levels (June 2017)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels

(7) EPA Industrial - Screening Levels multiplied by 10 pursuant to Section IV.D.2 of the Oct. 31, 2013 RCRA Post-Closure Permit because the constituent is listed as carcinogenic

(8) NMED Table 6-2 TPH Soil Screening Levels "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Residential Soil Screening Level
Yellow highlight represents value above Non-Residential Soil Screening Level
Bold with yellow highlight value exceeds Residential Soil Screening Level and Non-Residential Soil Screening Level

v = reportable detection above the Practical quantitation limit (PQL)

u - result is not detected at method detection limit (MDL)

j - estimated result at concentration above MDL but less than PQL

Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
Metals (ug/l) TOTAL																						
Antimony	6	(2)	<0.47	u	<0.47	u	<2.36	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	-		-	
Arsenic	10	(2)	7.7	v	4.9	J	16	Z	10	Z	8	J	16	Z	8.7	J	9.4	v	-		7.6	J
Barium	2000	(2)	2000	Z	3800	Z	8700	Z	4900	Z	4200	Z	8500	Z	3000	Z	5200	Z	-		2100	Z
Beryllium	4	(2)	0.71	J	<0.36	u	1.7	J	0.43	J	<0.36	u	6.4	Z	0.51	J	3.7	v	-		-	
Cadmium	5	(2)	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	<1.48	u	-		<1.484	u
Chromium	50	(3)	11	v	<2.66	u	14	v	14	v	<2.66	u	31	v	4.5	J	17	v	-		<2.656	u
Cobalt	6	(1)	4.6	J	<1.7	u	9.4	v	7.6	v	4.4	J	20	v	12	v	13	v	-		-	
Cyanide	200	(3)	<10	u	<10	u	<10	u	11.5	v	<10	u	<10	u	<10	u	27.3	v	-		-	
Iron	13800	(4)	10000	Z	3500	Z	28000	Z	17000	Z	8200	Z	36000	Z	9100	Z	27000	Z	-		4900	Z
Lead	15	(2)	12	v	0.31	J	21	Z	3.5	v	1.9	v	64	Z	9.3	v	36	Z	-		0.14	J
Manganese	2020	(4)	1800	Z	1800	Z	4200	Z	3400	Z	1900	Z	7200	Z	3500	Z	4100	Z	-		2200	Z
Mercury	2	(3)	0.16	J	0.15	J	0.21	v	0.16	J	0.12	J	0.18	J	0.14	J	0.13	J	-		-	
Nickel	372	(4)	34	v	70	v	57	v	54	v	82	v	100	Z	84	v	35	v	-		-	
Selenium	50	(3)	13	v	11	v	14	J	16	v	10	v	9.2	v	13	v	12	v	-		14	v
Silver	50	(3)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	-		<1.548	u
Vanadium	63.1	(4)	16	J	3.8	J	31	J	8.6	J	7.4	J	65	v	17	J	43	J	-		-	
Zinc	10000	(3)	30	v	8.2	J	61	v	15	v	13	v	64	v	17	v	48	v	-		15	v
Chloride	250000	(3)	130000	v	150000	v	140000	v	170000	v	140000	v	94000	v	180000	v	160000	v	-		-	
Fluoride	1600	(3)	240	v	370	v	<250	u	<250	u	440	v	<250	u	220	v	250	v	-		-	
Sulfate	600000	(3)	35000	v	5800	v	990	J	960	J	3100	v	4100	v	6200	v	1200	v	-		-	
Metals (ug/l) DISSOLVED																						
Antimony (D)	6	(2)	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	<0.47	u	-		-	
Arsenic (D)	10	(2)	7.8	J	2.9	J	14	Z	10	Z	3.4	v	9.3	v	4.1	J	4.1	J	-		8.6	v
Barium (D)	1000	(3)	1800	v	3600	Z	6300	Z	5100	Z	3200	Z	3100	Z	2100	Z	3000	Z	-		2200	Z
Beryllium (D)	4	(2)	<0.31	u	<0.31	u	<0.31	u	<0.00031	u	<0.31	u	<0.31	u	<0.31	u	<0.31	u	-		-	
Cadmium (D)	5	(2)	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	<0.75	u	-		<0.746	u
Chromium (D)	50	(3)	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	<1.75	u	-		<1.754	u
Cobalt (D)	50	(3)	2.6	J	1.4	J	3.5	J	6.8	v	5.2	v	5.1	J	7.4	v	2.2	J	-		-	
Iron (D)	1000	(3)	4700	Z	920	Z	7900	Z	550	Z	3900	Z	7600	Z	740	Z	6600	Z	-		-	
Lead (D)	15	(2)	0.41	J	<0.00013	u	<0.00013	J	<0.17	u	<0.17	u	1.2	v	<0.17	u	1.1	v	-		<0.168	u
Manganese (D)	200	(3)	1600	Z	1700	Z	2600	Z	3100	Z	1600	Z	3100	Z	2100	Z	2100	Z	-		2200	Z
Nickel (D)	372	(4)	31	v	69	v	50	v	61	v	74	v	88	v	80	v	15	v	-		-	
Selenium (D)	50	(3)	7.4	J	5.6	J	9.7	J	11	J	5.2	J	4.2	J	8.2	J	6.4	J	-		12	J
Silver (D)	50	(3)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	-		<2.751	u
Vanadium (D)	63.1	(4)	1.7	J	4.7	J	4.8	J	4.4	J	4.8	J	7.8	J	4.9	J	4.6	J	-		-	
Zinc (D)	10000	(3)	4.9	J	9.3	J	22	v	6.9	J	9.5	J	10	v	5.3	J	3	J	-		28	v
Volatiles (ug/l)																						
1,1,1,2-Tetrachloroethane	5.74	(4)	<2.23	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<5.57	u	<22.3	u	<0.557	u
1,1,1-Trichloroethane	60	(3)	<1.83	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<4.57	u	<18.3	u	<0.457	u
1,1,2,2-Tetrachloroethane	10	(3)	<2.56	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<25.6	u	<0.641	u
1,1,2-Trichloroethane	5	(2)	<2.55	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<6.37	u	<25.5	u	<0.637	u
1,1-Dichloroethane	25	(3)	<2.16	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<5.4	u	<21.6	u	<0.54	u
1,1-Dichloroethene	5	(3)	<2.14	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<5.36	u	<21.4	u	<0.536	u
1,1-Dichloropropene	-		<2.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<6.66	u	<26.6	u	<0.666	u
1,2,3-Trichlorobenzene	7	(1)	<2.26	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<5.64	u	<22.6	u	<0.564	u
1,2,3-Trichloropropane	0.01	(4)	<4.04	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<10.1	u	<40.4	u	<1.01	u
1,2,4-Trichlorobenzene (V)	70	(2)	<2.66	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<6.64	u	<26.6	u	<0.664	u
1,2,4-Trimethylbenzene	56	(1)	1300	v	850	v	1500	v	1000	v	930	v	1400	v	7.3	J	690	v	210	v	7.1	v
1,2-Dibromo-3-chloropropane	0.2	(2)	<4.69	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<11.72	u	<46.9	u	<1.172	u
1,2-Dibromoethane (EDB)	0.05	(2)	57	v	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<5.59	u	<22.4	u	<0.559	u

Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
1,2-Dichlorobenzene (V)	600	(2)	<8	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<80	u	<2	u
1,2-Dichloroethane (EDC)	5	(2)	<2.3	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<23	u	<0.575	u
1,2-Dichloropropane	5	(2)	**32**	v	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<5.49	u	<22	u	<0.549	u
1,3,5-Trimethylbenzene	60	(1)	**350**	v	**190**	v	**410**	v	**300**	v	**270**	v	**430**	v	<5.77	u	**210**	v	44	J	0.82	J
1,3-Dichlorobenzene (V)	-		<2.86	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<7.16	u	<28.6	u	<0.716	u
1,3-Dichloropropane	370	(1)	<3.11	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<7.79	u	<31.1	u	<0.779	u
1,4-Dichlorobenzene (V)	75	(2)	<2.85	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<7.13	u	<28.5	u	<0.713	u
1-Methylnaphthalene (V)	1.10	(1)	**40**	J	**67**	J	**61**	J	**26**	J	**24**	J	**24**	J	**150**	J	**89**	J	**88**	J	**34**	v
2,2-Dichloropropane	-		<3.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<8.33	u	<33.3	u	<0.833	u
2-Butanone	5565	(4)	77	J	<36.85	u	830	v	740	v	<36.85	u	110	J	<36.85	u	<36.85	u	<147.4	u	<3.685	u
2-Chlorotoluene	240	(1)	<8	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<80	u	<2	u
2-Hexanone	38	(1)	<16.8	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<41.99	u	<168	u	<4.199	u
2-Methylnaphthalene (V)	36	(1)	**59**	J	**76**	J	**82**	J	31	J	28	J	33	J	**140**	J	**97**	J	<31.7	u	<0.791	u
4-Chlorotoluene	250	(1)	<2.56	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<6.41	u	<25.6	u	<0.641	u
4-Isopropyltoluene	-		6.4	J	16	J	9.7	J	26	J	21	J	47	J	<7.03	u	15	J	<28.1	u	<0.703	u
4-Methyl-2-pentanone	-		<8.55	u	<21.38	u	200	J	160	J	<21.38	u	240	J	<21.38	u	<21.38	u	<85.5	u	<2.138	u
Acetone	14100	(4)	140	J	<245.44	u	1500	v	770	v	<245.44	u	<245.44	u	<245.44	u	<245.44	u	<981.7	u	<24.544	u
Benzene	5	(2)	**16000**	v	**28000**	v	**34000**	v	**23000**	v	**24000**	v	**23000**	v	**11000**	v	**32000**	v	**38000**	v	**8100**	v
Bromobenzene	62	(1)	<1.95	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<4.89	u	<19.5	u	<0.489	u
Bromodichloromethane	1.34	(4)	<2.8	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<6.99	u	<28	u	<0.699	u
Bromoform	3.3	(1)	<2.04	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<5.11	u	<20.4	u	<0.511	u
Bromomethane	7.54	(4)	<15.6	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<38.99	u	<156	u	<3.899	u
Carbon disulfide	810	(4)	<11.95	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<29.87	u	<119.5	u	<2.987	u
Carbon Tetrachloride	5	(2)	<2.16	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<5.41	u	<21.6	u	<0.541	u
Chlorobenzene	100	(2)	<2.29	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<5.72	u	<22.9	u	<0.572	u
Chloroethane	20857	(4)	<3.82	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<9.55	u	<38.2	u	<0.955	u
Chloroform	100	(3)	<1.78	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<4.44	u	<17.8	u	<0.444	u
Chloromethane	20.3	(4)	<4.26	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<10.64	u	<42.6	u	<1.064	u
cis-1,2-DCE	70	(2)	<2.48	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<6.21	u	<24.8	u	<0.621	u
cis-1,3-Dichloropropene	4.71	(4)	<2.13	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<5.33	u	<21.3	u	<0.533	u
Dibromochloromethane	1.68	(4)	<1.73	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<4.34	u	<17.3	u	<0.434	u
Dibromomethane	8.3	(1)	<2.38	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<5.96	u	<23.8	u	<0.596	u
Dichlorodifluoromethane	197	(4)	<7.15	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<17.87	u	<71.5	u	<1.787	u
Ethylbenzene	700	(2)	**1800**	v	**1600**	v	**2700**	v	**2000**	v	**1700**	v	**2100**	v	570	v	**1500**	v	**1200**	v	250	v
Hexachlorobutadiene (V)	1.39	(4)	<3.97	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<9.93	u	<39.7	u	<0.993	u
Isopropylbenzene	447	(4)	43	v	74	v	53	v	160	v	140	v	220	v	22	J	72	v	30	J	8.5	v
Methyl tert-butyl ether (MTBE)	143	(4)	**10000**	v	140	v	**1100**	v	**1000**	v	**700**	v	74	v	**180**	v	**3300**	v	**1600**	v	**580**	v
Methylene Chloride	5	(2)	<3.75	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<9.37	u	<37.5	u	<0.937	u
Naphthalene (V)	1.65	(4)	**280**	v	**220**	v	**320**	v	**88**	J	**82**	J	**92**	J	**220**	v	**240**	v	**140**	J	**18**	v
n-Butylbenzene	1000	(1)	14	J	18	J	20	J	22	J	17	J	47	J	9.1	J	21	J	<32.1	u	1.3	J
n-Propylbenzene	660		160	v	140	v	190	v	180	v	160	v	270	v	48	J	150	v	56	J	11	v
sec-Butylbenzene	2000	(1)	7.8	J	17	J	11	J	26	J	21	J	51	v	<6.15	u	18	J	<24.6	u	2.2	J
Styrene	100	(2)	<2.2	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<5.5	u	<22	u	<0.55	u
tert-Butylbenzene	-		<2.3	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<5.75	u	<23	u	<0.575	u
Tetrachloroethene (PCE)	5	(2)	<3.04	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<7.6	u	<30.4	u	<0.76	u
Toluene	750	(3)	**10000**	v	**9300**	v	**41000**	v	**25000**	v	**20000**	v	**25000**	v	54	v	**6600**	v	**3800**	v	2.9	J
trans-1,2-DCE	100	(2)	<8	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<20	u	<80	u	< 2	u
trans-1,3-Dichloropropene	4.71	(4)	<2.07	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<5.16	u	<20.7	u	<0.516	u
Trichloroethene (TCE)	5	(2)	<3.5	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<8.75	u	<35	u	<0.875	u
Trichlorofluoromethane	1137	(4)	<4.09	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<10.22	u	<40.9	u	<1.022	u
Vinyl chloride	1	(3)	<3.91	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<9.77	u	<39.1	u	<0.977	u

Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
Xylenes, Total	620	(3)	10000	v	5900	v	15000	v	10000	v	9200	v	11000	v	140	v	4400	v	3100	v	8	v
Semi-volatiles (ug/l)																						
1,2,4-Trichlorobenzene	70	(2)	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<26.2	u	<2.62	u	<2.62	u	-		-	
1,2-Dichlorobenzene	600	(2)	<2.29	u	<2.29	u	<2.29	u	<2.29	u	<2.29	u	<22.85	u	<2.29	u	<2.29	u	-		-	
1,3-Dichlorobenzene	-		<2.26	u	<2.26	u	<2.26	u	<2.26	u	<2.26	u	<22.57	u	<2.26	u	<2.26	u	-		-	
1,4-Dichlorobenzene	75	(2)	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<23.88	u	<2.39	u	<2.39	u	-		-	
1-Methylnaphthalene	1.1	(5)	66	v	80	v	71	v	59	v	110	v	120	v	110	v	65	v	-		-	
2,4,5-Trichlorophenol	1166	(4)	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<21.8	u	<2.18	u	<2.18	u	-		-	
2,4,6-Trichlorophenol	11.9	(4)	<2.45	u	<2.45	u	<2.45	u	<2.45	u	<2.45	u	<24.46	u	<2.45	u	<2.45	u	-		-	
2,4-Dichlorophenol	45.3	(4)	<2.33	u	<2.33	u	<2.33	u	<2.33	u	<2.33	u	<23.3	u	<2.33	u	<2.33	u	-		-	
2,4-Dimethylphenol	353.9	(4)	71	v	34	v	33	v	46	v	97	v	52	J	8.4	J	3.9	J	-		-	
2,4-Dinitrophenol	38.7	(4)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<27.53	u	<2.75	u	<2.75	u	-		-	
2,4-Dinitrotoluene	2.37	(4)	<3.13	u	<3.13	u	<3.13	u	<3.13	u	<3.13	u	<31.29	u	<3.13	u	<3.13	u	-		-	
2,6-Dinitrotoluene	0.485	(4)	<2.73	u	<2.73	u	<2.73	u	<2.73	u	<2.73	u	<27.34	u	<2.73	u	<2.73	u	-		-	
2-Chloronaphthalene	733	(4)	<2.25	u	<2.25	u	<2.25	u	<2.25	u	<2.25	u	<22.51	u	<2.25	u	<2.25	u	-		-	
2-Chlorophenol	91	(4)	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<21.84	u	<2.18	u	<2.18	u	-		-	
2-Methylnaphthalene	36	(1)	57	v	49	v	76	v	<2.89	u	<2.89	u	110	v	98	v	71	v	-		-	
2-Methylphenol	930	(1)	65	v	23	v	68	v	80	v	98	v	210	v	<2.54	u	5.2	J	-		-	
2-Nitroaniline	190	(1)	<2.76	u	<2.76	u	<2.76	u	<2.76	u	<2.76	u	<27.58	u	<2.76	u	<2.76	u	-		-	
2-Nitrophenol	-		<2.38	u	<2.38	u	<2.38	u	<2.38	u	<2.38	u	<23.78	u	<2.38	u	<2.38	u	-		-	
3,3´-Dichlorobenzidine	1.25	(4)	<2.4	u	<2.4	u	<2.4	u	<2.4	u	<2.4	u	<23.96	u	<2.4	u	<2.4	u	-		-	
3+4-Methylphenol	930	(1)	87	v	26	v	110	v	130	v	99	v	200	v	<2.3	u	7.9	J	-		-	
3-Nitroaniline	-		<2.95	u	<2.95	u	<2.95	u	<2.95	u	<2.95	u	<29.48	u	<2.95	u	<2.95	u	-		-	
4,6-Dinitro-2-methylphenol	1.52	(4)	<1.8	u	<1.8	u	<1.8	u	<1.8	u	<1.8	u	<17.97	u	<1.8	u	<1.8	u	-		-	
4-Bromophenyl phenyl ether	-		<2.64	u	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<26.37	u	<2.64	u	<2.64	u	-		-	
4-Chloro-3-methylphenol	-		<2.56	u	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<25.59	u	<2.56	u	<2.56	u	-		-	
4-Chloroaniline	0.37	(5)	<2.71	u	<2.71	u	<2.71	u	<2.71	u	<2.71	u	<27.12	u	<2.71	u	<2.71	u	-		-	
4-Chlorophenyl phenyl ether	-		<2.56	u	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<25.56	u	<2.56	u	<2.56	u	-		-	
4-Nitroaniline	3.8	(5)	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<2.56	u	<25.59	u	<2.56	u	<2.56	u	-		-	
4-Nitrophenol	-		<2.55	u	<2.55	u	<2.55	u	<2.55	u	<2.55	u	<25.53	u	<2.55	u	<2.55	u	-		-	
Acenaphthene	535	(4)	<2.55	u	<2.55	u	<2.55	u	<2.55	u	<2.55	u	<25.53	u	<2.55	u	<2.55	u	-		-	
Acenaphthylene	-		<2.36	u	<2.36	u	<2.36	u	<2.36	u	<2.36	u	<23.57	u	<2.36	u	<2.36	u	-		-	
Aniline	13	(5)	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<24.41	u	<2.44	u	<2.44	u	-		-	
Anthracene	1720	(4)	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<24.86	u	<2.49	u	<2.49	u	-		-	
Azobenzene	0.12	(5)	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<26.68	u	<2.67	u	<2.67	u	-		-	
Benz(a)anthracene	0.12	(4)	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<26.39	u	<2.64	u	<2.64	u	-		-	
Benzo(a)pyrene	0.2	(2)	<2.72	u	<2.72	u	<2.72	u	<2.72	u	<2.72	u	<27.18	u	<2.72	u	<2.72	u	-		-	
Benzo(b)fluoranthene	0.343	(4)	<2.88	u	<2.88	u	<2.88	u	<2.88	u	<2.88	u	<28.8	u	<2.88	u	<2.88	u	-		-	
Benzo(g,h,i)perylene	-		<2.64	u	<2.64	u	<2.64	u	<2.64	u	<2.64	u	<26.43	u	<2.64	u	<2.64	u	-		-	
Benzo(k)fluoranthene	3.43	(4)	<3	u	<3	u	<3	u	<3	u	<3	u	<29.98	u	<3	u	<3	u	-		-	
Benzoic acid	75000	(1)	41	v	45	v	43	v	43	v	68	v	450	v	32	v	16	J	-		-	
Benzyl alcohol	2000	(1)	<3.01	u	<3.01	u	<3.01	u	<3.01	u	<3.01	u	<30.12	u	<3.01	u	<3.01	u	-		-	
Bis(2-chloroethoxy)methane	59	(1)	<2.81	u	<2.81	u	<2.81	u	<2.81	u	<2.81	u	<28.14	u	<2.81	u	<2.81	u	-		-	
Bis(2-chloroethyl)ether	0.137	(4)	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<2.67	u	<26.74	u	<2.67	u	<2.67	u	-		-	
Bis(2-chloroisopropyl)ether	9.81	(4)	<1.91	u	<1.91	u	<1.91	u	<1.91	u	<1.91	u	<19.09	u	<1.91	u	<1.91	u	-		-	
Bis(2-ethylhexyl)phthalate	6	(2)	6	J	<2.62	u	12	v	7.1	J	7.8	J	66	J	4.2	J	2.8	J	-		-	
Butyl benzyl phthalate	16	(5)	<2.48	u	<2.48	u	<2.48	u	<2.48	u	<2.48	u	<24.78	u	<2.48	u	<2.48	u	-		-	
Carbazole	-		2.6	J	5	J	<2.29	u	<2.29	u	<2.29	u	<22.87	u	4.2	J	2.8	J	-		-	
Chrysene	34.3	(4)	<2.78	u	<2.78	u	<2.78	u	<2.78	u	<2.78	u	<27.79	u	<2.78	u	<2.78	u	-		-	
Dibenz(a,h)anthracene	0.0343	(4)	<2.66	u	<2.66	u	<2.66	u	<2.66	u	<2.66	u	<26.61	u	<2.66	u	<2.66	u	-		-	
Dibenzofuran	7.9	(1)	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<2.49	u	<24.93	u	<2.49	u	<2.49	u	-		-	

Groundwater Analytical Results Summary
Marathon Petroleum Company - Gallup Refinery
Gallup, New Mexico

	Screening Levels	Source	TK 568-1-GW		TK 568-2-GW		TK-569-1-GW		TK-569-2-GW		TK 569-3-GW		TK 570-1-GW		OW-57		OW-58		RW-2		OW-14	
Lab ID			1610091-001		1610091-002		1610355-001		1610355-002		1610091-003		1610091-004		1610091-005		1610091-006		1609783-001		1609076-001	
Sample Date			10/2/2016		10/2/2016		10/5/2016		10/5/2016		10/2/2016		9/30/2016		10/1/2016		9/30/2016		9/13/2016		8/31/2016	
Diethyl phthalate	14800	(4)	<2.71	u	<2.71	u	<2.71	u	<2.71	u	3.4	J	<27.15	u	<2.71	u	<2.71	u	-		-	
Dimethyl phthalate	-		3.1	J	3	J	26	v	18	v	31	v	<24.29	u	<2.43	u	<2.43	u	-		-	
Di-n-butyl phthalate	885	(4)	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<2.44	u	<24.44	u	<2.44	u	<2.44	u	-		-	
Di-n-octyl phthalate	-		2	J	<1.98	u	6.8	J	6.8	J	<1.98	u	<19.83	u	<1.98	u	<1.98	u	-		-	
Fluoranthene	802	(4)	<2.61	u	<2.61	u	<2.61	u	<2.61	u	<2.61	u	<26.07	u	<2.61	u	<2.61	u	-		-	
Fluorene	288	(4)	<2.72	u	3.1	J	<2.72	u	<2.72	u	<2.72	u	<27.24	u	7.2	J	3.8	J	-		-	
Hexachlorobenzene	0.0976	(4)	<2.63	u	<2.63	u	<2.63	u	<2.63	u	<2.63	u	<26.33	u	<2.63	u	<2.63	u	-		-	
Hexachlorobutadiene	1.387	(4)	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<2.18	u	<21.84	u	<2.18	u	<2.18	u	-		-	
Hexachlorocyclopentadiene	50	(4)	<2.28	u	<2.28	u	<2.28	u	<2.28	u	<2.28	u	<22.84	u	<2.28	u	<2.28	u	-		-	
Hexachloroethane	3.28	(4)	<2.37	u	<2.37	u	<2.37	u	<2.37	u	<2.37	u	<23.68	u	<2.37	u	<2.37	u	-		-	
Indeno(1,2,3-cd)pyrene	0.343	(4)	<2.96	u	<2.96	u	<2.96	u	<2.96	u	<2.96	u	<29.64	u	<2.96	u	<2.96	u	-		-	
Isophorone	781	(4)	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<2.62	u	<26.15	u	<2.62	u	<2.62	u	-		-	
Naphthalene	1.65	(4)	**210**	v	**130**	v	**210**	v	**47**	v	**68**	v	**220**	v	**140**	v	**160**	v	-		-	
Nitrobenzene	1.4	(4)	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<2.75	u	<27.53	u	<2.75	u	<2.75	u	-		-	
N-Nitrosodimethylamine	0.0017	(4)	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<21.58	u	<2.16	u	<2.16	u	-		-	
N-Nitrosodi-n-propylamine	0.011	(5)	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<2.39	u	<23.89	u	<2.39	u	<2.39	u	-		-	
N-Nitrosodiphenylamine	0.0049	(4)	<2.32	u	<2.32	u	<2.32	u	<2.32	u	<2.32	u	<23.2	u	<2.32	u	<2.32	u	-		-	
Phenanthrene	170	(4)	<2.59	u	<2.59	u	<2.59	u	<2.59	u	<2.59	u	<25.87	u	7.6	J	2.9	J	-		-	
Pentachlorophenol	1	(4)	<2.34	u	<2.34	u	<2.34	u	<2.34	u	<2.34	u	<23.42	u	<2.34	u	<2.34	u	-		-	
Phenol	5760	(4)	160	v	69	v	69	v	96	v	98	v	120	v	88	v	51	v	-		-	
Pyrene	117	(4)	<3.09	u	<3.09	u	<3.09	u	<3.09	u	<3.09	u	<30.94	u	<3.09	u	<3.09	u	-		-	
Pyridine	20	(1)	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<2.16	u	<21.61	u	<2.16	u	<2.16	u	-		-	
TPH (mg/l)																						
Gasoline Range Organics (GRO	3.98E-02	(6)	**140**	v	**140**	v	**260**	v	**160**	v	**170**	v	**240**	v	**46**	v	**150**	v	**140000**	v	**31000**	v
Diesel Range Organics (DRO)	3.98E-02	(6)	**10**	v	**12**	v	**22**	v	**14**	v	**21**	v	**170**	v	**9.3**	v	**5.6**	v	**14000**	v	**4100**	v
Motor Oil Range Organics (MRO	3.98E-02	(6)	< 5	u	< 5	u	< 5	u	< 5	u	< 5	u	< 50	u	< 5	u	< 5	u	<5000	u	<5000	u

\- No screening level or analytical result available

450 - bolded value exceeds screening level

(1) EPA - Regional Screening Levels (November 2018) - Tap Water

(2) EPA - Regional Screening Levels (November 2018) - MCL

(3) NMED WQCC standards - Title 20 Chapter 6, Part 2, - 20.6.2.3101 Standards for Ground Water of 10,000 mg/l TDS Concentration or less

(4) NMED Tap Water Screening Level - Risk Assessment Guidance for Site Investigations and Remediation (March 2017)

(5) EPA Screening Level - Tap Water x 10 for carcinogenic compounds

(6) NMED groundwater screening level for unknown oil

v = reportable detection above the Practical quantitation limit (PQL)

u - result is not detected at method detection limit (MDL)

j - estimated result at concentration above MDL but less than PQL

z - concentration exceeds MCL

DiSorbo
Environmental Consulting Firm

Western Refining SW, Inc.
Gallup Refinery - OW-14 Area Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc. / Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollw Stem Auger 7.5"
Sampling Method	: 2' Split Spoon - 2" Diameter
Comments	: N 35° 29.493' / W 108° 25.501'
Total Depth	: 27'
Ground Water	: 18'
Start Date	: 09/21/2016
Finish Date	: 09/21/2016

WELL NO. OW-57

(Sheet 1 of 2)

Elev., TOC (ft.msl)	: 6933.10
Elev., PAD (ft. msl)	: 6930.64
Elev., GL (ft. msl)	:
Site Coordinates	:
N	: N 163475.52
E	: E 2546961.79

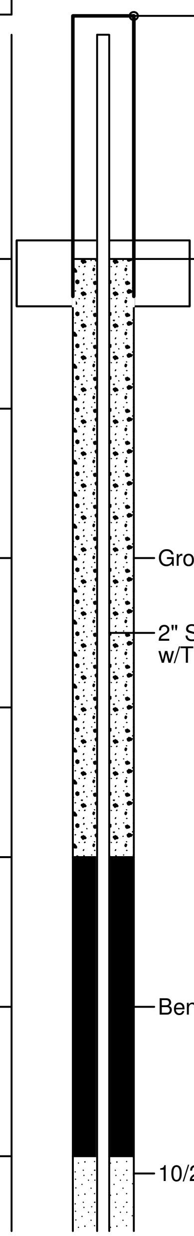
Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	0.6			CL	100		SILTY CLAY, moderate, firm, damp, brown, no odor,
2–4	0.6			CL	100		SILTY CLAY, SIMILAR TO ABOVE (STA),
4–6	2.6			CL	100		SILTY CLAY, STA,
6–8	6.2			CL	100		SILTY CLAY, STA, darker brown,
8–10	23.7			CL	90		SILTY CLAY, STA, no odor,
10–12	118			CL	90		SANDY CLAY, low, soft, damp, brown, odor,
12–13	85			CL			SANDY CLAY, STA, brown/tan silt at base, odor,

Completion Results

OW-57



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Environmental Consulting Firm

Western Refining SW, Inc.
Gallup Refinery - OW-14 Area Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc. / Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollw Stem Auger 7.5"
Sampling Method	: 2' Split Spoon - 2" Diameter
Comments	: N 35° 29.493' / W 108° 25.501'
Total Depth	: 27'
Ground Water	: 18'
Start Date	: 09/21/2016
Finish Date	: 09/21/2016

WELL NO. OW-57

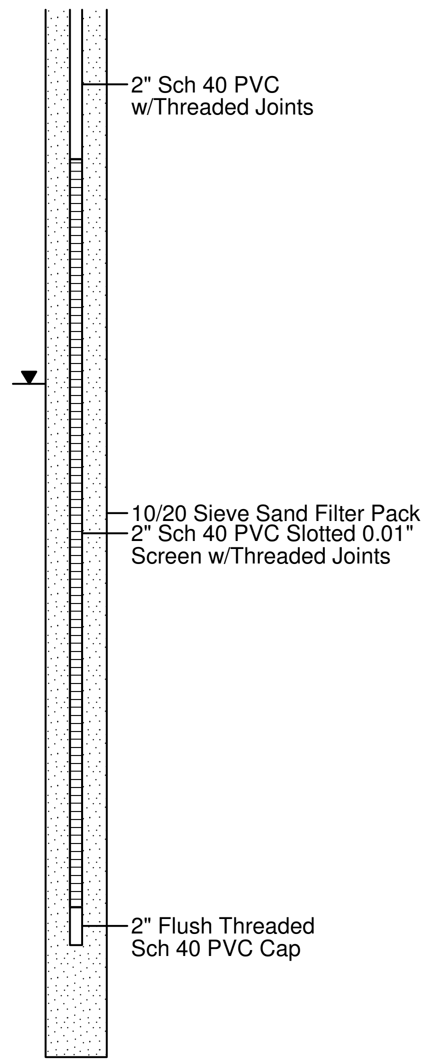
Elev., TOC (ft.msl)	: 6933.10
Elev., PAD (ft. msl)	: 6930.64
Elev., GL (ft. msl)	:
Site Coordinates	:
N	: N 163475.52
E	: E 2546961.79

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	USCS	Recovery (%)	DESCRIPTION
13–14	85	CL	80	
14–16	197	ML	90	CLAYEY SILT, very fine, soft, damp, brown and tan, odor,
16–18	205	CL	60	SILTY CLAY, low, firm, tan and brown, damp, odor,
18–20	58	CL	20	GRAVELLY CLAY, low, soft, damp to slightly moist to saturated, sandstone gravel, sandy, odor,
20–22	243	SS	10	SANDSTONE/SAND, fine, dense, llight greenish white,very moist to saturated,
22–24	846	CL	70	GRAVELLY SANDY CLAY, low, soft, very moist to saturated, grey, green sandstone, calcareous, odor,
24–25		CL	70	GRAVELLY SANDY CLAY, STA, odor,
25–26	44	CL/ST	70	CLAYSTONE, very dense, dry, purple, grey at base, faint odor,
26–27	39	CL/ST	30	CLAYSTONE, STA, faint odor.

Completion Results

OW-57



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Gallup Refinery - OW-14 Area Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc. / Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollw Stem Auger 7.5"
Sampling Method	: 2' Split Spoon - 2" Diameter
Comments	: N 35° 29.500' / W 108° 28.410'
Total Depth	: 48.5'
Ground Water	: 29'
Start Date	: 09/22/2016
Finish Date	: 09/22/2016

WELL NO. OW-58

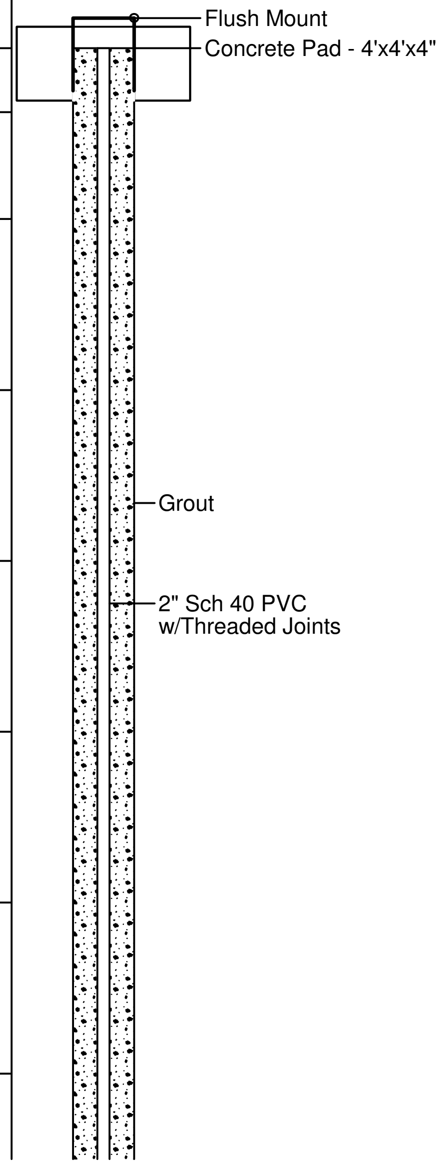
Elev., TOC (ft.msl)	: 6934.50
Elev., PAD (ft. msl)	: 6934.71
Elev., GL (ft. msl)	:
Site Coordinates	:
N	: N 1634800.15
E	: E 2547414.91

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–0.75				AR	100		ASPHALT/BASE,
0.75–2	110			CL	100		SILTY CLAY, moderate, firm to stiff, damp, brown, odor,
2–4	40			CL	100		SILTY CLAY, SIMILAR TO ABOVE (STA),
4–6	11.2			CL	100		SILTY CLAY, STA, moist, faint odor,
6–8	2.2			CL	90		SILTY CLAY, low, soft, damp, brown, faint odor,
8–10	5.3			CL	60		SILTY CLAY, STA, no odor,
10–12	37			CL	80	X	SILTY CLAY, STA, sticky, black discoloration, odor,
12–13	42			CL			SILTY CLAY, STA,

Completion Results

OW-58



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DiSorbo Environmental Consulting Firm Western Refining SW, Inc. Gallup Refinery - OW-14 Area Investigation Job No. WEST16006	Geologist : Tracy Payne Driller : Enviro-Drill, Inc. / Cohagan Drilling Rig : CME 75 Drilling Method : Hollw Stem Auger 7.5" Sampling Method : 2' Split Spoon - 2" Diameter Comments : N 35° 29.500' / W 108° 28.410' Total Depth : 48.5' Ground Water : 29' Start Date : 09/22/2016 Finish Date : 09/22/2016	WELL NO. OW-58 (Sheet 2 of 4) Elev., TOC (ft.msl) : 6934.50 Elev., PAD (ft. msl): 6934.71 Elev., GL (ft. msl) : Site Coordinates : N : N 1634800.15 E : E 2547414.91

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
13–14	42			CL	70		
14–16	25			CL	60		SILTY CLAY, low, stiff, damp, brown with black discoloration, faint odor,
16–18	226			CL	60		SANDY CLAY, low, stiff, very fine grain sand, damp, brown, odor,
18–20	240			CL	50		SANDY CLAY, STA, odor,
20–22	200			CL	60		SANDY CLAY, STA, odor,
22–24	2020			CL	90	X	SILTY CLAY, low, very stiff, damp, brown, tan silt pockets/seams present, odor,
24–26	1980			CL	90		SILTY CLAY, low, firm, soft/ crumbly, damp, brown, strong odor, outside of core is oily/phase separated hydrocarbon (PSH),
26–27	973			CL			SILTY CLAY, STA, firm to stiff, odor, outside of core is oily/PSH,

Completion Results

OW-58

Grout

2" Sch 40 PVC w/Threaded Joints

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Gallup Refinery - OW-14 Area Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc. / Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollw Stem Auger 7.5"
Sampling Method	: 2' Split Spoon - 2" Diameter
Comments	: N 35° 29.500' / W 108° 28.410'
Total Depth	: 48.5'
Ground Water	: 29'
Start Date	: 09/22/2016
Finish Date	: 09/22/2016

WELL NO. OW-58

(Sheet 3 of 4)

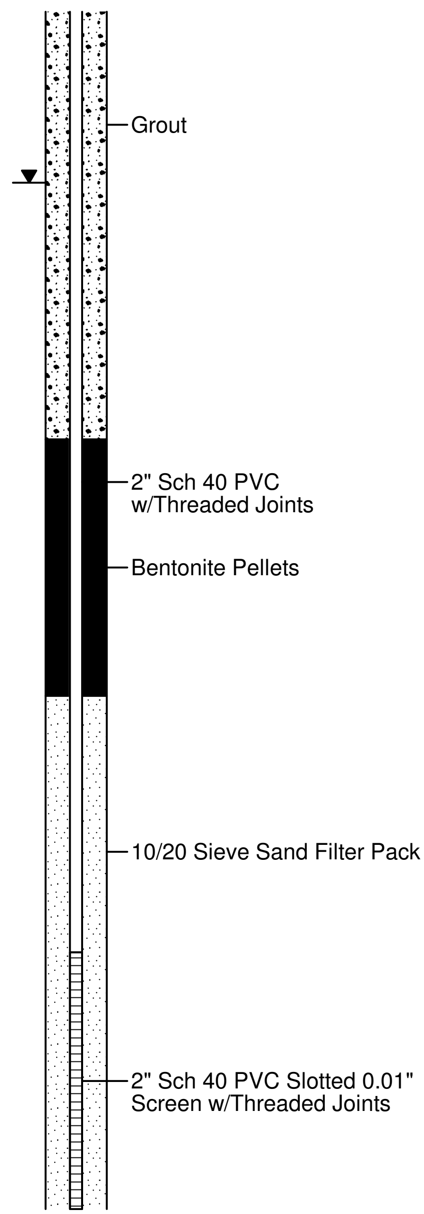
Elev., TOC (ft.msl)	: 6934.50
Elev., PAD (ft. msl)	: 6934.71
Elev., GL (ft. msl)	:
Site Coordinates	:
N	: N 1634800.15
E	: E 2547414.91

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
27	973			CL	90		
28				CL	90		SILTY CLAY, STA, damp to moist, odor,
29	2784	▼		CL/SC	90		SANDY CLAY/CLAYEY SAND, low, soft, very moist to saturated, dark brown, odor,
30	2350			CL	90		SANDY SILTY CLAY, low, firm, damp, saturated sand at base, grey/brown, odor,
32	1775			SM	90		SILTY SAND, fine, loose, saturated, grey/brown, odor,
33.5				CL	90		SILTY CLAY, low, soft, damp, greyish brown, odor,
34	575			CL	90		SILTY CLAY, STA, damp to very moist, odor,
36	227			CL	80		SILTY CLAY, low, firm, damp, greyish brown, odor,
38	545			CL	50		SILTY CLAY, STA, brown, odor,
40	531			CH			CLAY, high, firm, damp, brown, odor,

Completion Results

OW-58



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Comments	: N 35° 29.500' / W 108° 28.410'
Total Depth	: 48.5'
Ground Water	: 29'
Start Date	: 09/22/2016
Finish Date	: 09/22/2016

WELL NO. OW-58

Elev., TOC (ft.msl)	: 6934.50
Elev., PAD (ft. msl)	: 6934.71
Elev., GL (ft. msl)	:
Site Coordinates	:
N	: N 1634800.15
E	: E 2547414.91

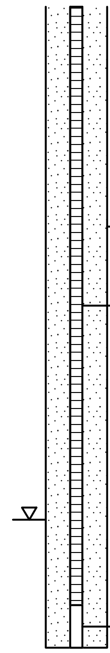
Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
41	531			CH	50		
42–43	288			CH	50		CLAY, STA, odor,
44–45	357			CL	50		SILTY CLAY, low to moderate, firm, occasional gravel, damp, brown, odor,
46		▽		CL	50		SILTY CLAY, STA, odor,
47	204			SP	50		SANDY GRAVEL, medium to coarse sand with 1/4 to 1/2 inch gravel, very moist to saturated, trace silt/clay, brown, odor,
48	250			SH	10	☒	SHALE, very dense/hard, dry, dark grey, odor.

Depth (ft.): 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55

Completion Results

OW-58



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Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 49'
Ground Water	: 32' BGL
Start Date	: 9/23/2016
Finish Date	: 9/23/2016

WELL NO. TK 568-1

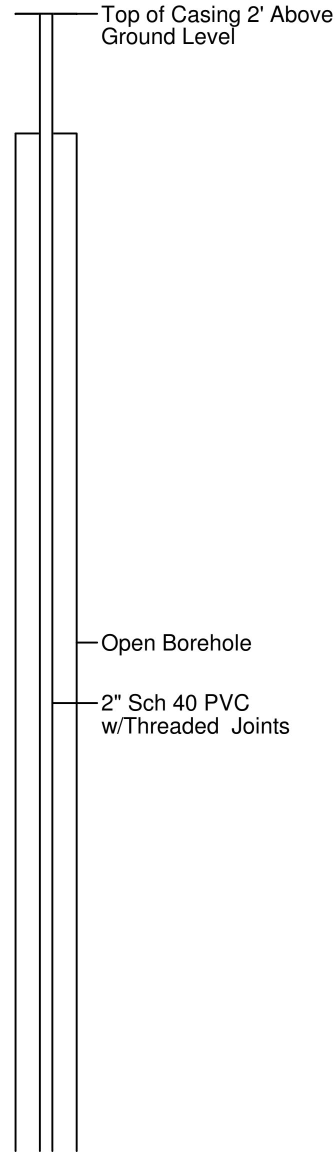
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6950.66
Site Coordinates	:
N	: N 35° 29.412'
E	: W 108° 25.430

Saturation
▼ Saturation
▽ Saturation

Temporary Well

Temporary Well No. TK 568-1

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	0.8		▨	CL	100		SANDY SILTY CLAY, low, soft, damp, brown, no odor,
2–4	3.1		▨	CL	100		SANDY SILTY CLAY, SIMILAR TO ABOVE (STA), no odor,
4–6	15.9		▨	CL	100		SANDY SILTY CLAY, STA, no odor,
6–8	66.9		▨	CL	60		SANDY SILTY CLAY, STA, odor,
8–10	309		▨	CL	60		SANDY SILTY CLAY, STA, odor,
10–12	2214		▨	CL	80		SILTY CLAY, low, firm, damp, brown, odor,
12–14	1957		▨	CL	80	☒	SILTY CLAY, STA, trace very fine grain sand, damp, odor, inside of spoon oily,
14–16	976		▥	ML	90		CLAYEY SANDY SILT, very fine grain, low, soft, damp to moist, brown, odor,
16–17	1243		▥	ML			SANDY CLAYEY SILT, STA, moist in sand seams, odor,



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Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 49'
Ground Water	: 32' BGL
Start Date	: 9/23/2016
Finish Date	: 9/23/2016

WELL NO. TK 568-1

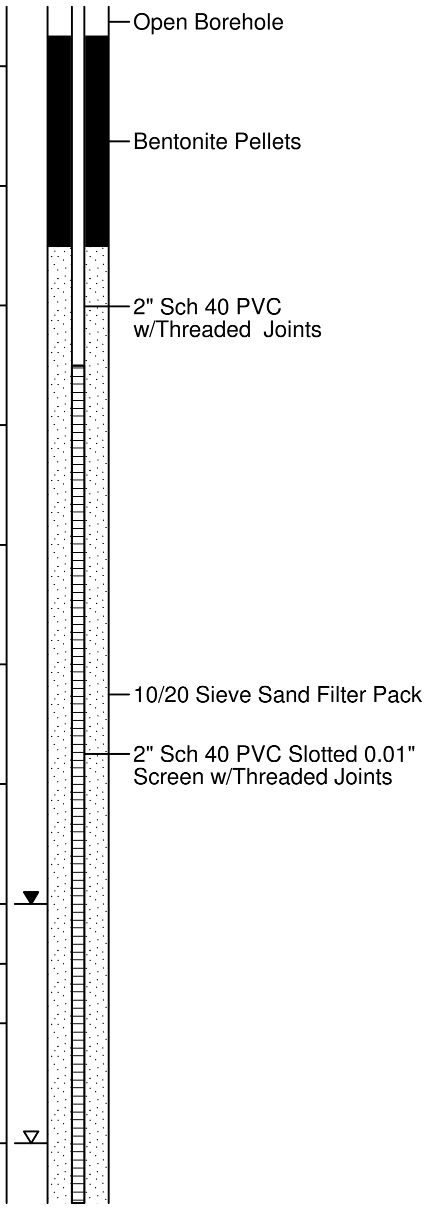
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6950.66
Site Coordinates	:
N	: N 35° 29.412'
E	: W 108° 25.430

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
17–18	1243			ML	90		
18–20	1731			ML	90		SANDY CLAYEY SILT, STA, odor,
20–22	1780			ML	90		SANDY CLAYEY SILT, STA, odor,
22–24	1125			ML	90		CLAYEY SANDY SILT, very fine grain sand, soft, damp to moist, brown, odor,
24–26	1119			CL	90		SILTY SANDY CLAY, low, soft to firm, damp, brown, odor,
26–28	965			CL	90		SILTY SANDY CLAY, STA, odor,
28–30	970			CL	90		SILTY SANDY CLAY, STA, odor,
30–32	1308	▼		CL	90	X	SILTY SANDY CLAY, STA, black discoloration in sand at base, very moist, odor,
32–33	1680			SC	90		CLAYEY SAND, fine grain, loose, saturated, black, odor,
33–34	733			CL	90		SILTY CLAY, low, firm, damp, brown, odor,
34–36	1695	▽		CL	90		SILTY SANDY CLAY, low, soft, black discoloration, damp, brown, odor,
36–37	1282			SM			SILTY SAND, fine, loose, saturated, grey, odor, poor recovery,

Temporary Well

Temporary Well No. TK 568-1



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Geologist	: Tracy Payne
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Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 49'
Ground Water	: 32' BGL
Start Date	: 9/23/2016
Finish Date	: 9/23/2016

WELL NO. TK 568-1

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6950.66
Site Coordinates	:
N	: N 35° 29.412'
E	: W 108° 25.430

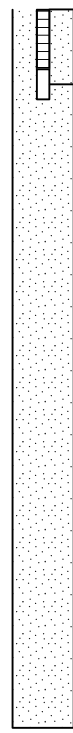
Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
37–38	1282			SM	10		
38–40	1078			CL	80		SANDY CLAY, low, firm, damp to moist, brown, odor, sheen on core,
40–42	383			CL	20		SANDY CLAY, STA, damp, odor,
42–44	476			CL	20		SANDY CLAY, STA, white clay at base, odor,
44–46	144			CL	50		CLAY, low, dense/crumbly, dry, dark reddish brown/grey, no odor,
46–48	80			CL	20		CLAY, STA,
48–49	41			SH	20	☒	SANDY SHALE, very dense, dry, grey, no odor.

Depth scale: 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57

Temporary Well

Temporary Well No. TK 568-1



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Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 37'
Ground Water	: 30'
Start Date	: 9/27/2016
Finish Date	: 9/27/2016

WELL NO. TK 568-2

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6950.66
Site Coordinates	:
N	: N 35° 29.396'
E	: W 108° 25.435'

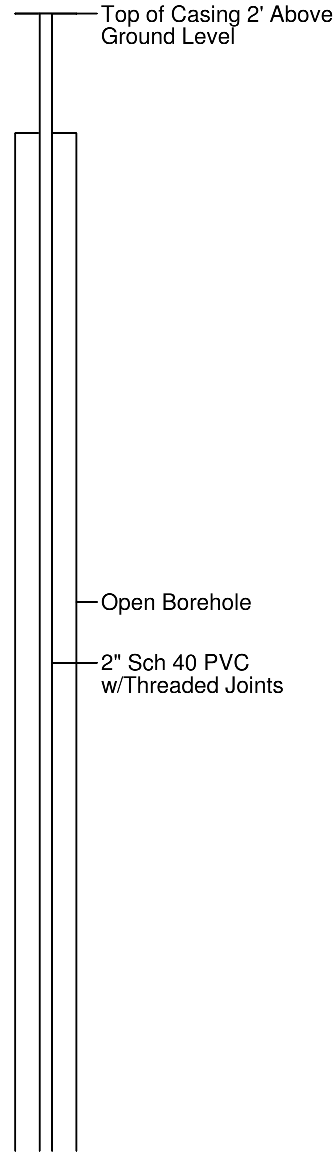
Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	0.2			CL	100		SILTY CLAY, low, firm, damp, brown,
2–4	0.5			CL	100		SILTY CLAY, SIMILAR TO ABOVE (STA), no odor,
4–6	4.3			CL	100		SILTY CLAY, STA, faint odor,
6–8	4.6			CL	40		SILTY CLAY, low, soft, damp, brown, no odor,
8–10	5.3			CL	40		SILTY CLAY, STA, no odor,
10–12	30.8			CL	40		SANDY CLAY, low, soft, damp, brown, no odor,
12–14	34.5			CL	40		SANDY CLAY, STA, no odor,
14–16	16.0			CL	40		SANDY CLAY, STA, trace gravel, faint odor,
16–17	-						No Recovery

Temporary Well

Temporary Well No. TK 568-2



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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist : Tracy Payne
Driller : Enviro-Drill, Inc./Cohagan
Drilling Rig : CME 75
Drilling Method : Hollow-Stem Auger
Sampling Method : 2" Split Spoon - 2" Diameter
Comments : Hand Augered to 6 Feet
Total Depth : 37'
Ground Water : 30'
Start Date : 9/27/2016
Finish Date : 9/27/2016

WELL NO. TK 568-2

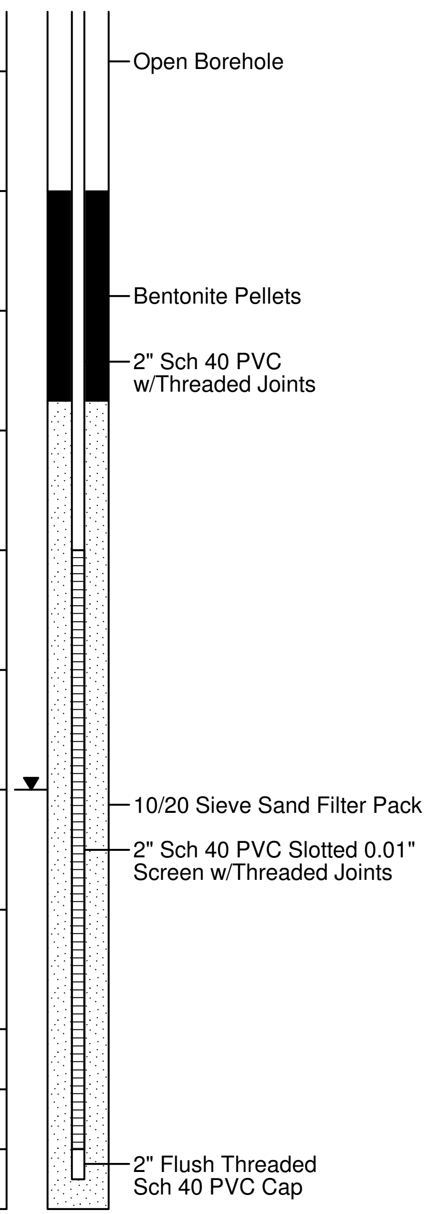
Elev., TOC (ft.msl) :
Elev., PAD (ft. msl) :
Elev., GL (ft. msl) : 6950.66
Site Coordinates :
N : N 35° 29.396'
E : W 108° 25.435'

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
17–18	-				-		
18–20	36.5			CL	40		SANDY CLAY, STA, faint odor,
20–22	29.6			CL	40		SANDY CLAY, STA, trace gravel, faint odor,
22–24	82			SC	60	X	CLAYEY SAND, fine grain, loose, trace gravel, damp, brown, odor,
24–26	-				-		No Recovery - white sandstone lodged in shoe
26–28	-				-		No Recovery - very dense hard sandstone in shoe
28–30	2803	▼		SC	90	X	CLAYEY SAND, very fine to fine, compact, moist to saturated at 30', brown, odor,
30–32	-			SC	90		CLAYEY SAND, STA, white sandstone lenses present, trace gravel, odor,
32–34	-			SP	90		GRAVELLY SAND, fine to medium, compact, gravel 1/4 to 1/2", saturated, brown, odor, sheen on sampler,
34–35	-			GP	90		SANDY GRAVEL, well rounded, loose, saturated, odor,
35–36	53			CLST	90		CLAYSTONE, very hard/dense, dry, dark reddish brown,
36–37	21			CLST	50	X	CLAYSTONE, STA, shaley at base.

Temporary Well

Temporary Well No. TK 568-2



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Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 42'
Ground Water	: 24-26'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-1

(Sheet 1 of 3)

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.469'

Saturation
▼ Saturation
▽ Saturation

Temporary Well

Temporary Well No. TK 569-1

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	7.3			CL	100		SILTY CLAY, low, firm, damp, brown, no odor,
2–4	6.6			CL	100		SILTY CLAY, SIMILAR TO ABOVE (STA),
4–6	4.1			CL	100		SILTY CLAY, STA,
6–8	0.5			CL	90		SILTY CLAY, STA,
8–10	0.5			CL	90		SILTY CLAY, STA,
10–12	2.3			CL	80		SILTY CLAY, STA,
12–14	4.2			CL	70		SILTY CLAY, STA, trace very fine grain sand,
14–15	13.6			CL			SANDY CLAY, low, firm to soft, very fine grain sand throughout, damp, brown,

Well construction:
Top of Casing 2.5' Above Ground Level
2" Sch 40 PVC w/Threaded Joints
Open Borehole

DiSorbo
Environmental Consulting Firm

Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 42'
Ground Water	: 24-26'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-1

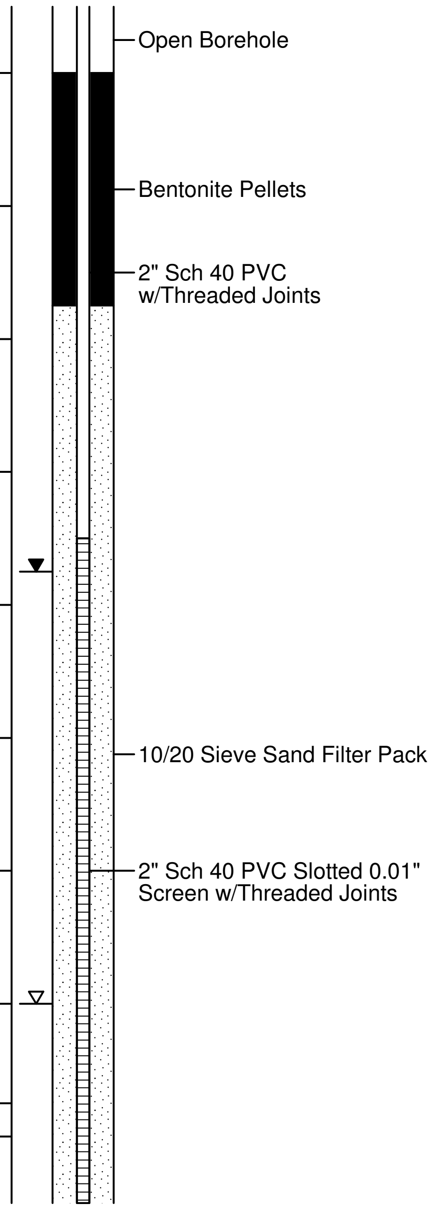
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.469'

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
15–16	13.6			CL	70		
16–18	32.6			CL	60		SANDY CLAY, STA, odor,
18–20	152			CL	70	X	SANDY CLAY, STA, odor,
20–22	41.6			SC/SM	90		CLAYEY SILTY SAND, fine to medium grain, compact, becomes more silty with depth, gravel at base, damp, odor,
22–24	92.2	▼		SC/SM	90		CLAYEY SILTY SAND, STA, medium to coarse sand, occasional gravel, damp,
24–26	2158			SC/SM	90	X	CLAYEY SILTY SAND, very fine grain, compact, moist to saturated in silty sand seams, brown, odor,
26–28	1147			CL	20		SANDY CLAY, STA with greater clay content, brown trace gravel at base, moist to saturated in silty sand seams,
28–30	1060	▽		SM	50		GRAVELLY SILTY SAND, medium to coarse grain, compact, damp to moist in seams-not saturated throughtout core, brown, odor, sandstone gravel present,
30–31.5	1353			GW	60		CLAYEY SANDY GRAVEL, 1/8" to 1/2" gravel with medium to coarse grain sand, compact to loose, saturated, brown, odor,
31.5–32				CL	60		SILTY CLAY, low, firm, damp, brown, odor,
32–33	1622			CL			SILTY CLAY, STA, odor,

Temporary Well

Temporary Well No. TK 569-1



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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 42'
Ground Water	: 24-26'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-1

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.469'

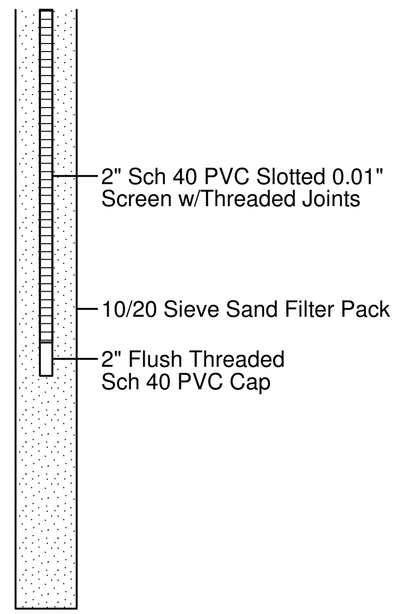
Saturation
▼ Saturation
▽ Saturation

Temporary Well

Temporary Well No. TK 569-1

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
33–34	1622		▨	CL	50		
34–36	1292		▨	CL	70		SILTY CLAY, STA, gravel present at base,
36–38	1621		▨	CH	10	☒	CLAY, high, firm, traces gravel, damp, reddish brown/gray,
38–40	1649		░	GW	50		CLAYEY GRAVEL, sandstone present, very hard, damp, odor,
40–42	95.6		■	CLST	20	☒	CLAYSTONE, very dense, light reddish purple/grey, odor.

Depth scale: 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51



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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 38'
Ground Water	: 31'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-2

(Sheet 1 of 3)

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.451'

Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
-3							
-2							
-1							
0							SILTY CLAY, low, firm, damp, brown, no odor,
1	0.3			CL	100		
2							SILTY CLAY, SIMILAR TO ABOVE (STA),
3	0.1			CL	100		
4							SILTY SAND, fine, compact, damp, brown, no odor,
5	0.0			SM	100		
6							SILTY SAND, STA,
7	0.0			SM	60		
8							SILTY CLAY, low, soft, damp, brown, no odor,
9	0.6			CL	60		
10							SILTY CLAY, STA, poor recovery,
11	7.2			CL	10		
12	36.5			CL			SILTY CLAY, STA, very soft, poor recovery, faint odor,
13							

Temporary Well

Temporary Well No. TK 569-2

Top of Casing 2' Above Ground Level

Open Borehole

2" Sch 40 PVC w/Threaded Joints

DiSorbo
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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 38'
Ground Water	: 31'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-2

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.451'

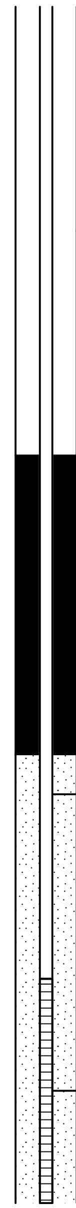
Saturation

▼ Saturation

Temporary Well

Temporary Well No. TK 569-2

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
13–14	36.5			CL	10		
14–16	899			SC	70		CLAYEY SAND, very fine grain, compact, damp, brown, odor,
16–18	2332			SC	70	X	CLAYEY SAND, STA, odor,
18–20	702			SC/CL	90		CLAYEY SAND/SANDY CLAY, STA, odor,
20–22	833			SC	60		CLAYEY SAND, STA, sand/gravel lense from 21-21.5', loose, damp, grey,
22–23.5	398			SM	90		SILTY SAND, fine grain, loose, damp, brown, odor,
23.5–24				GW			SANDY GRAVEL, grey sandstone gravel with fine to coarse grain sand, damp, odor,
24–26	190			GW	10		SANDY GRAVEL, STA, white sandstone present,
26–28	1973			GW	10		SANDY GRAVEL, STA, white sandstone present,
28–29	1684			GW			SANDY GRAVEL, STA, poor recovery, very hard, trace clay, damp,



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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 38'
Ground Water	: 31'
Start Date	: 10/4/2016
Finish Date	: 10/4/2016

WELL NO. TK 569-2

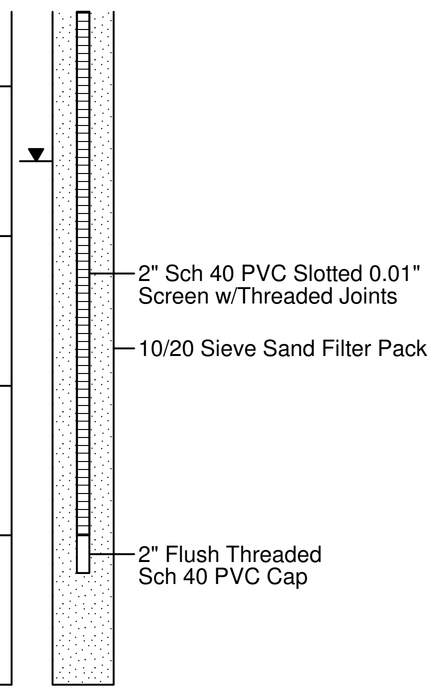
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.403'
E	: W 108° 25.451'

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
29–30	1145			GW	10		
30–32	1420	▼ 31		SC	90		SILTY CLAY, low, firm to soft, damp, moist to saturated, silty sand seams throughout, dark brown, odor,
32–34	1390			CH	80		CLAY, high, stiff, damp, brown, odor,
34–36	1210			GW	20		CLAYEY GRAVEL, very hard with 4-6" sandstone (grey) at base, odor,
36–38	405			CLST	90		CLAYSTONE, very hard, dry, reddish purple and grey.

Temporary Well

Temporary Well No. TK 569-2



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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 39'
Ground Water	: 26'
Start Date	: 9/28/2016
Finish Date	: 9/28/2016

WELL NO. TK 569-3

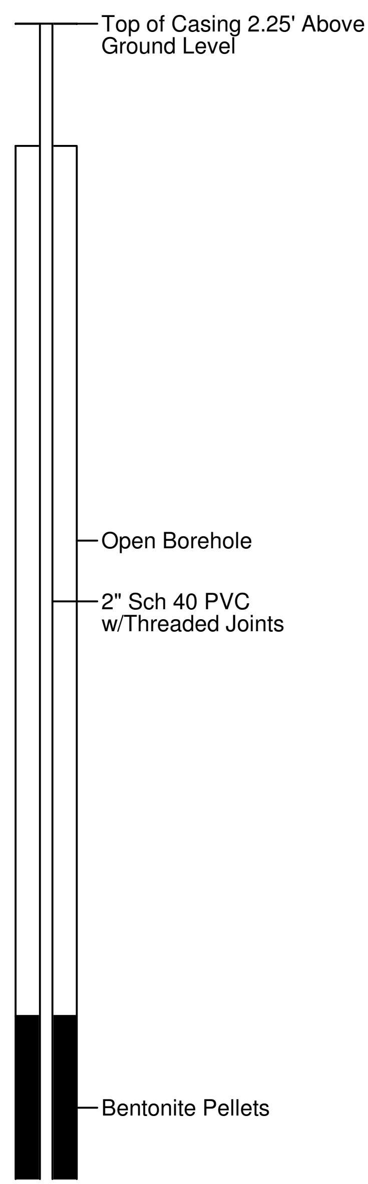
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.390'
E	: W 108° 25.459'

Saturation
▼ Saturation
▽ Saturation

Temporary Well

Temporary Well No. TK 569-3

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	8.9			CL	100		SILTY CLAY, low, firm, damp, brown, no odor,
2–4	10.4			CL	100		SILTY CLAY, SIMILAR TO ABOVE (STA),
4–6	12.4			CL	100		SILTY CLAY, STA,
6–8	31.8			CL	60		SILTY CLAY, STA,
8–10	27.6			CL	50		SILTY CLAY, STA, soft,
10–12	50.9			CL	70		SILTY CLAY, low, firm, damp, brown, odor,
12–14	63.9			CL	60		SILTY CLAY, STA, trace very fine grain sand, odor,
14–16	303			SC	70		CLAYEY SAND, very fine, compact, damp, brown, odor,
16–18	377			SC	70	X	CLAYEY SAND, STA, odor,
18–19	250			SC/CL			CLAYEY SAND/SANDY CLAY, STA, odor,



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Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 39'
Ground Water	: 26'
Start Date	: 9/28/2016
Finish Date	: 9/28/2016

WELL NO. TK 569-3

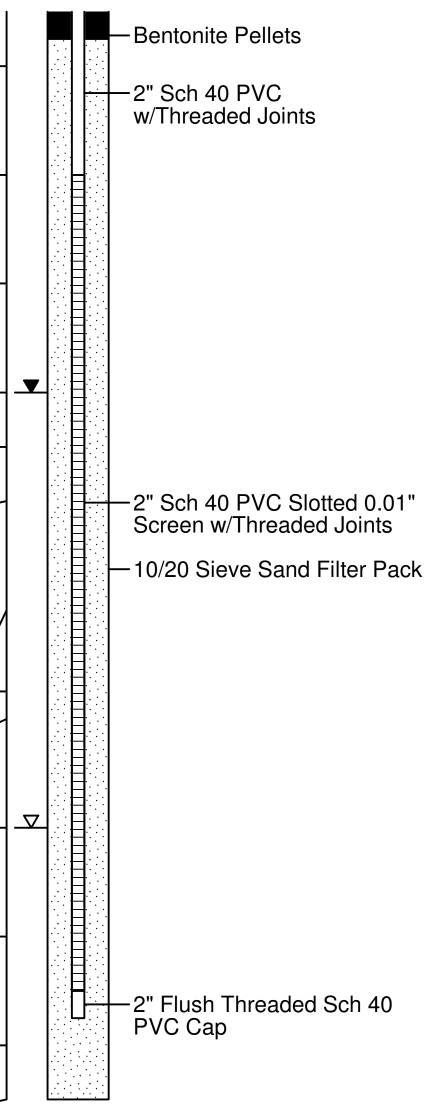
Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6952.00
Site Coordinates	:
N	: N 35° 29.390'
E	: W 108° 25.459'

Saturation
▼ Saturation
▽ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
19–20	250			SC/CL	80		
20–22	387			CL	80		SANDY CLAY, low, firm, damp, brown, odor,
22–24	405			CL	60		SANDY CLAY, STA, odor,
24–26	955	▼		SM	70	☒	SILTY SAND, fine grain, loose, very moist, brown, odor, phase separated hydrocarbon (PSH),
26–27				SM	90		SILTY SAND, STA, saturated, odor, PSH,
27–28	sat			GW	90		SANDY GRAVEL, compact, 1/2"-1" gravel, medium to coarse sand, saturated, odor, PSH,
28–30	sat			GW	80		SANDY CLAYEY GRAVEL, STA, clay present, very moist to saturated in seams, pockets, sandstone (white) present, very dense, greenish grey sandstone at base, strong odor, ,
30–31.5				GW	50		SANDY CLAYEY GRAVEL, STA, saturated, odor,
31.5–32	1620			CL	50		SILTY CLAY, low, firm, damp, brown, odor,
32–34	1950	▽		CL	90		SILTY CLAY, STA, moderate, grey streaks, odor,
34–36				GW	90		SANDY GRAVEL, compact, 1/4"-1/2" gravel, coarse sand, saturated, odor,
36–38	239			GW	20		SANDY CLAYEY GRAVEL, very hard, 1/4" gravel with clay and sand, damp, grey and brown, odor,
38–39	258			CLST	30	☒	CLAYSTONE, very hard, dry, reddish purple and grey.

Temporary Well

Temporary Well No. TK 569-3



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DiSorbo
Environmental Consulting Firm

Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 45'
Ground Water	: 33' BGL
Start Date	: 9/27/2016
Finish Date	: 9/27/2016

WELL NO. TK 570-1

(Sheet 1 of 3)

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6958.88
Site Coordinates	:
N	: N 35° 29.377'
E	: W 108° 25.459'

Saturation

▼ Saturation

Temporary Well

Temporary Well No. TK 570-1

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	5.3			FILL	100		FILL-SILT/GRAVEL, damp, brown, no odor,
2–4	14.9			FILL	100		FILL-SILT/GRAVEL, SIMILAR TO ABOVE (STA), faint odor,
4–6	15.8			FILL	100		FILL-SILT/GRAVEL, STA, faint odor,
6–8	24.1			SW	90		GRAVELLY SAND, medium to coarse, loose, damp, odor,
8–10	1775			GM	90		CLAYEY GRAVEL, 1/4" to 1/2" gravel in low plastic, brown, damp clay, odor,
10–12	3445			ML	10		SANDY SILT, low, very soft, damp, dark brown, odor,
12–13	2408			ML			SANDY SILT, STA, odor,

Well construction notes: Top of Casing 2' Above Ground Level; 2" Sch 40 PVC w/Threaded Joints; Open Borehole

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Environmental Consulting Firm

Western Refining SW, Inc
Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 45'
Ground Water	: 33' BGL
Start Date	: 9/27/2016
Finish Date	: 9/27/2016

WELL NO. TK 570-1

(Sheet 2 of 3)

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6958.88
Site Coordinates	:
N	: N 35° 29.377'
E	: W 108° 25.459'

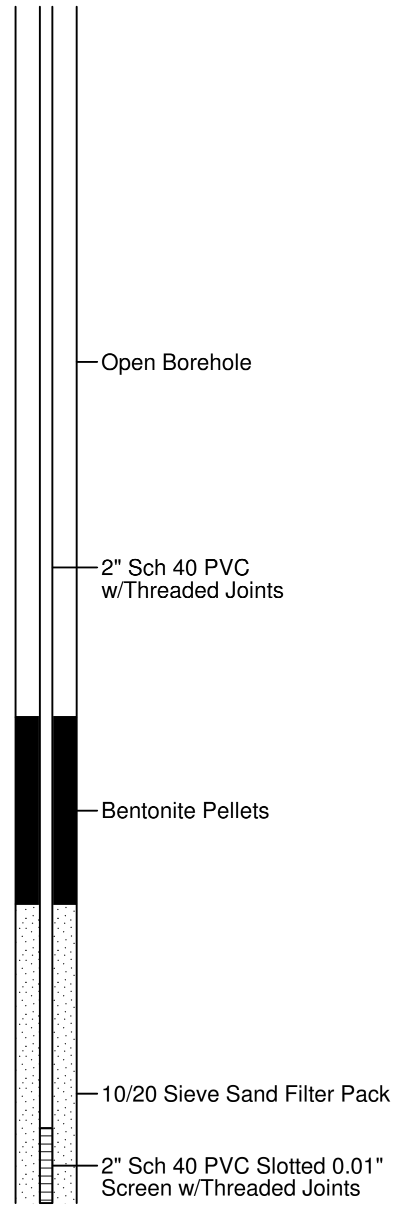
Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
13	2408			ML	10		
14–16	2350			CL	90		SANDY CLAY, low, firm to soft, damp, sandy at base, brown, odor,
16–18	1139			CL	90		SILTY CLAY, low, firm, damp, ocassional sandy clay lenses, brown, odor,
18–20	1250			CL	90		SILTY CLAY, STA, odor,
20–21	1460			CL	90		SILTY CLAY, STA, odor,
21–22				SC	90		CLAYEY SAND, fine, compact to loose, damp, brown, odor,
22–24	399			SC	90		CLAYEY SAND, STA, decrease in clay with depth, odor,
24–26	695			SC	100		CLAYEY SAND, STA, odor,
26–28	952			SM	90		SILTY SAND, very fine, soft/compact, damp, brown, odor,
28–29	1441			SC			CLAYEY SAND, very fine, compact, damp, brown, odor,

Temporary Well

Temporary Well No. TK 570-1



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Gallup Refinery - OW-14 Source Investigation
Job No. WEST16006

Geologist	: Tracy Payne
Driller	: Enviro-Drill, Inc./Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Auger
Sampling Method	: 2" Split Spoon - 2" Diameter
Comments	: Hand Augered to 6 Feet
Total Depth	: 45'
Ground Water	: 33' BGL
Start Date	: 9/27/2016
Finish Date	: 9/27/2016

WELL NO. TK 570-1

Elev., TOC (ft.msl)	:
Elev., PAD (ft. msl)	:
Elev., GL (ft. msl)	: 6958.88
Site Coordinates	:
N	: N 35° 29.377'
E	: W 108° 25.459'

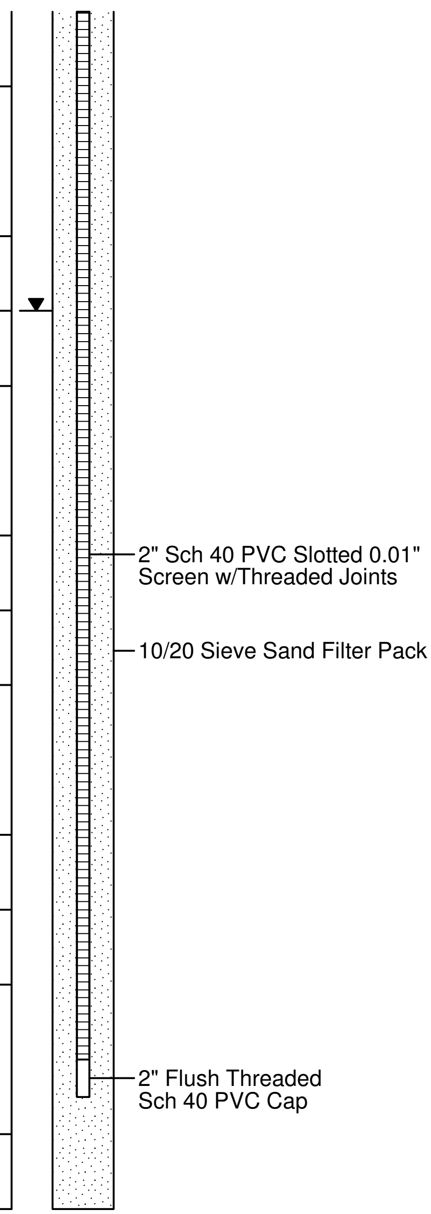
Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	USCS	Recovery (%)	Sample	DESCRIPTION
29–30	1441		SC	90		
30–32	968		SM	90		SILTY SAND, very fine, soft/loose, damp, brown, odor,
32–33	804	▼ (33)	SM	60	X	SILTY SAND, STA, damper than above,
33–34			SW	60		GRAVELLY SAND, medium to coarse, loose, very moist to saturated, grey, odor,
34–36			GW	90		SANDY GRAVEL, 1/2" to 1" gravel with sand, fine to coarse, saturated, brown, odor,
36–37			GW	90		SANDY GRAVEL, STA,
37–38	676		CH	90		CLAY, high, firm to stiff, brown, odor,
38–40	1392		CH	90		CLAY, STA, sandstone present,
40–41			CH	60		CLAY, STA,
41–42	1117		GW	60		CLAYEY SANDY GRAVEL, compact, moist to very moist, brown, odor,
42–44	555		CL	50		GRAVELLY CLAY, low, stiff, damp to dry, reddish brown,
44–45	165		CLST	70	X	CLAYSTONE, very stiff, dry, purple/reddish brown, odor.

Temporary Well

Temporary Well No. TK 570-1



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Aerial Map Source: Google Map, 01/05/2014.

0 160
SCALE IN FEET

LEGEND

TK 568-1 SOIL BORING / TEMP WELL LOCATION AND IDENTIFICATION NUMBER

OW-14 ALLUVIUM / CHINLE GP MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

NEW MEXICO
GALLUP SITE LOCATION

MARATHON PETROLEUM COMPANY
GALLUP REFINERY

PROJ. NO.: Marathon | DATE: 08/10/19 | FILE: Mathon–dB224

2019 SITE INVESTIGATION
LOCATION OF SOIL BORINGS AND WELLS

DiSorbo
Environmental Consulting Firm
8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759

Tank 570 WELLS FLUID LEVEL MEASUREMENTS

MARATHON - GALLUP REFINERY

Gallup, New Mexico

Well ID	Date	DTP (ft-btoc)	DTW (ft-btoc)	PSH thickness (ft)	Total Depth (ft-btoc)	Screen Interval (ft-bgl)	Stickup (ft)
TK570-1	9/30/2016	33.75	35.63	1.88	44.35	28 - 43	2.0
TK570-2	8/13/2019	33.52	33.53	0.01	45.39	24 - 44	3.0
TK570-3	8/13/2019	33.65	33.96	0.31	47.34	24 - 44	3.0
TK570-4	8/13/2019	ND	29.45	0	45.03	24 - 44	3.0
TK570-5	8/13/2019	33.92	34.38	0.46	47.32	24 - 44	3.0
RW-1	8/9/2019	27.46	28.12	0.66	NM	25 - 40	3.2

btoc - below top of casing   bgl - below ground level

ft - feet

PSH - phase-separated hydrocarbon

ND - not detected

NM - not measured

DTP - depth to product

DTW - depth to water

DiSorbo
Environmental Consulting Firm

Marathon Petroleum Company LP
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Driller Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" Diam.
Total Depth	: 48'
Saturation Depth	: 32' & 38' BGL
Start Date/Time	: 7-31-19 / 12:00
Finish Date/Time	: 7-31-19 / 17:00

WELL NO. TK 570-2

N	: N35° 29' 22.6"
E	: W108° 25' 27.7"
Comments	: Hand augered to 6' BGL
Air Temp. (F)	: High 87, Low 80

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	33.3			FILL	100		FILL - SAND/SILT/GRAVEL, dry to damp, brown, no odor.
2–4	7.8			SW	100		GRAVELLY SAND - medium, loose, brown, damp, no odor.
4–6	79.2			SW	100		GRAVELLY SAND - Similar to above (STA), odor at 5.5 feet becomes black, donned respirator per safety permit - no olfactory observations.
6–8	15,000			SW	100		GRAVELLY SAND - STA, black, damp.
8–10				--	0		No recovery, gravel in shoe.
10–11	15,000			CL			SILTY CLAY - moderate, soft, damp, brown.

Completion Results

TK 570-2

Top of Casing 3' above ground level

Open Borehole

2" Sch 40 PVC w/Threaded Joints

DiSorbo Consulting, LLC

1001 Louisiana Street, Suite 3250
Houston, Texas 77002
713-955-1230

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Austin, Texas 78759
512-693-4190

WELL NO. TK 570-2

DiSorbo Environmental Consulting Firm

Marathon Petroleum Company LP
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Driller Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" Diam.
Total Depth	: 48'
Saturation Depth	: 32' & 38' BGL
Start Date/Time	: 7-31-19 / 12:00
Finish Date/Time	: 7-31-19 / 17:00

N	: N35° 29' 22.6"
E	: W108° 25' 27.7"
Comments	: Hand augered to 6' BGL
Air Temp. (F)	: High 87, Low 80

Saturation
▼ Saturation

Completion Results
TK 570-2

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
11–12	15,000			CL	90		
12–14	15,000			CL	90		SANDY SILTY CLAY - low, soft, damp, brown, trace fine grain sand.
14–16	15,000			CL	90		SANDY SILTY CLAY - STA.
16–17.8	15,000			SC	90		CLAYEY SAND - very fine grain, compact, dark brown, moist to very moist, brown.
17.8–18				CH	90		CLAY - high, firm, damp, brown.
18–20	15,000			SC/CL	90		CLAYEY SAND / SANDY CLAY - soft, low plasticity, damp, brown.
20–22	15,000			CL	90		SILTY CLAY - low, firm, damp, brown.
22–24	15,000			SC	90		CLAYEY SAND - fine, soft/compact, damp, light brown to brown.
24–25	15,000			SC			CLAYEY SAND - STA.

Completion (11–25 ft): Open Borehole; Bentonite Pellets; 10/20 Sieve Sand Filter Pack; 2" Sch 40 PVC w/Threaded Joints; 2" Sch 40 PVC Slotted 0.01" Screen w/Threaded Joints

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Environmental Consulting Firm

Marathon Petroleum Company LP
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Driller Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" Diam.
Total Depth	: 48'
Saturation Depth	: 32' & 38' BGL
Start Date/Time	: 7-31-19 / 12:00
Finish Date/Time	: 7-31-19 / 17:00

WELL NO. TK 570-2

N	: N35° 29' 22.6"
E	: W108° 25' 27.7"
Comments	: Hand augered to 6' BGL
Air Temp. (F)	: High 87, Low 80

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
25–26	15,000			SC	30		
26–28	15,000			SM	90		SILTY SAND - very fine, soft/compact, moist/oily, brown.
28–30	15,000			CL	90		SILTY CLAY - low, soft, damp, brown, trace very fine grain sand.
30–32	15,000	▼ (32)		CL	90		SILTY CLAY - STA.
32–34	15,000			SM	90		SILTY SAND - very fine, soft, very moist to saturated, greyish brown.
34–36	15,000			SM	90		SILTY SAND - STA, brown-grey at base (35.75-36'), trace gravel
36–38	15,000	▼ (38)		CH	90		CLAY - high, firm to firm, brown.
38–39	15,000			GW			CLAYEY SANDY GRAVEL - compact, brown, saturated, 10-80mm gravel.

Completion Results

TK 570-2

10/20 Sieve Sand Filter Pack

2" Sch 40 PVC Slotted 0.01" Screen w/Threaded Joints

09-09-2019 C:\Box Sync\Sheftall, Allie\Projects for others\Crouch\WEST19038\Phase 3\TK 570-2.bor

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Marathon Petroleum Company LP
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Driller Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" Diam.
Total Depth	: 48'
Saturation Depth	: 32' & 38' BGL
Start Date/Time	: 7-31-19 / 12:00
Finish Date/Time	: 7-31-19 / 17:00

WELL NO. TK 570-2

N	: N35° 29' 22.6"
E	: W108° 25' 27.7"
Comments	: Hand augered to 6' BGL
Air Temp. (F)	: High 87, Low 80

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
39–40	15,000			GW	90		
40–42	15,000			CL	70		SILTY CLAY - low to moderate, stiff, brown, pockets of light tan silt throughout
42–44	15,000			CL	30		GRAVELLY CLAY - low, stiff, damp, brown, STA @ gravel.
44–46	2,810			CLST	25		CLAY/CLAYSTONE - low, very stiff, reddish brown and grey, damp, shaley.
46–48	822			CLST	25		CLAYSTONE - STA.

Completion Results

TK 570-2

2" Sch 40 PVC Slotted 0.01" Screen w/Threaded Joints
10/20 Sieve Sand Filter Pack
2" Flush Threaded Sch 40 PVC Cap

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DiSorbo
Environmental Consulting Firm

Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 33.5' BGL
Start Date/Time	: 8-1-2019 / 14:30
Finish Date/Time	: 8-5-2019 / 17:20

WELL NO. TK 570-3

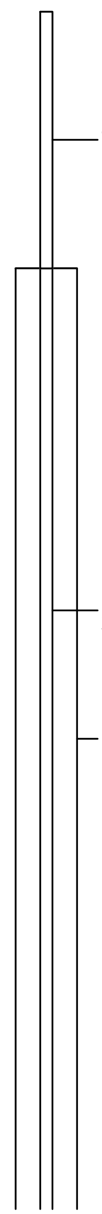
N	: N35° 29' 22.2"
E	: W108° 25' 28.1"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 86, Low 70

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
-3 to 0							
0–2	15,000			Fill	100	X	FILL - SILT/SAND/GRAVEL, dry to damp, brown, no odor. (Respirator donned - no olfactory observations.)
2–4	15,000			CL	80	X	SANDY CLAY - low, firm, damp, brown, calcareous, very fine grain sand.
4–6	15,000			CL	70		SANDY CLAY - Similar to above (STA), damp.
6–8	15,000			CL	60		SANDY CLAY - STA, damp.
8–9.75	15,000			CL	70		SANDY CLAY - STA, damp.
9.75–10				SM	70		SILTY SAND - fine, angular, compact, damp brown.
10–11	15,000			CL			SANDY CLAY - low, firm, damp, brown.

Completion Results

TK 570-3



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 33.5' BGL
Start Date/Time	: 8-1-2019 / 14:30
Finish Date/Time	: 8-5-2019 / 17:20

WELL NO. TK 570-3

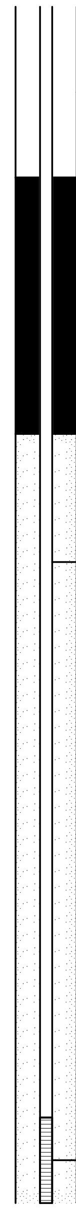
N	: N35° 29' 22.2"
E	: W108° 25' 28.1"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 86, Low 70

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
11–12	15,000			CL	70		
12–14	15,000			CH	80		SILTY CLAY - high, soft, damp, brown, trace very fine grain sand.
14–16	15,000			CL	80		SANDY SILTY CLAY - low to moderate, soft, damp, brown, very fine grain sand.
16–18	15,000			SM	40		SILTY SAND - fine to medium, subangular, loose, damp, brown, trace gravel.
18–20	15,000			CL	50		SANDY SILTY CLAY - low to moderate, firm to soft, damp, brown.
20–22	15,000			CL	90		SILTY CLAY - low, firm, damp, brown.
22–24	15,000			CL	90		SANDY SILTY CLAY - low, firm, damp, brown, very fine grain sand.
24–25	15,000			CL			SANDY SILTY CLAY - STA, damp.

Completion Results

TK 570-3



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Environmental Consulting Firm

Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 33.5' BGL
Start Date/Time	: 8-1-2019 / 14:30
Finish Date/Time	: 8-5-2019 / 17:20

WELL NO. TK 570-3

N	: N35° 29' 22.2"
E	: W108° 25' 28.1"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 86, Low 70

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
25–26	15,000			CL	90		
26–28	15,000			CL	90		SANDY SILTY CLAY - STA, sand lenses throughout, damp.
28–30	15,000			CL	90		SANDY SILTY CLAY - low, firm, damp, brown.
30–32	15,000			CL	100		SILTY CLAY - moderate to low, firm to soft, damp, brown.
32–33.5	15,000	▼		CL	100	X	SILTY CLAY - STA.
33.5–34	15,000			SM	100		SILTY SAND - fine to medium, loose, very moist, brown.
34–36	15,000			SP	100		SAND - medium, loose, saturated, brown.
36–38	15,000			SP	100		SAND - STA.
38–39	15,000			SP	100		SAND - STA.

Completion Results

TK 570-3

10/20 Sieve Sand Filter Pack

2" Sch 40 PVC Slotted 0.01" Screen w/Threaded Joints

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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 33.5' BGL
Start Date/Time	: 8-1-2019 / 14:30
Finish Date/Time	: 8-5-2019 / 17:20

WELL NO. TK 570-3

N	: N35° 29' 22.2"
E	: W108° 25' 28.1"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 86, Low 70

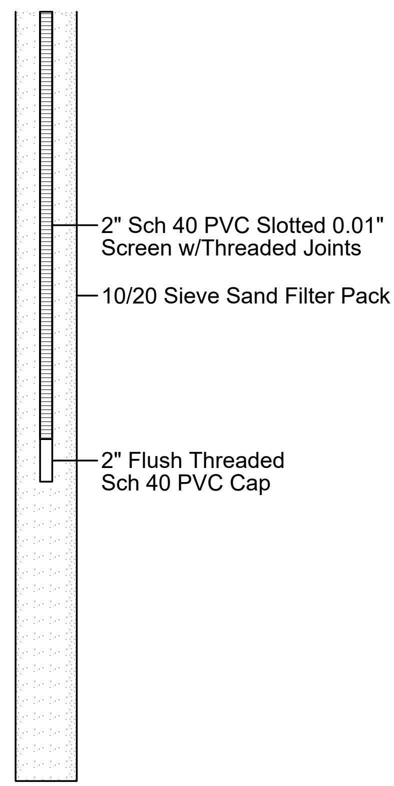
Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
39–40	15,000		▨	CL	100		CLAY - high, very stiff, damp, brown, dark olive brown sandstone at base.
40–42	15,000		▨	CL	80		SILTY CLAY - low, stiff, damp, dark brown, pockets of light tan silt throughout.
42–44	2810		▨	CL	80		SILTY CLAY - low, firm to soft, damp, moist in sand seams, gravel at base.
44–46	4494		■	CLST	50		CLAY/CLAYSTONE - low, very stiff, dark reddish brown-trace gray, damp, shaley.
46–48	116		■	CLST	40	☒	CLAYSTONE - STA.

Depth scale: 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53

Completion Results

TK 570-3



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagen
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 26' and 42' BGL
Start Date/Time	: 8-7-2019 / 19:50
Finish Date/Time	: 8-7-2019 / 13:00

WELL NO. TK 570-4

N	: N35° 29' 21.7"
E	: W108° 25' 27.5"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 75, Low 72

Saturation

▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0–2	95.2			FILL	100	X	FILL - SILT/SAND/GRAVEL, dry to damp, brown. (Respirator donned - no olfactory observations.)
2–4	28.2			CL	100	X	SANDY CLAY - low, firm, damp, brown, very fine grain sand.
4–6	82.9			CL	70		SANDY CLAY - Similar to above (STA), damp.
6–8	15,000			CL	70	X	GRAVELLY CLAY - low, soft, damp, brown, 10mm gravel.
8–10	15,000			CL	80		SANDY SILTY CLAY - low, soft, damp, brown, very fine grain sand.

Completion Results

TK 570-4

- Top of Casing 3' Above Ground Level
- 2" Sch 40 PVC w/Threaded Joints
- Open Borehole

DiSorbo
Environmental Consulting Firm

Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagen
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 26' and 42' BGL
Start Date/Time	: 8-7-2019 / 19:50
Finish Date/Time	: 8-7-2019 / 13:00

WELL NO. TK 570-4

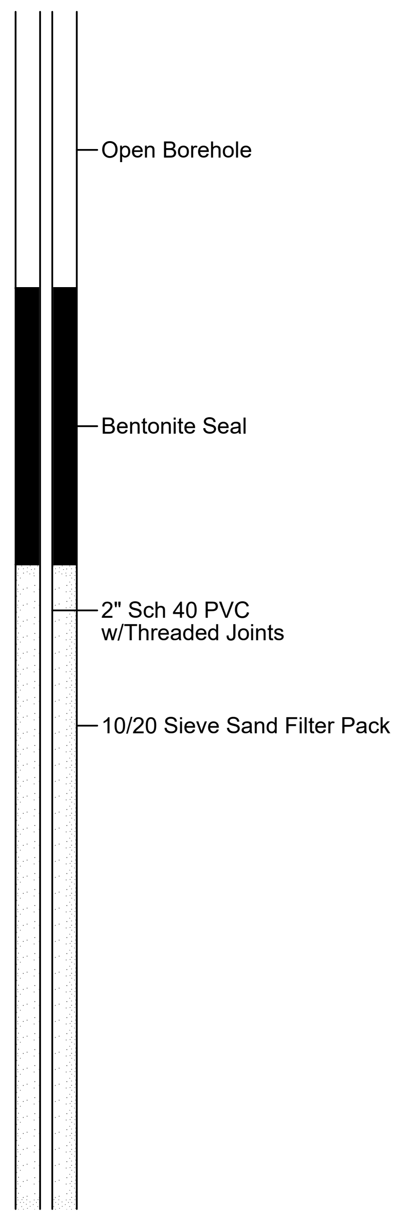
N	: N35° 29' 21.7"
E	: W108° 25' 27.5"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 75, Low 72

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
10–12	15,000			CL	25		SILTY CLAY - low, very soft, damp, greyish brown.
12–14	15,000			CL	25		SILTY CLAY - STA, damp.
14–16	15,000			CL	90		SILTY SANDY CLAY - low, very soft, damp, brown - sand in matrix and in lenses.
16–17	15,000			CL	90		SILTY SANDY CLAY - STA, damper than above.
17–18				CH	90		CLAY - high, very stiff, damp, brown.
18–20	15,000			CL	90		SILTY CLAY - low, very soft, damp, brown.
20–22	15,000			CL	90		SILTY CLAY - low, firm to soft, damp, brown, trace very fine grain sand.
22–23	15,000			CL			SILTY SANDY CLAY - low, soft/crumbly, damp, fine grain sand, calcareous at base.

Completion Results

TK 570-4



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagen
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 26' and 42' BGL
Start Date/Time	: 8-7-2019 / 19:50
Finish Date/Time	: 8-7-2019 / 13:00

WELL NO. TK 570-4

(Sheet 3 of 4)

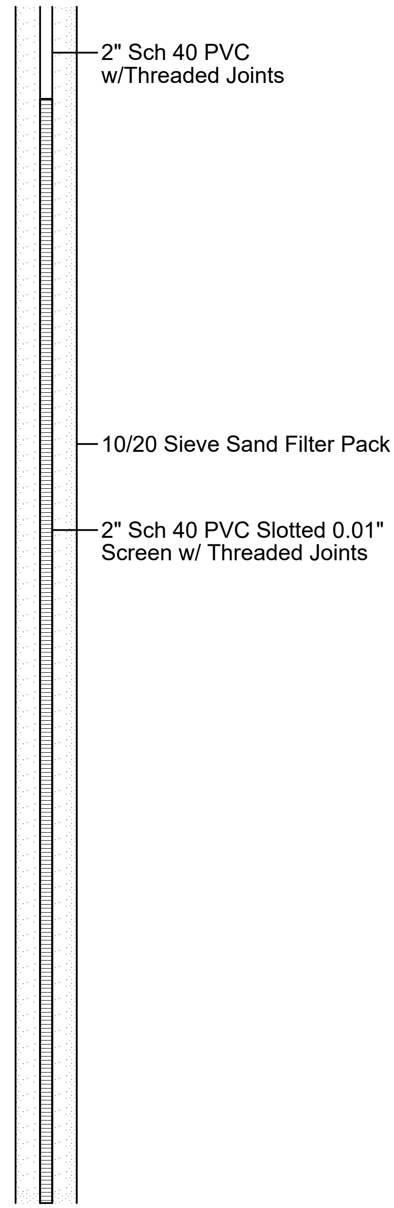
N	: N35° 29' 21.7"
E	: W108° 25' 27.5"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 75, Low 72

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
23–24	15,000			CL	80		
24–26	15,000			CL	90	X	SANDY SILTY CLAY - STA, damp, brown.
26–28	15,000	▼ (26)		SM	60		SILTY SAND - fine to medium, compact to loose, very moist, brown.
28–29	15,000			SM	90		SILTY SAND - STA, saturated, gravelly at base.
29–30	15,000			CH	90		CLAY - moderate to high, stiff, damp brown.
30–32	1404			SC/SM	40		CLAYEY SILT/SAND - low, very fine, damp to sc. moist, brown.
32–34	1711			CL	40		SANDY CLAY / CLAYEY SAND - fine grain, soft, damp, brown.
34–35				CL	90		CLAYEY SAND - STA.
35–36	1550			CH	90		SILTY CLAY / CLAY - high, stiff, damp, brown.

Completion Results

TK 570-4



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagen
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 48'
Saturation Depth	: 26' and 42' BGL
Start Date/Time	: 8-7-2019 / 19:50
Finish Date/Time	: 8-7-2019 / 13:00

WELL NO. TK 570-4

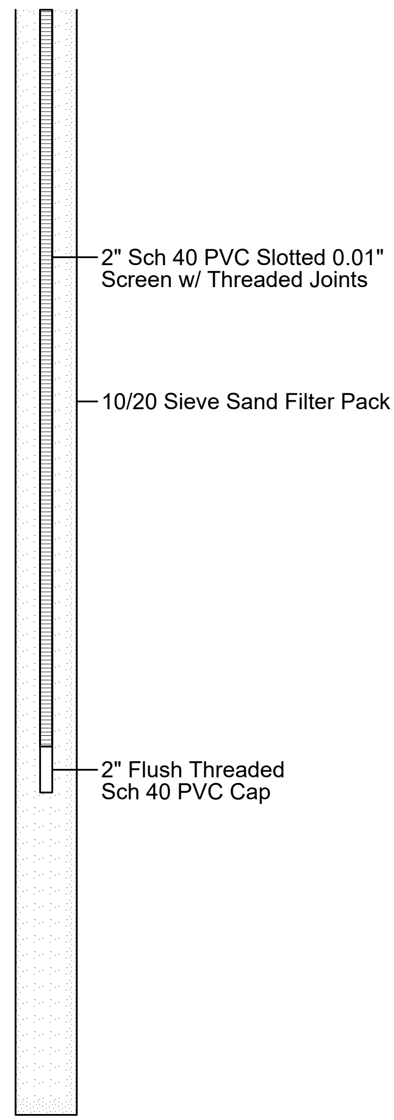
N	: N35° 29' 21.7"
E	: W108° 25' 27.5"
Comments	: Hand Augered to 6' BGL
Air Temp. (F)	: High 75, Low 72

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
36–38	834			CH	100		SILTY CLAY / CLAY - high, stiff, damp, brown, calcareous nodules present.
38–40	989			CH	70		SILTY CLAY / CLAY - STA, dark brown, pockets of tan / light tansilt present.
40–42	607			CH	90	X	SILTY CLAY / CLAY - high, very stiff, damp, dark brown, pockets of light tan silt present, very calcareous (10mm gravel).
42–44	2686	▼		GC	80		CLAYEY SANDY GRAVEL - Angular 20mm gravel, brown clay, medium grain sand, moist to saturated.
44–46	624			CLST	50		CLAY/CLAYSTONE - low, very stiff, dark reddish brown, damp, shaley at base.
46–48	99			CLST	40	X	CLAYSTONE - STA.

Completion Results

TK 570-4



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 46'
Saturation Depth	: 32', 36', & 40' BGL
Start Date/Time	: 8-8-2019 / 10:30
Finish Date/Time	: 8-8-2019 / 14:20

WELL NO. TK 570-5

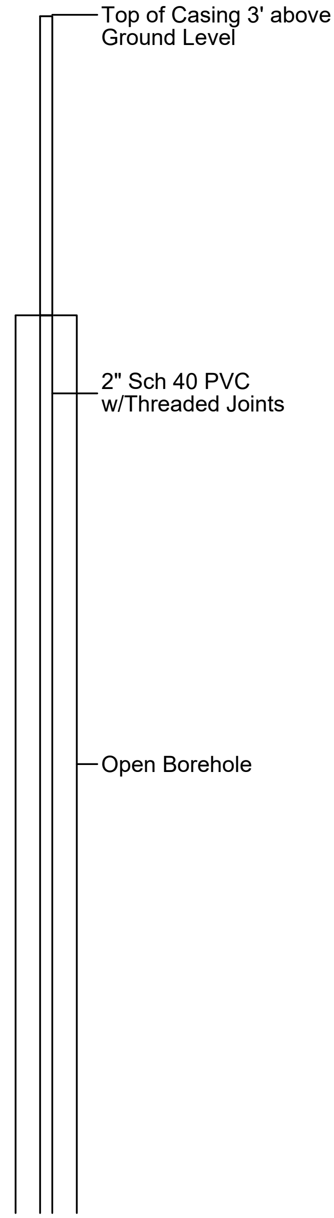
N : N35° 29' 22.0"
E : W108° 25' 27.0"
Comments : Hand augered to 2' - refusal in gravel.
Air Temp.(F) High 81, Low 77

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
-3							
-2							
-1							
0–2	24			FILL	100	X	FILL - SILT/SAND/GRAVEL, dry to damp, brown. (Respirator donned - no olfactory observations)
2–4	--			--	--		NO RECOVERY - gravel rock in split spoon shoe.
4–6	28			SW	60	X	GRAVELLY SAND - loose, medium grain, dry to damp, light brown.
6–8	18			SW	70		GRAVELLY SAND - Similar to above (STA).
8–9	1			SC/CL			CLAYEY SAND / SANDY CLAY - low crumbly, dry to damp, light brown.

Completion Results

TK 570-5



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Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
Drilling Rig	: CME 75
Drilling Method	: Hollow-Stem Augers
Sampling Method	: 2' Split Spoon - 2" diamet.
Total Depth	: 46'
Saturation Depth	: 32', 36', & 40' BGL
Start Date/Time	: 8-8-2019 / 10:30
Finish Date/Time	: 8-8-2019 / 14:20

WELL NO. TK 570-5

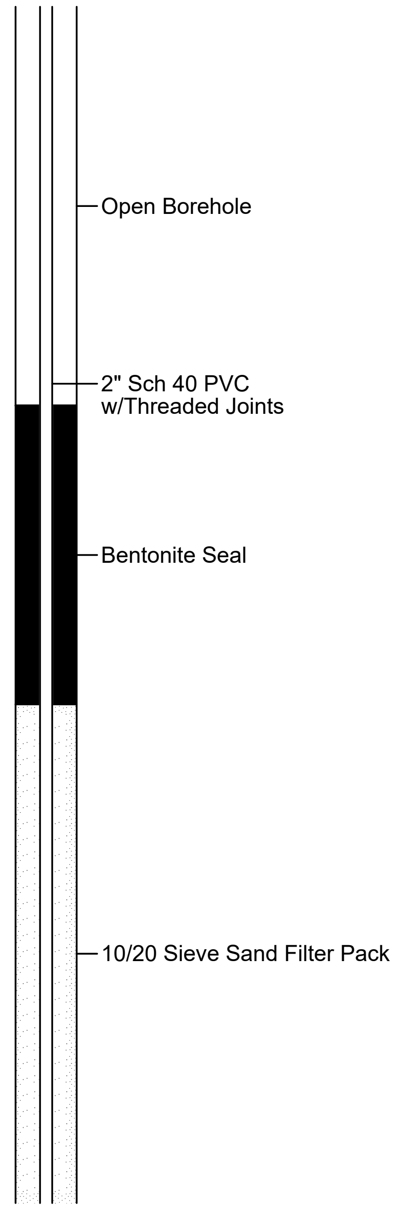
N : N35° 29' 22.0"
E : W108° 25' 27.0"
Comments : Hand augered to 2' - refusal in gravel.
Air Temp.(F) High 81, Low 77

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
9	1			SC/CL	70		
10–12	98.5			CL	70		SILTY SANDY CLAY - low, soft/crumbly, dry to damp, brown, fine to medium grain sand.
12–14	324			CL	40		SILTY CLAY - low, soft, damp, brown, trace fine grain sand.
14–16	855			CL	80		SILTY CLAY - STA, dark brown, damper than above.
16–18	1515			CH	90	X	SILTY CLAY - high, stiff, damp, dark brown.
18–19				CH	90		SILTY CLAY - STA.
19–20	1285			ML	90		CLAYEY SILT - low, soft, moist, brown, trace fine grain sand.
20–21	5210			CH			SILTY CLAY - high, stiff, damp, brown, sandy at base.

Completion Results

TK 570-5



DiSorbo Consulting, LLC

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DiSorbo
Environmental Consulting Firm

Marathon Petroleum Company
TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
Drilling Company	: Enviro-Drill, Inc.
Driller	: Cohagan
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Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
21–22	5210			CH	90		
22–24	15,000			SC/CL	90		CLAYEY SAND / SANDY CLAY - low, soft, crumbly, damp, brown, fine grain sand.
24–26	15,000			CL	90		SANDY CLAY - moderate, stiff, damp, brown, fine grain sand.
26–28	15,000			CL	60		SANDY CLAY - low, firm, damp, brown, fine grain sand in matrix and lense.
28–30	7549			CH	90		CLAY - high, stiff, damp, brown.
30–32	15,000			CL	90		SANDY CLAY - low, firm to soft, damp, brown.
32–33	15,000	▼		SM			SILTY SAND - fine, medium, compact, very moist, seperate-phase hydrocarbon present, greyish brown.

Completion Results

TK 570-5

2" Sch 40 PVC w/Threaded Joints

10/20 Sieve Sand Filter Pack

2" Sch 40 PVC Slotted 0.01" Screen w/Threaded Joints

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TK 570 - Gallup Refinery
WEST19038-03

Geologist	: Tracy Payne
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WELL NO. TK 570-5

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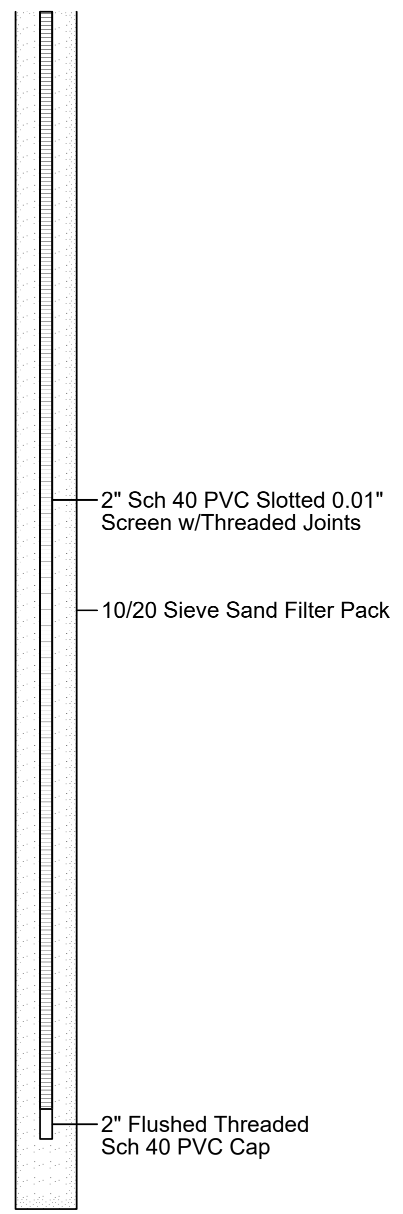
E	: W108° 25' 27.0"
Comments	: Hand augered to 2' - refusal in gravel.
Air Temp.(F)	High 81, Low 77

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
33–34	15,000			SM	90		
34–36	15,000	▼ (36)		CL	60		GRAVELLY SAND - low, soft, damp, grey to brown, sandstone present.
36–37.5	--			SW	90		GRAVELLY SAND - medium to coarse, loose, grey, saturated, sheen present.
37.5–38	4650			CH	90		CLAY - high, very stiff, damp, brown/reddish brown, calcareous.
38–40	5110	▼ (40)		CL	30		GRAVELLY CLAY - STA, gravelly sandstone present.
40–42	--			GW	30		SANDY GRAVEL - medium to coarse, compact, sandstone, very moist to saturated.
42–44	--			GW	40		SANDY GRAVEL - STA, clay present, very moist.
44–45	110			CLST			CLAYSTONE - low, very stiff, reddish brown and grey, damp, shaley.

Completion Results

TK 570-5



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Well Development

All monitoring wells will be developed to create an effective filter pack around the well screen, correct damage to the formation caused by drilling, remove fine particles from the formation near the borehole, and assist in restoring the natural water quality of the aquifer in the vicinity of the well. Newly installed monitoring wells will not be developed for at least 48 hours after the surface pad and outer protective casing are installed. This will allow sufficient time for the well materials to cure before the development procedures are initiated. A new monitoring well will be developed until the column of water in the well is free of visible sediment, and the pH, temperature, turbidity, and specific conductivity have stabilized. In most cases, the above requirements can be satisfied. However, in some cases, the pH, temperature, and specific conductivity may stabilize but the water remains turbid. In this case, continuous flushing may be necessary to complete the well development. If the well is pumped dry, the water level will be allowed to sufficiently recover before the next development period is initiated. The common methods used for developing wells include:

(1) pumping and over-pumping;

(2) backwashing;

(3) surging (with a surge block);

(4) bailing;

(5) jetting; and

(6) airlift pumping.

These development procedures will be used, either individually or in combination, to achieve the most effective well development. However, the most favorable well development methods include pumping, over-pumping, bailing, surging, or a combination of these methods. Well development methods and equipment that alter the chemical composition of the groundwater will not be used.

Development methods that involve adding water or other fluids to the well or borehole, or that use air to accomplish well development will be avoided, if possible. Approval will be obtained from the NMED prior to introducing air, water, or other fluids into the well for the purpose of well development. If water is introduced to a borehole during well drilling and completion, then the same or greater volume of water will be removed from the well during development. In addition, the volume of water withdrawn from a well during development will be recorded, and best efforts will be used to avoid pumping wells dry during development activities.

Well Purging

All zones in each monitoring well will be purged by removing groundwater prior to sampling and in order to ensure that formation water is being sampled. Purge volumes will be determined by monitoring, at a minimum, groundwater pH, specific conductance, dissolved oxygen concentrations, turbidity, redox potential, and temperature during purging of volumes and at measurement intervals of not less than ¼ the pre-purge well volume. The groundwater quality parameters and fluid levels will be measured using a YSI Professional Plus Multiparameter Meter, YSI Water Quality Sonde, Hach Portable Turbidimeter, and a Geotech Interface Meter. The volume of groundwater purged, the instruments used, and the readings obtained at each interval will be recorded on the field monitoring log. In general, water samples may be obtained from the well after the measured parameters of the purge water have stabilized to within ten percent for three consecutive measurements. Well purging may also be conducted in accordance with the NMED's Position Paper "Use of Low-Flow and other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring" (October 30, 2001). If necessary, a written request for a variance from the described methods of well purging for individual wells may be submitted to NMED no later than 90 days prior to scheduled sampling activities.