# GW - 040

# ANNUAL REPORT

2019





February 27, 2020

Carl Chavez
New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

RE: 2019 Annual Report

Former Giant Bloomfield Refinery Marathon Petroleum Company LP Former Giant Bloomfield Refinery San Juan County, New Mexico

Dear Mr. Chavez:

On behalf of Western Refining Southwest, Inc., LT Environmental is submitting the 2019 Annual Report for the former Giant Bloomfield Refinery located in San Juan County, New Mexico. The 2019 Annual Report summarizes groundwater monitoring activities in 2019. In addition, the report summarizes plug and abandonment work performed on a portion of the remediation system and several monitoring/recovery wells located at the Site.

If you have any questions or would like to discuss any aspect of the submittal, please contact Gregory McCartney at (419) 310-4888.

Sincerely,

LT ENVIRONMENTAL, INC. AND MARATHON PETROLEUM COMPANY LP

**Gregory McCartney** 

Marathon Petroleum Company LP

Stuart Hyde, LG

Project Geologist, LT Environmental



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of WSP

# 2019 ANNUAL REPORT

# FORMER GIANT BLOOMFIELD REFINERY BLOOMFIELD, NEW MEXICO

**FEBRUARY 2020** 

**Prepared for:** 

MARATHON PETROLEUM COMPANY LP 539 SOUTH MAIN STREET, ROOM M-7081 FINDLAY, OH 45840

Prepared by:

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### **2019 ANNUAL REPORT**

### FORMER GIANT BLOOMFIELD REFINERY BLOOMFIELD, NEW MEXICO

Project Number: 095820002

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	LTE Senior Geologist	

### **TABLE OF CONTENTS**

1.0	INTRODUCTION	1
	1.1 SITE DESCRIPTION	
	1.2.1 ADJACENT LEE ACRES LANDFILL SUPERFUND SITE	2
	1.3 SITE HYDROLOGY	
2.0	METHODOLOGY	5
	2.1 ANNUAL GROUNDWATER MONITORING COMPLIANCE	5 6
3.0	RESULTS	3
	3.1 ANNUAL GROUNDWATER COMPLIANCE SAMPLING	
4.0	CONCLUSIONS	10
5.0	REFERENCES 1	12



### **FIGURES**

FIGURE 1	SITE LOCATION MAP
FIGURE 2	SITE MAP
FIGURE 3	CROSS SECTION A-A'
FIGURE 4	CROSS SECTION B-B'
FIGURE 5	GROUNDWATER POTENTIOMETRIC SURFACE MAP (MARCH 2019)
FIGURE 6	GROUNDWATER POTENTIOMETRIC SURFACE MAP (NOVEMBER 2019)
	TABLES
TABLE 1	GROUNDWATER ELEVATIONS AND THICKNESS OF PHASE-SEPARATED HYDROCARBONS
TABLE 2	2019 ANNUAL COMPLIANCE – GROUNDWATER LABORATORY ANALYTICAL RESULTS
	ADDENDICES
	APPENDICES
APPENDIX A	WELL PLUG AND ABANDONMENT DOCUMENTATION
APPENDIX B	PHOTOGRAPH LOG
APPENDIX C	LABORATORY ANALYTICAL REPORTS



### 1.0 INTRODUCTION

This 2019 Annual Report summarizes groundwater monitoring activities completed between January 2019 and December 2019 at the former Giant Bloomfield Refinery (GBR) (Site) in Bloomfield, New Mexico. In addition, this report summarizes plug and abandonment (P&A) work performed on several monitoring and recovery wells located at the Site. The Site was formerly operated by Western Refining Southwest, Inc. (Western) until 2018 when Marathon Petroleum Company LP (Marathon) acquired Western and the GBR property. The Site currently is operated by Marathon and is regulated by the New Mexico Oil Conservation Division (NMOCD) under a discharge permit (GW-40) that was originally issued for a groundwater recovery and remediation system operating at the Site. Prior to August 2015, the groundwater recovery system had been in operation for approximately 27 years and had significantly improved groundwater conditions over that time. During operation, treated groundwater was discharged through infiltration trenches located on the GBR property.

As noted in previous annual reports, sampling of the influent to the treatment system had not detected the presence of volatile organic compounds (VOCs) in 13 years. Due to these observed conditions, in 2015 Western implemented more intensive monitoring of the groundwater to evaluate background groundwater quality and the extent of any residual impact. To facilitate the evaluation, compliance samples were analyzed for additional parameters and additional groundwater samples were collected. The recovery system was shut off in August 2015, and Western monitored groundwater elevations, groundwater quality, and phase-separated hydrocarbon (PSH) accumulation for a 5-month period under static conditions. Observations indicated no measurable change in groundwater conditions after ceasing the recovery operations. Based on the favorable observations in 2015, Western did not resume pumping operations, but continued ongoing groundwater monitoring at the Site. This report summarizes groundwater monitoring and P&A work conducted at the Site in 2019.

### 1.1 SITE DESCRIPTION

The Site is on the northeast corner of United States Highway 64 and County Road 3500, approximately five miles west of Bloomfield, New Mexico, in the southwest quarter of Section 22 and the northwest quarter of Section 27, Township 29 North, Range 12 West in San Juan County, New Mexico (Figure 1). Components of the former remediation system still on site include two control buildings, two carbon filtration tanks, an aboveground storage tank (AST), an infiltration trench, groundwater monitoring wells, and groundwater recovery wells (Figure 2).

### 1.2 SITE HISTORY

The former refinery, under ownership of Giant Industries (Giant), Arizona, produced leaded and unleaded gasoline, diesel, kerosene, and other refined petroleum products from 1974 to 1982 and is currently inactive. The refining operations and subsequent truck loading and unloading activities impacted groundwater, which was identified and investigated as part of the site closure requirements prescribed by the NMOCD in 1986. Details of a subsurface investigation and initial remediation efforts are contained in a 1987 report entitled, *Soil and Groundwater Investigations and Remedial Action Plan, Giant Industries, Inc. Bloomfield Refinery, Bloomfield, New Mexico*. The investigation identified three source areas (Figure 2).



- Northern Area (Diesel Spill Area): 10,000 to 15,000 gallons of diesel were released from a pipeline in 1985.
- Central Area (Truck Fueling Area): 15,000 gallons of diesel were released from a pipeline in 1986.
- Southern Area: Historical releases from a former firefighting drill area east and upgradient of the Site that may have collected in a former seep and a stormwater catchment area.

### 1.2.1 ADJACENT LEE ACRES LANDFILL SUPERFUND SITE

Concurrent with refinery operations, the former Lee Acres Landfill (located upgradient of the Site) operated as a San Juan County landfill from 1962 to 1986 (Figure 1). Landfill operations included solid waste disposal in trenches and liquid waste disposal in a series of lagoons. The NMOCD sampled the lagoons in 1985 and demonstrated that the liquids in the impoundments contained a variety of chlorinated solvents, petroleum hydrocarbon constituents, heavy metals, and salts. In April 1985, a breach in the lagoon dike, which had been retaining liquids in the lagoons, released liquid wastes into an arroyo west of the Site. The arroyo drains south toward the Lee Acres Subdivision, where the NMOCD and the New Mexico Environment Department (NMED) identified impacted groundwater in domestic water wells in 1986. In response, the NMOCD required Giant to investigate petroleum hydrocarbon impacts to groundwater downgradient of the refinery in the Lee Acres Subdivision and the NMED conducted a separate investigation to identify potential impacts from the landfill. The results of the subsurface investigation conducted by Giant south of the refinery are contained in three volumes of the 1992 report, *Remedial Investigation Report for Lee Acres Landfill*. The NMED, in conjunction with the Bureau of Land Management (BLM) and the United States Geological Survey (USGS), published their results in three reports referenced in Section 4.0 of this report.

The investigations identified two separate plumes of impacted groundwater that commingled across the refinery and flowed downgradient into the Lee Acres Subdivision. Groundwater contaminants detected in the refinery plume included PSH and dissolved-phase petroleum hydrocarbons. The dissolved-phase constituents included benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, and 1,2-dichloroethane (EDC). The landfill contaminant plume contained total dissolved solids (TDS), chloride, sulfate, manganese, metals, BTEX, naphthalene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, tetrachloroethene (PCE), 1,1,1-trichloroethane, and trichloroethene (TCE).

### 1.2.2 GIANT BLOOMFIELD REFINERY GROUNDWATER RECOVERY SYSTEM

Beginning in 1988, Giant installed a groundwater recovery, treatment, and disposal system in stages to restrict migration of contaminants and to remediate groundwater impacts caused by Giant's former operations. A total of 45 monitoring wells were initially installed and designated GBR monitoring wells (Figure 2). Of these 45 monitoring wells, 11 were converted to recovery wells and re-named with GRW designations. An additional 17 monitoring wells were installed in the Lee Acres Subdivision and designated as SHS monitoring and recovery wells. Four SHS wells initially operated as recovery wells. Giant pumped groundwater from the recovery wells into storage tanks, treated the groundwater with an air stripper and carbon filtration, and re-injected treated groundwater into the subsurface through two infiltration trenches. Western acquired the Site from Giant in June 2007.



As groundwater quality improved over time, the remediation system was gradually simplified and eventually shut down following extensive assessment of Site conditions. The air stripper was eliminated in the 1980s once product accumulation declined. In 2008, Western conducted a supplemental evaluation of the remedial operations, which included shutting down the remediation system and sampling groundwater wells under static conditions to redefine the area of impact and assess effectiveness of the remediation system. Existing equipment was inspected and repaired to optimize performance. Results from the sampling event were included in the 2008 Annual Report submitted to the NMOCD. Pumping and treating operations were resumed in February 2009.

Western stopped recovering groundwater south of Highway 64 in 2009 as groundwater sampling results indicated no change to contaminant concentrations. Aboveground storage of groundwater was eliminated in 2014 based on reduced groundwater recovery volumes. By 2015, the system consisted of only nine active groundwater recovery wells that pumped groundwater directly into the carbon filtration tanks, with the treated effluent discharged into the water infiltration trench.

Following 13 years of regular influent and effluent sampling without the detection of VOCs, Western conducted another assessment of Site groundwater conditions in 2015. Western sampled and monitored select wells to characterize groundwater under active pumping conditions, then shut down the recovery system to allow groundwater to equilibrate. A second sampling and monitoring event was conducted on the same groundwater monitoring wells to compare active groundwater recovery to postshutdown static conditions. In August 2015, additional groundwater samples were collected from select monitoring wells to establish a reference for groundwater conditions when the remediation system was operational. Historical documentation was reviewed to determine which wells had the most potential to contain impacted groundwater or to exhibit a change in groundwater quality before and after the remediation system was inactivated. Monitoring wells GBR-8, GBR-11, GBR-20, GBR-21D, GBR-22, GBR-25, GBR-26, GBR-34, SHS-2, SHS-8, and SHS-9 were selected due to radius of influence of actively pumping recovery wells and/or historical documentation of PSH measured in the monitoring wells. Samples from these monitoring wells were collected and analyzed for chloride by United States Environmental Protection Agency (EPA) Method 300.0, BTEX by EPA Method 8260B, total petroleum hydrocarbon (TPH)-gasoline range organics (GRO) by EPA Method 8015D, and TPH-diesel range organics (DRO) by EPA Method 8015M/D. Follow-up samples were collected after the system was turned off and groundwater conditions were allowed to equilibrate.

Assessment results suggested the remediation system had successfully remediated the groundwater impact it was originally designed to address but was no longer an effective method for remediating residual impacts at the Site. As such, Western did not turn the recovery system back on, focusing instead on monitoring existing Site conditions to better characterize the residual impact. Results of the assessment were included in the 2015 Annual Report. Sampling from these monitoring wells under equilibrium conditions continued in March, July, and October of 2016 and were documented in the 2016 Annual Report.

### 1.2.3 SHS RECOVERY SYSTEM ABANDONMENT

At the request of the New Mexico Department of Transportation (NMDOT), Western submitted Well Plugging Plans of Operations to the New Mexico Office of State Engineer (NMOSE) to plug and abandon SHS-1, SHS-2, SHS-3, SHS-4, and SHS-5 on June 5, 2017, approved on June 7, 2017. These wells were in the right-of-way (ROW) of the highway and in the way of pending construction. On June 14, 2017, each



well was cemented to the surface and the well vault was removed per the NMOSE requirements. Sampling and P&A activities were documented in the 2017 Annual Report.

Western again conducted semi-annual gauging and annual compliance sampling at the Site in 2018. Results from these activities were documented in the 2018 Annual Report. In addition, based on historical groundwater conditions and sample results for wells in the SHS area, additional sampling was conducted with the intent of P&A of the monitoring and recovery wells associated with the SHS area. LTE submitted a Partial Remediation System Closure Approval Request (dated November 27, 2018) to NMOCD with the results of the additional sampling and the request to P&A wells SHS-6, SHS-8, SHS-9, and SHS-13 through SHS-19. NMOCD granted approval of the closure plan in an email dated May 9, 2019. Results of the P&A work are included in this 2019 Annual Report.

### 1.3 SITE HYDROLOGY

The Site is located on weathered outcrops of the Nacimiento Formation, which is comprised of shales, sandstones, and siltstones of Cretaceous-Tertiary age. The San Juan River is approximately 2,000 feet south of the Site. Immediately west is a large unnamed arroyo, which is underlain by 30 feet to 60 feet of Quaternary alluvial sediments. Older Quaternary terrace deposits of cobbles and boulders were observed on the interfluvial ridges adjacent to the arroyo. These terrace deposits may have been used as fill on the Site. The outcropping surfaces of the Nacimiento Formation have been eroded to form a paleo channel that appears to be similar in morphology to the existing surface arroyo located to the west of the Site. The bedrock is overlain by recent alluvial deposits (gravel, sand, silt, and clay), which thicken toward the south-southwest as illustrated on the cross section on Figure 3 and Figure 4.

The subsurface geology is a controlling feature for groundwater flow direction and potential contaminant migration. Shallow groundwater is generally unconfined with some local areas potentially under semi-confined conditions. There are two aquifers of concern that are in direct hydraulic communication: a shallow aquifer composed of recent alluvial materials and a bedrock aquifer that exists in the underlying Nacimiento Formation (Figures 3 and 4, respectively). The alluvial aquifer generally has the higher permeability of the two aquifers and recovery wells completed within this aquifer have higher yields with larger radii of influence.

### 1.4 SCOPE OF WORK

The scope of work (SOW) for this project in 2019 included semi-annual monitoring of groundwater elevations and the presence of PSH, an annual compliance groundwater sampling event, and the P&A of wells (SHS-6, SHS-8, and SHS-14 through SHS-19). A summary of field activities, results, and conclusions, as related to annual discharge permit compliance and monitoring results, are presented in the subsequent sections of this report.



### 2.0 METHODOLOGY

### 2.1 ANNUAL GROUNDWATER MONITORING COMPLIANCE

Although no discharge occurred during 2019, Marathon conducted annual compliance sampling in accordance with Discharge Permit GW-040. Marathon measured depth to groundwater semi-annually in 53 monitoring wells and 15 former recovery wells with a Keck oil-water interface probe. The interface probe was decontaminated with Alconox<sup>TM</sup> soap and rinsed with de-ionized water before each measurement. Depth to groundwater measurements were used to calculate quarterly groundwater elevations at the Site to determine direction of groundwater flow.

Annual groundwater compliance samples were collected in October 2019. Samples were collected from the following groundwater monitoring wells and former recovery wells at the Site: GRW-3, GRW-6, GBR-17, GBR-24D, GBR-30, GBR-31, GBR-32, GBR-48, GBR-49, GBR-50, GBR-52, and SHS-9. The volume of groundwater in the wells was calculated and a minimum of three well casing volumes of groundwater was purged from each well using a disposable bailer. As groundwater was extracted, pH, electrical conductivity (EC), and temperature were monitored. Wells were purged until these properties stabilized or the well was bailed dry, indicating the purge water was representative of aquifer conditions. Stabilization was defined as three consecutive stable readings for each groundwater property (plus or minus (±) 0.4 units for pH, ±10 percent for EC, and ±2 degrees Celsius for temperature).

Once each well was properly purged, groundwater samples were collected in bottles or vials and shipped to Hall Environmental Analysis Laboratory (HEAL) of Albuquerque, New Mexico. Groundwater samples were analyzed for VOCs according to EPA Method 8260B and general groundwater chemistry (GWC) parameters including pH by EPA Standard Method 4500, EC by EPA Method 2510B, TDS by EPA Standard Method 2540C, alkalinity by EPA Standard Method 2320B, hardness by EPA Standard Method 2340B, anions (bromide, chloride, sulfate, fluoride, nitrite-nitrate, and phosphorus) by EPA Method 300.0, and cations (calcium, iron, magnesium, potassium, and sodium) by EPA Method 200.7. In addition, groundwater samples collected from monitoring wells GRW-3, GRW-6, GBR-17, GBR-24D, GBR-30, and GBR-31 were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C, and groundwater samples collected from GBR-32, GBR-48, GBR-49, and GBR-50 were analyzed for metals (barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, zinc, antimony, arsenic, selenium, thallium, and mercury).

Analytical results are further discussed in Section 3.1 below.

### 2.2 SHS SYSTEM P&A ACTIVITIES

As previously stated, LTE submitted a *Partial Remediation System Closure Approval Request* (dated November 27, 2018) to NMOCD to P&A wells SHS-6, SHS-8, SHS-9, and SHS-13 through SHS-19. NMOCD granted approval of the closure plan in an email dated May 9, 2019 and letter dated June 13, 2019 (attached as Appendix A) but requested that wells SHS-9 and SHS-13 be left in place for ongoing monitoring. LTE coordinated the P&A work, conducted contractor oversight, and documented the removal of piping, surface equipment, and P&A of the SHS wells. The goal of this work was to abandon and remove inactive components of the former remediation system.

The following activities were included in this work:



- Subsurface lines were flushed using freshwater to remove residual product prior to piping closure. A total of 115 gallons was collected and transferred to the water/oil holding tank at the Bloomfield Products Terminal Facility for processing on May 22, 2018.
- Lateral lines crossing US Highway 64 were plugged on each side of the highway and the lines crossing the highway via a 3-inch culvert were removed and disposed of.
- LTE filed the appropriate paperwork with the NMOSE including a well plugging plan of operations in advance of plugging operations on June 12, 2019.
- The groundwater monitoring wells and recovery wells were abandoned by a New Mexico state-licensed driller to comply with the standards for plugging wells on June 13, 14, and 17, 2019.
   Well casing was cut to at least 1-foot below grade and wells were filled with bentonite and/or cement grout from total depth to approximately 6 inches above the top of the cut-off casing.
- Recovery well vaults and monitoring well covers were removed and disposed of or recycled and the areas were brought to surface grade using suitable backfill material on June 17, 2019.
- Subsurface lines were cut approximately 1-foot below ground surface (bgs) and the vertical riser
  portion of the pipe was filled with grout in the southern control building. This was conducted on
  August 15, 2019.
- The southern control building was removed, and materials were disposed of or recycled, as applicable, on August 23, 2019.
- Any remaining pumps and equipment associated with the recovery wells, the well vaults, and the southern control building were removed and transferred to the pump building located on the southern portion of the Site.

Well Plugging Plan of Operations forms for the SHS wells are included as Appendix A. Boring logs and well completion diagrams for the SHS wells also are included in Appendix A. A photograph log from the P&A work is attached as Appendix B.

### 2.3 GBR-51 P&A ACTIVITIES

Due to road construction on US Highway 64, the NMDOT required that well GBR-51 be P&A in the summer of 2019. The location of well GB-51 had not previously been identified by the NMDOT during planning phases of construction. Because of this, immediate P&A work was required so that road construction activities could continue. On July 24, 2019, the well was P&A using the same procedures as the recovery and monitoring wells described above. P&A supporting documents for well GBR-51 are included in Appendix A.

### 2.4 SOUTHERN CONTROL BUILDING REMOVAL ACTIVITIES

The removal of the southern control building was first conducted on August 8, 2019 when LTE coordinated with Farmington Electric to disconnect power and remove the electrical meter from the building. On August 15, 2019, LTE removed the recovery well system manifold, cut the subsurface pipes 1-foot bgs, and filled the vertical riser portion of the pipe with bentonite grout. The structural material of the building was torn down and disposed of or recycled on August 23, 2019.



This demolition work included the removal of the walls, electrical lines, foundation slab, miscellaneous polyvinyl chloride (PVC) piping, and supports. LTE hired and monitored a third-party contractor, Halo Services from Bloomfield, New Mexico, which conducted the demolition of building and disposal of material. All debris was disposed of at Lee Acres Landfill in Farmington, New Mexico.



### 3.0 RESULTS

### 3.1 ANNUAL GROUNDWATER COMPLIANCE SAMPLING

Groundwater elevations measured in groundwater monitoring and recovery wells are presented in Table 1 and semi-annual potentiometric surface maps are depicted on Figures 5 and 6. Groundwater flow direction was consistently toward the south-southwest throughout the year. Phase-separated hydrocarbons only were encountered in well GBR-7.

Laboratory analytical results from annual groundwater compliance sampling are presented in Table 2 and the complete laboratory analytical reports are presented in Appendix C. Isopach maps and geologic cross sections illustrating the distribution of analytes are not included due to the fact that sampling events do not include wells from all of the current source areas. Such a presentation of results would not be indicative of actual conditions at the Site. Laboratory analytical results from 2019 as compared to New Mexico Water Quality Control Commission (NMWQCC) standards are summarized below:

- VOCs and PAHs were detected in the annual groundwater samples in trace concentrations below NMWQCC standards.
  - o EDC was detected in groundwater from monitoring well GBR-24D.
  - o Ethylbenzene, isopropylbenzene, and n-propylbenzene was detected in groundwater from monitoring well SHS-9.
  - Tert-butylbenzene and tert-butylbenzene were detected in groundwater from monitoring well GRW-3.
  - o PAH compounds acenaphthene and fluorene were detected in groundwater from monitoring well GRW-3. There are no NMWQCC standards for these compounds.
- Chloride concentrations exceeded the NMWQCC standard in groundwater samples collected from wells GBR-30, GBR-31, and GBR-48.
- Sulfate concentrations exceeded the NMWQCC standard in all samples collected from groundwater monitoring and former recovery wells, with the exception of GRW-3 and SHS-9.
- Chromium concentrations exceeded the NMWQCC standard in groundwater samples collected from monitoring wells GBR-32, GBR-48, and GBR-49, which are located within the arroyo adjacent to and upgradient of the Site.
- Iron was detected in concentrations exceeding the NMWQCC standard in groundwater samples from all groundwater monitoring and former recovery wells.
- Manganese was detected in concentrations exceeding the NMWQCC standard in groundwater samples from all groundwater monitoring and former recovery wells, with the exception of wells GBR-50 and GBR-52.
- TDS exceeded the NMWQCC standard in all samples collected from the groundwater monitoring and former recovery wells.



### 3.2 SHS SYSTEM CLOSURE AND WELL ABANDONMENT

As described in Sections 2.2, 2.3, and 2.4, P&A activities conducted at the Site were performed in accordance with the NMOCD-approved *Partial Remediation System Closure Approval Request* document prepared by LTE (dated November 27, 2018). P&A work was performed by a New Mexico-licensed well driller (Geomat, Inc.) and in accordance with 19.27.4 of the New Mexico Administrative Code (NMAC).



### 4.0 CONCLUSIONS

By 2015, Western had documented over 13 years of pumping and treating groundwater that did not contain detectable concentrations of VOCs. Western shut down the pump and treatment system in August 2015, to evaluate its effectiveness at addressing residual impacts at the Site and assess potential rebound of contaminant concentrations. Continued monitoring and sampling conducted under equilibrium conditions suggested that the remediation system had become asymptotic and was no longer actively remediating contaminants of concern at the Site. With these results, Western did not reactivate the system.

Conclusions from the continued monitoring of static groundwater conditions at the Site include:

- PSH accumulation has not changed significantly in recent years compared to observations collected prior to 2015 during active pump and treat remediation.
  - There was no PSH migration into monitoring wells where PSH had not previously been observed.
  - Groundwater impacted by petroleum hydrocarbons is characterized by presence of PSH and little to no dissolved-phase hydrocarbons regulated by the NMWQCC.
  - Field observations and laboratory analytical results indicate impacted areas are consistent with previously-identified source areas and do not appear to have been affected by the cessation of pump and treat remediation efforts.
- Annual compliance sampling was conducted in November 2019. Contaminants of concern were
  either not detected in groundwater samples or, if detected, can be attributed to an upgradient
  source, and/or naturally-occurring background conditions. Annual groundwater samples
  collected from monitoring and recovery wells did not contain VOCs or PAHs exceeding
  NMWQCC standards.

Annual groundwater monitoring well sampling results are consistently compliant with standards for general chemistry parameters and metals, with the exception of TDS, chloride, and sulfate. Elevated TDS, chloride, and sulfate are historically characteristic of groundwater conditions at the Site and are most likely related to historical releases at the Lee Acres Landfill. These analytes were identified in earlier studies as constituents within the groundwater contaminant plume that originated from the landfill.

Previous investigations of the landfill reported elevated levels of chloride present in the water sampled from the liquid waste lagoons (McQuillan, D. and Longmire, P., Water Quality Investigations at the Lee Acres Landfill and Vicinity, San Juan County, New Mexico) and the landfill accepted produced water from natural gas well operations in the San Juan Basin. During initial landfill investigations, the upgradient area near GBR-32, GBR-48, GBR-49, and GBR-50 was identified as the "northern containment slug." Groundwater representative of this area contained TDS concentrations ranging from 2,125 milligrams per kilogram (mg/kg) to 6,068 mg/kg, chloride concentrations ranging from 14.7 mg/kg to 2,110 mg/kg, and sulfate concentrations ranging from 1,920 mg/kg to 5,830 mg/kg (Roy F. Weston, Inc., Remedial Investigation Report for Lee Acres Landfill, Volume 1).



Heavy metals, including chromium, iron, manganese, and nickel, were detected in groundwater monitoring wells and former recovery wells during the annual sampling in November 2019. Additionally, chromium, iron, and manganese concentrations exceeded NMWQCC standards. Previous studies conducted for the Lee Acres Landfill identified chromium, iron, lead, manganese, nickel, and selenium in groundwater sampled upgradient of the Site. *The Remedial Investigation Report for Lee Acres Landfill, Volume 1* states that the upgradient background alluvial aquifer contains elevated levels of chromium and manganese and suggests an unidentified source that is unrelated to the landfill or the Site.

It is apparent that the remediation system successfully remediated petroleum hydrocarbon impacts as designed. Following the reduction in petroleum hydrocarbon concentrations, the remediation system's primary purpose was to provide hydraulic control and restrict migration of potential contaminants off site. By shutting down the system to re-establish equilibrium conditions, Western demonstrated that the remediation system has no effect on existing petroleum hydrocarbon groundwater impacts or the migration of impacts offsite. Residual impacts at the Site consist of PSH accumulations which, based on thicknesses measured and locations consistent with original source areas, are likely to be adsorbed by soil in the three original source areas. With no active source, the residual contaminants are not likely to migrate with or without the hydraulic barrier introduced by the remediation system.

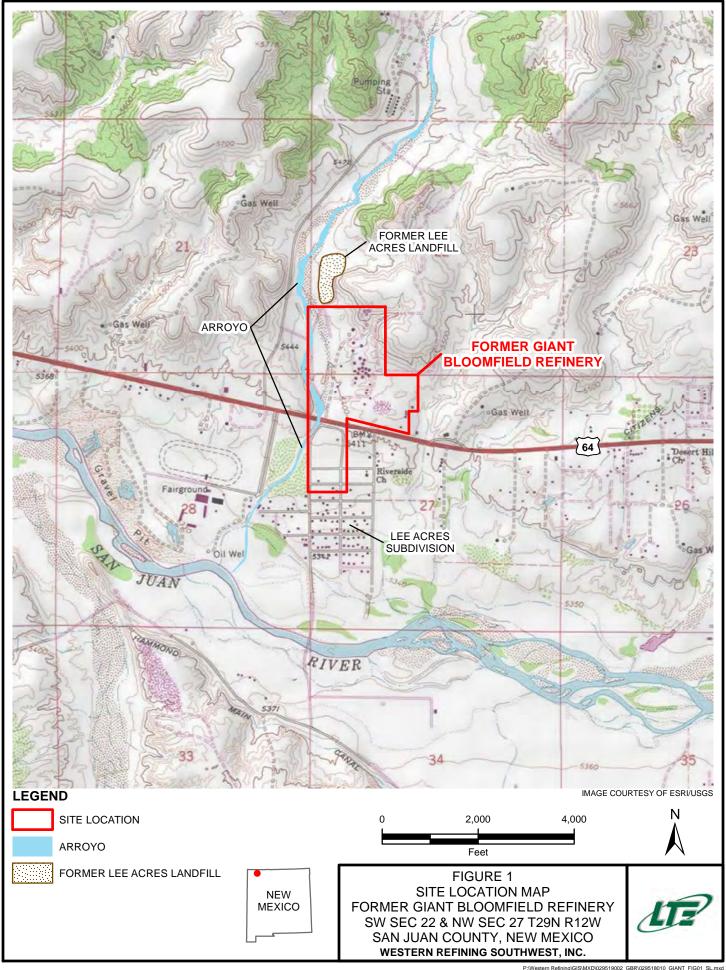


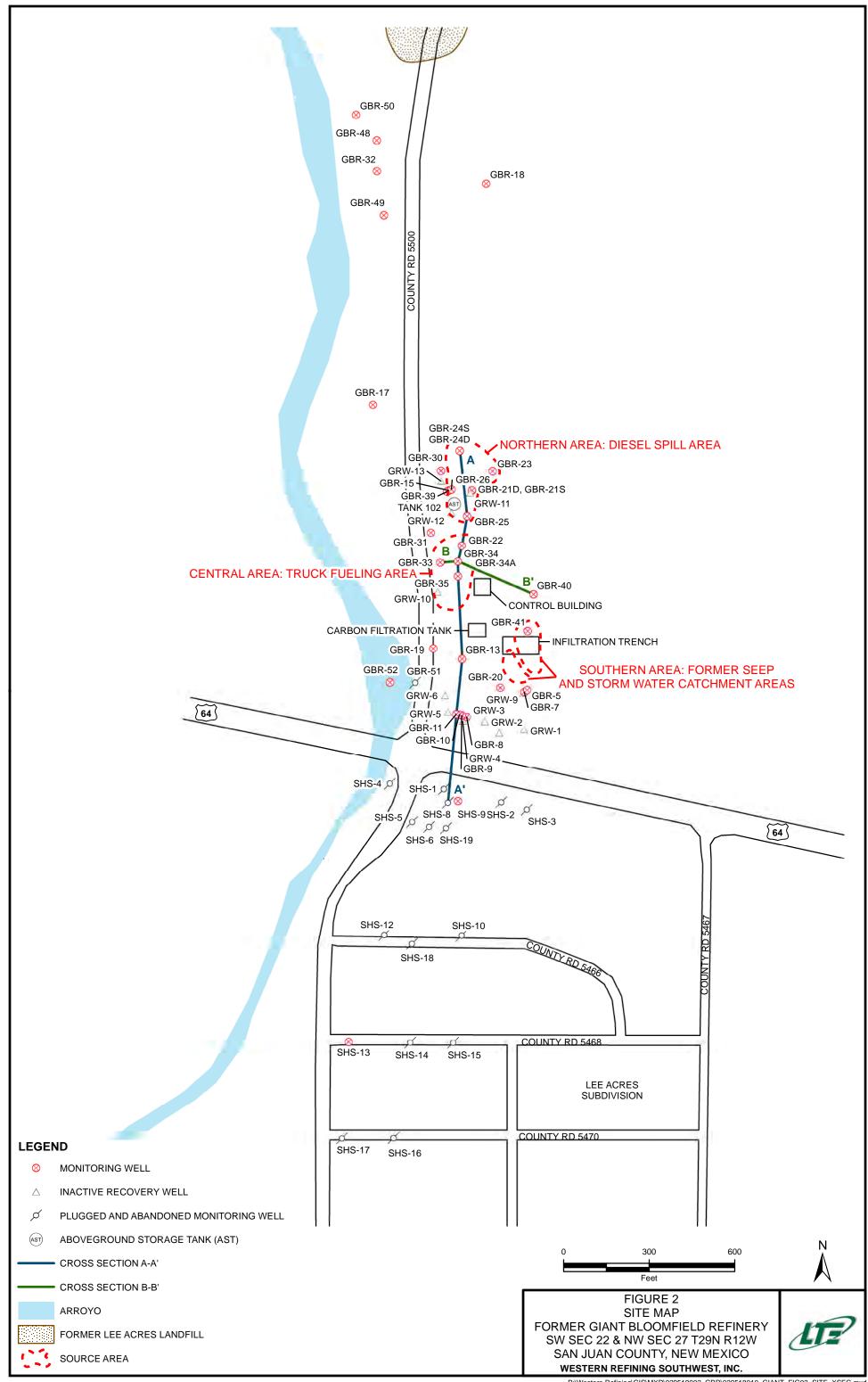
### 5.0 REFERENCES

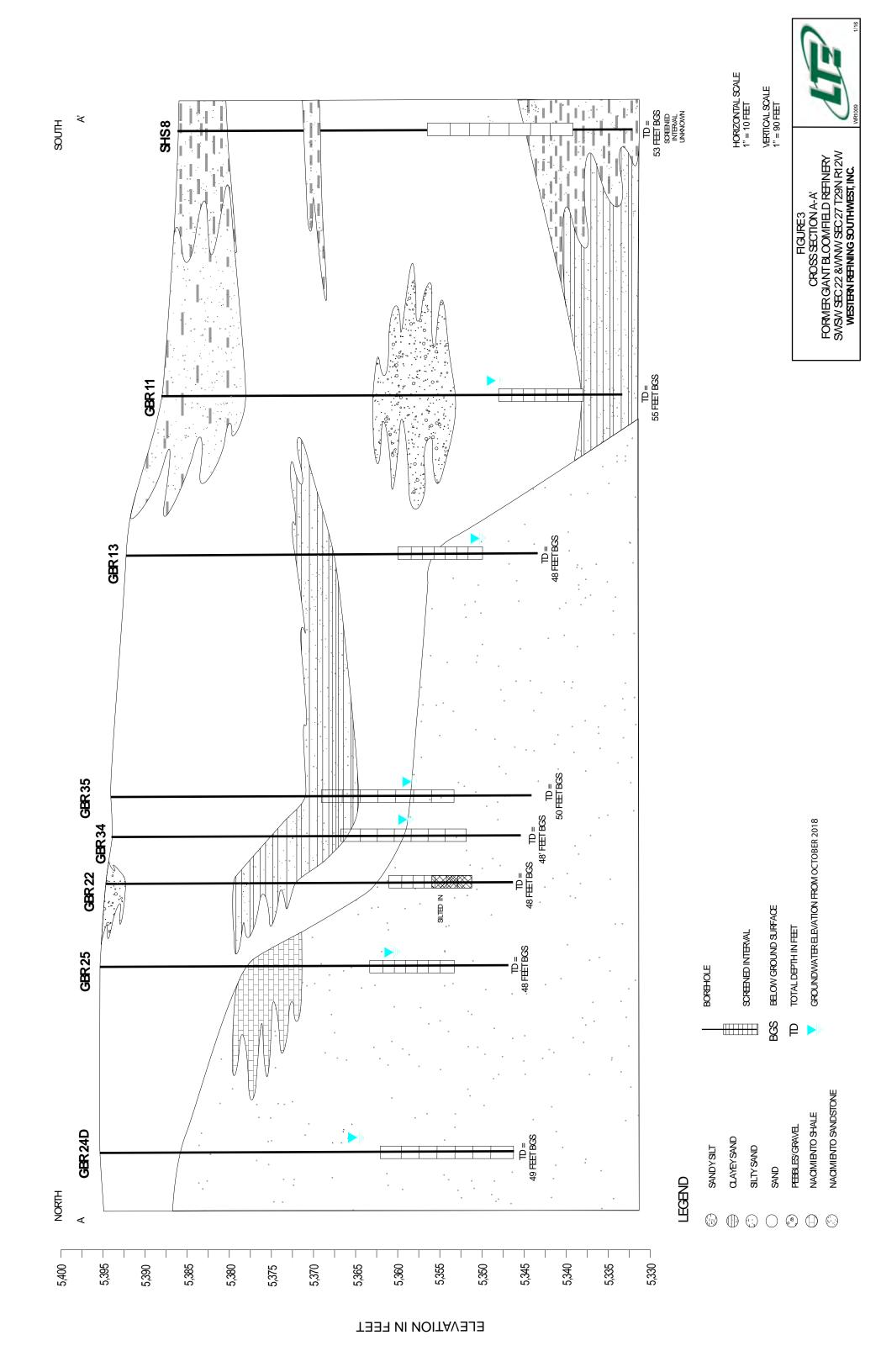
- AEPCO, Inc. Site Investigation Report for Lee Acres Site, San Juan County, New Mexico (Final Report), BLM Contract NO. AA852-Ct5-26, United States Department of the Interior, BLM, Washing D.C., May 1986.
- McQuillan, D. and Longmire, P. Water Quality Investigations at the Lee Acres Landfill and Vicinity, San Juan County, New Mexico, Environmental Division, Ground water/Hazardous Waste Bureau, Santa Fe, NM, February 1986.
- Peter, K., Williams, R.A. and King, K.W. *Hydrogeologic Characteristics of the Lee Acres Landfill Area, San Juan County, New Mexico,* United States Geological Survey Water Resources Investigations Report 87-4246, Albuquerque, NM, 1987.
- Roy F. Weston, Inc. *Remedial Investigation Report for Lee Acres Landfill, Volumes 1-3, Albuquerque, NM,* September 1992.
- Roy F. Weston, Inc. *Proposed Emergency Action for Lee Acres Landfill,* Albuquerque, NM, November 1990.
- Geoscience Consultants, LTD., Soil and Groundwater Investigations and Remedial Action Plan, Giant Industries, Inc. Bloomfield Refinery, Bloomfield, New Mexico, 1987.
- Lodestar Services, Inc., Annual Data Report Former Giant Bloomfield Refinery, March 2009.
- RPS JDC Consulting, Review of Groundwater Remediation System, Old Giant Bloomfield Refinery, Bloomfield, New Mexico, June 2009.

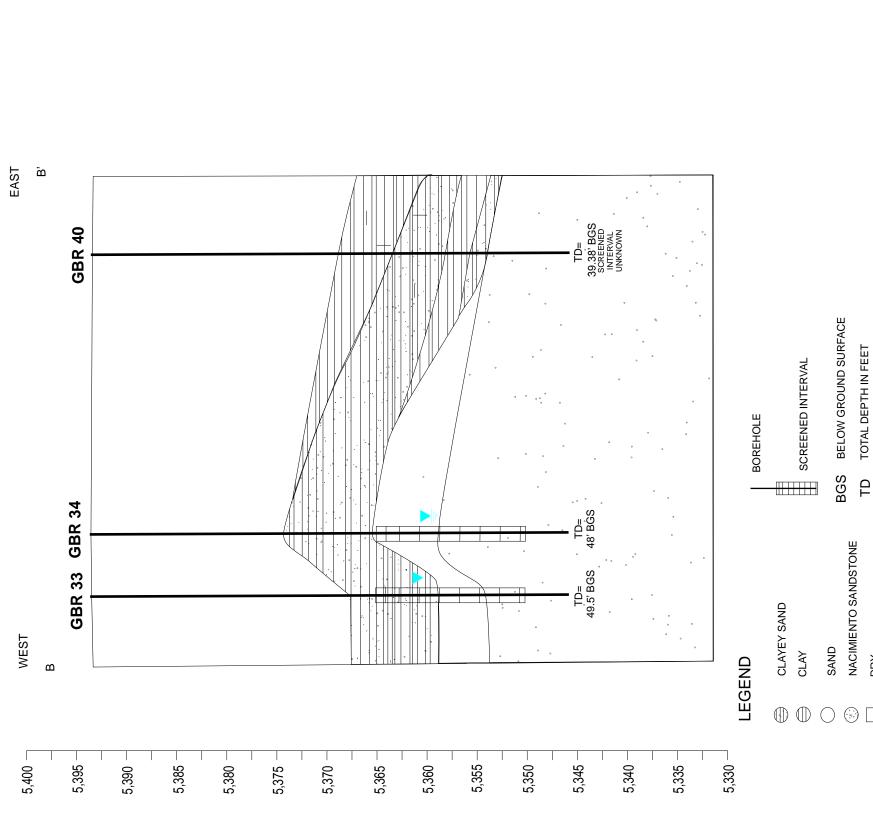












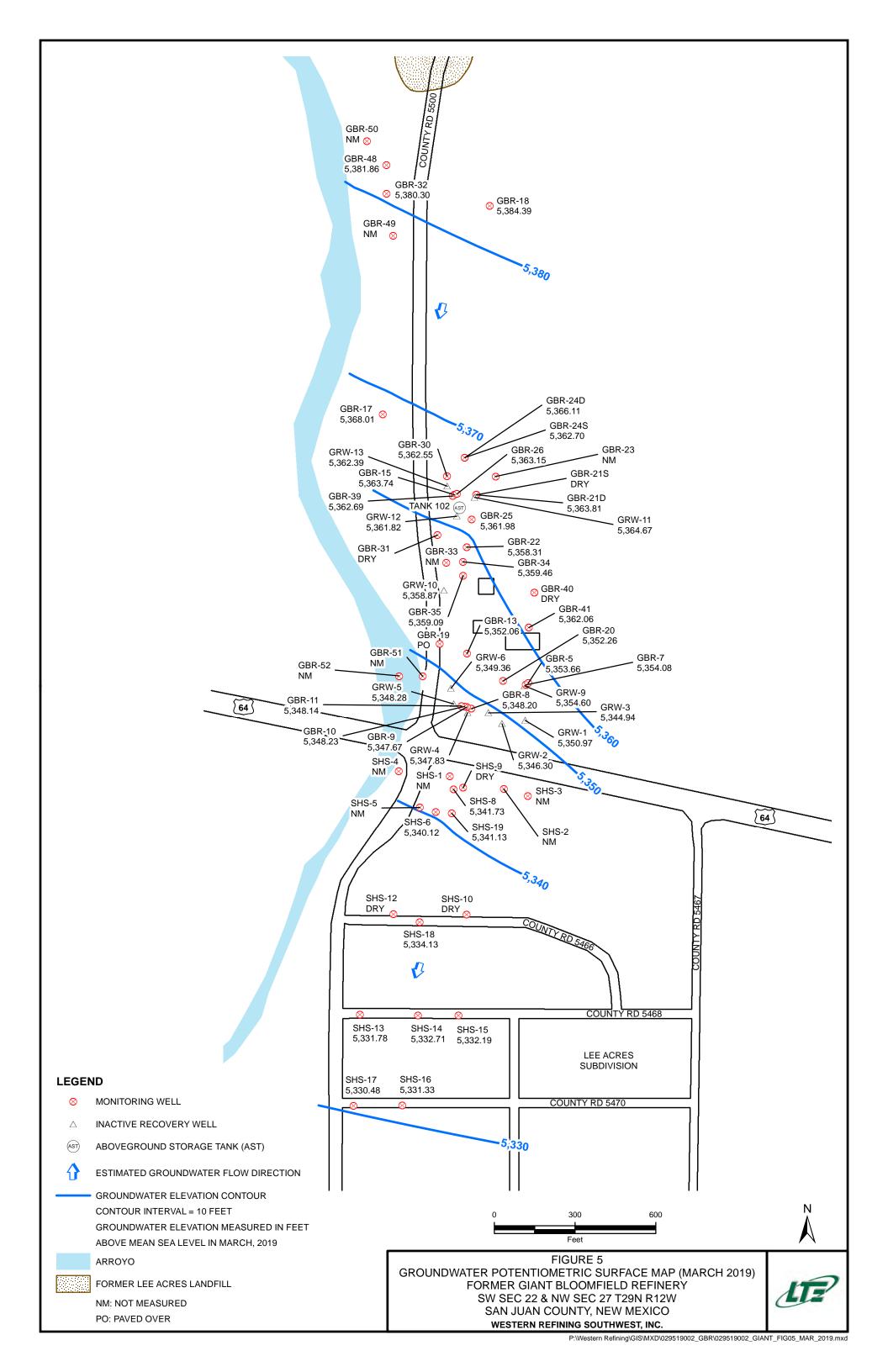
HORIZONTAL SCALE 1" = 10 FEET VERTICAL SCALE 1" = 90 FEET

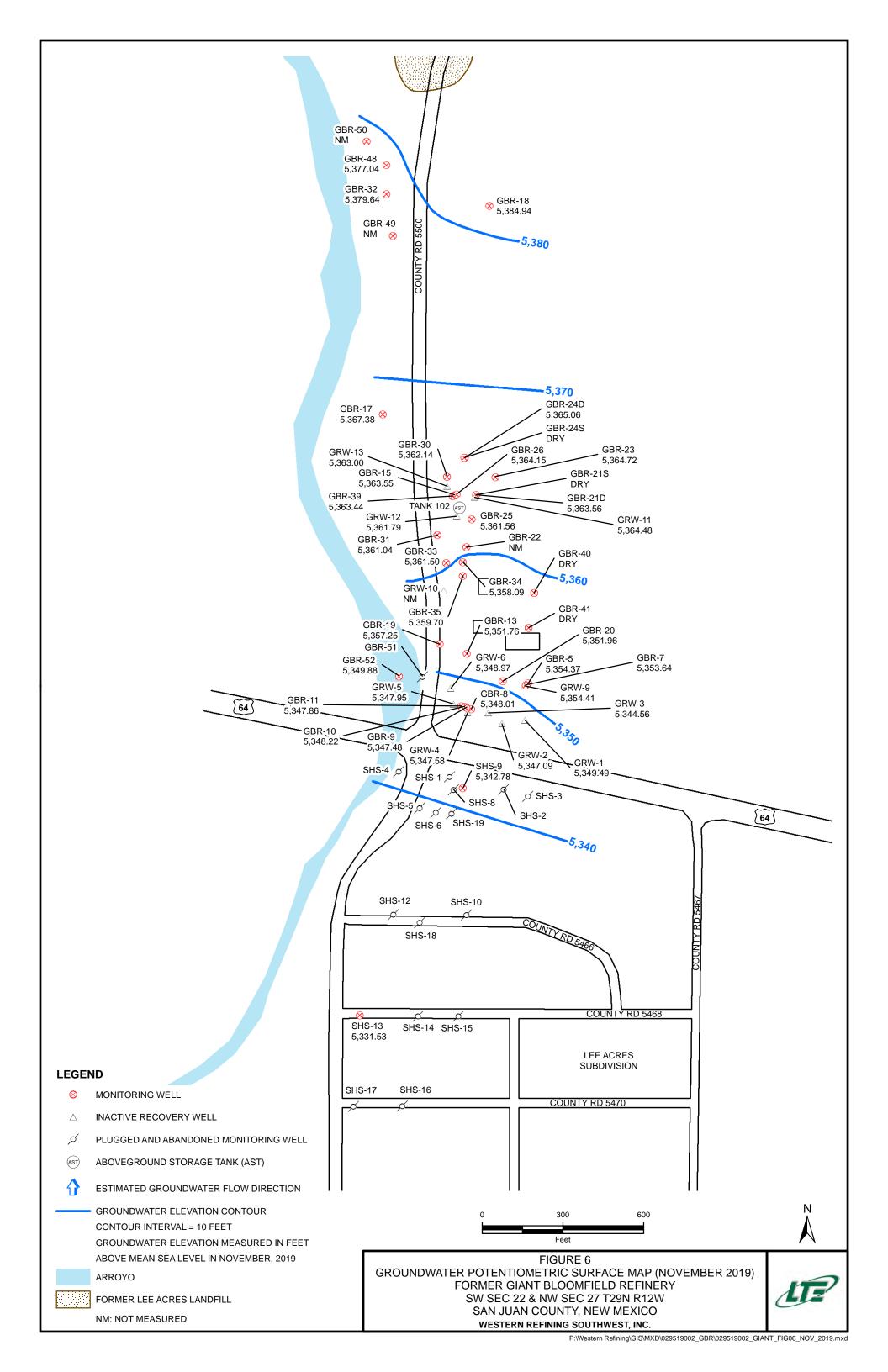
TOTAL DEPTH IN FEET

GROUNDWATER ELEVATION OCTOBER 2017

FIGURE 4
CROSS SECTION B-B'
FORMER GIANT BLOOMFIELD REFINERY
SWSW SEC 22 &WNW SEC 27 T29N R12W
WESTERN REFINING SOUTHWEST, INC.

ELEVATION IN FEET







### TABLE 1 GROUNDWATER ELEVATIONS AND THICKNESS OF PHASE-SEPARATED HYDROCARBONS

## FORMER GIANT BLOOMFIELD REFINERY WESTERN REFINING SOUTHWEST, INC. SAN JUAN COUNTY, NEW MEXICO

GRW-1 GRW-2 GRW-3	Wellhead Elevation (feet) 5,394.30 5,391.28	Total Depth (feet)	Depth to Water (feet BTOC)	Depth to	rch 2019 PSH		Depth to		ber 2019	
GRW-1 GRW-2	Elevation (feet) 5,394.30	Depth	Water	Depth to	DCH					
GRW-1 GRW-2	(feet) 5,394.30	-			гэп	Adjusted GWEL	Water	Depth to	PSH	Adjusted GWEL
GRW-2	5,394.30	(icct)		Product	Thickness	(feet)	(feet BTOC)	Product	Thickness	(feet)
GRW-2			(leet Bloc)	(feet)	(feet)	(leet)	(leet Bloc)	(feet)	(feet)	(leet)
GRW-2		72.25	42.22			F 2F0 07	44.04			F 240 40
	5,391.28	73.35	43.33	-	-	5,350.97	44.81	-	-	5,349.49
(3KW-3	F 200 77	61.00	44.98	-	-	5,346.30	44.19	-	-	5,347.09
	5,388.77	58.30	43.83	-	-	5,344.94	44.21	-	-	5,344.56
GRW-4	5,390.02	60.00	42.19	-	-	5,347.83	42.44	-	-	5,347.58
GRW-5	5,390.56	68.30	42.28	-	-	5,348.28	42.61		-	5,347.95
GRW-6	5,390.81	53.80	41.45	-	-	5,349.36	41.84	-	-	5,348.97
GRW-9	5,395.70	54.40	41.10	-		5,354.60	41.29	=	- ll -+ F f:	5,354.41
GRW-10	5,395.02	66.02	36.15	-	-	5,358.87		NM - Well blo	ocked at 5 te	
GRW-11	5,397.85	64.00	33.18	-	-	5,364.67	33.37	-	-	5,364.48
GRW-12	5,397.24	48.00	35.42	-	-	5,361.82	35.45 33.90	-	-	5,361.79
GRW-13	5,396.90	61.30	34.51	-	-	5,362.39		-	-	5,363.00
GBR-5	5,395.07	47.08	41.41	41.74	0.17	5,353.66 5,354.08	40.70	42.10	0.17	5,354.37
GBR-7	5,395.85	51.65	41.91	41.74	0.17	,	42.35	42.18	0.17	5,353.64
GBR-8	5,390.50	50.90	42.30			5,348.20	42.49			5,348.01
GBR-9	5,389.92	67.22	42.25	-	-	5,347.67	42.44	-	-	5,347.48
GBR-10	5,390.57	47.56	42.34	-	-	5,348.23	42.35	-	-	5,348.22
GBR-11	5,389.43	51.87	41.29	-	-	5,348.14	41.57	-	-	5,347.86
GBR-13	5,393.04	45.47	40.98	-	-	5,352.06	41.28	-	-	5,351.76
GBR-15	5,397.99	58.42	34.25	-	-	5,363.74	34.44	-	-	5,363.55
GBR-17	5,402.69	43.20	34.68	-	-	5,368.01	35.31	-	-	5,367.38
GBR-18	5,421.68	47.85	37.29	-	-	5,384.39	37.74	-	-	5,383.94
GBR-19 (1)	5,393.83	46.23	-	-	-		-	-	-	
GBR-20	5,393.47	54.57	41.21	-	-	5,352.26	41.51	-	-	5,351.96
GBR-21D	5,400.19	49.77	36.38	-		5,363.81	36.63			5,363.56
GBR-21S	5,400.65	49.77 38.73	37.60		Dry	F 2F0 24	NIN		ory	
GBR-22	5,395.91			-	-	5,358.31		/I - Cap glued I	onto well c	
GBR-23 (2) GBR-24D	5,403.72	39.45 51.40	37.54 30.66	-	-	5,366.11	39.00 31.71	-	-	5,364.72 5,365.06
+	5,396.77	37.05		-	-		51./1		l - Dry	3,303.00
GBR-24S	5,396.08		33.38	-	-	5,362.70	25 47		1	F 2C1 FC
GBR-25 GBR-26	5,397.03 5,396.72	37.12 41.29	35.05 33.57	-	-	5,361.98 5,363.15	35.47 32.57	-	-	5,361.56 5,364.15
		41.29	33.57	-	-	5,363.15	33.45	-	-	5,364.15
GBR-30 GBR-31	5,395.59 5,396.58	43.50	33.04	-		3,302.33	35.54	-		5,362.14
GBR-31 GBR-32		43.50	34.56		Dry -	5,380.30	35.22	-		5,361.04
GBR-32	5,414.86 5,396.28	45.72	34.30	-		2,300.30	34.78	_		5,361.50
GBR-34	5,394.00	42.20	34.54	-		5,359.46	35.91	-	-	5,358.09
GBR-35	5,394.00	42.35	34.57	-	-	5,359.40	34.96	-	-	5,358.70
GBR-39	5,393.00	41.42	34.86	-	-	5,362.69	34.11	-	-	5,363.44
GBR-40	5,400.76	39.38	37.00		Dry	3,302.03	37.11		)ry	5,505.44
GBR-41	5,396.35	34.28	34.29	_		5,362.06			)ry	
GBR-48	5,413.90	43.54	32.04	-	_	5,381.86	36.86	-		5,377.04
GBR-49	(3)	40.30	32.96	-	-	-	33.34	-	-	-
GBR-50	(3)	44.37	32.12	-	-	-	32.59	-	-	-
GBR-51	5,389.68	57.07	39.76	-	_	-	P&A	_	_	-
GBR-52	5,387.74	52.73	37.88	-	-	-	37.86	-	_	5,349.88



### TABLE 1 GROUNDWATER ELEVATIONS AND THICKNESS OF PHASE-SEPARATED HYDROCARBONS

## FORMER GIANT BLOOMFIELD REFINERY WESTERN REFINING SOUTHWEST, INC. SAN JUAN COUNTY, NEW MEXICO

				Mai	ch 2019			Novem	ber 2019	
Well Number	Wellhead Elevation (feet)	Total Depth (feet)	Depth to Water (feet BTOC)	Depth to Product (feet)	PSH Thickness (feet)	Adjusted GWEL (feet)	Depth to Water (feet BTOC)	Depth to Product (feet)	PSH Thickness (feet)	Adjusted GWEL (feet)
SHS-1	5,383.54	50.40	P&A	-	•	-	P&A	-	-	-
SHS-2	5,381.66	44.56	P&A	-	-	-	P&A	-	-	=
SHS-3 (4)	5,383.33	-	P&A	-	-	-	P&A	-	-	-
SHS-4	5,383.62	52.16	P&A	-	-	-	P&A	-	-	-
SHS-5	5,378.36	47.85	P&A	-	1	-	P&A	ı	-	-
SHS-6	5,378.17	52.78	38.05	-	-	5,340.12	P&A	ı	-	=
SHS-8	5,380.25	50.92	38.52	-	-	5,341.73	P&A	-	-	-
SHS-9	5,380.79	46.25			Dry		38.01	ı	-	5,342.78
SHS-10	5,373.80	45.80	Dry		P&A	ı	-	=		
SHS-12	5,373.94	52.41	Dry		P&A	-	-	=		
SHS-13	5,367.81	47.51	36.03	-	-	5,331.78	36.28	-	-	5,331.53
SHS-14	5,367.07	52.71	34.36	-	-	5,332.71	P&A	-	-	-
SHS-15 (5)	5,366.21	47.78	34.02	-	•	5,332.19	P&A	-	-	-
SHS-16	5,362.58	42.20	31.25	-	-	5,331.33	P&A	-	-	=
SHS-17	5,364.35	46.21	33.87	-	-	5,330.48	P&A	-	-	-
SHS-18	5,373.64	47.36	39.51	-	-	5,334.13	P&A	-	-	-
SHS-19	5,378.89	52.40	37.76	-	-	5,341.13	P&A	-	-	-

### Notes:

BTOC - below top of casing

D - designates that the well screen is deep

GWEL - groundwater elevation

NM - not measured

 $\ensuremath{\mathsf{P\&A}}$  - plugged and abandoned

PSH - phase-separated hydrocarbon

S - designates that the well screen is shallow

- (1) Well was paved over in June 2010
- (2) Well hit by a vehicle May 2014
- (3) Top-of-casing elevation is unknown
- (4) Well is damaged by a tree root
- (5) Well visibly broken/buried January 2016
- indicates no GWEL or PSH measured

When PSH is detected, the GWEL is corrected using an estimated density correction factor of  $0.8\,$ 



# TABLE 2 2019 ANNUAL COMPLIANCE - GROUNDWATER LABORATORY ANALYTICAL RESULTS

# FORMER GIANT BLOOMFIELD REFINERY SAN JUAN COUNTRY, NEW MEXICO WESTERN REFINING PIPELINE, LLC.

	JOMMN		GBW-3	9-WAS	GRB-17	GRR-24D	GBB-30	GRR-31	GBB-32	GR B-48	GBB-40	GRB-50	GBB-52	6-SHS
Analyte	Standard	Onit	7-Nov	7-Nov	5-Nov	6-Nov	voN-9	7-Nov	5-Nov	5-Nov	S-Nov	5-Nov	5-Nov	S-Nov
USEPA Method 8260B - Volatiles														
benzene	10	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.5
toluene	750	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
ethylbenzene	750	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	18
methyl tert-butyl ether (MTBE)	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2,4-trimethylbenzene	620	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,3,5-trimethylbenzene	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2-dichloroethane (EDC)	10	hg/L	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2-dibromoethane (EDB)	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
naphthalene	NE	hg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10
1-methylnaphthalene	NE	hg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<20
2-methylnaphthalene	NE	hg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<20
acetone	NE	hg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
bromobenzene	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
bromodichloromethane	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
bromoform	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
bromomethane	NE	hg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<15
2-butanone	NE	hg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
carbon disulfide	NE	hg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
carbon tetrachloride	10	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
chlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
chloroethane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10
chloroform	100	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
chloromethane	NE	hg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<15
2-chlorotoluene	NE	1/8rl	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
4-chlorotoluene	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
cis-1,2-DCE	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
cis-1,3-dichloropropene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2-dibromo-3-chloropropane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10
dibromochloromethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
dibromomethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2-dichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,3-dichlorobenzene	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,4-dichlorobenzene	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
dichlorodifluoromethane	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1-dichloroethane	25	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1-dichloroethene	2	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2-dichloropropane	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,3-dichloropropane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
2,2-dichloropropane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10



Table 3 Page 1 of 4

# TABLE 2 2019 ANNUAL COMPLIANCE - GROUNDWATER LABORATORY ANALYTICAL RESULTS

# FORMER GIANT BLOOMFIELD REFINERY SAN JUAN COUNTRY, NEW MEXICO WESTERN REFINING PIPELINE, LLC.

	NMWQCC	45	GRW-3	GRW-6	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-32	GBR-48	GBR-49	GBR-50	GBR-52	SHS-9
Analyte	Standard	) O	7-Nov	7-Nov	5-Nov	6-Nov	6-Nov	7-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov
1,1-dichloropropene	NE	η/gπ	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
hexachlorobutadiene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
2-hexanone	NE	hg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
isopropylbenzene	NE	η/βη	<1.0	<1.0	<1.0	0.1>	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.1
4-isopropytoluene	NE	η/βη	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
4-methyl-2-pentanone	NE	hg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
methylene chloride	100	hg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<15
n-butylbenzene	NE	hg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<15
n-propylbenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	8.1
sec-butylbenzene	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
styrene	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
tert-butylbenzene	NE	hg/L	2.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1,1,2-tetrachloroethane	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1,2,2-tetrachloroethane	10	hg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10
tetrachloroethene (PCE)	20	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
trans-1,2-DCE	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
trans-1,3-dichloropropene	NE	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2,3-trichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2,4-trichlorobenzene	NE	η/βη	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1,1-trichloroethane	09	hg/L	<1.0	<1.0	<1.0	0.1>	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1,2-trichloroethane	10	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
trichloroethene (TCE)	100	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
trichlorofluoromethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2,3-trichloropropane	NE	hg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10
vinyl chloride	1	hg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
xylenes, total	620	µg/L	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<7.5
USEPA Method 8270C: Polycylic Aromatic Hydrocarbons	atic Hydrocarbo	ns												
naphthalene	30	hg/L	<0.50	<0.50	<0.50	05.0>	<0.50	<0.50	LN	NT	LN	NT	LN	LN
1-methylnaphthalene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	LN	NT	LN	NT	LN	NT
2-methylnaphthalene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	LN	NT	LN	NT	LN	LN
acenaphthylene	NE	hg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LN	NT	LN	NT	LN	LN
acenaphthene	NE	µg/L	0.98	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	LN
fluorene	NE	hg/L	4.3	<0.50	<0.50	<0.50	<0.50	<0.50	LN	LN	L	NT	NT	LN
phenanthrene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	LN
anthracene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	LN
fluoranthene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LN	NT	LN	NT	LN	LN
pyrene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LN	LN	LN	NT	LN	LN
benz(a)anthracene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LN	NT	NT	NT	NT	LN
chrysene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	L



Table 3 Page 2 of 4

TABLE 2
2019 ANNUAL COMPLIANCE - GROUNDWATER LABORATORY ANALYTICAL RESULTS

# FORMER GIANT BLOOMFIELD REFINERY SAN JUAN COUNTRY, NEW MEXICO WESTERN REFINING PIPELINE, LLC.

A 11-14	NMWQCC	1	GRW-3	GRW-6	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-32	GBR-48	GBR-49	GBR-50	GBR-52	SHS-9
Analyte	Standard	ב ב	7-Nov	7-Nov	5-Nov	- Nov	- Nov	7-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov
benzo(b)fluoranthene	NE	hg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LN	TN	LN	TN	TN	TN
benzo(k)fluoranthene	NE	hg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LN	LN	LN	LN	NT	LN
benzo(a)pyrene	0.7	hg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LN	LN	LN	LN	LN	LN
dibenz(a,h)anthracene	NE	η/βη	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LN	LN	LN	LN	TN	LN
benzo(g,h,i)perylene	NE	hg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LN	LN	LN	LN	LN	LN
indeno(1,2,3-cd)pyrene	NE	hg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LN	LN	LN	LN	TN	LN
<b>USEPA Method 300.0: Anions</b>														
bromide	NE	mg/L	0.53	<0.50	<0.50	<0.50	<0.50	0.98	<0.50	<0.50	<0.50	<0.50	<0.50	0.78
chloride	250	mg/L	100	94	22	170	280	290	190	270	97	69	09	130
sulfate	009	mg/L	450	1,200	1,200	2,100	1,700	1,600	1,700	2,000	1,500	1,700	1,500	35
fluoride	1.6	mg/L	<0.50	09.0	<0.50	0.58	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.70
nitrate + nitrite as N	NE	mg/L	<0.50	<0.50	5.2	<1.0	1.4	<0.50	<1.0	1.9	<1.0	6.9	6.9	<1.0
phosphorus, orthophosphate (As P)	R	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
<b>USEPA Method 200.7: Total Metals</b>														
barium	NE	mg/L	IN	LN	LN	TN	IN	IN	0.034	0.31	0.021	0.018	LN	IN
beryllium	R	mg/L	IN	LN	LN	TN	IN	TN	<0.010	0.0038	<0.0020	<0.0020	LN	IN
cadmium	0.01	mg/L	LN	LN	LN	NT	LN	NT	<0.010	<0.0020	<0.0020	<0.0020	NT	LN
calcium	NE	mg/L	180	370	450	470	540	530	470	220	400	530	470	150
chromium	0.05	mg/L	LN	LN	NT	NT	LN	NT	0.097	0.23	0.10	0.039	NT	NT
iron	1.0	mg/L	2.3	8.0	120	8.3	43	15	3.6	48	1.4	2.2	1.4	74
magnesium	NE	mg/L	23	39	23	40	52	49	48	28	37	39	36	36
manganese	0.2	mg/L	1.4	5.9	3.8	1.4	4.2	2.7	2.1	1.8	0.87	0.14	0.026	0.91
nickel	0.2	mg/L	NT	LN	LN	NT	LN	NT	0.074	0.098	0.12	0.055	NT	L
potassium	NE	mg/L	<5.0	2.1	9.4	7.0	7.0	3.4	<5.0	10	2.9	2.3	1.2	4.7
silver	0.05	mg/L	LN	NT	NT	NT	LN	NT	<0.025	<0.0050	0.0063	0.0079	NT	L
sodium	NE	mg/L	480	380	240	7.0	490	430	480	260	410	330	310	450
zinc	10	mg/L	L	NT	NT	NT	NT	NT	<0.050	0.097	0.013	<0.010	NT	NT
<b>USEPA Method 200.8: Total Metals</b>														
antimony	NE	mg/L	LN	LN	LN	L	LN	LN	<0.0050	<0.0010	<0.0010	<0.0010	LN	LN
arsenic	0.1	mg/L	LN	NT	NT	NT	LN	NT	<0.0010	0.0076	<0.0010	<0.0010	NT	NT
copper	1.0	mg/L	LN	LN	LN	LN	IN	TN	0.0085	0.048	0.0043	0.0024	NT	NT
lead	0.05	mg/L	LN	LN	LN	NT	LN	NT	0.0012	0.031	0.00083	0.00096	NT	L
selenium	0.05	mg/L	LN	LN	LN	LN	LN	LN	0.0029	0.018	0.0011	0.0083	NT	L
thallium	NE	mg/L	NT	NT	NT	NT	NT	NT	<0.00050	0.00053	<0.000050	<0.00050	NT	NT
USEPA Method 245.1: Mercury														
mercury	0.002	mg/L	LN	LN	LN	LN	IN	IN	<0.00020	<0.00020	<0.00020	<0.00020	NT	NT



Table 3 Page 3 of 4

# 2019 ANNUAL COMPLIANCE - GROUNDWATER LABORATORY ANALYTICAL RESULTS

# FORMER GIANT BLOOMFIELD REFINERY SAN JUAN COUNTRY, NEW MEXICO WESTERN REFINING PIPELINE, LLC.

11111	NMWQCC	1,511	GRW-3	GRW-6	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-32	GBR-48	GBR-49	GBR-50	GBR-52	6-SHS
Analyte	Standard	Onit	7-Nov	7-Nov	5-Nov	6-Nov	6-Nov	7-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov
SM 2340B: Hardness														
hardness (as CaCO3)	NE	T/Bm	089	1,100	1,300	1,300	1,600	1,500	1,400	1,600	1,200	1,500	1,300	520
USEPA Method SM 2320B: Alkalinity														
alkalinity, total (As CaCO3)	JN	mg/L CaCO3	1,083	342.8	208.8	238.8	259.1	300.8	267.7	272.6	244.2	195.3	210.1	1128
carbonate	NE	mg/L CaCO3	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<5.000
bicarbonate	JN	mg/L CaCO3	1,083	342.8	208.8	238.8	259.1	300.8	267.7	272.6	244.2	195.3	210.1	1128
USEPA Method 120.1: Specific Conductance	tance													
specific conductance	ЭN	യാ/soyunt	2,900	3,100	2,700	4,300	4,000	4,000	3,900	4,400	3,400	3,400	3,100	2,500
USEPA Method SM4500-H+B: pH														
Hd	6-9	pH units	7.89	7.97	7.75	7.87	7.76	7.75	7.73	7.66	7.58	7.65	7.83	7.91
USEPA Method SM2540C Modified: Total Dissolved Solids	tal Dissolved S	olids												
total dissolved solids	1,000	T/Bm	1,990	2,470	2,150	3,420	3,040	3,220	3,200	3,450	2,710	2,910	2,600	1,470

µg/L - micrograms per liter

BOLD - indicates concentration exceeds the NMWQCC standard
mg/L - milligrams per liter
NE - not established

NMWQCC - New Mexico Water Quality Control Commission NT - not tested USEPA - United States Environmental Protection Agency



Table 3

Page 4 of 4





### STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER AZTEC

John R. D'Antonio, Jr., P.E. State Engineer

100 Gossett Drive, Suite A Aztec, New Mexico 87410

June 13, 2019

Devin Hencmann, Project Geologist, LT Environmental Western Refining Southwest, Inc. 111 County Road 4990 Bloomfield, NM 87413

RE: Well Plugging Plans of Operations, Monitoring Wells (No OSE Permit), former Giant Bloomfield Refinery (intersection of US Hwy 64 and Road 350)

Dear Mr. Hencmann:

On June 12, 2019, the New Mexico Office of the State Engineer (NMOSE) received ten Well Plugging Plans of Operations for ten unpermitted monitoring wells associated with groundwater remediation project for the above referenced facility. These plans were signed and submitted digitally due to project time restraints caused by current road construction taking place in immediate proximity to the investigation site location. Because of these circumstances, an exception has been made to the requirement for plugging plans to be submitted with original signatures. Please make note that future plugging plan submittals need to be made in triplicate with original signatures. NMOSE approves the proposed Well Plugging Plans of Operations with the attached Specific Plugging Conditions (enclosed).

Within 20 days after completion of well plugging, please submit completed well Plugging Records (OSE Form WD-11) describing the actual abandonment process and itemizing the materials used. The plugging records should be sent to the NMOSE District V, 100 Gossett Drive, Suite A, Aztec, NM, 87410.

If you have any questions regarding this approval action, please feel free to contact me at (505) 334-4571.

Sincerely,

Miles Juett

Assistant Watermaster

Water Rights Division District V

Enclosures

cc: Aztec Reading (w/o enclosures)

Aztec Office Files: P&A and SJ-4110

Brandon Powell, NMOCD District 3 (Aztec), via email: Brandon.Powell@state.nm.us





Trn.

# Existing well with no OSE File # SHS-6

### WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging.

1. FILING FEE: There is no filing fee for this form.

	NERAL / WELL OWNI	gineer POD Number (W		for well to be plugged	NA NA	
		n Refining Southwest	, Inc.			
	g address: 111 County				30-10-0	
	Bloomfield		tate: New M		Zip code:	
Phone	number: 505-632-4166		E-mail:	gjmccartney@mar	athonpetroleum.	com
111. W	ELL DRILLER INFOR	MATION:				
	riller contracted to provide		omat, Inc.			
	exico Well Driller License			Expiration Da	nte: 08-30-2020	
	ELL INFORMATION:					
Note:	A copy of the existing We				•	Č
1)	GPS Well Location:	Latitude: 36 Longitude: -108	deg, 42	min, 5.62	sec sec, NAD 83	Ç.
2)	Reason(s) for plugging v		monitoring a	ctivities. Approval g	ranted by New	
3)	Was well used for any t section VII of this for monitor contaminated or required prior to pluggin	n to detail what hydro or poor quality water, at	geologic parai	neters were monitore	d. If the well w	as used to
4)	Does the well tap brack	ish, saline, or otherwise	poor quality w	rater? NO [	f yes, provide addit	ional detail,
	including analytical resu	lts and/or laboratory repo	ort(s):			
5)	Static water level: 38.0	5 (feet below last	nd surface) fee	et above land surface	(circle one)	
6)	Depth of the well: 48.4	2 feet				
No.					Well Plugging Version: Janua	

7)	Inside diameter of innermost casing: 4.0inches.	
8)	Casing material: PVC and Stainless Steel	
9)	The well was constructed with:	
	an open-hole production interval, state the open interval:	
	X a well screen or perforated pipe, state the screened interval(s): 32.48' to 42.85'	117
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? 26' to 1'	
11)	Was the well built with surface casing? No	or
	otherwise sealed? If yes, please describe:	
12)	Has all pumping equipment and associated piping been removed from the well? YesIf not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.	
V. DE	ESCRIPTION OF PLANNED WELL PLUGGING:	
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodologoproposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremie pip	
	The uppermost two feet will be filled with native dirt and graded to natural conditions	
2)	Will well head be cut-off below land surface after plugging? Yes	Managen
<u>VI. P</u>	LUGGING AND SEALING MATERIALS:	9
	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty scalant	,1:
1)	For plugging intervals that employ cement grout, complete and attach Table A.	
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.	
3)	Theoretical volume of grout required to plug the well to land surface: 23.3 gallons	H
4)	Type of Cement proposed: Portland Cement Type I/II	Ħ
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.	
6)	Will the grout be:batch-mixed and delivered to the site mixed on site	

Trn. No

Well Plugging Plan Version: January 21, 2016 Page 2 of 5

### SHS-6

7)	Grout additives requested, and percent by dr	ry weight relative to cement: 5% power	der bentonite	
				_
8)	Additional notes and calculations:			
	- 40	77.4		
<u>VII. /</u>	ADDITIONAL INFORMATION: List additi	onal information below, or on separate sl	heet(s):	
Grou	ndwater quality			
Grou	ndwater elevation	AND THE RESERVE OF THE PERSON	Š.	C.
				7
			<b>ပ</b>	
			င္	6
			ယ	$\bigcirc$
	SIGNATURE: lary Mrdjenovich			
Operat Engine	tions and any attachments, which are a part here eer pertaining to the plugging of wells and will ng Plan of Operations and attachments are true	comply with them, and that each and all	regulations of the State	
		Mary Mrdjenovich	06/12/2019	
		Signature of Applicant	Date	
IX. A	CTION OF THE STATE ENGINEER:			
This W	/ell Plugging Plan of Operations is:			
	Approved subject to the attached economic Not approved for the reasons provide			
	Witness my hand and official seal this13	day of		
		Tom Blaine P.E., New Mexico Si	tate Engineer	
		By: Mil	A	
		Miles Juett, Assistant Watermast	er	
Frn. Ne			Well Plugging Plan Version: January 21, 201	6

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			2 feet below ground surface
Bottom of proposed interval of grout placement (ft bgl)		nose en un sella-	32.48 feet below ground surface
Theoretical volume of grout required per interval (gallons)			23.3 gallons
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6 gallons
Mixed on-site or batch- mixed and delivered?			mixed on site
Grout additive 1 requested			powder bentonite
Additive 1 percent by dry weight relative to cement			5%
Grout additive 2 requested		alla mileg	
Additive 2 percent by dry weight relative to cement			ස ස

AZTEC, NEW NEXICO

TABLE B - For plugging intervals that will employ approved non-cement based scalant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			32.48 feet below ground surface
Bottom of proposed sealant of grout placement (ft bgl)			48.42 feet below ground surface
Theoretical volume of sealant required per interval (gallons)	OSE Note: 10.41 gallons calcul screened interval if bentonite po of casing. well.		1.3 Cu.Ft. or approximately 9.7 gallons
Proposed abandonment sealant (manufacturer and trade name)		(•)	bentonite

2019 JUN 13 AM 8: 30

STATE ENGINEER OFFICE AZTEC, NEW MEXICO

#### SH5-8



Trn.

# WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging.

1. FILING FEE: There is no filing fee for this form.

	There is no m	ing fee for this torni.				
<u> П С</u>	ENERAL/WELLOWNE	RSHIP:				
	ng Office of the State Eng			well to be plugged:	NA	
	of well owner: Western		t, Inc.			
Mailin	ng address: 111 County	Road 4990				
	Bloomfield		State: New Mexi	СО	Zip code:	87413
Phone	number: 505-632-4166		E-mail: <u>9</u> i	mccartney@mara	thonpetroleum	1.com
	VELL DRILLER INFORM					
Well I	Oriller contracted to provide	plugging services: G	eomat, Inc.			
New N	Mexico Well Driller License	No.: WD-1762		Expiration Date	08-30-2020	
						Z019
IV. W	ELL INFORMATION:					19.
Note:	A copy of the existing Wel	Record for the well to	be plugged should	be attached to this pl	an.	AZTEC, NEW MEXICO
1)	GPS Well Location:	Latitude: 36	dev. 42	<sub>min.</sub> 6.45	sec	₩ 高
,		Longitude: -108	deg,5	min, 39.47	_sec, NAD 83	
	Reason(s) for plugging w	Completion of	monitorina nativi	tion Approval Cro	ntod by Nam	<b>향</b> 등
2)	Reason(s) for plugging w Mexico Oil Conservat		monitoring activi	iles. Appiovai Gia	ined by New	
	MCXICO OII CONSEIVAI	IOII DIVISION.				-
3)	Was well used for any ty section VII of this form	n to detail what hydro	ogeologic paramete	ers were monitored.	If the well	s, please use was used to
	monitor contaminated o required prior to plugging	r poor quality water, a	uthorization from t	he New Mexico Env	ronment Depart	ment may be
				NO		
4)	Does the well tap bracki			15 NO IL	es, provide addi	itional detail,
	including analytical resul	ts and/or laboratory rep	ort(s):			
5)	Static water level: 38.5	2 (feet below la	and surface feet ab	oove land surface (c	ircle one)	
6)	Depth of the well: 52.50	feet				
No		7			Well Plugging Version: Janu	

### 2H2-8

7)	Inside diameter of innermost casing: 4.0inches.
8)	Casing material: PVC and Stainless Steel
9)	The well was constructed with:  an open-hole production interval, state the open interval:  X a well screen or perforated pipe, state the screened interval(s):  30.83' to 46.60'
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? 24 to 1'
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? If yes, please describe:
12)	Has all pumping equipment and associated piping been removed from the well? YesIf not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
<u>V. D</u>	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe, a	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional cal information, such as geophysical logs, that are necessary to adequately describe the proposal.  Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremie pipe.
	The uppermost two feet will be filled with native dirt and graded to natural conditions
2)	Will well head be cut-off below land surface after plugging? Yes
VI. P	LUGGING AND SEALING MATERIALS:
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface:  31.5 gallons
4)	Type of Cement proposed: Portland Cement Type I/II
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.  Will the grout be: batch-mixed and delivered to the site mixed on site

Trn. No

Well Plugging Plan Version January 21, 2016 Page 2 of 5

# 5H5-8

	Grout additives requested, and percent by dry v	veight relative to cement: 376	powder bentonite	-
3)	Additional notes and calculations:	Page .		
		18		
/II. A <u>I</u>	DDITIONAL INFORMATION: List additional	nl information below, or on sepa	arate sheet(s):	
Ground	dwater elevation			,
	444			
			<u> </u>	
				9
<u> </u>			C	7/5
			T.	Fi
			Guard Engles	
Ma Operatio	ons and any attachments, which are a part hereof;	ny that I have carefully read the that I am familiar with the rule	foregoing Well Plugging Plan s and regulations of the State	of
Ma Operatio	ons and any attachments, which are a part hereof; r pertaining to the plugging of wells and will cong Plan of Operations and attachments are true to the plugging of wells are true to the plugging of wells and will cong plan of Operations and attachments are true to the plugging of wells are true to the plugging of wells and well at the plugging of well and well attachments are true to the plugging of well at the plugging of well and well at the plugging of well and well at the plugging of well and well at the plugging of well at the plugging of well at the plugging of well and well at the plugging of well at the plugging of well and well at the plugging of well at the plugging of well at the plugging of well and well at the plugging of well	that I am familiar with the rule	foregoing Well Plugging Planes and regulations of the State and all of the statements in the lelief.	of Well
, <u>Ma</u> Operatio Engineer	ons and any attachments, which are a part hereof; r pertaining to the plugging of wells and will cong Plan of Operations and attachments are true to the plugging of wells are true to the plugging of wells and will cong plan of Operations and attachments are true to the plugging of wells are true to the plugging of wells and well at the plugging of well and well attachments are true to the plugging of well at the plugging of well and well at the plugging of well and well at the plugging of well and well at the plugging of well at the plugging of well at the plugging of well and well at the plugging of well at the plugging of well and well at the plugging of well at the plugging of well at the plugging of well and well at the plugging of well	that I am familiar with the rule nply with them, and that each a the best of my knowledge and b	foregoing Well Plugging Planes and regulations of the State and all of the statements in the lelief.	of Well
, Ma Operatio Engineer Plugging	ons and any attachments, which are a part hereof; r pertaining to the plugging of wells and will cong Plan of Operations and attachments are true to the plugging of wells are true to the plugging of wells and will cong plan of Operations and attachments are true to the plugging of wells are true to the plugging of wells and well at the plugging of well and well attachments are true to the plugging of well at the plugging of well and well at the plugging of well and well at the plugging of well and well at the plugging of well at the plugging of well at the plugging of well and well at the plugging of well at the plugging of well and well at the plugging of well at the plugging of well at the plugging of well and well at the plugging of well	that I am familiar with the rule nply with them, and that each a the best of my knowledge and b  Jenovich  Digitally signed by Mary Date: 2019.06.12 15:57	foregoing Well Plugging Planes and regulations of the State and all of the statements in the lelief.  Mrdjenovich 51-06'00' 06/12/20	of Well
, Ma  Operatio  Ingineer  Plugging	ons and any attachments, which are a part hereof; r pertaining to the plugging of wells and will cong Plan of Operations and attachments are true to to	that I am familiar with the rule nply with them, and that each a the best of my knowledge and b  Jenovich  Digitally signed by Mary Date: 2019.06.12 15:57	foregoing Well Plugging Planes and regulations of the State and all of the statements in the lelief.  Mrdjenovich 51-06'00' 06/12/20	of Well
Ma Operatio Ingineer Plugging	ons and any attachments, which are a part hereof; r pertaining to the plugging of wells and will cong Plan of Operations and attachments are true to to Mary Mrc	that I am familiar with the rule nply with them, and that each a the best of my knowledge and b  Ijenovich Digitally signed by Mary Date: 2019.06.12 15.57  Signature of Applicant	foregoing Well Plugging Planes and regulations of the State and all of the statements in the lelief.  Mrdjenovich 51-06'00' 06/12/20	of Well
, Ma Degration D	ons and any attachments, which are a part hereof; r pertaining to the plugging of wells and will cong Plan of Operations and attachments are true to the Mary Mrc.  TION OF THE STATE ENGINEER:  Approved subject to the attached cond	that I am familiar with the rule nply with them, and that each a the best of my knowledge and b  Ijenovich Digitally signed by Mary Date: 2019.06.12 15.57  Signature of Applicant	foregoing Well Plugging Planes and regulations of the State and all of the statements in the lelief.  Mrdjenovich 51-06'00' 06/12/20	of Well
Ma Operatio Engineer Plugging	my Mrdjenovich ons and any attachments, which are a part hereof; r pertaining to the plugging of wells and will con g Plan of Operations and attachments are true to t  Mary Mrc  TION OF THE STATE ENGINEER:  Il Plugging Plan of Operations is:  X Approved subject to the attached cond Not approved for the reasons provided	that I am familiar with the rule nply with them, and that each a the best of my knowledge and by Mary Date: 2019.06.12 15.57.  Signature of Applicant itions.  on the attached letter.	foregoing Well Plugging Planes and regulations of the State and all of the statements in the lelief.  Mrdjenovich 51-06'00' 06/12/20  Date	of Well
Ma Operatio Engineer Plugging	my Mrdjenovich ons and any attachments, which are a part hereof; r pertaining to the plugging of wells and will con g Plan of Operations and attachments are true to t  Mary Mrc  TION OF THE STATE ENGINEER:  Il Plugging Plan of Operations is:  X Approved subject to the attached cond Not approved for the reasons provided	that I am familiar with the rule apply with them, and that each a the best of my knowledge and by the best of my knowledge and	foregoing Well Plugging Planes and regulations of the State and all of the statements in the lelief.  Midjenovich 51-06'00' 06/12/20  Date 2019  xico State Engineer	of Well
, Ma Dperatio Engineer Plugging X. AC	my Mrdjenovich ons and any attachments, which are a part hereof; r pertaining to the plugging of wells and will con g Plan of Operations and attachments are true to t  Mary Mrc  TION OF THE STATE ENGINEER:  Il Plugging Plan of Operations is:  X Approved subject to the attached cond Not approved for the reasons provided	that I am familiar with the rule apply with them, and that each a the best of my knowledge and by the best of my knowledge and	foregoing Well Plugging Planes and regulations of the State and all of the statements in the lelief.  Mrdjenovich 51-06'00' 06/12/20  Date	of Well

5#5-8

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shal	low
			Note: if the well is non-artesian and bread only one aquifer, use only this column	hes
Top of proposed interval of grout placement (ft bgl)			2 feet below groun surface	d
Bottom of proposed interval of grout placement (ft bgl)			30.83 feet below ground surface	
Theoretical volume of grout required per interval (gallons)	OSE Note: 18.82 gallons calculated if cement grout pour starts at top of		17.3 gallons	
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6 gallons	
Mixed on-site or batch- mixed and delivered?			mixed on site	
Grout additive 1 requested			powder bentonite	
Additive 1 percent by dry weight relative to cement			5% 2019	**
Grout additive 2 requested			2019 3 AA	TICO MENTINE
Additive 2 percent hy dry weight relative to cement			55	

Trn. No

Well Plugging Plan Version: January 21, 2016 Page 4 of 5

TABLE B - For plugging intervals that will employ approved non-cement based scalant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			30.83 feet below ground surface
Bottom of proposed sealant of grout placement (ft bgl)			52.50 feet below ground surface
Theoretical volume of scalant required per interval (gallons)	OSE Note: 14.15 gallons cascreened interval if bentoning of casing well.		1.7 Cu.Ft. or approximately 12.7 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

#### 5H5-10



Trn.

#### WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging.

<u>I. FI</u>	LING FEE; There is no filing	fee for this form.				
II. G	ENERAL/WELL OWNERS	HIP:				
Existi	ing Office of the State Engineer			well to be plugged:	NA	
	of well owner.	efining Southwest,	Inc.			
	ng address: 111 County Ro					
	Bloomfield	Sta	ite: New Mexic	00	Zip code: 8741	3
Phone	number: 505-632-4166		E-mail:	mccartney@mara	thonpetroleum.com	
	VELL DRILLER INFORMA				2	
	Driller contracted to provide plu		mat, Inc.		00.00.000	<u></u>
New I	Mexico Well Driller License No	. WD-1762		Expiration Date	08-30-2020	
					<u></u>	20
	VELL INFORMATION:					
Note:	A copy of the existing Well Re					
1)		ntitude: 36	deg,42	min, 1.75	sec _sec, NAD 83	87
	L	ongitude: -108	deg, _5	min, 40.07	_sec, NAD 83 💍	ि
2)	Reason(s) for plugging well:	Completion of me	onitoring activi	ties. Approval gra	nted by New	
-/	Mexico Oil Conservation					
3)	Was well used for any type	of monitoring program	n or environmen	tal assessment? Ye	If yes, pleas	se use
	section VII of this form to monitor contaminated or po	detail what hydroge or quality water, auth	eologic paramete iorization from the	ers were monitored. he New Mexico Envi	If the well was us ironment Department m	ed to
	required prior to plugging.					,
4)	Does the well tap brackish,	saline, or otherwise po	oor quality water	NO If	es, provide additional	detail.
	including analytical results a				, ,	
5)	Static water level: Dry	(ieet below land	surface feet ab	ove land surface (c	ircle one)	
6)	Depth of the well: 48.6	feet				
					Well Plugging Plan	
No			*		Version: January 21, 2 Page 1 of 5	.016

### 5HS-10

7)	Inside diameter of innermost easing: 4.0inches.
8)	Casing material: PVC and Stainless Steel
9)	The well was constructed with:an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 31.66' to 46.69'
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? 14.3' to 1'
11)	Was the well built with surface casing? NoIf yes, is the annulus surrounding the surface casing grouted or
	otherwise sealed? If yes, please describe:
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. DI	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe, a	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional cal information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well:
	The uppermost two feet will be filled with native dirt and graded to natural conditions
2)	Will well head be cut-off below land surface after plugging? Yes
<u>VI. P</u>	LUGGING AND SEALING MATERIALS;
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: 29.1 gallons
4)	Type of Cement proposed: Portland Cement Type I/II
5)	Proposed cement grout mix:6gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be:batch-mixed and delivered to the site mixed on site

Well Plugging Plan Version: January 21, 2016 Page 2 of 5

7)	Grout additives requested, and percent by dry	weight relativ	e to cement: 5% powde	r bentonite		
8)	Additional notes and calculations:					
·				6)		
VII.	ADDITIONAL INFORMATION: List additio	nal information	below, or on separate shee	et(s):		
	indwater quality		£3.*			
Grou	indwater elevation				20	
					9	2
						11
					ಎ	
					- July -	772
					Constitution of the second	Ę
					N	Ö
	SIGNATURE:					
Operate Engine	Mary Mrdjenovich  tions and any attachments, which are a part hereceer pertaining to the plugging of wells and will cong Plan of Operations and attachments are true to	of; that I am far omply with the	niliar with the rules and reg m, and that each and all of	rulations of the Sta	ite	
		rdjenovich	Digitally signed by Mary Mrdjenovich Date: 2019.06.12 15:59:39 -06:00*	06/12	/2010	1
	100119 101		Date: 2019.06.12 15:59:39 -06:00*		Date	
		-	**			
IX. A	CTION OF THE STATE ENGINEER:					
This W	Vell Plugging Plan of Operations is:					
	X Approved subject to the attached con Not approved for the reasons provide	nditions. ed on the attach	ed letter.			
	Witness my hand and official seal this 13	day of	June	, 2019	_	
		Tom Bl	aine P.E., New Mexico State	e Engineer		
			n 10 1	2		
		By:	les Juett 64			
		////	res duett, 65E	Aztec		
Frn. No	0			Well Plugging F Version: Januar Page 3 of 5		116

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval I – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			2 feet below ground surface
Bottom of proposed interval of grout placement (ft bgl)			31.66 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: 19.36 gallons calculate cement grout pour starts at top of		17.2 gallons
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6 gallons
Mixed on-site or batch- mixed and delivered?			mixed on site
Grout additive 1 requested			powder bentonite
Additive 1 percent by dry weight relative to cement			5%
Grout additive 2 requested			2019 JUI
Additive 2 percent by dry weight relative to cement			13 ANIO 03

Trn. No

Well Plugging Plan Version: January 21, 2016 Page 4 of 5

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest Inte	val 2 Interval 3 – most shallow
		Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)		31.66 feet below ground surface
Bottom of proposed scalant of grout placement (ft bgl)		48.6 feet below ground surface
Theoretical volume of sealant required per interval (gallons)	OSE Note: 11.06 gallons calculated to fi screened interval if bentonite pour starts of casing. well.	
Proposed abandonment scalant (manufacturer and trade name)		bentonite

2019 JUN 13 AM 8: 49

AZTEC, NEW MEXICO



#### SHS-12

## WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging.

	of well owner: Western		west, Inc.				
Maili	ng address: 111 County						
	Bloomfield		State: New Me	exico	Zip code:	87413	}
Phone	e number: 505-632-4166		E-mail:	Kelly.robinson@wnr.c	com		
<u>111.                                   </u>	WELL DRILLER INFORM	AATION:					
	Driller contracted to provide		Geomat, Inc.			2	
	Mexico Well Driller License			Expiration Date:	08-30-2020	9 (11)	7
							200
<u>IV. y</u>	VELL INFORMATION:					w	7
Note:	A copy of the existing Wel	Record for the we	ll to be plugged sho	uld be attached to this pla	n.		77
1)	GPS Well Location:						171
-,	Of 5 Well Location	Longitude: -108	deg,	min, 1.82 min, 43.15	sec, NAD 83	<u>က</u> ထဲ	2
2)	Reason(s) for plugging w Mexico Oil Conservat		or monitoring act	ivities. Approval grante	ed by New		
3)	Was well used for any ty section VII of this forn monitor contaminated or required prior to plugging	to detail what he poor quality water	ydrogeologic paran	neters were monitored.	If the well	was use	ed to
4)	Does the well tap bracki including analytical resul			ater? NO If ye			etail,
		111111111111111111111111111111111111111				•	
5)	Static water level; 39.0	feet helo	w land surface fee	t above land surface (cir	cle one)		
6)	Depth of the well: 55.0	feet					
No		7			Well Plugging Version: Janu		16

#### SHS-12

7)	Inside diameter of innermost casing: 4.0 inches.
8)	Casing material: PVC and Stainless Steel
9)	The well was constructed with: an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 31.5' to 46.5'
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? 22.33' to 1'
11)	Was the well built with surface casing? NoIf yes, is the annulus surrounding the surface casing grouted or otherwise sealed? If yes, please describe:
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. DES	SCRIPTION OF PLANNED WELL PLUGGING:
pipe, a	f this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional al information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremie pipe.
	The uppermost two feet will be filled with native dirt and graded to natural conditions
2)	Will well head be cut-off below land surface after plugging? Yes
VI DI	JUGGING AND SEALING MATERIALS:
	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1) =	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface:  31.4 gallons
4)	Type of Cement proposed: Portland Cement Type I/II
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be:batch-mixed and delivered to the site mixed on site

Trn. No

Well Plugging Plan Version: January 21, 2016 Page 2 of 5

7)	Grout additives requested, and percent by dry w	veight relative to cement: 5% po	owder bentonite		
8)	Additional notes and calculations:				
			¥8		
	ADDITIONAL INFORMATION: List additional national	l information below, or on separat	e sheet(s):		
	ndwater quality			22	
Oloui	nowater elevation			*****	
				5	
					-
-				ω	看
				III.	
				(E)	3
I, Ma Operat Engine	signature:  ary Mrdjenovich  ions and any attachments, which are a part hereof; eer pertaining to the plugging of wells and will con ng Plan of Operations and attachments are true to t	nply with them, and that each and	nd regulations of that all of the statement	ie State	
	Mary Mro	ijenovich Digitally signed by Mary Mrdj Date: 2019.06.12 16:00:43 -	Se.00. 0	6/12/201	9
		Signature of Applicant		Date	
IX. A	CTION OF THE STATE ENGINEER:				
This W	ell Plugging Plan of Operations is:				
	Approved subject to the attached cond  Not approved for the reasons provided				
	Witness my hand and official seal this 13	day of June	2019		
		Tom Blaine P.E., New Mexico	o State Engineer		
		By: My	At		
		Miles Juett	OSE Azt	lec	
Γrn. No				gging Plan January 21, 1	2016

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			2 feet below ground surface
Bottom of proposed interval of grout placement (ft bgl)			31.5 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: 19.26 gallons calculat cement grout pour starts at top of		17.2 gallons
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6 gallons
Mixed on-site or batch- mixed and delivered?			mixed on site
Grout additive 1 requested			powder bentonite
Additive 1 percent by dry weight relative to cement			5%
Grout additive 2 requested			2019 JUN
Additive 2 percent by dry weight relative to cement			3 AH IO: 12

Trn. No

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgI)			31.5 feet below ground surface
Bottom of proposed sealant of grout placement (ft bg!)			55.0 feet below ground surface
Theoretical volume of scalant required per interval (gallons)	OSE Note: 15.34 gallons cascreened interval if bentonion of casing.we\-		1.8 Cu.Ft. or approximately 13.4 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite



### 5H5-14

## WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging.

1. FILING FEE: There is no filing fee for this form.

	e of well owner: Wester						
City:	Bloomfield	S	tate: New Mex	ico	Zip code:	8741	3
Phone	e number: 505-632-4166	5	E-mail: _9	jmccartney@marath	non petroleum	1.com	
ш. у	WELL DRILLER INFOR	MATION:				2019	
	Driller contracted to provid		omat, Inc.			C	Ī
	Mexico Well Driller Licens			Expiration Date:	08-30-2020	32	
						င်ပ	Ü
<u>IV. V</u>	WELL INFORMATION:						7
Note:	A copy of the existing We	ell Record for the well to	ne plugged should	d be attached to this pla	n.	9	250
1)	GPS Well Location:	Latitude: 36	deg, 41	min, 58.07 min, 40.89	sec	0	
2)	Reason(s) for plugging Mexico Oil Conserva	well: Completion of n	nonitoring activ	ities. Approval grant	ed by New		
	Mexico Oil Collselva	mon Division.					
3)	section VII of this for	type of monitoring progr m to detail what hydrog or poor quality water, au	geologic paramet	ers were monitored.	If the well v	vas us	ed
4)	Does the well tap brack	tish, saline, or otherwise	poor quality wate	r? NO If ye	s, provide addi	tional c	leta
	including analytical resu	lts and/or laboratory repo	ort(s):				
			-91-	) j.			_
5)	Static water level: 34.3	166 (feet below lar	nd surface) feet al	bove land surface (cir	cle one)		
6)	Depth of the well: 55	feet					
					Well Plugging		
					Version Janua	4FV 24 . 29	

7)	Inside diameter of innermost casing: 4.0 inches.	
8)	Casing material: PVC and Stainless Steel	
9)	The well was constructed with:	
	an open-hole production interval, state the open interval:	
	X a well screen or perforated pipe, state the screened interval(s): 28.7' to 48.7'	
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? 10' to 1'	
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing gro	uted or
	otherwise sealed? If yes, please describe:	
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, descremaining equipment and intentions to remove prior to plugging in Section VII of this form.	ribe
	ESCRIPTION OF PLANNED WELL PLUGGING:	
	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a	** ******
	a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any ad- cal information, such as geophysical logs, that are necessary to adequately describe the proposal.	ditional
techni	cal information, such as geophysical logs, that are necessary to adequately describe the proposal.  Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:	dology
techni	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremi	dology
techni	cal information, such as geophysical logs, that are necessary to adequately describe the proposal.  Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:	dology
techni	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremi	dology
techni 1) 2)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremi The uppermost two feet will be filled with native dirt and graded to natural conditions  Will well head be cut-off below land surface after plugging?  Yes	dology
techni  1)  2)  VI. P	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremi The uppermost two feet will be filled with native dirt and graded to natural conditions  Will well head be cut-off below land surface after plugging?  Yes	dology e pipe.
techni  1)  2)  VI. P	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremi The uppermost two feet will be filled with native dirt and graded to natural conditions  Will well head be cut-off below land surface after plugging?  Yes	dology e pipe.
techni  1)  2)  VI. P	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremi The uppermost two feet will be filled with native dirt and graded to natural conditions  Will well head be cut-off below land surface after plugging?  Yes	dology e pipe.
1) 2) VI. P Note:	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremi The uppermost two feet will be filled with native dirt and graded to natural conditions  Will well head be cut-off below land surface after plugging?  Yes  LUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant.	dology e pipe.
1) 2) VI. P Note: 1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremi The uppermost two feet will be filled with native dirt and graded to natural conditions  Will well head be cut-off below land surface after plugging?  Yes  LUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant For plugging intervals that employ cement grout, complete and attach Table A.  For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.  Theoretical volume of grout required to plug the well to land surface:  31.4 gallons	dology e pipe.
1) 2) VI. P Note: 1) 2)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremi The uppermost two feet will be filled with native dirt and graded to natural conditions  Will well head be cut-off below land surface after plugging?  Yes  LUGGING AND SEALING MATERIALS: The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealan For plugging intervals that employ cement grout, complete and attach Table A.  For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.	dology e pipe.
1) 2) VI. P Note: 1) 2) 3)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremi The uppermost two feet will be filled with native dirt and graded to natural conditions  Will well head be cut-off below land surface after plugging?  Yes  LUGGING AND SEALING MATERIALS: The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant For plugging intervals that employ cement grout, complete and attach Table A.  For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table 3.  Theoretical volume of grout required to plug the well to land surface:  31.4 gallons	dology e pipe.
1) 2) VI. P Note: 1) 2) 3) 4)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging metho proposed for the well:  Portland Type I/II cement sturry filled from the bottom upwards to two feet below ground surface using a tremi The uppermost two feet will be filled with native dirt and graded to natural conditions  Will well head be cut-off below land surface after plugging?  Yes  LUGGING AND SEALING MATERIALS: The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty seatan For plugging intervals that employ cement grout, complete and attach Table A.  For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.  Theoretical volume of grout required to plug the well to land surface:  31.4 gallons  Portland Cement Type I/II	dology e pipe.

Trn. No

Well Plugging Plan Version: January 21, 2016 Page 2 of 5

# SH5-14

		weight relative to cement: 5% powder	
8)	Additional notes and calculations:		
	+0.		
VII. AD	DITIONAL INFORMATION: List addition	al information below, or on separate shee	t(s):
Ground	lwater quality		20
Ground	lwater elevation		40
			ţ
			(J)
			339
		100 days -	e-alia
Mary	GNATURE: / Mrdjenovich ps and any attachments, which are a part hereol	say that I have carefully read the foregoing	g Well Plugging Plan of
, Mary Operation Engineer		t; that I am familiar with the rules and reg mply with them, and that each and all of t	ulations of the State
Mary Operation Engineer	Mrdjenovich, s as and any attachments, which are a part hereol pertaining to the plugging of wells and will co Plan of Operations and attachments are true to	t; that I am familiar with the rules and reg mply with them, and that each and all of t	ulations of the State
Mary Operation Engineer	Mrdjenovich, s as and any attachments, which are a part hereol pertaining to the plugging of wells and will co Plan of Operations and attachments are true to	i; that I am familiar with the rules and reg mply with them, and that each and all of t the best of my knowledge and belief.	ulations of the State he statements in the Well
Mary Operation Engineer Plugging	Mrdjenovich, s as and any attachments, which are a part hereol pertaining to the plugging of wells and will co Plan of Operations and attachments are true to	r; that I am familiar with the rules and reg mply with them, and that each and all of the best of my knowledge and belief.  Digitally signed by Mary Mrdjenovich Date: 2019.08.12 18:01:21 -06'00'	the statements in the Well  06/12/2019
Mary Operation Engineer Plugging	/ Mrdjenovich  ns and any attachments, which are a part hereof pertaining to the plugging of wells and will co. Plan of Operations and attachments are true to.  Mary Mr.	r; that I am familiar with the rules and reg mply with them, and that each and all of the best of my knowledge and belief.  Digitally signed by Mary Mrdjenovich Date: 2019.08.12 18:01:21 -06'00'	the statements in the Well  06/12/2019
Mary Operation Engineer Plugging  X. ACT	y Mrdjenovich  ns and any attachments, which are a part hereof pertaining to the plugging of wells and will coplan of Operations and attachments are true to Mary Mr.  CION OF THE STATE ENGINEER:	r; that I am familiar with the rules and reg mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovich Date: 2019.08.12 18:01:21 -06:00'  Signature of Applicant  ditions.	the statements in the Well  06/12/2019
Mary Operation Engineer Plugging  X. ACT	y Mrdjenovich  ns and any attachments, which are a part hereof pertaining to the plugging of wells and will coplan of Operations and attachments are true to Mary Mr.  TION OF THE STATE ENGINEER:  I Plugging Plan of Operations is:  X Approved subject to the attached conditions.	r; that I am familiar with the rules and reg mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovich Date: 2019.08.12 18:01:21 -06:00'  Signature of Applicant  ditions.	the statements in the Well  06/12/2019
Mary Operation Engineer Plugging  X. ACT	y Mrdjenovich  ns and any attachments, which are a part hereof pertaining to the plugging of wells and will concern pertaining to the plugging of wells and will be presented to the plugging of wells and will be plugging of wells a	that I am familiar with the rules and reg mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovich Date: 2019.08.12 18:01:21-06'00'  Signature of Applicant  ditions. d on the attached letter.  day of June  Tom Blaine P.E., New Mexico State	06/12/2019 Date
Mary Operation Engineer Plugging  X. ACT	y Mrdjenovich  ns and any attachments, which are a part hereof pertaining to the plugging of wells and will concern pertaining to the plugging of wells and will be presented to the plugging of wells and will be plugging of wells a	that I am familiar with the rules and reg mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovich Date: 2019.08.12 18:01:21-06'00'  Signature of Applicant  ditions. d on the attached letter.  day of June  Tom Blaine P.E., New Mexico State  By:	06/12/2019  Date  2019  Engineer
Mary Operation Engineer Plugging	y Mrdjenovich  ns and any attachments, which are a part hereof pertaining to the plugging of wells and will concern pertaining to the plugging of wells and will be presented to the plugging of wells and will be plugging of wells a	that I am familiar with the rules and reg mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovich Date: 2019.08.12 18:01:21-06'00'  Signature of Applicant  ditions. d on the attached letter.  day of June  Tom Blaine P.E., New Mexico State	O6/12/2019  Date  2019  Engineer

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			2 feet below ground surface
Bottom of proposed interval of grout placement (ft bgl)			28.7 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: 17.43 gallons calcula cement grout pour starts at top o		15.7 gallons
Proposed cement grout mix gallons of water per 94-lb, sack of Portland cement			6 gallons
Mixed on-site or batch- mixed and delivered?			mixed on site
Grout additive 1 requested			powder bentonite
Additive 1 percent by dry weight relative to cement	Es .		5%
Grout additive 2 requested			2019 JUN 1
Additive 2 percent by dry weight relative to cement			3 AF 10 12

AZTEC, NEW YEYON

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of scalant placement (ft bgl)			28.7 feet below ground surface
Bottom of proposed sealant of grout placement (ft bgl)			55 feet below ground surface
Theoretical volume of sealant required per interval (gallons)	OSE Note: 17.17 gallons calc screened interval if bentonite of easing.we\\.	culated to fill entire pour starts at total depth	2.1 Cu.Ft. or approximately 15.7 gallons
Proposed abandonment sealant (manufacturer and trade name)	12		bentonite

AZTEC, NEW MEXICO



#### SHS-15

## WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging.

I. FILING FEE: There is no filing fee for this form

Mailing address: Bloomfield State: New Mexico Zip Phone number: 505-632-4166		
Phone number: 505-632-4166  E-mail: gjmccartney@marathonpetr  Ht. WELL DRILLER INFORMATION:  Well Driller contracted to provide plugging services: Geomat, Inc.  New Mexico Well Driller License No.: WD-1762  Expiration Date: 08-30  IV. WELL INFORMATION:  Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 58.08 sec Longitude: -108 deg, 5 min, 38.42 sec, NA  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi	. 87	7/13
Well Driller contracted to provide plugging services:  New Mexico Well Driller License No.:  WD-1762  Expiration Date: 08-30  WL. WELL INFORMATION:  Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  OPS Well Location:  Latitude: 36 deg, 41 min, 58.08 sec Longitude: -108 deg, 5 min, 38.42 sec, NA  Completion of monitoring activities. Approval granted by Mexico Oil Conservation Division.  Was well used for any type of monitoring program or environmental assessment? Yes section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi	eum.co	om
Well Driller contracted to provide plugging services:    Geomat, Inc.		
New Mexico Well Driller License No.: WD-1762 Expiration Date: 08-30  IV. WELL INFORMATION:  Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 58.08 sec Longitude: -108 deg, deg, -108 deg		
New Mexico Well Driller License No.: WD-1762 Expiration Date: 08-30  IV. WELL INFORMATION:  Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 58.08 sec Longitude: -108 deg, deg, -108 deg		
Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 58.08 sec Longitude: -108 deg, 5 min, 38.42 sec, NA  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi	020 🛌	3
Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 58.08 sec Longitude: -108 deg, 5 min, 38.42 sec, NA  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi	<u></u>	5 3
1) GPS Well Location:  Latitude: 36 deg, 41 min, 58.08 sec MA  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi	25	
Reason(s) for plugging well: Completion of monitoring activities. Approval granted by Mexico Oil Conservation Division.  Was well used for any type of monitoring program or environmental assessment? Yes section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi	C.	5
2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi		
Mexico Oil Conservation Division.  Was well used for any type of monitoring program or environmental assessment? Yes section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi	83	
Mexico Oil Conservation Division.  Was well used for any type of monitoring program or environmental assessment? Yes section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi	ew 5	5
section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi		
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section VII of this form to detail what hydrogeologic parameters were monitored. If the monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi		
monitor contaminated or poor quality water, authorization from the New Mexico Environment required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi		
4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provi	partmen	it may
including analytical results and/or laboratory report(s):	addition	nal deta
5) Static water level: 34.02 (feet below land surface) feet above land surface (circle one)		Ph
6) Depth of the well: 50 feet		P

7)	Inside diameter of innermost casing: 4.0inches.		
8)	Casing material: PVC and Stainless Steel		
9)	The well was constructed with:		
	an open-hole production interval, state the open interval:		
	X a well screen or perforated pipe, state the screened interval(s): 27.4' to 42.4'		
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? 21.8' to 1'		
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casin	ng grou	ted or
	otherwise sealed? If yes, please describe:		
12)	Has all pumping equipment and associated piping been removed from the well? Yes If no remaining equipment and intentions to remove prior to plugging in Section VII of this form.	t, descr	ibe
V. DES	SCRIPTION OF PLANNED WELL PLUGGING:		
pipe, a	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as a al information, such as geophysical logs, that are necessary to adequately describe the proposal.		
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging	nethod	ology
	proposed for the well:	tremie	nine
	The uppermost two feet will be filled with native dirt and graded to natural conditions		pipo.
2)	Will well head be cut-off below land surface after plugging?		
VI. PI	UGGING AND SEALING MATERIALS:		
-	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty	sealant	_0
1)	For plugging intervals that employ cement grout, complete and attach Table A.	Ē	
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Tab	le B.	
3)	Theoretical volume of grout required to plug the well to land surface: 28.4 gallons	3	温
4)	Type of Cement proposed: Portland Cement Type I/II	9	양
	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.	01	1,6
5)			
6)	Will the grout be:batch-mixed and delivered to the site		
	mîxed on site		

Well Plugging Plan Version: January 21, 2016 Page 2 of 5

Trn. No

## SHS-15

7)	Grout additives requested, and percent by dry	weight relative to cement: 5% pov	wder bentoni	te	.70
8)	Additional notes and calculations:				
			name at a second		
	ADDITIONAL INFORMATION: List additional addi	al information below, or on separate	sheet(s):		
Grou	ndwater elevation				
N				20	П
				9	P
				=	i'r
				- w	F
				, Jan	- 05
				5	Ş.
VIII.	SIGNATURE:			N	9
Operat Engine	ions and any attachments, which are a part hereof eer pertaining to the plugging of wells and will coing Plan of Operations and attachments are true to	mply with them, and that each and al	d regulations o	f the State	ell
		Signature of Applicant		Date	
IX. A	CTION OF THE STATE ENGINEER:				
This W	ell Plugging Plan of Operations is:				
	X Approved subject to the attached cond Not approved for the reasons provided				
	Witness my hand and official seal this 13	day of June	2019		
		Tom Blaine P.E., New Mexico	State Engineer		
		By: My Chil	H		
		Mites Trett	/	ztec Plugging Plan	
rn. No				on: January 21, 20	016

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval I – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			2 feet below ground surface
Bottom of proposed interval of grout placement (ft bgl)			27.4 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: 16.58 gallons calculate cement grout pour starts at top of		14.9 gallons
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6 gallons
Mixed on-site or batch- mixed and delivered?			mixed on site
Grout additive 1 requested			powder bentonite
Additive 1 percent by dry weight relative to cement			5%
Grout additive 2 requested			2019 JUN 13
Additive 2 percent by dry weight relative to cement			AN 10-12

Trn. No

Well Plugging Plan Version: January 21, 2016 Page 4 of 5 SH5-15

TABLE B - For plugging intervals that will employ approved non-cement based scalant(s). Start with deepest interval.

	Interval I – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			27.4 feet below ground surface
Bottom of proposed sealant of grout placement (ft bgl)			50 feet below ground surface
Theoretical volume of sealant required per interval (gallons)	OSE Note: 14.75 gallons cascreened interval if bentoning of casing.we\\.	l	1.8 Cu.Ft. or approximately 13.4 gallons
Proposed abandonment sealant (manufacturer and trade name)		П	bentonite

AZTEO, NEW MEXICO



# WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging.

1. FILING FEE: There is no filing fee for this form.

Mailing address:  City: Bloomfield State: New Mexico Zip code:  Phone number: 505-632-4166 E-mail: gjmccartney@marathonpetroleum.  E-mail: gjmccartney@marathonpetrole			n Refining Southwest, I	nc.		
Phone number: 505-632-4166  E-mail: gjmccartney@marathonpetroleum.c    Completion of monitoring activities.   Email: gjmccartney@marathonpetroleum.c    Completion of monitoring activities.   Email: gjmccartney@marathonpetroleum.c    Completion of monitoring activities.   Email: gjmccartney@marathonpetroleum.c    Completion of monitoring activities.   Expiration Date:   O8-30-2020						86.W. 4
Well Driller contracted to provide plugging services:  New Mexico Well Driller License No.: WD-1762  Expiration Date: 08-30-2020  IV. WELL INFORMATION:  Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 54.74 sec Longitude: -108 deg, 5 min, 42.13 sec, NAD 83  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes If yes, section VII of this form to detail what hydrogeologic parameters were monitored. If the well we monitor contaminated or poor quality water, authorization from the New Mexico Environment Departm required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additincluding analytical results and/or laboratory report(s):			Stat	e: New Mexico	Zip code;	87413
Well Driller contracted to provide plugging services:    Mode	Phone	number: 505-632-4166		E-mail: gjmccartne	y@marathonpetroleum	.com
New Mexico Well Driller License No.: WD-1762 Expiration Date: 08-30-2020  IV. WELL INFORMATION:  Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 54.74 sec Longitude: 108 deg, 5 min, 42.13 sec, NAD 83  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes If yes, section VII of this form to detail what hydrogeologic parameters were monitored. If the well we monitor contaminated or poor quality water, authorization from the New Mexico Environment Department of the plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):						
Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 54.74 sec Longitude: -108 deg, 5 min, 42.13 sec, NAD 83  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes If yes, section VII of this form to detail what hydrogeologic parameters were monitored. If the well we monitor contaminated or poor quality water, authorization from the New Mexico Environment Department of plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):				nat, Inc.		
Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 54.74 sec Longitude: -108 deg, 5 min, 42.13 sec, NAD 83  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes If yes, section VII of this form to detail what hydrogeologic parameters were monitored. If the well we monitor contaminated or poor quality water, authorization from the New Mexico Environment Department of plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additionally including analytical results and/or laboratory report(s):	New N	Mexico Well Driller Licens	e No.: WD-1762	Expir	ration Date: 08-30-2020	22
1) GPS Well Location:  Latitude: 36deg, 41min, 54.74sec	<u>IV. W</u>	VELL INFORMATION:				9
Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  Was well used for any type of monitoring program or environmental assessment? Yes If yes, section VII of this form to detail what hydrogeologic parameters were monitored. If the well w monitor contaminated or poor quality water, authorization from the New Mexico Environment Departm required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additionally including analytical results and/or laboratory report(s):	Note:	A copy of the existing We	ll Record for the well to be	plugged should be attache	d to this plan.	CO
Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  Was well used for any type of monitoring program or environmental assessment? Yes If yes, section VII of this form to detail what hydrogeologic parameters were monitored. If the well w monitor contaminated or poor quality water, authorization from the New Mexico Environment Departm required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additionally including analytical results and/or laboratory report(s):	1)	GPS Well Location	Latitude: 36	deg 41 min	54.74	730 735
Was well used for any type of monitoring program or environmental assessment? Yes If yes, section VII of this form to detail what hydrogeologic parameters were monitored. If the well we monitor contaminated or poor quality water, authorization from the New Mexico Environment Department of plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):	•,	of B Well Education.	Longitude: -108	deg,min,	42.13 sec, NAD 83	2
section VII of this form to detail what hydrogeologic parameters were monitored. If the well we monitor contaminated or poor quality water, authorization from the New Mexico Environment Department required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):	2)			nitoring activities. App	roval granted by New	6
including analytical results and/or laboratory report(s):	3)	section VII of this for monitor contaminated of	m to detail what hydroged or poor quality water, author	ologic parameters were i	nonitored. If the well	was used
5) Static water level: 31.25 (feet below land surface) feet above land surface (circle one)	4)					itional deta
6) Depth of the well: 50 feet	5)	Static water level: 31.2	25 (feet below land	surface) feet above land s	urface (circle one)	

### SHS-16

7)	Inside diameter of innermost casing: 4.0inches.
8)	Casing material: PVC and Stainless Steel
9)	The well was constructed with:  an open-hole production interval, state the open interval:  X a well screen or perforated pipe, state the screened interval(s):  22.2' to 37.2'
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? 15' to 1'
11)	Was the well built with surface casing? No
12)	Has all pumping equipment and associated piping been removed from the well? YesIf not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
Note: pipe, a	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional cal information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremie pipe.
	The uppermost two feet will be filled with native dirt and graded to natural conditions
2)	Will well head be cut-off below land surface after plugging? Yes
VI. P	LUGGING AND SEALING MATERIALS:
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: 28.4 gallons
4)	Type of Cement proposed: Portland Cement Type I/II
5)	Proposed cement grout mix:6gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be:batch-mixed and delivered to the site mixed on site

Trn. No

Well Plugging Plan Version: January 21, 2016 Page 2 of 5

	Grout additives requested, and percent by dry	weight relative to cement: 5% powder	er bentonite
8)	Additional notes and calculations:		
			-1
	ADDITIONAL INFORMATION: List addition undwater quality	-	
	undwater elevation		
			\$ 1000 pt
			CO F
·	***		
VIII.	SIGNATURE:		5
-,	lary Mrdjenovich	say that I have carefully read the foregoi	ng Well Plugging Plan of
Opera Engin	tions and any attachments, which are a part hereo	f; that I am familiar with the rules and re	gulations of the State
Plugg	eer pertaining to the plugging of wells and will coing Plan of Operations and attachments are true to	mply with them, and that each and all o	f the statements in the Well
Plugg	ing Plan of Operations and attachments are true to	mply with them, and that each and all o	
Plugg	ing Plan of Operations and attachments are true to	imply with them, and that each and all o the best of my knowledge and belief.	
Plugg	ing Plan of Operations and attachments are true to  Mary Mr	mply with them, and that each and all o the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovici Date: 2019.06.12 16:02:56 -06'00'	06/12/2019
Plugg	ing Plan of Operations and attachments are true to  Mary Mr  CTION OF THE STATE ENGINEER:	mply with them, and that each and all o the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovici Date: 2019.06.12 16:02:56 -06'00'	06/12/2019
Plugg	ing Plan of Operations and attachments are true to  Mary Mr	mply with them, and that each and all o the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovici Date: 2019.06.12 16:02:56 -06'00'	06/12/2019
Plugg	ing Plan of Operations and attachments are true to  Mary Mr  CTION OF THE STATE ENGINEER:	mply with them, and that each and all o the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovici Date: 2019.08.12 18:02:56 -06'00'  Signature of Applicant  ditions.	06/12/2019
Plugg	Mary Mr  CTION OF THE STATE ENGINEER:  Well Plugging Plan of Operations is:  X Approved subject to the attached con	mply with them, and that each and all o the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovici Date: 2019.08.12 18:02:56 -06'00'  Signature of Applicant  ditions.	06/12/2019
Plugg	Mary Mr  CTION OF THE STATE ENGINEER:  Well Plugging Plan of Operations is:  X Approved subject to the attached con Not approved for the reasons provide	mply with them, and that each and all o the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovich Date: 2019.06.12 16:02:56-0600'  Signature of Applicant  ditions. d on the attached letter.	06/12/2019 Date
Plugg	Mary Mr  CTION OF THE STATE ENGINEER:  Well Plugging Plan of Operations is:  X Approved subject to the attached con Not approved for the reasons provide	mply with them, and that each and all o the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovich Date: 2019.08.12 18:02:56 -06'00'  Signature of Applicant  ditions. d on the attached letter.  day of June	06/12/2019 Date
Plugg	Mary Mr  CTION OF THE STATE ENGINEER:  Well Plugging Plan of Operations is:  X Approved subject to the attached con Not approved for the reasons provide	mply with them, and that each and all o the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovich Date: 2019.08.12 18:02:56 -06'00'  Signature of Applicant  ditions. d on the attached letter.  day of June  Tom Blaine P.E., New Mexico Sta	06/12/2019 Date  , 2019
Plugg	Mary Mr  CTION OF THE STATE ENGINEER:  Well Plugging Plan of Operations is:  X Approved subject to the attached con Not approved for the reasons provide	mply with them, and that each and all o the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mrdjenovich Date: 2019.08.12 18:02:56 -06'00'  Signature of Applicant  ditions. d on the attached letter.  day of June  Tom Blaine P.E., New Mexico Sta	06/12/2019 Date

SHS-16

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest In	terval 2 Interval 3 – most shallow
		Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)		2 feet below ground surface
Bottom of proposed interval of grout placement (ft bgl)		22.2 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: 13.19 gallons calculated to fill car cement grout pour starts at top of screened in	
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement		6 gallons
Mixed on-site or batch- mixed and delivered?		mixed on site
Grout additive 1 requested		powder bentonite
Additive 1 percent by dry weight relative to cement		5%
Grout additive 2 requested		2019 J
Additive 2 percent by dry weight relative to cement		
		trong (

Trn. No

Well Plugging Plan Version: January 21, 2016 Page 4 of 5

TABLE B - For plugging intervals that will employ approved non-cement based scalant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of scalant placement (ft bgl)			22.2 feet below ground surface
Bottom of proposed scalant of grout placement (ft bgl)			50 feet below ground surface
Theoretical volume of sealant required per interval (gallons)	OSE Note: 18.15 gallons cascreened interval if bentonit of casing. Well.		2.2 Cu.Ft. or approximately 16.4 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite 2019 JUN

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NEW MEXICO



## WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging.

1. FILING FEE: There is no filing fee for this form.

City: Bloomfield  State: New Mexico  Zip code: E-mail: gjmccartney@marathonpetroleum  HIL WELL DRILLER INFORMATION: Well Driller contracted to provide plugging services: Geomat, Inc.  New Mexico Well Driller License No.: WD-1762  Expiration Date: 08-30-2020  IV. WELL INFORMATION: Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 54.70 sec Longitude: 108 deg, 5 min, 43.92 sec, NAD 83  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes If yes section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additincluding analytical results and/or laboratory report(s):		ing address: 111 County Road 4990				
Well Driller contracted to provide plugging services:   Geomat, Inc.	-		New Mexic	:0	Zip code:	8741
Well Driller contracted to provide plugging services:   Geomat, Inc.	Phon	e number: 505-632-4166	E-mail:gjr	mccartney@maratl	nonpetroleum	.com
Well Driller contracted to provide plugging services:  New Mexico Well Driller License No.: WD-1762  Expiration Date: 08-30-2020  IV. WELL INFORMATION:  Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 54.70 sec Longitude: 108 deg, 5 min, 43.92 sec, NAD 83  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes If yes section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additincluding analytical results and/or laboratory report(s):	111 1	WELL DRILLED INCODMATION:				
New Mexico Well Driller License No.: WD-1762 Expiration Date: 08-30-2020  IV. WELL INFORMATION: Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 54.70 sec Longitude: -108 deg, 5 min, 43.92 sec, NAD 83  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes If yes section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additincluding analytical results and/or laboratory report(s):			at, Inc.			2
Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 54.70 sec Longitude: -108 deg, 5 min, 43.92 sec, NAD 83  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes If yes section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additiculating analytical results and/or laboratory report(s):				Expiration Date:	08-30-2020	-
Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 54.70 sec Longitude: -108 deg, 5 min, 43.92 sec, NAD 83  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes If yes section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additincluding analytical results and/or laboratory report(s):				BAJMINION DUTC.	-	3
Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.  1) GPS Well Location: Latitude: 36 deg, 41 min, 54.70 sec Longitude: -108 deg, 5 min, 43.92 sec, NAD 83  2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  3) Was well used for any type of monitoring program or environmental assessment? Yes If yes section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  4) Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additincluding analytical results and/or laboratory report(s):	IV. V	WELL INFORMATION:				<u>-</u>
1) GPS Well Location:  Latitude: 36			lugged should l	be attached to this pla	n,	
Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  Was well used for any type of monitoring program or environmental assessment? Yes If yes section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):						7
Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Oil Conservation Division.  Was well used for any type of monitoring program or environmental assessment? Yes If yes section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):	-,	Longitude:108	_deg,	min, 43.92	sec, NAD 83	9 2
Was well used for any type of monitoring program or environmental assessment? Yes If yes section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Departirequired prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):		Completion of	itaulaa aati iti	:	tand but Nilaur	9
Was well used for any type of monitoring program or environmental assessment? Yes If yes section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):	2)		illoring activit	ies. Approvai grani	led by New	
section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):		Mexico Oil Collsel Valion Division.	***			
section VII of this form to detail what hydrogeologic parameters were monitored. If the well monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):						
monitor contaminated or poor quality water, authorization from the New Mexico Environment Depart required prior to plugging.  Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide additional including analytical results and/or laboratory report(s):	3)	Was well used for any type of monitoring program of	or environmenta	al assessment? Yes	If yes	pleas
Does the well tap brackish, saline, or otherwise poor quality water? NO If yes, provide addincluding analytical results and/or laboratory report(s):		section VII of this form to detail what hydrogeol	logic parameter	rs were monitored.	If the well v	vas us
including analytical results and/or laboratory report(s):		required prior to plugging.	rization from th	le New Mexico Envir	onment Departi	nent m
including analytical results and/or laboratory report(s):	4)	Does the well tan brackish saline or otherwise noo	r mality water	NO If yo	s provida oddi	ional a
20.07	1/			11 ye	s, provide audi	ijonai (
5) Static water level: 33.87 (feet below land surface) feet above land surface (circle one)		mending analytical results and/or laboratory reports	)-			
5) Static water level: 33.87 (feet below land surface) feet above land surface (circle one)			171			
5) Static water level: 33.87 feet below land surface feet above land surface (circle one)						
	5)	Static water level: 33.87 feet below land su	urface) feet abo	ove land surface (cir	cle one)	
Depth of the well: 46.21 feet	61	Don'th of the well, 46.21				
					Well Plugging Version: Janua	

### 51+5-17

7)	Inside diameter of innermost casing: 4.0inches.
8)	Casing material: PVC and Stainless Steel
9)	The well was constructed with:  an open-hole production interval, state the open interval:  X a well screen or perforated pipe, state the screened interval(s):  35.67' to 45.67'
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? 33.2' to 1'
11)	Was the well built with surface casing? If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? If yes, please describe:
12)	Has all pumping equipment and associated piping been removed from the well? YesIf not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. DI	ESCRIPTION OF PLANNED WELL PLUGGING:
	detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional cal information, such as geophysical logs, that are necessary to adequately describe the proposal.  Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a tremie pipe.
	The uppermost two feet will be filled with native dirt and graded to natural conditions
2)	Will well head be cut-off below land surface after plugging? Yes
VI. P	LUGGING AND SEALING MATERIALS:
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: 27.6 gallons
4)	Type of Cement proposed: Portland Cement Type I/II
5)	Proposed cement grout mix:6gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be:batch-mixed and delivered to the site mixed on site

Trn. No

Well Plugging Plan Version: January 21, 2016 Page 2 of 5

7)	Grout additives requested, and percent by dry	weight relative to cement: 5% [	owder bentonite	
8)	Additional notes and calculations:			
0)	reduction forces and calculations.			
		***		
	ADDITIONAL INFORMATION: List addition	al information below, or on separa	ate sheet(s);	
Grou	ndwater elevation			7
				15
			A SA	-3
			Ç	
Engine	tions and any attachments, which are a part hereof eer pertaining to the plugging of wells and will co- ing Plan of Operations and attachments are true to	mply with them, and that each and the best of my knowledge and bel	d all of the statements in the Vief.	Vell
	Mary Mr	djenovich Digitally signed by Mary M	rdjenovich 06'00' 06/12/20	19
		Signature of Applicant	Date	<b>&gt;</b>
IX. A	CTION OF THE STATE ENGINEER:			
This W	ell Plugging Plan of Operations is:			
	Approved subject to the attached cond Not approved for the reasons provided	ditions. d on the attached letter.		
	Witness my hand and official seal this 13	day of June	, 2019	
		Tom Blaine P.E., New Mexi	co State Engineer	
		Ву:	H	
		Miles Jus	off OSE A=te	<u>_</u>
Trn. No			Well Plugging Plan Version: January 21, Page 3 of 5	

SHS-17

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

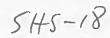
	Interval 3 - most shallow
	Note: if the well is non-artesian and breaches only one aquifer, use only this column.
	2 feet below ground surface
	35.67 feet below ground surface
	20.1 gallons
	6 gallons
	mixed on site
	powder bentonite
	5%
	Parasa Service
	3
	OSE Note: 21.98 gallons calculated to fill casing to 2' bgs if cement grout pour starts at top of screened interval.

Trn. No

TABLE B - For plugging intervals that will employ approved non-cement based scalant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			35.67 feet below ground surface
Bottom of proposed scalant of grout placement (ft bgl)			46.21 feet below ground surface
Theoretical volume of seafant required per interval (gallons)	OSE Note: 6.88 gallons cal screened interval if bentonit of well.	1	0.84 Cu.Ft. or approximately 6.2 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite 2019

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Trn.

## WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging.

I. FILING FEE: There is no filing fee for this form.

I. FII.	ANG FEE: There is no filing fee	for this form					
	ENERAL/WELL OWNERSHI						
Existit	ng Office of the State Engineer	POD Number	r (Well Number) (	or well to be plugged:	NA		
	of well owner: Western Refi		vest, inc.				
	g address: 111 County Road	4990	No. 04			0744	
	Bloomfield 505 632 4166	-	_ State: New M		Zip code:	8/41	3
Phone	number: 505-632-4166		E-mail:	gjmccartney@mar	atnonpetroleum	.com	
						D-3	
	ELL DRILLER INFORMATION	_	Geomat Inc			2019	A segment
	Oriller contracted to provide plugg		Geomat, IIIc.		UB 3U 3U3U	eni.	
New N	Mexico Well Driller License No.:	VVD-1702	<u> </u>	Expiration Dat	08-30-2020		
***	(CL L INCODIL ) (CL L)					ယ	
	<u>ELL INFORMATION:</u>	t. C		111			ZIEO NEW MEXICO
Note	A copy of the existing Well Reco		It to be plugged sho	uld be attached to this p	olan.	0	8
1)		tude: 36 gitude: -108	deg, 42	min, 1.52	sec. NAD 83	34	
2)	Reason(s) for plugging well: _		of monitoring ac	tivities. Approval gra	anted by New		
	Mexico Oil Conservation D	ivision.					
2)	Was well used for any type of	itasina u			es ic		
3)	section VII of this form to d						
	monitor contaminated or poor required prior to plugging.	quality wate	er, authorization fro	m the New Mexico En	vironment Departr	ment m	ay be
4)	Does the well tap brackish, sai			ater? NO If	yes, provide addi	tional (	detail,
	including analytical results and	or laboratory	report(s);				
					-		
5)	Static water level: 39.51	feet belov	w land surface) fee	t above land surface (	circle one)		
,							
6)	Depth of the well: 47.36	feet			Well Plugging	. Dlan	
No					Version: Janua		.016

### SHS-18

PVC and Stainless or perforated pipe, stainless surrounding the artest sould with surface casing?	state the open interval:tate the screened interval(state the screened interval) is complete the screened interval in screened interval inter	nulus surroundir the well? ction VII of this ement grout, pla tion shall be atta	33.36' to 1  ng the surface  Yes s form.	If not, describe
ben-hole production interval, all screen or perforated pipe, so interval surrounding the artest puilt with surface casing?	ian casing of this well is concerned.  No	nulus surroundir the well? ction VII of this ement grout, pla tion shall be atta	33.36' to 1  ng the surface  Yes s form.	If not, describe
interval surrounding the artes built with surface casing? If yes,	ian casing of this well is concerned.  No	nulus surroundir the well? ction VII of this ement grout, pla tion shall be atta	33.36' to 1  ng the surface  Yes s form.	If not, describe
interval surrounding the artes built with surface casing?  ed? If yes,  ing equipment and associated pripment and intentions to remove the property of the well showing propose such as geophysical logs, that method by which cement grounding proposed.	na casing of this well is contained and please describe:  piping been removed from ove prior to plugging in Security and away other than with contained final plugged configuration are necessary to adequate	nulus surroundir the well? ction VII of this ement grout, pla tion shall be atta	33.36' to 1  ng the surface  Yes s form.	If not, describe
built with surface casing?  ed?  If yes,  ing equipment and associated pipment and intentions to remove the property of the well showing propose such as geophysical logs, that method by which cement grounds.	no	the well?ection VII of this ement grout, plation shall be attaly describe the p	Yes s form.	If not, describe
ng equipment and associated pripment and intentions to remove the property of the well showing propose such as geophysical logs, that method by which cement grounds.	please describe:  piping been removed from ove prior to plugging in Second in S	ethe well?  ection VII of this  ement grout, pla  tion shall be atte  ly describe the p	Yes s form.	If not, describe
ng equipment and associated proposed in the proposed in the state of the well showing proposed in the w	piping been removed from ove prior to plugging in Se GGING: In a way other than with co ed final plugged configura are necessary to adequate	ection VII of this ement grout, pla tion shall be atta ly describe the p	Yes s form.	If not, describe
F PLANNED WELL PLUC oses to plug an artesian well in of the well showing propose such as geophysical logs, that method by which cement ground	GGING:  n a way other than with cold final plugged configura are necessary to adequate	ection VII of this ement grout, pla tion shall be atte ly describe the p	s form.  seed bottom to ached, as well	o top with a tremie
F PLANNED WELL PLUC oses to plug an artesian well in of the well showing propose such as geophysical logs, that method by which cement ground	GGING:  n a way other than with cold final plugged configura are necessary to adequate	ection VII of this ement grout, pla tion shall be atte ly describe the p	s form.  seed bottom to ached, as well	o top with a tremie
oses to plug an artesian well in of the well showing propose such as geophysical logs, that nethod by which cement grou	n a way other than with cod final plugged configura are necessary to adequate	tion shall be atta ly describe the p	ached, as well	
oses to plug an artesian well in of the well showing propose such as geophysical logs, that nethod by which cement grou	n a way other than with cod final plugged configura are necessary to adequate	tion shall be atta ly describe the p	ached, as well	
	·· <del>-</del> ···-			
ost two feet will be filled	with native dirt and gra	ided to natura	l conditions	
				THE S
be cut-off below land surfac	e after plugging? Yes			<u>9</u>
SEALING MATERIALS:				m-f
		of a specialty ce	ement or speci	ialty scalant
ntervals that employ cement g	rout, complete and attach	Table A.		
ntervals that will employ app	roved non-cement based s	ealant(s), compl	lete and attach	n Table B.
lume of grout required to plu	g the well to land surface:	28.4 gallor	ns	
nt proposed: Portland Ce	ment Type I/II			
		94 pound sack o	of Portland cei	ment,
	delivered to the site			
of in	most two feet will be filled and be cut-off below land surface to SEALING MATERIALS: If a well that taps poor quality with intervals that employ cement golume of grout required to plug tent proposed:  Portland Cement grout grout ground to plug tent proposed:  Portland Cement grout grout ground to plug tent proposed:	most two feet will be filled with native dirt and grand be cut-off below land surface after plugging? Yes ID SEALING MATERIALS: If a well that taps poor quality water may require the use intervals that employ cement grout, complete and attach intervals that will employ approved non-cement based solume of grout required to plug the well to land surface:  The proposed: Portland Cement Type I/II  The proposed of the plugging in the proposed of the site of the site of the proposed in the proposed of the propo	most two feet will be filled with native dirt and graded to natural and be cut-off below land surface after plugging?  Yes  ID SEALING MATERIALS: If a well that taps poor quality water may require the use of a specialty continuer that employ cement grout, complete and attach Table A. Intervals that will employ approved non-cement based sealant(s), complete and grout required to plug the well to land surface:  28.4 gallow the proposed:  Portland Cement Type I/II  The proposed of grout mix:  6 gallons of water per 94 pound sack of the continuer places.  Batch-mixed and delivered to the site	ID SEALING MATERIALS:  If a well that taps poor quality water may require the use of a specialty cement or specintervals that employ cement grout, complete and attach Table A.  Intervals that will employ approved non-cement based sealant(s), complete and attach rolume of grout required to plug the well to land surface:    Portland Cement Type  /

Well Plugging Plan Version: January 21, 2016 Page 2 of 5

# SHS-18

	Grout additives requested, and percent by dry	weight relative to cement: 5% powder	bentonite
8)	Additional notes and calculations:		
			-
<u>/II. A</u>	DDITIONAL INFORMATION: List addition	al information below, or on separate sheet	u(s):
	ndwater quality		
Groun	ndwater elevation		: 50
			= =
			Ç
			54
	44		<u>N</u>
Inginee			Well Plugging Plan of ulations of the State
Pluggin;	er pertaining to the plugging of wells and will co ig Plan of Operations and attachments are true to	mply with them, and that each and all of the	ulations of the State
luggin,	g Plan of Operations and attachments are true to	mply with them, and that each and all of the	ulations of the State
'luggin	g Plan of Operations and attachments are true to	mply with them, and that each and all of the best of my knowledge and belief.	litations of the State he statements in the Wel
	g Plan of Operations and attachments are true to	mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Date: 2019.06.12 16:04:16 -06'00'	the statements in the Wel
X. AC	g Plan of Operations and attachments are true to  Mary Mr	mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Date: 2019.06.12 16:04:16 -06'00'	the statements in the Well
X. AC	g Plan of Operations and attachments are true to  Mary Mr  TION OF THE STATE ENGINEER:	mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mirdjenovich Date: 2019.06.12 16:04:16-06'00'  Signature of Applicant	the statements in the Wel
X. AC	Mary Mr.  Mary Mr.  TION OF THE STATE ENGINEER:  ell Plugging Plan of Operations is:  X Approved subject to the attached cond.  Not approved for the reasons provided.	mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mirdjenovich Date: 2019.06.12 16:04:16-06'00'  Signature of Applicant	the statements in the Well
X. AC	Mary Mr.  Mary Mr.  TION OF THE STATE ENGINEER:  ell Plugging Plan of Operations is:  X Approved subject to the attached cond.  Not approved for the reasons provided.	mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Digitally signed by Mary Midjenovich Date: 2019.06.12 16:04:16-06'00'  Signature of Applicant  ditions.  d on the attached letter.  day of June  Tom Blaine P.E., New Mexico State	06/12/2019 Date  Date  Engineer
X. AC	Mary Mr.  Mary Mr.  TION OF THE STATE ENGINEER:  ell Plugging Plan of Operations is:  X Approved subject to the attached cond.  Not approved for the reasons provided.	mply with them, and that each and all of the best of my knowledge and belief.  djenovich  Digitally signed by Mary Mirdjenovich Date: 2019.06.12 16:04:16-06'00'  Signature of Applicant  ditions.  d on the attached letter.  day of June  Tom Blaine P.E., New Mexico State	06/12/2019 Date  Date  Engineer

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest Interva	al 2   Interval 3 – most shallow
		Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)		2 feet below ground surface
Bottom of proposed interval of grout placement (ft bgl)		37.36 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: 23.08 gallons calculated to fill easing to cement grout pour starts at top of screened interval.	
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement		6 gallons
Mixed on-site or batch- mixed and delivered?		mixed on site
Grout additive 1 requested		powder bentonite
Additive 1 percent by dry weight relative to cement		5%
Grout additive 2 requested		2019 A
Additive 2 percent by dry weight relative to cement		LC, NEW MEXICO

Trn. No

Well Plugging Plan Version: January 21, 2016 Page 4 of 5

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			37.36 feet below ground surface
Bottom of proposed sealant of grout placement (ft bgl)			47.36 feet below ground surface
Theoretical volume of scalant required per interval (gallons)	OSE Note: <b>6.53 gallons</b> cal screened interval if bentoniof well.	culated to fill entire e pour starts at total depth	0.80 Cu.Ft. or approximately 6.0 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite 2



Trn. No

### 545-19

### WELL PLUGGING PLAN OF OPERATIONS



Well Plugging Plan Version: January 21, 2016

Page I of 5

NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. 1. FILING FEE: There is no filing fee for this form. II. GENERAL / WELL OWNERSHIP: Existing Office of the State Engineer POD Number (Well Number) for well to be plugged; NA Name of well owner: Western Refining Southwest, Inc. Mailing address: 111 County Road 4990 City: Bloomfield State: New Mexico Zip code: 87413 Phone number; 505-632-4166 E-mail: gjmccartney@marathonpetroleum.com III. WELL DRILLER INFORMATION: Well Driller contracted to provide plugging services: Geomat, Inc. New Mexico Well Driller License No.: WD-1762 Expiration Date: 08-30-2020 IV. WELL INFORMATION: Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan. Latitude: 36 1) GPS Well Location: Longitude: -108 sec, NAD 83 Completion of monitoring activities. Approval granted by New 2) Reason(s) for plugging well: Mexico Oil Conservation Division. Was well used for any type of monitoring program or environmental assessment? Yes 3) \_\_\_ If yes, please use section VII of this form to detail what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging 4) Does the well tap brackish, saline, or otherwise poor quality water? If yes, provide additional detail, including analytical results and/or laboratory report(s): Static water level: 37.76 5) feet below land surface) feet above land surface (circle one) Depth of the well: 52.40 6) feet

0.)	Casing material: PVC and Stainless Steel	
8)	Casing material: 1 10 and Germoss Stool	
9)	The well was constructed with:	
	an open-hole production interval, state the open interval:	
	X a well screen or perforated pipe, state the screened interval(s): 32.40' to 52.40'	<u> </u>
10)	What annular interval surrounding the artesian easing of this well is cement-grouted? 28.40	to 1'
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the sur	rface casing grouted
	otherwise sealed?If yes, please describe:	
4.5%	Yes	
12)	Has all pumping equipment and associated piping been removed from the well? Yes remaining equipment and intentions to remove prior to plugging in Section VII of this form.	If not, describe
	ESCRIPTION OF PLANNED WELL PLUGGING:  If this plan proposes to plug an artesian well in a way other than with cement grout, placed botto	
DIDC		
techn	a detailed diagram of the well showing proposed final plugged configuration shall be attached, as ical information, such as geophysical logs, that are necessary to adequately describe the proposal.	
	Describe the method by which cement grout shall be placed in the well, or describe requested	
techn	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:	plugging methodolog
techn	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface.	plugging methodolog ce using a tremie pip
techn	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:	plugging methodolog ce using a tremie pip
techn	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface.  The uppermost two feet will be filled with native dirt and graded to natural conditions.	plugging methodolog ce using a tremie pip
techn  1)	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface. The uppermost two feet will be filled with native dirt and graded to natural condition. Will well head be cut-off below land surface after plugging?  Yes	plugging methodolog ce using a tremie pip
1) 2) VI. 1	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface. The uppermost two feet will be filled with native dirt and graded to natural condition. Will well head be cut-off below land surface after plugging?  Yes  PLUGGING AND SEALING MATERIALS:	plugging methodolog ce using a tremle pipe ions
1) 2) VI. 1	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface. The uppermost two feet will be filled with native dirt and graded to natural condition. Will well head be cut-off below land surface after plugging?  Yes	plugging methodologice using a tremie pipeions
1) 2) VI. 1	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface. The uppermost two feet will be filled with native dirt and graded to natural condition. Will well head be cut-off below land surface after plugging?  Yes  PLUGGING AND SEALING MATERIALS:	plugging methodolog ce using a tremle pipe ions
1) 2) VI. 1 Note:	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface. The uppermost two feet will be filled with native dirt and graded to natural condition.  Will well head be cut-off below land surface after plugging?  Yes  PLUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or second second surface.	plugging methodologice using a tremle pipilons
1) 2) VI. 1 Note: 1) 2)	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface. The uppermost two feet will be filled with native dirt and graded to natural condition.  Will well head be cut-off below land surface after plugging?  Yes  PLUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or a plugging intervals that employ cement grout, complete and attach Table A.  For plugging intervals that will employ approved non-cement based sealant(s), complete and at a possible of the plugging intervals.	plugging methodologice using a tremie piperions  specialty seafant attach Table B.
1) 2) VI. 1 Note:	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface.  The uppermost two feet will be filled with native dirt and graded to natural condition.  Will well head be cut-off below land surface after plugging?  Yes  PLUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or a special property of the plugging intervals that employ cement grout, complete and attach Table A.  For plugging intervals that will employ approved non-cement based sealant(s), complete and a Theoretical volume of grout required to plug the well to land surface:  29.9 gallons	plugging methodologice using a tremle pipions
1) 2) VI. 1 Note: 1) 2)	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface. The uppermost two feet will be filled with native dirt and graded to natural condition.  Will well head be cut-off below land surface after plugging?  Yes  PLUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or a plugging intervals that employ cement grout, complete and attach Table A.  For plugging intervals that will employ approved non-cement based sealant(s), complete and at a possible of the plugging intervals.	plugging methodologice using a tremle pipions specialty sealant attach Table B.
1) 2) VI. J Note: 1) 2) 3)	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface.  The uppermost two feet will be filled with native dirt and graded to natural condition.  Will well head be cut-off below land surface after plugging?  Yes  PLUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or a special property of the plugging intervals that employ cement grout, complete and attach Table A.  For plugging intervals that will employ approved non-cement based sealant(s), complete and a Theoretical volume of grout required to plug the well to land surface:  29.9 gallons	plugging methodologice using a tremle pipelions specialty seafant attach Table B.
1) 2) VI. J Note: 1) 2) 3) 4)	Describe the method by which cement grout shall be placed in the well, or describe requested proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface. The uppermost two feet will be filled with native dirt and graded to natural condition. Will well head be cut-off below land surface after plugging?  PLUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or a plugging intervals that employ cement grout, complete and attach Table A.  For plugging intervals that will employ approved non-cement based sealant(s), complete and a Theoretical volume of grout required to plug the well to land surface:  Portland Cement Type I/II	plugging methodologice using a tremle pipelions specialty seafant attach Table B.

## SHS-19

7)	Grout additives requested, and percent by dry v	veight relative to cement	5% powder b	entonite		
8)	Additional notes and calculations:					
\$8				T.		
<u>УП.</u> А	ADDITIONAL INFORMATION: List additiona	ıl information below, or	on separate sheet(s	s):		
Grou	ndwater quality					
	ndwater elevation					
					2 2 20 40	
					2019	
					<u> </u>	
					<u> </u>	<u> </u>
	SIGNATURE:				9	
- 7	ary Mrdjenovich, sa ions and any attachments, which are a part hereof.	y that I have carefully rethat I am familiar with	ead the foregoing V	Well Plugging	Planof	. 0
Engine	eer pertaining to the plugging of wells and will corng Plan of Operations and attachments are true to	nply with them, and that	each and all of the	statements in	the We	11
	Mary Mro	djenovich Digitally sign	ed by Mary Mrdjenovich 8.12 16:94:51 -08'00'	06/1	12/2019	)
		Signature of Appl	icant	***	Date	
IX. A	CTION OF THE STATE ENGINEER:					
This W	ell Plugging Plan of Operations is:					
	X Approved subject to the attached cond Not approved for the reasons provided					
	Witness my hand and official seal this 13	day of June		2019		
		Tom Blaine P.E., N	ew Mexigo State E	ngineer		
		By: M	Just			
			Just4, OS:	E Azti	°.C	
Trn. No				Well Pluggir Version: Jan	ig Plan	116

SHS-19

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			2 feet below ground surface
Bottom of proposed interval of grout placement (ft bgl)			32.40 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: 19.85 gallons calculated cement grout pour starts at top of sc		17.9 gallons
Proposed cement grout mix gallons of water per 94-lb, sack of Portland cement			6 gallons
Mixed on-site or batch- mixed and delivered?			mixed on site
Grout additive 1 requested			powder bentonite
Additive 1 percent by dry weight relative to cement			5%
Grout additive 2 requested			2019 JUNE 13
Additive 2 percent by dry weight relative to cement			5 8

SHS-19

TABLE B - For plugging intervals that will employ approved non-cement based scalant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - r	nost shallow
			Note: if t non-artesian only one use only th	and breaches aquifer,
Top of proposed interval of sealant placement (ft bgl)			32.40 feet b ground surf	
Bottom of proposed scalant of grout placement (ft bgl)			52.40 feet b ground surf	
Theoretical volume of scalant required per interval (gallons)	OSE Note: 13.06 gallons calcuscreened interval if bentonite pof well.		1.6 Cu.Ft. o approximate gallons	
Proposed abandonment sealant (manufacturer and trade name)			bentonite	2019 JULY 13



# John R. D'Antonio, Jr., P.E. NEW MEXICO STATE ENGINEER

On June 12, 2019, the New Mexico Office of the State Engineer (NMOSE) received Well Plugging Plans of Operations for ten wells used for monitoring groundwater conditions. The plugging plan was submitted by LT Environmental on behalf of Western Refining Southwest, Inc. The ten existing and unpermitted monitoring wells (no OSE File number), as listed below, shall be plugged and abandoned in accordance with 19.27.4 NMAC.

The wells to be plugged are associated with the investigation of the groundwater investigation and pollution recovery program associated with the former Giant Bloomfield Refinery with New Mexico Oil Conservation Division (NMOCD) regulatory oversight. The plugging plans state that these ten wells have been identified by the New Mexico Department of Transportation (NMDOT) as being within the construction zone of a pending highway project, and that NMOCD has approved plug and abandonment of the wells. Plugging will be performed by Geomat, Inc. under well driller license WD-1762. Depth-to-water in the wells ranges from approximately 31 to 40 feet below land surface, with total well depths of approximately 46 to 55 feet.

Location: The wells are located in the NW¼ of Section 27, T29N, R12W, San Juan County, New Mexico. Approximate coordinates for each monitoring well to be abandoned are listed below (Lat/Long, NAD83).

Well Name	Casing - Inside Diameter (inches)	<u>Latitude</u> North	Longitude West
SHS-6	4-inch PVC & Steel	36° 42' 5.62"	-108° 05' 40.10"
SHS-8	4-inch PVC & Steel	36° 42' 6.45"	-108° 05' 39.47"
SHS-10	4-inch PVC & Steel	36° 42' 1.75"	-108° 05' 40.07"
SHS-12	4-inch PVC & Steel	36° 42' 1.82"	-108° 05' 43.15"
SHS-14	4-inch PVC & Steel	36° 41' 58.07"	-108° 05' 40.89"
SHS-15	4-inch PVC & Steel	36° 41' 58.08"	-108° 05' 38.42"
SHS-16	4-inch PVC & Steel	36° 41' 54.74"	-108° 05' 42.13"
SHS-17	4-inch PVC & Steel	36° 41' 54.70"	-108° 05' 43.92"
SHS-18	4-inch PVC & Steel	36° 42' 1.52"	-108° 05' 40.81"
SHS-19	4-inch PVC & Steel	36° 42' 5.53"	-108° 05' 39.36"

#### **Specific Plugging Conditions of Approval:**

 Water well drilling and other well drilling activities, including well plugging, are regulated under 19.27.4 NMAC. In accordance with Subsection A of 19.27.4.29 NMAC, on-site supervision of well drilling/plugging is required by the holder of a New Mexico Well Driller License or a NMOSE-registered Drill Rig Supervisor. The New Mexico licensed Well Driller shall ensure that well drilling activities are completed in accordance with 19.27.4.29, 19.27.4.30 and 19.27.4.31 NMAC.

- 2. Obstructions in the well/borehole shall be identified and removed if possible. If an obstruction cannot be removed, the method used to grout below and around the obstruction shall be described in detail in the plugging record.
- 3. The theoretical volumes of sealant required for abandonment of 2-inch and 4-inch well casings is approximately 0.16 and 0.65 gallons per linear foot of casing (respectively). The theoretical volume of sealant required for abandonment of each well casing shall be determined prior to plugging. The total minimum volume of sealant shall be calculated based on the actual measured pluggable depth of the well and the volume factor for the casing diameter. The volume of sealing material placed in the well shall be compared with the theoretical volume to verify the actual volume of sealant is equal to or exceeds the theoretical volume.
- 4. The Well Plugging Plan of Operations submitted proposes to create a bentonite plug in the screened interval of each well, overlain by a cement/bentonite slurry to within two feet of land surface. The bentonite plug is to be created by filling each well from the total well depth to the top of the screen interval with bentonite chips, which will then be hydrated in-place with potable water, prior to the introduction of the cement/bentonite slurry.
- 5. The cement/bentonite slurry to be placed over the bentonite plug will be composed of Portland Type I/II Cement with the addition of 5% bentonite powder. The water mixed with the cement to create the plugging sealant shall be potable water or of similar quality. Portland cement has a fundamental water demand of 5.2 gallons of water per 94-lb sack of cement. Up to a maximum of 6.0 gallons per 94-lb sack is acceptable to allow for greater pumpability.

Pure bentonite powder ("90 barrel yield") is allowed as a cement additive by NMOSE and American Water Works Association (AWWA) guidelines. Neither granular bentonite nor extended-yield bentonite shall be mixed with cement for the purpose of this plugging activity. When supplementing a cement slurry with bentonite powder, water demand for the mix increases at a rate of approximately 0.65 gallon of water for each 1% increment of bentonite bdwc (by dry weight cement) above the stated base water demand of 6.0 gallons of water per 94-lb sack of cement for neat cement. Bentonite powder must be hydrated separately with its required increment of water before being mixed into the wet neat cement. If water is otherwise added to the combination of dry ingredients or the dry bentonite is blended into wet cement, the alkalinity of the cement will restrict the yield of the bentonite powder, resulting in excess free water in the slurry and excessive cement shrinkage upon curing.

- 6. Placement of the cement/bentonite sealant within the well(s) shall be by pumping through a tremie pipe extended to near the top of the bentonite plug and kept below the top of the slurry column (i.e., immersed in the slurry) as the well is plugged from bottom upwards in a manner that displaces the standing water column.
- 7. Prior to, or upon completion of plugging, the well casing may be cut-off below grade as necessary to allow for approved construction onsite, provided a minimum six-inch thickness of reinforced abandonment plugging sealant or concrete completely covers the top of the cut-off casing. Any remaining void to the surface maybe filled with native soil, concrete, or asphalt as needed to match the surrounding surface material and blended with the surface topography to prevent ponding.

- 8. Within 20 days after completion of well plugging, a complete well Plugging Record shall be filed with the State Engineer in accordance with Paragraph (3) of Subsection C of 19.27.4.30 NMAC for each well plugged. The Well Plugging Record(s) shall be filed with the State Engineer at the NMOSE District V Office, 100 Gossett Drive, Suite A, Aztec, NM 87410. The required well plugging record form is available at the following website address: http://www.ose.state.nm.us/PDF/WellDrillers/WD-11.pdf.
- 9. Should another regulatory agency sharing jurisdiction of the project authorize, or by regulation require, more stringent requirements than stated herein, the more stringent procedure should be followed. These, among others, may include provisions regarding pre-authorization to proceed, type of methods and materials used, inspection, or prohibition of free discharge of any fluid or other material to or from the well that is related to the drilling and/or monitoring process.
- 10. Witnessing of the plugging work by NMOSE will not be required, but shall be facilitated if an NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the NMOSE District V Office at (505) 334-4571, at least 48 hours in advance. NMOSE inspection will occur depending on personnel availability.
- 11. While documentation may or may not have been provided with this Well Plugging Plan of Operations indicating that access has been granted for any aforementioned well(s) located on property owned by someone other than the well owner/applicant, OSE approval of this plugging plan in no way infers the right of access to land not owned by the well owner/applicant.

Date: June 13, 2019

The combined Well Plugging Plans of Operations received June 12, 2019, with NMOSE annotations/revisions (if applicable) are hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Miles Juett, Assistant Watermaster

Water Rights Division District V



## STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER AZTEC

John R. D'Antonio, Jr., P.E. State Engineer 100 Gossett Drive, Suite A Aztec, New Mexico 87410

August 7, 2019

Devin Hencmann, Project Geologist, LT Environmental Western Refining Southwest, Inc. 111 County Road 4990 Bloomfield, NM 87413

RE: Well Plugging Plan of Operations, Monitoring Well (No OSE Permit), former Giant Bloomfield Refinery (intersection of US Hwy 64 and Road 350)

Dear Mr. Hencmann:

On August 6, 2019, the New Mexico Office of the State Engineer (NMOSE) received an after-the-fact Well Plugging Plan of Operations for an unpermitted monitoring well associated with a groundwater remediation project for the above referenced facility. Prior to receiving hard copies of the plan, verbal authorization to plug the subject well was granted by OSE when the well was unexpectedly encountered during approved plugging of other nearby wells at the same site. NMOSE approves the after-the-fact Well Plugging Plan of Operation with the attached Specific Plugging Conditions (enclosed).

Within 20 days after completion of well plugging, please submit completed well Plugging Records (OSE Form WD-11) describing the actual abandonment process and itemizing the materials used. The plugging records should be sent to the NMOSE District V, 100 Gossett Drive, Suite A, Aztec, NM, 87410.

If you have any questions regarding this approval action, please feel free to contact me at (505) 334-4571.

Sincerely,

Miles Juett

Assistant Watermaster

Water Rights Division District V

Enclosures

cc:

Aztec Reading (w/o enclosures)

Aztec Office Files: P&A and SJ-4110

Brandon Powell, NMOCD District 3 (Aztec), via email: Brandon.Powell@state.nm.us



### WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. I. FILING FEE: There is no filing fee for this form. II. GENERAL / WELL OWNERSHIP: Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: NA Name of well owner: Western Refining Southwest, Inc. Mailing address: 111 County Road 4990 City: Bloomfield New Mexico \_\_\_\_\_ State: \_\_\_\_ Zip code: Phone number: 505-632-4166 E-mail: gjmccartney@marathonpetroleum.com III. WELL DRILLER INFORMATION: Well Driller contracted to provide plugging services: Mo-Te Drilling Company New Mexico Well Driller License No.: 06/30/2021 **Expiration Date:** IV. WELL INFORMATION: Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan. 1) GPS Well Location: Latitude: \_ Longitude: -108 40.8 sec, WGS84 Check if seconds are decimal format. 2) Reason(s) for plugging well: Completion of monitoring activities. Approval granted by New Mexico Conservation Division. Yes 3) Was well used for any type of monitoring program? If yes, please use section VII of this form to detail what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging. No If yes, provide additional detail, 4) Does the well tap brackish, saline, or otherwise poor quality water? including analytical results and/or laboratory report(s): 39.76 5) Static water level: feet below land surface / feet above land surface (circle one)

60.15

Depth of the well:

6)

7)	Inside diameter of innermost casing: 6.0 inches.	
8)	Casing material: PVC and stainless steel	
9)	The well was constructed with:  an open-hole production interval, state the open interval:  a well screen or perforated pipe, state the screened interval(s):  38.50' to 58.50'	LILIA
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? 36.50' to Surface	
11)	Was the well built with surface casing? If yes, is the annulus surrounding the surface casing gotherwise sealed? If yes, please describe:	routed or
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, d remaining equipment and intentions to remove prior to plugging in Section VII of this form.	escribe
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top wit a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any sical information, such as geophysical logs, that are necessary to adequately describe the proposal.  Describe the method by which cement grout shall be placed in the well, or describe requested plugging method proposed for the well:  Portland Type I/II cement slurry filled from the bottom upwards to two feet below ground surface using a treatment proposed two feet will be filled with native dirt and graded to natural conditions.	additional
2)	Will well head be cut-off below land surface after plugging? Yes	
VI. P	LUGGING AND SEALING MATERIALS:	
	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty seems.	ant ANE
1)	For plugging intervals that employ cement grout, complete and attach Table A.	
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B	
3)	Theoretical volume of grout required to plug the well to land surface:	- 550
4)	Type of Cement proposed: Portland Cement Type I/II	<u>_</u>
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.	
6)	Will the grout be:batch-mixed and delivered to the site mixed on site	

7)	Grout additives requested, and percent by dry weig 6% powder bentonite	ht relative to cement:	
	Marine Company of Sympathy		
8)	Additional notes and calculations:		
VII.	ADDITIONAL INFORMATION: List additional in	formation below, or on senarate	sheet(s):
	ored for Groundwater quality and Groundwater elevatio		
			AZIEC, NE 2019 AUG6
			PM
			29
I, <u>Mar</u> Opera Engin	tions and any attachments, which are a part hereof; that eer pertaining to the plugging of wells and will comply ng Plan of Operations and attachments are true to the b	with them, and that each and all pest of my knowledge and belief.	regulations of the State
	mary	Majerner	07/22/2019
	O .	Signature of Applicant	Date
IX. A	CTION OF THE STATE ENGINEER:		
This V	Vell Plugging Plan of Operations is:		
	Approved subject to the attached condition  Not approved for the reasons provided on the		
	Witness my hand and official seal this7	_day ofAugust	2019
		John R. D'Ant	onio, Jr., P.E.,
		By:	4 - b 27 a
		Miles Jueft, Assis	tant Watermaster

Well Plugging Plan Version: 06/30/2017 Page 3 of 5

### TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			2 feet below ground surface
Bottom of proposed interval of grout placement (ft bgl)			38.5 feet below ground surface
Theoretical volume of grout required per interval (gallons)			130.5 gallons
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6 gallons
Mixed on-site or batch- mixed and delivered?			Mixed on site
Grout additive 1 requested			Powder bentonite
Additive 1 percent by dry weight relative to cement	The Control of the Co	Lupso MA	6%
Grout additive 2 requested			2019 AUG -
Additive 2 percent by dry weight relative to cement			6 PH 1: 30

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			38.5 feet below ground surface
Bottom of proposed sealant of grout placement (ft bgl)			60.15 feet below ground surface
Theoretical volume of sealant required per interval (gallons)			2.25 Cu.Ft or 14.5 gallons
Proposed abandonment sealant (manufacturer and trade name)			Bentonite 2019 AUG

PA 1: 29



# John R. D'Antonio, Jr., P.E. NEW MEXICO STATE ENGINEER

On August 6, 2019, the New Mexico Office of the State Engineer (NMOSE) received an after-the-fact Well Plugging Plan of Operations for one well used for monitoring groundwater conditions. The plugging plan was submitted by LT Environmental on behalf of Western Refining Southwest, Inc. The existing, monitoring well (no OSE File number), as listed below, was already plugged and abandoned.

The plugging plan stated that this well was unexpectedly located during approved plugging of other wells at this location. This well was found by the New Mexico Department of Transportation (NMDOT) as being within the construction zone of a pending highway project, and that NMOCD has approved plug and abandonment of the well. Plugging was completed by MO-TE under well driller license WD-733. Depth-to-water in the well was 39.76 feet below land surface, with a total well depth of 60.15 feet.

Location: The well is located in the NW¼ of Section 27, T29N, R12W, San Juan County, New Mexico. Approximate coordinates for the abandoned well are listed below (Lat/Long, NAD83).

Well Name	Casing - Inside Diameter (inches)	<u>Latitude</u> <u>North</u>	Longitude West
GBR-51	6-inch PVC & Steel	36° 42' 10.5"	-108° 05' 40.8"

#### **Specific Plugging Conditions of Approval:**

- Water well drilling and other well drilling activities, including well plugging, are regulated under 19.27.4 NMAC. In accordance with Subsection A of 19.27.4.29 NMAC, on-site supervision of well drilling/plugging is required by the holder of a New Mexico Well Driller License or a NMOSE-registered Drill Rig Supervisor. The New Mexico licensed Well Driller shall ensure that well drilling activities are completed in accordance with 19.27.4.29, 19.27.4.30 and 19.27.4.31 NMAC.
- 2. Obstructions in the well/borehole shall be identified and removed if possible. If an obstruction cannot be removed, the method used to grout below and around the obstruction shall be described in detail in the plugging record.
- 3. The theoretical volumes of sealant required for abandonment of 2-inch and 4-inch well casings is approximately 0.16 and 0.65 gallons per linear foot of casing (respectively). The theoretical volume of sealant required for abandonment of each well casing shall be determined prior to plugging. The total minimum volume of sealant shall be calculated based on the actual measured pluggable depth of the well and the volume factor for the casing diameter. The volume of sealing material placed in the well shall be compared with the theoretical volume to verify the actual volume of sealant is equal to or exceeds the theoretical volume.
- 4. The Well Plugging Plan of Operations submitted proposes to create a bentonite plug in the screened interval of each well, overlain by a cement/bentonite slurry to within two feet of land

surface. The bentonite plug is to be created by filling each well from the total well depth to the top of the screen interval with bentonite chips, which will then be hydrated in-place with potable water, prior to the introduction of the cement/bentonite slurry.

- 5. The cement/bentonite slurry to be placed over the bentonite plug will be composed of Portland Type I/II Cement with the addition of 5% bentonite powder. The water mixed with the cement to create the plugging sealant shall be potable water or of similar quality. Portland cement has a fundamental water demand of 5.2 gallons of water per 94-lb sack of cement. Up to a maximum of 6.0 gallons per 94-lb sack is acceptable to allow for greater pumpability.
  - Pure bentonite powder ("90 barrel yield") is allowed as a cement additive by NMOSE and American Water Works Association (AWWA) guidelines. Neither granular bentonite nor extended-yield bentonite shall be mixed with cement for the purpose of this plugging activity. When supplementing a cement slurry with bentonite powder, water demand for the mix increases at a rate of approximately 0.65 gallon of water for each 1% increment of bentonite bdwc (by dry weight cement) above the stated base water demand of 6.0 gallons of water per 94-lb sack of cement for neat cement. Bentonite powder must be hydrated separately with its required increment of water before being mixed into the wet neat cement. If water is otherwise added to the combination of dry ingredients or the dry bentonite is blended into wet cement, the alkalinity of the cement will restrict the yield of the bentonite powder, resulting in excess free water in the slurry and excessive cement shrinkage upon curing.
- 6. Placement of the cement/bentonite sealant within the well(s) shall be by pumping through a tremie pipe extended to near the top of the bentonite plug and kept below the top of the slurry column (i.e., immersed in the slurry) as the well is plugged from bottom upwards in a manner that displaces the standing water column.
- 7. Prior to, or upon completion of plugging, the well casing may be cut-off below grade as necessary to allow for approved construction onsite, provided a minimum six-inch thickness of reinforced abandonment plugging sealant or concrete completely covers the top of the cut-off casing. Any remaining void to the surface maybe filled with native soil, concrete, or asphalt as needed to match the surrounding surface material and blended with the surface topography to prevent ponding.
- 8. Within 20 days after completion of well plugging, a complete well Plugging Record shall be filed with the State Engineer in accordance with Paragraph (3) of Subsection C of 19.27.4.30 NMAC for each well plugged. The Well Plugging Record(s) shall be filed with the State Engineer at the NMOSE District V Office, 100 Gossett Drive, Suite A, Aztec, NM 87410. The required well plugging record form is available at the following website address: http://www.ose.state.nm.us/PDF/WellDrillers/WD-11.pdf.
- 9. Should another regulatory agency sharing jurisdiction of the project authorize, or by regulation require, more stringent requirements than stated herein, the more stringent procedure should be followed. These, among others, may include provisions regarding pre-authorization to proceed, type of methods and materials used, inspection, or prohibition of free discharge of any fluid or other material to or from the well that is related to the drilling and/or monitoring process.
- 10. Witnessing of the plugging work by NMOSE will not be required, but shall be facilitated if an NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by

calling the NMOSE - District V Office at (505) 334-4571, at least 48 hours in advance. NMOSE inspection will occur depending on personnel availability.

11. While documentation may or may not have been provided with this Well Plugging Plan of Operations indicating that access has been granted for any aforementioned well(s) located on property owned by someone other than the well owner/applicant, OSE approval of this plugging plan in no way infers the right of access to land not owned by the well owner/applicant.

The Well Plugging Plan of Operations received August 6, 2019, with NMOSE annotations/revisions (if applicable) is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Date: August 7, 2019

Miles Juett, Assistant Watermaster Water Rights Division District V



848 East Second Avenue Durango, Colorado 81301 T 970.385.1096

August 6, 2019

Miles Juett
Assistant Watermaster
NM Office of the State Engineer
100 Gossett Drive, Suite A
Aztec, New Mexico 87410

RE: Monitoring Well GBR-51 Plugging and Abandonment

Giant Former Refinery San Juan County, New Mexico

Dear Mr. Juett:

LT Environmental, Inc. (LTE), on behalf of Western Refining Southwest (Western), is pleased to provide the attached Well Plugging Plan of Operation for monitoring well GBR-51. This plan is being submitted post plugging operations. The need to plug the well prior to submittal of a Well Plugging Plan of Operation was dictated by a New Mexico Department of Transportation (NMDOT) road construction project requiring immediate plugging of the well located in a highway right-of-way. The location of GBR-51 was impeding construction progress. The location of the well had not been previously identified by the NMDOT during planning phases, which required immediate action so road construction activities could continue.

LTE appreciates the opportunity to provide this Well Plugging Plan of Operation to the NMOSE. If you have any questions please contact the project manager, Devin Hencmann, at 970-403-6023.

Sincerely,

LT ENVIRONMENTAL, INC.

Devin Hencmann Project Manager

Attachment



SIIS-1 • BI H-3	_	GIRVAY 64	
SE 1/4 SW 1/4 NW 1/	4 <u>NV 1/4</u>	S_27_129H	R12W

Fage	1	of_	1
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LOCATION DESCRIPTION: South of Giant's Bloomfield refinery on NMSR 64 right of way, 100 ft west of BLM-37

DC 02.11		R	S		RUN		SAMPLE			VICUAL CLAPSIFICATION
DEPTH	LITH.	C	H	*	FROM	10	1.b.	TYPE	uscs	VISUAL CLASSIFICATION
0			2	1 2	0	3			SW	0-28' Sand Hod Brn, 10 YR 4/4, v fine to fine grained, well sorted, unconsol., slightly moist at approx. 13'. Hinor pebble gravel at 11'-13'.
5			2	e.	,	•			CL	Silty clayey sand stringer, moderate brown, 10 YR 4/4, at approx. 15'-15.5'.
1			3	3	8	13			GP	Minor small pebble gravel 22-28'.
10						.5				28'-30' <u>Cla</u> y, moderate olive brn, 5 Y 4/4, minor fine to coarse sand.
			3	4	13	18			sw	30'-30.5' <u>Sand</u> as above (0'-28'), no gravel.
15									CL	6" clay to 31' grading to v fine sand at 33' olive gray, 5 Y 3/2.
			0	5	18	23			sc	33'-36' <u>Silty Sandy Clay</u> , moderate olive brn, 5 Y 4/4, approx. 33% clay, 33% sand, 33% silt.
20				6	23	28				36'-37' as above only stained, olive gray, 5Y 3/2. Fine to coarse sand interval 37' to 37-1/2' then to silty clay olive gray, 5 Y 3/2.
25			3		"	١			CL	37'-1/2-39' Silty clay, olive gray 5 Y 3/2.
				7	28	33	·		SH	39'-40' Silty sand, olive gray, 5 Y 3/2 Unconsol., HW sorted.
30			5						CL	40'-41.5' Clay, mottled, mod yllsh brn, 10 YR 5/4 - olive gray. 5 YR 3/2.
	HILI		0	8	33	38			SW	41.5'-42.5' Send. mod. olive brn 5 Y 4/4, f-m sand, unconsol., MW sorted.
35	M								sc	42.5'-43.5' <u>Sendy clay</u> , mod brn, 5 YR 4/4.
			2	9	38	43			SW	43'-50' <u>Sand</u> , mod yllsh brn, 10 YR 5/4, fine to med sand. unconsol. MW sorted, saturated
40			0	10	43	48			NA	50'-51.5' mudstone/claystone, dusky yellow 5 Y 6/4 to light olive brn, 5 Y 5/6 mod well consolidated, carbonaceous shale present, weathered, shale present.
45									NA	51.5'-52' <u>Sandstone</u> , dusky yellow, 5 Y 6/4 to light olive brn, 5 Y 5/6, fine to med grained, well consolidated, well sorted.
50		بنين عاملالات	3	11	48	52				

/:	Joseph Carlo	SIIS-	1 · BLM-37	V.S. H	IGINAY	61	
(3)							- 1

Page	1	01_1
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SITE ID: Lee Acres Community LOCATION ID: SHS-2
SITE COORDINATES (ft.): Coordinates are local to GBR
N 9854.92 E 11609.55
GROUND ELEVATION (ft. HSL): Approx. 5382
STATE: New Hexico COUNTY: San Juan
DRILLING METHOD: Hollow Stem Auger
DRILLING CONTR.: Vestern Technology
DATE STARTED: 8/2/89 DATE COMPLETED: 8/2/89
FIELD REP.: M. Nee
COMMENTS:

LOCATION DESCRIPTION: South of Giants Bloomfield Refinery on NMSR 64 right of way. 100 ft east of BLM-37

LOCATIO	LOCATION DESCRIPTION: South of Giants Bloomfield Refinery on NHSR 64 right of way, 100 ft east of BLM-37									
		R	S		RUN		SAMPLE			
DEPTH	LITH.	E C	Ĥ		FROH	10	1.0.	TYPE	nsc <b>s</b>	VISUAL CLASSIFICATION
0			3.5	1	0	3.5	١			0-1' <u>Soil</u> , Silty sand w/organics, mod. yllsh, brn 10 YR 5/4, 40% silt, 60% f sand, unconsolidated,
5			2	2	3.5	3.5				mod well sorted, sub angular to sub rounded.  1'-26' <u>Gravelly Sand</u> , Dark yellowish orange, 10 YR 6/6, 90X v fine - fine pred. quartz, unconsol., well sorted, sub ang to sub rounded, 10X gravel is fine to coarse pebble gravel, rounded.
10				3	8.5	13.5				26'-30' <u>Sandy gravel</u> , Dark yilsh orange, 10 YR 6/6, unconsol., rounded, pebble gravel to cobbles.
15			3	4	13.5	18.5				30'-33.5' <u>Clayey Silty Sand</u> , mod yllsh brn, 10 YR 5/4. Clay to fine sand, unconsol. poorly sorted.
20			3	5	18.5	23.5				33.5'-36' <u>Sand</u> , mod yllsh brn, 10 YR 5/4, fine to mod sand, unconsol. sub ang to sub rounded, mod well.
										36'-37' Clayey Silt, dark yllsh brn, 10 YR 4/4, unconsol. MW sorted.
25			0	6	23.5	28.5				37'-39.5' <u>Gravelly Sand</u> , dark yllsh brn, 10 YR 4/2, to olive black, 5 Y 2/1, at 38.5'.
30			0	7	28.5	33.5				80% Fine sand, 20% small cobbles, ps, unconsol. sand is sub ang to sub rounded, cobbles are rounded.
										39.5'-40.5' <u>Sandstone</u> , olive black 5 Y 2/1, HW consolidated, stained, appears to be Naciamento.
35	izivzi		2.5	8	33.5	38.5				40.5'-40.8' <u>Claystone</u> , olive gray, 5 Y 4/1, mod well consolidated.  40.8'-41.1' <u>Sandstone</u> , dark ylish orange, 10 YR
40			5	9	38.5	43.5				6/6, med send, MV sorted, unconsolidated.  41.1'-41.3' <u>Claystone</u> , olive gray, 5 Y 4/1.  mod well consolidated.
45	1777.7		5	10	43.5	48.5				41.8'-42' <u>Sandstone</u> , grayish orange, 10 YR 7/4, med sand, mod consol., subang, calcium cement, moist.
50			5	11	48.5	53.5				

SIIS-4.)  SIIS-6  SIIS-6	\$115-1 • \$115-8 • • •\$115-5 • \$11	\$H\$-2	• SHS-3	
1/41/4	1/4 _	1/4 s_	T R.	`

Page	ㅗ	of	-3-

ITE ID: OFFSITE GIANT ITE COORDINATES (ft.):	LOCATION ID: SHS-3
	E
ROUND ELEVATION (ft. MSL):	
TATE: NEW MEXICO	COUNTY: SAN JUAN
RILLING METHOD: HOLLOW ST	
RILLING CONTR.: WESTERN	
ATE STARTED: 11/29/89	DATE COMPLETED: 11/30/89
TELD REP .: LINLEY	
COMMENTS:	

LOCATIO	N DESCRI	PTIC	W: _					· · · · · ·		
DEPTH	LITH.	R	SA		RUN		SAMPLE		uscs	VISUAL CLASSIFICATION
		Č	Ħ	#	FROM	10	t.D.	TYPE		
0									SW	0-6' SAND: Yelsh orange (10 YR 6/6) fn to med fn grained, uncons, mod poorly sorted, sbang to sbrndd, fill.
5									SM	6-8' CLAYEY SAND: Dark yelsh brn (10 YR 4/2) v fn to fn grained, uncons, mod poorly sorted, sbang to sbrndd.
10									su	8-35' SAND: Dark yelsh orange (10 YR 6/6) fn to med grained, uncons, mod sorted, sbang to sbrndd. At 25' BGL cobbles (intbd w/depth). Clay
15										fraction <10%, Grv fraction ≈15% to 25%.
20										
25				·						
30							·			
35									su	35-38' SAND: (Vilw with d Sst), mod redsh brn (10 R 4/6) to dk yelsh orange (10 YR 6/6), fn to med sand, mod sorting, semiconsol, fri sbang to sbrndd. (v dns) Clay fraction incr w/depth to =20%.
40	(X 25.2								Pt	38-38.5' <u>COAL</u> : Blk (N1), flaky to leaf like layering, fri, consol.
45									GH	38.5-39.5' GRAVELLY SANDY CLAY: Gnsh gry (5 GY 6/1) to dk yelsh orange (10 YR 6/6) v fn to med grained, poorly sorted, semiconsol, sbang to sbrndd. Grv fraction #10-15% & up to 1/8" diam. Sand fraction #20-25%.
50									GM	39.5-44' GRAVELLY SAND: Dk yel orange (10 YR 6/6) med to crs grained, uncons, poorly sorted, sbang to sbrndd, wet.
	Y//	1								

(Continued)

Page 2 of 2

LOCATION ID: SHS-3

		R	s	<del></del> -	RUN		SAMPLE		<del></del>	
DEPTH	LITH.	E	A	#	FROM	70	1.0.	TYPE	USCS	VISUAL CLASSIFICATION
50						·			ML	44-54' CLAY (SHALE): it olv gry (5 Y 6/1) v fn grained, consol, intod med crs sand horizons (dk yelsh orange (10 YR 6/6) mod sorting, sbang to sbrodd, wet upper 4 <sup>M</sup> of sample & becoming dry w/depth.
55										αι γ π/σερτη.
60 65										
70										
75			l L							
80										
85							. •			
90										
95										
105										
110										
115										·
		_								·

	U.S. -1 · BLH-37 IS-8 · SIIS-2	VIGIRAY 64	
\$115-6° .	SIIS-5 • SIIS-7		X - X
	1/41/4 s	• 8LH-30 T R	

	Page <u>1</u> of <u>2</u>
SITE ID: OFFSITE GIANT	LOCATION ID: SHS-4
SITE COORDINATES (ft.):	
N	E
GROUND ELEVATION (ft. MSL)	:
STATE: NEW_MEXICO	COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW S	TEM AUGER
DRILLING CONTR.: WESTERN	TECHNOLOGIES INC.
DATE STARTED: 11/27/89	DATE COMPLETED: 11/28/89
FIELD REP .: LINLEY	
COMMENTS:	

DEPTH LITH. C A H # FROM TO I.D. TYPE  USCS VISUAL CLASSIFICATION  USCS VISUAL CLASSIFICATION  D-27' SAND: Grysh orange (10 YR 7/4): v fn to grained, abang to abrindd, uncons, mod a moist at =15' BGL. 20-21' BGL Gry horind, "0.5" dam. Overall grain size i w/depth to med-med crs sand. Grv fract in Lith at =25' BGL.  10  27-32' GRAVELLY CLAYEY SAND: Grysh orange (10 Yr fraction Lith at =25' BGL.  GM 27-32' GRAVELLY CLAYEY SAND: Grysh orange (10 Yr fraction Lith at =25' BGL.  GM 27-32' GRAVELLY CLAYEY SAND: Grysh orange (10 Yr fraction Lith at =25' BGL.  GC 32-37' GRAVELLY CLAYEY SAND: Grysh orange (10 Yr fraction =25-30X.  GC 32-37' GRAVELLY SAND: Grysh orange (10 Yr fraction =25-30X.  GC 7-32' GRAVELLY SAND: Grysh orange (10 Yr fraction =25-30X.  GC 32-37' GRAVELLY SAND: Grysh orange (10 Yr fraction der w/depth the fraction fract	sorted, izon, well incr
grained, sbang to sbridd, uncons, mod a moist at =15' BGL 20-21' BGL Gry hori ridd, =0.5" diam. Overall grain size in widepth to med-med crs sand. Gry fract in Lith at =25' BGL.  10  21  22  23  24  27-32' GRAVELLY CLAYEY SAND: Grysh orange (10' v into crs grained, poorly sorted, sinch shrinds, semi to uncons, moist. Gry creation = 10-15%, clay fraction =25-30%.  30  30  31  32-37' GRAVELLY SANDY CLAY: As above w/color grysh orange (10' VR 7/4) to mod yelish	sorted, izon, well incr
GH 27-32' GRAVELLY CLAYEY SAND: Grysh orange (10 v fn to crs grained, poorly sorted, si sbrndd, semi to uncons, moist. Gry compared to the semi to	
GM 27-32' GRAVELLY CLAYEY SAND: Grysh orange (10 v fn to crs grained, poorly sorted, si sbrndd, semi to uncons, moist. Grv cm = 10-15%, clay fraction = 25-30%.  GC 32-37' GRAVELLY SANDY CLAY: As above w/color grysh orange (10 YR 7/4) to mod yelsh	
GM 27-32' GRAVELLY CLAYEY SAND: Grysh orange (11 v in to crs grained, poorly sorted, si sbrindd, semi to uncons, moist. Grv ci #10-15%, clay fraction #25-30%.  GC 32-37' GRAVELLY SANDY CLAY: As above w/color grysh orange (10 YR 7/4) to mod yeish	
GM 27-32' GRAVELLY CLAYEY SAND: Grysh orange (10 v fn to crs grained, poorly sorted, sl sbrndd, semi to uncons, moist. Gry compared to uncons, moist. Gry compared to semi tou	
GC 32-37' GRAVELLY SANDY CLAY: As above w/color grysh orange (10 YR 7/4) to mod yelsh	bang to
clay fraction #50% incr w/depth to #7	brn (10 o ≈5%,
SC 37-44' SANDY CLAY: Grysh orange (10 YR 7/4) med fn grained, poorly sorted, semico sbang to sbrndd, moist. Sand fractio & decr w/depth to 15-20% & bcm fn gra	msol, on ≈20-25%
SM 44-45' <u>CLAYEY SAND</u> : Grysh orange (10 YR 7/4) yelsh brn (10 YR 5/4). V fn to med f uncons, sbang to sbrndd, poorly sorte  SC 45-50' <u>SANDY CLAY</u> : Grysh orange (10 YR 7/4)	in grained ed, moist.
yelsh brn (10 YR 5/4) v fn to med gra poorly sorted, sbang to sbrndd, semic moist. Sand fraction #20% incr w/dep 35% at 48' BGL, then decr to #15% & b grained. Grv horizon at 47-49' BGL.	sined, consol, oth to #30

(Continued)

Page \_ 2 of \_ 2

LOCATION ID: SHS-4

	<del></del>								<del></del> -	,
DEPTH	LITH.	R E	S		RUN		SAMPLE		USC\$	VISUAL CLASSIFICATION
		Č.	H	#	FROM	10	1.0.	TYPE		
50									ML	50-60' SHALE: Lt olv (10 Y 5/4) to dk gnsh yel (10 Y 6/6) v fn græined, consol, well sorted, sbrndd to rndd.
55				i						
60										
65										
70										
75										
80										
85										
90										
95										
100										
105										
110										
115										
				<u> </u>		1_				<u> </u>

/  /	U.S. 1 -1 · BLM-37 IS-B · SIIS-2 SIIS-5 · SIIS-7	• 5HS-3
8LH-27		BLH-30 N
1/41/4	1/41/4 S_	1 R

	Page <u>1</u> of <u>1</u>
SITE ID: OFFSITE GIANT LOCATION ID:	SHS-5
SITE COORDINATES (ft.):	
N E	
GROUND ELEVATION (ft. MSL):	
STATE: NEW MEXICO COUNTY: SAN JU	JAN
DRILLING METHOD: HOLLOW STEM AUGER	
DRILLING CONTR .: WESTERN TECHNOLOGIES INC	•
DATE STARTED: 1/7/90 DATE COMPL	ETED: 1/8/90
FIELD REP .: LINLEY	
COMMENTS:	

LOCATION DESCRIPTION: \_

C   N   P   FROM   10   1.D.   TIPE   SW   0-31' SAND: Grysh orange (10 YR 7/4), v fn to med fn sand, poorly sorted, uncons, shang to sbrodd, abd rootlets. Cobbles at 10' 801 -up to 4" dism, sbrodd = 11' 801 -up to 4" dism sbang to sbrodd.	DEPTH	LITH.	RE	S		RUN		SAMPLE		uscs	VICIAL CLASSISIONIO
100x   1   1   0   3'	UEPIN	Liin.			#	FROM	10	1.0.	TYPE	USCS	AISDAL CLASSILICATION
10							]			sw	sand, poorly sorted, uncons, sbang to sbrndd, abd rootlets. Cobbles at 10' BGL -up to 4" diam, sbrndd #1' thick at 13-14' BGL -at #18' BGL 6" thick lens of clayey silt -intbd Grv
20  75x 6 6 23 27'  25  100x 7 7 27 33'  30  SC 31-32' CLAYEY SILT: Mod yetsh brn (10 YR 5/4) v fn t fn med sorting uncons to semiconsol, sbang to sbrndd.  SN 32-38' SILTY SAND: Crysh orange (10 YR 7/4), fn to med fn grained semi to uncons sbang to sbrndd mod poorly sorted incr grain size w/depth to med sand.  SP 38-42' SAND: Pale yetsh orange (10 YR 8/6) fn to med crs, poorly sorted, uncons sbang to sbrndd, vmoist.  SC 42-43' CLAYEY SILT: Pale yetsh brn (10 YR 6/2) v fr to fn, mod sorted, semiconsol, sbang to sbrndd, vmoist.  SC 42-43' CLAYEY SILT: Pale yetsh brn (10 YR 6/2) v fr to fn, mod sorted, semiconsol, sbang to sbrndd, sand, poorly sorted, uncons, s	10		4x	3	3	8	141				
25  25  100x 7 7 27 33'  30  SC 31-32' CLAYEY SILI: Mod yelsh brn (10 YR 5/4) v fn t fn med sorting uncons to semiconsol, sbang to sbrndd.  35  38  39  30  SC 31-32' CLAYEY SILI: Mod yelsh brn (10 YR 5/4) v fn t fn med sorting uncons to semiconsol, sbang to sbrndd med fn grained semi to uncons sbang to sbrndd med poorly sorted incr grain size w/depth to med sand.  SP 38-42' SAND: Pale yelsh orange (10 YR 8/6) fn to med crs, poorly sorted, uncons sbang to sbrndd, v moist.  SC 42-43' CLAYEY SILI: Pale yelsh brn (10 YR 6/2) v fn to fn, mod sorted, semiconsol, sbang to sbrndd, sat.  SV 43-58' SAND: Pale yelsh brn (10 YR 6/2) fn to med crs, poorly sorted, uncons, sbang to sbrndd, sand, poorly sorted, uncons,	15		40%	4	4	14	18'				
25  100x 7 7 27 33'  SC 31-32' CLAYEY SILT: Mod yelsh brn (10 YR 5/4) v fn t fn med sorting uncons to semiconsol, sbang to sbrndd.  35  SM 32-38' SILTY SAND: Grysh orange (10 YR 7/4), fn to med fn grained semi to uncons sbang to sbrndd mod poorly sorted incr grain size w/depth to med sand.  SP 38-42' SAND: Pale yelsh orange (10 YR 8/6) fn to med crs, poorly sorted, uncons sbang to sbrndd, v moist.  SC 42-43' CLAYEY SILT: Pale yelsh brn (10 YR 6/2) v fr to fn, mod sorted, semiconsol, sbang to sbrndd, sat.  SW 43-58' SAND: Pale yelsh brn (10 YR 6/2) fn to med c sand, poorly sorted, uncons, sbang to sbrndd, poorly sorted, uncons, sbang to sbrndd, poorly sorted,	20		ox	5	5	18	23,				
SC 31-32' CLAYEY SILT: Mod yelsh brn (10 YR 5/4) v fn t fn med sorting uncons to semiconsol, sbang to sbrndd.  SN 32-38' SILTY SAND: Grysh orange (10 YR 7/4), fn to med fn grained semi to uncons sbang to sbrndd mod poorly sorted incr grain size w/depth to med sand.  SP 38-42' SAND: Pale yelsh orange (10 YR 8/6) fn to med crs, poorly sorted, uncons sbang to sbrndd, v moist.  SC 42-43' CLAYEY SILT: Pale yelsh brn (10 YR 6/2) v fr to fn, mod sorted, semiconsol, sbang to sbrndd sat.  SW 43-58' SAND: Pale yelsh brn (10 YR 6/2) fn to med crs, and, poorly sorted, uncons, sbang to sbrndd, sand, poorly sorted, uncons, sbang to sbrndd, poor	25										
sbrndd.  SM 32-38' SILTY SAND: Grysh orange (10 YR 7/4), fn to med fn grained semi to uncons sbang to sbrndd mod poorly sorted incr grain size w/depth to med sand.  SP 38-42' SAND: Pale yelsh orange (10 YR 8/6) fn to med crs, poorly sorted, uncons sbang to sbrndd, wo moist.  SC 42-43' CLAYEY SILT: Pale yelsh brn (10 YR 6/2) v fr to fn, mod sorted, semiconsol, sbang to sbrnd sat.  SW 43-58' SAND: Pale yelsh brn (10 YR 6/2) fn to med consol, sand, poorly sorted, uncons, sbang to sbrndd, sand, poorly sorted, uncons, sbang to	30	מלימ	100%			2"	33,			SC	31-32' CLAYEY SILT: Mod yelsh brn (10 YR 5/4) v fn to
mod poorly sorted incr grain size w/depth to med sand.  SP 38-42' SAND: Pale yelsh orange (10 YR 8/6) fn to med crs, poorly sorted, uncons sbang to sbrndd, w moist.  SC 42-43' CLAYEY SILT: Pale yelsh brn (10 YR 6/2) v fn to fn, mod sorted, semiconsol, sbang to sbrnd sat.  SW 43-58' SAND: Pale yelsh brn (10 YR 6/2) fn to med consol, poorly sorted, uncons, sbang to sbrndd, sand, poorly sor	35		1002	8	8	33	38'			SH	sbrndd. 32-38' <u>SILTY SAND</u> : Grysh orange (10 YR 7/4), fn to
20x 10 10 42 47'  SC 42-43' CLAYEY SILT: Pale yelsh brn (10 YR 6/2) v fr to fn, mod sorted, semiconsol, sbang to sbrnd sat.  SN 43-58' SAND: Pale yelsh brn (10 YR 6/2) fn to med consol, sbang to sbrnd sand, poorly sorted, uncons, sbang to sbrndd, sand, poorly sorted, sand, poorly sorted, sand, poorly sorted, sand, poorly sorted, sand, poorly	40		307	9	9	38	42'			SP	mod poorly sorted incr grain size w/depth to med sand.
to fn, mod sorted, semiconsol, sbang to sbrnd sat.  20% 11 11 47 52'  SW 43-58' SAND: Pale yelsh brn (10 YR 6/2) fn to med consol, sbang to sbrndd, sand, poorly sorted, uncons, sbang to sbrndd,		иии	20:	10	10	42	47'				crs, poorly sorted, uncons sbang to sbrndd, v moist.
sand, poorly sorted, uncons, sbang to sbrindd,	45		20	x 1	11	47	521				to fn, mod sorted, semiconsol, sbang to sbrndd, sat.
10x 12 12 52 57'	50		10	x 1:	2 12	52	57	,			send, poorly sorted, uncons, sbang to sbrndd,

\$115-4.) \$15-6' \$15-6'	2112-8 • 2112 2112-1 • Bru-3	•	
1/41/4	1/41/4	S R	

SITE ID: OFFSITE GIANT LOCATION ID: SHS-6 SITE COORDINATES (ft.):
NE
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECHNOLOGIES INC.
DATE STARTED: 01/03/90 DATE COMPLETED: 01/03/90
FIELD REP .: LINLEY
COMMENTS:

Page <u>1</u> of <u>1</u>

LOCATION DESCRIPTION: \_

DEPTH	LITH.	R	S		RUN		SAMPLE		uscs	Well classification
DEPIN	LIIM.	E C	A	#	FROM	10	1.0.	TYPE	USCS	VISUAL CLASSIFICATION
0		75%		1	0	3′			SW	0-24' SAND: Dk yelsh orange (10 YR 6/6) med fn to med crs grained, sbang to sbrndd, uncons, poorly sorted minor rootlets, Grv fraction 1-3% up to
5		50X	2	2	3	9′				1.5" diam. Bcm med to fn grained w/depth, clay - silt fraction =15-20% intbd (cobbles @ =8' BGL) - at 20' BGL back to med crs to crs sand. 21' BGL cobbles - out by 22' BGL.
10		75X	3	3	9	17'				
15		40X	4	4	13	17'				
20		40%	5	5	17	22'				
20		75X	6	6	22	26'				
25		80X	7	7	26	31′		·	SM	24-26' SANDY CLAY: It olv gry (5 Y 5/2) v fn grained, mod sorted, sbang to sbrndd, semiconsol, moist. Sand fraction #15% med fn grained - Grv layer just at contact of sand - clay interface (24') clasts up to 1.5-2" diam, sbrndd, at 24.5' BGL 0.5' sand lens med crs as above.
30 35		60X	8	8	31	36'			SW	26-45' SAND: Dusky yel (15 Y 6/4) to yellsh gry (5 Y 7/2) med crs sand, sbang to sbrndd, uncons, poorly sorted grading into med in sand at 28' BGL. #3" silt layer at 27.5" BGL. At 34' BGL
40		60X	9	9	36	41'				Grv lens #0.5-1.5" diam sbrndd 3-4" thick. Intbd of silty sands at 44' BGL cobbles 0.5" diam in sample. Sat at #37-38' BGL. No trace of HC in sampler - intbd Grv up to 2" diam sbang to sbrndd.
***		402	10	10	41	46'			SW	45-48.5' <u>BEDROCK-SANDSTONE</u> : Mod yel (5 Y 7/6) to dusky yel (5 Y 6/4), med to fn grained, consol, mod sorting sbang to sbrodd, intbd silty clays. TD 48.5 auger refusal.
45		:: 20% :-	11	11	46	48'				
50										

\$115-4.) \$3 \$115-6° \$3; \$115-6°	SIS-8 • \$SIS-8 • \$SIS-5 •\$SIS-	SHS-2	• SIIS-3 • BLM-30	
1/41/4 .	1/4 _	1/4	S T R_	

Page	1	of	2
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l	E
GROUND ELEVATION (ft. P	ISL):
	COUNTY: SAN JUAN
DRILLING METHOD: HOLLO	
DRILLING CONTR.: WESTE	RN TECHNOLOGIES INC.
	DATE COMPLETED: 01/06/90
FIELD REP .: LINLEY	
COMMENTS:	

LOCATION DESCRIPTION:

LOCATIO	M DESCRI		<u>: –</u>							
DEPTH	LITH.	R	S		RUN		SAMPLE		USCS	VISUAL CLASSIFICATION
<i>UCT</i> IN	LIIA.	C	Ĥ	*	FROM	TO	1.0.	TYPE	USCS	VISUAL CLASSIFICATION
0		100X 100X	1	2	0	91			SW	0-36' SAND: Dk yelsh orange (10 YR 6/6) fn to med fn grained, mod poorly sorted, uncons, sbang to sbrndd. Rootlets in upper 18", sand bcm more crs grained w/depth to a med to med crs grained, rootlets at 10-12' BGL, encountered cobbles at #16' BGL, cobbles at 26' GBL, med crs to crs
10		50X	3	3	9	14*				sand, cobbles up to 5" diam, rootlets at 27' BGL. Grv up to 2.5" diam w/med crs sand at 30- 35' BGL.
15		70X	4	4	14	181				
20		0x 50x		5	18	22'				·
25			7	7	27	32'				
30		80%	8	8	32	37'	·			
35	JJ.J.	302	9	9	37	411			SM	36-37' <u>SAND SILT</u> : Dk yelsh orange (10 YR 6/6) v fn to fn grained semiunconsol, sbang to sbrndd mod poorly sorted, clay fraction #15% sand fraction
40	Path	40	10	10	41	45'				#30%, 37' BGL noted HC odor from drilling cuttings at 38' BGL noted (bottom of sampler) blk horizon w/HC odor noted H_O at #42' BGL -cuttings have blk staining (?) w/HC odor. HC horizon
45		50	11	11	45	501			sc	37-40' CLAYEY SAND: Grysh olv, v fn to med crs, poorly sorted, semi to uncons sbang to sbrndd, sat. HC odor.
50									sc	40-41' CLAYEY SILT: Grysh orange (10 YR 7/4) v fn to fn mod poorly sorted, semi to consol sbang to sbrndd, moist, no odor.

(Conlinued)

Page 2 of 2

LOCATION ID: SHS-7

C H # FROM TO 1.D. TYPE			R	S	 RUN		SAMPLE			T
55 60 65 70 75 80 80 85 90 90 95 110 105 81 110	DEPTH	LITH.	E	A	FROM	TO	1.D.	TYPE	nsc <b>s</b>	VISUAL CLASSIFICATION
63 70 75 80 85 90 95 100 105										41-54' SAND: Pale to it olv (10Y 6/2-5/4) med crs, mod sorted uncons, sbang to sbridd, v moist. No odor silt fraction #25% decr w/depth, noted dk HC stained horizon at #49' BGL #4 to 6" thick TD 54' BGL.
70 75 80 85 90 95 100 105										
75 80 85 90 95 100	65									
85 90 95 100 105										
90 95 100 105										
90 95 100 105										
95 100 105								,		
105										·
110	100									
	105									
115	110									
T	115									

COMMENTS:\_\_

SHS-4.) SHS-1. SHS-8. SHS-6. SHS-5.	SHS-2	• SHS-3	
/&/ +BLN+27		• BLM-30	·

SITE ID: OFFSITE GIANT SITE COORDINATES (ft.):	LOCATION ID: SHS-8						
	<del></del>						
N							
GROUND ELEVATION (ft. MSL):	<b>:</b>						
STATE: NEW MEXICO	COUNTY: SAN JUAN						
DRILLING METHOD: HOLLOW S'	TEM_AUGER						
DRILLING CONTR .: WESTERN							
	DATE COMPLETED: 01/09/90						
FIELD REP .: LINLEY							

Page <u>1</u> of <u>1</u>

LOCATION DESCRIPTION:

LOCATIO	N DESCRI	PTION	<u> </u>							
DEPTH	LITH.	R	S		RUN		SAMPLE		uscs	VISUAL CLASSIFICATION
DEPIN		c	Ĥ	#	FROM	то	1.0.	TYPE	0,303	TIOUNE GENOSITIENTIAN
0		60%	1	1	0	41			SM	0-6' <u>SANDY SILT</u> : Dk yelsh orange (10 YR 6/6) v fn to fn grained uncons, mod sorted, sbang to sbrndd, rootlets.
5		80%	2	2	4	91			SW	6-15' SAND: Mod yelsh brn (10 YR 5/4) fn to med crs,
10		70%	3	3	9	141				poorly sorted, uncons sbang to sbrndd, Grv at #8' BGL and #1' thick, up to 1-2" diam, sbrndd to sbang, rootlets.
15		30%	4	4	14	19'			SM	15-17' SANDY SILT: Pale yelsh brn (10 YR 6/2) v fn to med fn grained, poorly sorted semi to uncons, sbang to sbrndd.
20		60%	5	5	19	241			SU	17-37' SAND: Mod yelsh brn (10 YR 5/4) fn to med crs, poorly sorted, uncons, sbang to sbrndd, moist, at =37' BGL noted blk stain in cuttings w/HC odor.
25		50%	6	6	24	291				
30		70%	7	7	29	34,				
35		100%	8	8	34	391				
40		70x		9	39	411			SH	37-39' SILTY SAND: Dk gnsh gry (5 GY 4/1) to grysh blk (N 2) (HC staining ?) v fn to med fn sand, semi to uncons, mod poorly sorted, sbang to sbrndd, v moist, HC odor w/staining, HNu = 120, LEL = 74%.
		0%					·		SW	39-41' SAND: Dk gnsh gry (5 GY 4/1) fn to med grained, poorly sorted, uncons, sbang to sbrndd, sat.
45		10%	11	11	45	50'			SM	41-53' SANDY SILT: Gnsh gry (5 GY 6/1) v fn to fn grained, mod poorly sorted, semi to uncons, sbang to sbrndd, sat.
50		202	12	12	50	53'				

J.S. Highway	SHS-1 •	BH-3		
	SHS-9 SHS-8 ● **	BLM-37 ABH-4 BH-2	SHS-2	●SHS-3
1/4	1/41/4	_1/4 S	_ т	R

LOCATION DESCRIPTION:

5-10'  Sand, mod yllsh brn 10 YR 5/4, clay-5%, sand-v med crs, subang., uncons.  10 10-25'  Sand, mod yllsh brn 10 YR 5/4, v. fine - mediu subang.  25 25-38'  Sandy clay, mod yllsh brn 10 YR 5/4 to dark yl 10 YR 4/2, v. fine-medium sand 40%, clay-60%, subang.  38-45'  Sandy clay, mod olive brn 5 Y 4/4, v. fine sand clay-90%, some cobbies at 42-43', uncons., sub		WIGHT CLASSIFICATION	,,,,,,,		SAMPLE		RUN		s	R	,,,	DEDT"
5-10'  Sand, mod yllsh brn 10 YR 5/4, clay-5%, sand-v med crs, subang., uncons.  10   10-25'   Sand, mod yllsh brn 10 YR 5/4, v. fine - mediusubang.  Sand, mod yllsh brn 10 YR 5/4, v. fine - mediusubang.  Sandy clay, mod yllsh brn 10 YR 5/4 to dark yll 10 YR 4/2, v. fine-medium sand 40%, clay-60%, subang.  Sandy clay, mod yllsh brn 10 YR 5/4 to dark yll 10 YR 4/2, v. fine-medium sand 40%, clay-60%, subang.  Sandy clay, mod olive brn 5 Y 4/4, v. fine sand clay-90%, some cobbles at 42-43', uncons., sub		VISUAL CLASSIFICATION	USCS	TYPE	· 1.D.	τo	FROM	#			LITH.	DEPIH
10 10-25'  Sand, mod yllsh brn 10 YR 5/4, v. fine - mediu subang.  25 25 26-38'  Sandy clay, mod yllsh brn 10 YR 5/4 to dark yll 10 YR 4/2, v. fine-medium sand 40%, clay-60%, subang.  Sandy clay, mod olive brn 5 Y 4/4, v. fine sar clay-90%, some cobbles at 42-43', uncons., sub	olidated	Backfill, dark yllsh brn 10 YR 4/2, sand-80%, clay-20%, v. fine to med sand, subang, unconsolid			0-5'							0
25 25-38'  Sandy clay, mod ylish brn 10 YR 5/4 to dark yl 10 YR 4/2, v. fine-medium sand 40%, clay-60%, subang.  30  35  Sandy clay, mod olive brn 5 Y 4/4, v. fine sand clay-90%, some cobbles at 42-43', uncons., sub	/. fine-	Sand, mod yllsh brn 10 YR 5/4, clay-5%, sand-v. med crs, subang., uncons.			5-10'							5
25-38'  Sandy clay, mod ylish brn 10 YR 5/4 to dark yl 10 YR 4/2, v. fine-medium sand 40%, clay-60%, subang.  Sandy clay, mod olive brn 5 Y 4/4, v. fine sar clay-90%, some cobbles at 42-43', uncons., sub	.m.,	Sand, mod yllsh brn 10 YR 5/4, v. fine - medium, subang.			10-25							10
25-38'  Sandy clay, mod yllsh brn 10 YR 5/4 to dark yl 10 YR 4/2, v. fine-medium sand 40%, clay-60%, subang.  Sandy clay, mod olive brn 5 Y 4/4, v. fine sar clay-90%, some cobbles at 42-43', uncons., sub												15
30  35  Sandy clay, mod olive brn 5 Y 4/4, v. fine sar clay-90%, some cobbles at 42-43', uncons., sub												20
38-45' Sandy clay, mod olive brn 5 Y 4/4, v. fine sar clay-90%, some cobbles at 42-43', uncons., sub	lish br uncons	Sandy clay, mod yllsh brn 10 YR 5/4 to dark ylls 10 YR 4/2, v. fine-medium sand 40%, clay-60%, un subang.			25-38'					_		25
Sandy clay, mod olive brn 5 Y 4/4, v. fine sar clay-90%, some cobbles at 42-43', uncons., sub												30
clay-90%, some cobbles at 42-43', uncons., sub	nd-109	South along med align han 5 V / // or 4 inc south			3R-454							35
45 -50/ Claystone med blob areay 5 8 5/1 to med bro 5	bang.	clay-90%, some cobbles at 42-43', uncons., suban			30 42							40
	YR <b>3</b> /4 ge	Claystone, med blsh gray 5 B 5/1 to mod brn 5 YR inter bedded with F. rich clays dk yllsh orange 10 YR 66.			45-50'							45
50 TD = 50'												50

SHS-11 SHS-10	NORTH
CIRCLE DR.	NOT TO SCALE
1/4 <u>sw1/4 <u>nw1/4 nw1/4</u> s<u>_27</u></u>	T 29H R 12W

Page <u>1</u> of <u>2</u>

SITE ID: OFFSITE GIANT LOCATION ID: SHS-10
SITE COORDINATES (ft.): 150' EAST of SHS-11
N_ 9748.99 E_ 11415.36 GROUND ELEVATION (ft. MSL): 5378.77
GROUND ELEVATION (ft. MSL): 5378.77
STATE: NM COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECHNOLOGIES
DATE STARTED: 6/18/90 DATE COMPLETED: 6/20/90
FIELD REP.: KYLE SUMMERS
COMMENTS:

LOCATION DESCRIPTION:

Depth	Lith	Drilling Time Scale:	Sample Type and Interval	Org. Vap ppm	Lithologic Description / Remarks
			Soll headspace		
5			5-7'	0	0-10' <u>Sand</u> , Mod yelsh brn 10 YR 5/4, v fn to med crs mix, ang to sbang uncons, poorly sorted.
10			10-12'	o	10-15' <u>Sand</u> , Mod yelsh brn 10 YR 5/4 to dk yelsh orange 10 YR 6/6, v fn med grained, uncons, ang to sbang sand, poorly sorted.
15			15-17'	0	15-21' <u>Sand</u> , Mod yelsh brn 10 YR 5/4, v fn to med, uncons, ang to sbang sand, poorly sorted.
20			20-22'	0	22-22.5' <u>Silty Sand</u> , Mod olv brn 5 Y 4/4, Sltst-7 -partially consol, some clay =10%, sli Cbls, poorly sorted, some grading.
25			22-24.5'	o	22.5-24.5' <u>Silty Sand</u> , Lt olv brn 5 Y 5/6, fn to v fn sand - 80%, some semi-consol silt intvls which are tight drilling, poorly sorted, some graded bedding.
30			30-32'	0	24.5-30' <u>Silty Sand</u> , Lt olv brn 5 Y 5/6, silt to med sand, occ Grv <1% tight but not consol, silt well sorted, some grading.  30-34.5' <u>Sand</u> , Mod yelsh brn, 10 YR 5/4, to grysh orange 10 YR 7/4, v fn sand 10%, fn to med - 80-90% Qtz sand, fairly well sorted, some grading.
35	<i>* 2.</i>	<u>.</u>			34.5-35.5' Sand, Dk mod yelsh brn 10 YR 4/2 to lt olv brn 5 Y 5/6, clay 5% to med sand 90%, fairly well sorted, some grading.
			35.5-36.5'	140	35.5-36.5' Sand, Lt olv brn 5 Y 5/6, v fn sand to med sand, v fn =10% fairly well sorted
40			36.5-38.5	180	36.5-38.5' Clayey Sand, HC staining at 37' grysh blk, N2, to med gry, N5, v fn sand =20%, fn to med 70%, clay/silt =10%, sand is ang to sbang uncons clay layer at 38', fairly sorted, graded.
45	49.2.0	<b>E</b>			38.5-40' <u>Sand</u> , Lt olv brn 5 Y 5/6, v fn to med sand fairly drk uncons to semi consol, fairly well sorted, graded.
50		<u>-</u>	40-42'	40	40-42' Gravelly Sand, Lt olv brn 5 Y 5/6, to med dk gry, N 3, some Fe stains at 42' cobbles seem to be sbrndd = Sst and Otz, poorly sorted.
					42-45' Gravelly Sand, Dk yelsh orange 10 YR 6/6, lge Cbls, sand, poorly sorted.

(continued)

Page <u>2</u> of <u>2</u>

Location ID SHS-10

Depth	Lith	Drilling Time Scale:	Sample Type and Interval	Org. Vap ppm	Lithologic Description / Remarks
50					45-48' No sample - plug in auger stem.
				Ì	48' = TD
55					
,					
					•
60			}		
				}	
,-					
65					
70					
75					
,					
•					
80		}			
85					
90					
95					
",					
100				1	
105					
,					
}					
110					
115					
115					
]					

SHS-11 SHS-10	нтяои
CIRCLE DR.	NOT TO SCALE
1/4 SW 1/4 NW 1/4 NW 1/4 S 27	T_29N R_12W

Page	1	of	1
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SITE ID: M&A OFFSITE LOCATION ID: SHS-11
SITE COORDINATES (ft.): 150' WEST OF SHS-10
N 9763.57 E 11358.35
GROUND ELEVATION (ft. MSL): 5378.36
STATE: NM COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH.
DATE STARTED: 6/20/90 DATE COMPLETED: 6/21/90
FIELD REP.: M. MOHORCICH
COMMENTS: T.D. AT 55', DRILLED FIRST W/ 7" AUGER THEN REAMED
W/ 10".

LOCATION DESCRIPTION:

Depth	Lith	Orilling Time Scale:	Sample Type and Interval	Org. Vap ppm	Lithologic Description / Remarks
		1110	0-51	0	0-5' <u>Sand</u> , mod yelsh brn 10 YR 4/2, med-crs, uncons.
5		·			5-32' <u>Sand</u> , yelsh brn 10 YR 5/4, abdt qtz, subrnd, uncons, med-crs grn
10			Soll headspace 10-12'	0	
15			15-17'	0	
20			20-22'		
25			25-27'	. 0 .	,
30			30-32'	0	
35			35-37°	>30	32-33' Cobbly sand, sand as above w/ minor cobbles.  33-41' Sand, olv gry 5 Y 3/2, med-crs grnd from 33-38' w/ noticed HC stain & odor at 36'. Noticebly drker HC stain from 38'-40'; with lighter ducky yellors 5 GY 5/2 from 40-41', HD at 38-
40			37-39' 39-41'	>30	with lighter dusky yel grn 5 GY 5/2 from 40-41'. H <sub>2</sub> O at 38-40'.
,,					41-43' Cobbly sand, light olv gry 5 Y 5/2, saturated, well sorted, crs grn sand w/ few 1" size cobbles, uncons.  43-45' Sand, light olv gry 5 Y 5/2, saturated.
43					45-55' <u>Cobbly sand</u> , ight olv gry 5 Y 5/2, saturated same as above (SAA) w/ minor cobbles, uncons. Pulled out 7" bit & reamed w/ 10" flights.
50					
		8			T.D. at 55'

US HWY. 64	.
SHS-11 SHS-10	NORTH
CIRCLE DR.	NOT TO SCALE
1/4 <u>sw 1/4 <u>nw</u> 1/4 <u>nw</u> 1/4 s <u>27</u></u>	T 29N R 12W

Page <u>1</u> of <u>2</u>

SITE ID: OFFSITE GIANT M&A LOCATION ID: SHS-12

SITE COORDINATES (ft.): 150' WEST OF SHS-11

N 9778.01 E 11300.38

GROUND ELEVATION (ft. MSL): 5378.17

STATE: NM COUNTY: SAN JUAN DRILLING METHOD: HOLLOW SIEM AUGER

DRILLING CONTR.: WESTERN TECHNOLOGIES

DATE STARTED: 6/21/90 DATE COMPLETED: 6/22/90

FIELD REP.: M. MOHORCICH

COMMENTS: T.D. 55'

LOCATION DESCRIPTION: \_

Depth	Lith	Drilling Time Scale:	Sample Type and Interval	Org. Vap ppm	Lithologic Description / Remarks
5		·	Soll headspace		0-15' <u>Sand</u> , lt olv brn 5 Y 5/6, med grain sand, sbrndd, prim uncons.
15					15-37' <u>Sand</u> , pale yellow orange 10 YR 8/6,med-coarse grain, uncons.
25					
30				0	No split at 30-32', just pushing a rock w/spoon down through uncons sand. Lost sand downhole, cavity at ≈ 32'.
35	**************************************		*35' HNU=Oppm		Sand seemed to get moist from 36-37' split.  37-39' Gravelly, Clayey sand, 10 YR 8/6, med-coarse qtz sand, 37-37.4' few 1/2-1" Grvl & minor amt of Cly at 37.2".  No H <sub>2</sub> O yet, maybe a bit more moist than above at 35'.  39-43' Sand, dusky yel 5 Y 6/4, med-crs gr, uncons, split from 40-42 gave H <sub>2</sub> O at 41'.
45					43-43.8' <u>Clayéy Sand</u> , dusky yel 5 Y 6/4, minor amt cly. 43.8-45' <u>Sand</u> , dusky yel 5 Y 6/4, unconsol. 45-50' <u>Cobbly Sand</u> , SAA w/minor cobbles surfacing.
50					50-55' <u>Sand</u> , SAA.

(continued)

Page 2 of 2

Location ID SHS-12

7						(CONTINUED) Location ID SHS	5-12
	Depth	Lith	Drilling Time Scale:	Sample Type and Interval	Org. Vap	Lithologic Description / Remarks	
	50 55					T.D. 55' w/ 10" flights.  Split 55-57' <u>Sand</u> , saa w/ cly zone from 56.6-57'.	
	60						
	65						
	70						
	75					,	
	80						
	85						
	90						
	95						
	100						
	105						
	110						
	115						

		B-4A	shs-	14	SHS-15
SHS	B-48	<b>A A</b> B-3	<u>A⊕</u> B-1	B-2	•

Page <u>1</u> of <u>1</u>

LOCATION DESCRIPTION: South of NM 64. East of County Road 5500. HNU bkground = .04 ppm

DEPTH	LITH.	R E	S		RUN		SAMPLE		uscs	VISUAL CLASSIFICATION
JEFIN	Liin.	C	H	#	FROM	TO	1.0.	TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 0-6	HNU bkg = .04 ppm	SM	Sand, mod yelsh brn 10YR 5/4, unconsolidated, moist, f-med gr w/ a few small cobbles ≈7.
5							9-16	bkg	SW	Cobbly sand, small cobbles w/ sand as above.
10										
15							16-21	bkg	sc	Clayey sand, increase in cly, minor amounts.  W/ loss of cly at 21'.
20		·					24-26	bkg	SM	Sand, moist, uconsolidatd 10 YR 4/2, fn-med grn.
25										
30							30-32 32-40		SM	Cobbly sand, cobbles at 30-32, 1/2-2".  Sand, 10 YR 4/2, unconsolidated, poorly sorted.
35										
40							40-50		SW	Cobbly sand, small cobbles, rig chattered down through 50'.  Sand, T.D. 58' w/ cave in of ≈10' to 48'.
45										Comment: HNU readings were taken from bore done w/ hollowstem split spoon ≈5' east of SHS-13.
50		•					·			

Page <u>1</u> of <u>1</u>

8-	4 A	SHS	5-14	SHS-15	Cty. Rd. 5468 (Meadow Lane)
<b>A</b>	<b>B</b> -3	<u>A⊕</u> B-1	<u>▲</u> B-2		
	1/4	SW 1/4	<u>NW</u> 1/4	<u>NW</u> 1/4	S 27 T 29N R 12W

DEDTU	1170	R E	S		RUN		SAMPLE		ucco	VIGUAL CLASSIFICATION
DEPTH	LITH.	C	A	#	FROM	TO	1.D.	TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 0-4	HNU bkg = .02	SM	Sand, mod yelsh brn 10 YR 5/4, poorly sorted, med gr, moist at 3' minor cobbles.
5							4-9	ppm bkg	SM	drk yelsh brn 10 YR 4/2, f gr moist, poorly sorted unconsolidated.
10							9-14	bkg	SM	10 YR 4/2, slily moist, med gr incr in qtz gr, poorly sorted.
15							14-19	bkg	sc	Cobbly sand, same as above w/cobbles at 16-17, no odor or stain.
20							19-24	bkg	SM	Sand, same as above w/out cobbles, moist.
25							24-29	bkg		Sand, same as above
30							29-34	25		29-33, same as above. 34 HC stain, soil came up & gave borehole HNU of 25 ppm olv gry 5YR 3/2.
35							34-39	174		34-39, blk soil & H2O table. Open borehole of 12 ppm.
40							39-44	250	SM	Sand, olv gry 5Y 3/2. Stained & odor med gr sat sand.
45							44-49			Same as above, med gr sat.
50							49-54			Cobbly sand Felt & drilled like cobbles. Same as above w/ 2" cobbles. TD at 54'

8-4	A	SHS	-14	SHS-15	Cty. Rd. 5468 (Meadow Lane)
<b>A</b>		A.	<u> </u>		
	B-3	B-1	B-2		
	_1/4	<u>sw</u> 1/4	<u>NW</u> 1/4	<u>NW</u> 1/4	S 27 T 29N R 12W

Page <u>1</u> of <u>1</u>

SITE ID: OFFSITE GIANT LOCATION ID: SHS-15, Cty Rd 5468
SITE COORDINATES (ft.):
NE
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 08/18/90 DATE COMPLETED: 08/19/90
FIELD REP.: M. MOHORCICH
COMMENTS: T.D. 48.7, HNU background = .04 ppm

LOCATION DESCRIPTION: South of NM 64, East of County Road 5500, 400' east of Lee Acre Rd, 150' east of SHS-14

DEDT	1170	R	S		RUN		SAMPLE		Hece	VICIAL CLASSIFICATION
DEPTH	LITH.	E C	A M	#	FROM	ΤO	1.D.	TYPE	uscs	VISUAL CLASSIFICATION
5							Split Spoon 0-7	HNU bkg = .04 ppm	SM	Sand, vry f gr, grysh or 10 YR 7/4 dry. At 7' color changes to mod yelsh brn 10 YR 5/4, f gr, moist, unconsolidated.
10	••••						91	.04		
15					:		14-16	.08	SW	Cobbly sand, at 10'-12' cobbles in sand as above, cobbles up to 2".
20							19-21	.04	SM	Sand, 12-19, change back to or 10 YR 7/4.  19-33 dusky yel 5Y 6/4. f-med gr, dry unconsolidated, poorly sorted.
25							24-26	.04		
30							33-35	.08		33-35 sand as above, H <sub>2</sub> O at 35'.
35										35-48.7 no cuttings due to slow speed of drilling but drilled like sand.
40										·
45										T.D. at 48.7'
50										1.0. BL 40.7

							BOI	REHOLI	E LOG	(SOIL)			
			74	, <u>.</u> ,,.						Page _1_ of _1_			
	•							SITE	ID: <u>O</u> F	FESITE GIANT LOCATION ID: SHS-16, Cty Rd 5470			
	· <u>s</u>	HS-1	6					N		NATES (ft.): 200' EAST OF LEE ACRES ROAD ROW			
B	-7 B	6	<b>B</b> -	5	<u>A</u> B-9	B-10	B-11	STATE	: NEW	ATION (ft. MSL): MEXICO COUNTY: SAN JUAN			
						_		DRILL	ING CO	THOD:AIR/H <sub>2</sub> O_ROTARY NTR.:MOTE_2 D:08/21/90 DATE_COMPLETED:08/21/90			
1//	1/4	<u> </u>	1/4	1.	/4 S	7		FIELD	REP .:	D: 08/21/90 DATE COMPLETED: 08/21/90 M. MOHORCICH rilled 10' east of bore 6 at NE corner of			
	<u> </u>								W	podsided shed. T.D. 50'			
LOCATIO	LOCATION DESCRIPTION: South of NM 64, East of County Road 5500, HNU Bkg = ,04 ppm												
DEPTH	LITH.	R E	S		RUN	1	SAMPLE		uscs	VISUAL CLASSIFICATION			
		C	М	#	FROM	10	1.0.	TYPE					
0							Split Spoon 0-9	bkg =	SM	Sand, f-med gr, dusky yel 5Y 6/4, unconsolidated, slily moist, poorly sorted.			
Ì		1						.04 ppm		Color change to drk yelsh brn 10 YR 4/2 at 12-16.			
5													
10			ļ ·										
									ļ ļ				
4.5							14-16	1.6					
15									İ				
							19-21	1	]	,			
20					1				<b>[</b>				
25							24-26	1.6	sc	Clayey sand, 24-29, clayey sand, drk yelsh brn 10 YR 4/2, sandy clay balls coming to surface.			
									}				
30							29-31	1.4	SM	<u>Sand</u> , split 29-31 - med gr, dusky yel 5Y 6/4,			
30			į							poorly sorted w/ H <sub>2</sub> O at 30'.			
35								1	sw	Cobbly sand, 35-40, med gr, 1/2-1" cobbles.			
40									SM	Sand, 40-50'			
										med gr sand, dusky yel, 5Y 6/4, poorly sorted. T.D. at 50'			
45								1		Comment: HNU readings were taken at Bore 6~			
"										5' east of SHS-16 w/ hollow stem auger split spoon.			
50		4				1	1						

SHS-4 •)	
SHS-1 ● SHS-9 SHS-8 ●	BH-3 BLM-37 SHS-2 ABH-4
	<b>*</b> вн-2
SHS-6 ● BH-1 ▲	the court was seen and the court of the court

	rage
SITE ID: OFFSITE GIANT LOCATION ID: SHS-	BH1
SITE COORDINATES (ft.):	
NE	
GROUND ELEVATION (ft. MSL):	
STATE: NEW MEXICO COUNTY: SAN JUAN	
DRILLING METHOD: HOLLOW STEM AUGER	
DRILLING CONTR.: WESTERN TECH INC.	
DATE STARTED: 04/23/90 DATE COMPLETED:	04/23/90
FIELD REP.: MARTIN NEE, KYLE SUMMERS	
COMMENTS:	

DEDTU	LITH.	R	S		RUN		SAMPLE		USCS	VICUAL CLASSIFICATION
DEPTH	LIIH.	C	A	#	FROM	TO	I.D.	TYPE	USUS	VISUAL CLASSIFICATION
5							3' 6'-21'			Sand, Dark yllsh brn 10 YR 4/2, v. fine to coarse sand, poorly sorted, unconsolidated, sub-angular, <10% fine pebble gravel.  Sand, Moderate yllsh brn, 10 YR 5/4, as above <5%
10										clay, <10% v. fine to coarse pebble gravel.
15										
20							211			Clayey sand, Dark ylish brn 10 YR 4/2, clay to medium unconsolidated, poorly sorted, sub-angular sand, 40% clay, 60% sand.
25							24'-40'			Sand same as 6'-21', cobbles at 39' hard drilling.
30										
35		<b>}</b>								
40	(///						40'-44'			Sand, greyish black N2, same as 24' out of cobbles at 45', 10% fine to coarse pebble gravel, 10% clay.
45							44'-45'			Sandy claystone, dark yllsh orange 10 YR 6/6, v. well consolidated. =10% v. fine sand.  TD = 45'
50										

LOCATION MAP	:			
	SHS-1 ◆ SHS-9 SHS-8 ◆	BH-3 BLM-37 BH-4	SHS-2	• 5HS-3
ene	BH-1 ▲	BH-2		
1/4	_1/41/4	1/4 S	T R	

SITE ID: OFFSITE GIANT LOCATION ID: SHS-BH2 SITE COORDINATES (ft.):
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 04/23/90 DATE COMPLETED: 04/23/90
FIELD REP.: MARTIN NEE, KYLE SUMMERS
COMMENTS:

Page <u>1</u> of <u>1</u>

		R	s		RUN		SAMPLE			WELL CLASSIFICATION
DEPTH	LITH.	E	M	#	FROM	TO	I.D.	TYPE	USCS	VISUAL CLASSIFICATION
0							0-5'			Sand, dark yllsh brn 10 YR 4/2 to mod yllsh brn 10 YR 5/4, unconsolidated, poorly sorted, sub-angular, v. fine to coarse. ≈10% clay, <5% gravel.
5							5-23'			Sand, moderate yllsh brn 10 YR 5/4, v. fine to coarse sand, poorly sorted, sub-angular to sub-rounded; minor fine pebble gravel, ≈10% mod to coarse pebble gravel at 13-20′.
10										
15										
20										
25							23-25'			Clayey sand, sand is dark yllsh brn 10 YR 4/2, clay is light olive gray 5 YR 5/2, sand is v. fine to coarse, poorly sorted, unconsolidated, sub-angular to sub-rounded.
30							25-36'			Clay, light olive gray 5 YR 5/2, mod consolidated.
35							36-38'			Clay, olive black 5 YR 2/1, HC odor, 12-5 ppm from cuttings.
40							38-41.5' 41.5-43'			Cobbles/sand - no cuttings.  Claystone, moderate brown 5 YR 4/4-5 YR 3/4, mod well consolidated.
45										TD = 43'
50										
ı L					J				}	

#### BOREHOLE LOG (SOIL) LOCATION MAP: Page <u>1</u> of <u>1</u> SITE ID: OFFSITE GIANT LOCATION ID: SHS-BH3 SITE COORDINATES (ft.):\_ **BH-3** SHS-1 ● BLM-37 SHS-2 GROUND ELEVATION (ft. MSL): **SHS-9** COUNTY: SAN JUAN STATE: NEW MEXICO SHS-8 . ◆SHS-3 DRILLING METHOD: HOLLOW STEM AUGER DRILLING CONTR.: WESTERN TECH INC. BH-2 BH-1▲ DATE STARTED: 04/23/90 DATE CO DATE COMPLETED: 04/23/90 SHS-6 . \_1/4\_ \_1/4\_ COMMENTS: LOCATION DESCRIPTION: South of NM 64, East of County Road 5500 S RUN SAMPLE DEPTH LITH. USCS VISUAL CLASSIFICATION Ε A # TYPE C М FROM TO 1.0. 0-31 Backfill dark yllsh brn 10 YR 4/2, 80% clay, 20% 0 v. fine to med sand, unconsolidated, sub-angular. <u>Sand</u>, mod yllsh brn 10 YR 5/4 - dk yllsh brn 10 YR 4/2, fine to med unconsolidated, sub-angular, sub-3-33' 5 rounded gravel (sparse) at 15ft. 10 15 20 25 30 33-361 Clayey Sand, dk ylish brn 10 YR 4/2, clay-40%, sand-60%, fine to med uncons., sub-angular sand. 35 <u>Sandy clay</u>, olive grey 5 Y 3/2 - moderate olive brn 5 Y 4/4, fine to med uncons sand, sbang, clay-70%, sand-30%, sparse, rd - subrd gravel. 36-384 40 Sandy clay, mod clive brn 5 Y 4/4, clay-80%, sand-20%. 38-45.54 45 45.51 Silty claystone, med blsh grey 5 B 5/1, consolidated. TD = 45.5'

50

#### BOREHOLE LOG (SOIL) ""Unway 64 Page <u>1</u> of <u>1</u> SITE ID: OFFSITE GIANT LOCATION ID: SHS-BH4 SITE COORDINATES (ft.); BH-3 SHS-1 . BLM-37 GROUND ELEVATION (ft. MSL): SHS-2 SHS-9 ABH-4 COUNTY: SAN JUAN STATE: NEW MEXICO • SHS-3 DRILLING METHOD: HOLLOW STEM AUGER BH-2 DRILLING CONTR .: WESTERN TECH INC. DATE STARTED: 04/23/90 DATE CO FIELD REP.: MARTIN NEE, KYLE SUMMERS SHS-6 . DATE COMPLETED: 04/23/90 1/4 1/4 COMMENTS:\_ 1/4 \_1/4 LOCATION DESCRIPTION: South of NM 64 East of County Road 5500 RUN SAMPLE LITH. uscs DEPTH E VISUAL CLASSIFICATION C M # FROM TO I.D. TYPE 0 0-51 Backfill, moderate yllsh brn 10 Y 5/4, sand-90%, rounded gravel-10%. v. fine-med sand. 5-23' 5 Sand, mod yllsh brn 10 Y 5/4, v. fine-coarse, subangular. 5% pebble size, sub-rounded gravel at 10'-23'. 10 15 20 Sandy clay, dk ylish brn 10 YR 4/2, sand-50%, clay-50%, v. fine - med sand, sub-angular. 23-30 25 30 30-374 Sandy clay, dk yllsh brn 10 YR 4/2, clay-70%, sand-30%. sand is fine. 35 <u>Silty clay</u>, olive gray 5 Y 3/2, silt to v.f. sand-10%, clay-90%. 37-41.54 41.51 Silty claystone, dusky yellow 5 Y 6/4, consolidated TD = 41.5' 45 50

В-	4.4	SHS	-14	SHS-15	Cty. Rd. 5468 (Meadow Lane)
<b>A</b>		4.	<b>A</b>	•	
	B-3	B-1	B-2		<del></del>
	-				
_	1/4	SW 1/4	NW 1/4	NW 1/4	S 27 T 29H R 12W

COMMENTS: County Road 5468, HNU background = 0 ppm

Page \_1 of \_1

LOCATION DESCRIPTION: South of NM 64, East of County Road 5500, down gradient from SHS-11

DERTH	1170	R	s		RUN		SAMPLE		usc <b>s</b>	VIEIN CLASSIFICATION
DEPTH	LITH.	C	H	*	FROM	70	1.0.	TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon	HNU bkg = 0 ppm	SM	0-25' <u>Sand</u> , unconsolidated, 10YR 4/2, poorly sorted, f-med gr, at 10' slight increase in sorting, med gr 10YR 5/4.
5							4-6	0		
10							9-11	0		
15							14-16	0		Increase in qtz grains, sub angular, w/ minor marble size pebbles.
20							19-21	0		
25							29-31	0	CL	25.0-25.1 and 29.4-29.6  Sandy clay, in sand as above 10 YR 5/4, mod consolidated.
30	///	X								33-34*
35							34-36	150	CH	Cobbly sand, at 33' Rig chattered & drk soil came up at 34' in minor cobbles.  34.4-35.5 blk HC stain in vry shrp contact in unconsolidated sand w/ H <sub>2</sub> O at 35.5'. Drilled to 34'.
40										Drilled to 34'.
45										
50										

B-4A	SHS	-14	SHS-15	Cty. Rd. 5468 (Meadow Lane)
<u> </u>	<u> </u>			
B-3	B-1	B-2		•
1/4	SW 1/4	<u>NH</u> 1/4	<u>NW</u> 1/4	S 27 T 29N R 12W

Page <u>1</u> of <u>1</u>
SITE ID: OFFSITE GIANT LOCATION ID: BORE 2
SITE COORDINATES (ft.): 100' EAST OF BORE 1
NE
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 08/13/90 DATE COMPLETED: 08/13/90
FIELD REP.: M. MOHORCICH
COMMENTS: County Road 5468, HNU background = 0 ppm

DEPTH	LITH.	R			R E	S		RUN		SAMPLE		uscs	WIDIAL CLASSICATION
DEFIN	Liin.	C	A	#	FROM	10	1.0.	TYPE	DSCS	VISUAL CLASSIFICATION			
0							Split spoon 4-6'	HNU bkg ≖ 0 ppm	SM	<u>Sand</u> , unconsolidated, poorly sorted, 10YR 5/4, mod yelsh brn. f to medium gr.			
5										9' rig chattered through some cobbles.			
10							9-111	bkg	sc	Clayey sand, 9.5-10.0' 5" of clayey sand where sand is finer grained than rest of split.			
15							14-16'	bkg		14.4-15.0 <u>Clayey sand</u> , f gr 15.5-15.7 2" of clayey sand - f gr drilled 16-19 just loose sand.			
20							19-211	bkg		19.0-19.4 = Clayey sand w/ poorly sorted, dusky yel 576/4, lighter colored, unconsolidated sub ang, sub rounded sand.			
25							24-26'	bkg	GM	Cobbly sand, drilling at 25 small cobble layer. 24-26 split came out sand as above.			
30							29-311	bkg	SM	26-34 Sand, moist at 30.5 but same as above. 5 Y 6/4.			
35							34-36'			T.D at 34' H <sub>2</sub> D at 35' in sand as above, w/ no HC stain or odor.			
40													
45													
50													

<u>B:</u>	4 A	SHS	- 14	SHS-15	Ciy. Rd. 5468 (Meadow Lane)
<u> </u>		40			
	B-3	B-1	B-2		
_	1/4	SW 1/4	<u>NW 1/4</u>	NW 1/4	S 27 T 29H R 12W

SITE ID: OFFSITE GIANT LOCATION ID: BORE 3
SITE COORDINATES (ft.): 175' East of Lee Acres Rd.
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 08/14/90 DATE COMPLETED: 08/14/90
FIELD REP.: M. MOHORCICH
COMMENTS: County Road 5468; HNU bkg .04 ppm

Page <u>1</u> of <u>1</u>

	R				RUN		SAMPLE			
DEPTH	LITH.	E	H	#	FROM	10	1.0.	TYPE	usc <b>s</b>	VISUAL CLASSIFICATION
0							Split Spoon 4-6'	HNU 5kg= .04	SM	0-5 <u>Sand</u> , mod yelsh brn 10 YR 5/4, poorly sorted, unconsolidated.
5	,,,,							ppm		5.0-5.5: <u>Clayey sand</u> , w/ f gr sand.
10							9-11		SM	5.5-27 <u>Sand</u> , very loose sand dusky yellow 5Y 6/4. Only 1/2 of a split.
15							14-16	17		
20			1				19-21	20		Minor cobbles at 19.5. Very loose sand med grained subangular same as above.
25							24-26	20	GL ML	Cobbly sand, minor cobble layer at ~27-28.  Sandy clay, 1" of sandy clay at 24.7-24.8.
30							29-31	25	SM	Sand, minor cobbles at 30' in drilling.
35	7//						34-36	130		at 33' color change to mod brn 5YR 3/4, soil at 34 cuttings seemed to smell of HC as they came up through hole.  HC stain at 34.3'-35.75 - olive gry 5Y 3/2,  H <sub>2</sub> 0 at 35'. At 35.7 color changes back to light olive gry 5Y 5/2.  At 34.3 sharp contact w/ stain, sand v f gr.
40									CL	Clay, 4" clay at 35.2-35.6. T.D at 36'.
45										
50										

		B-4B	SHS	14	SHS-15	(A
SHS	B-4A	B-3	<b>≜</b> • B-1	<b>≜</b> B-2		
 1/4	_ <u>sw_</u> 1/4	4 <u>NV</u> 1/4	<u>NW</u> 1/4	s <u>27</u>	T_29N_R_12	<u>.</u>

LOCATION DESCRIPTION: South of NM 64, East of County Road 5500 on County Road 5468

DEPTH	LITH.	R E	S		RUN		SAMPLE	{	uscs	VICUAL PLACELETRATION
DEFIN	LIIM.	C	H	#	FROH	то	1.D.	TYPE	Daca	VISUAL CLASSIFICATION
0							Split Spoon 0-4	HNU bkg= .02	SM	0-6 Sand, unconsolidated, dusky yel 5Y 6/4. f-med gr sand, poorly sorted.
5							4-9	ppm	CL	6-19 Clayey sand, darker yel brn 10YR 4/2, moist w/ increase in cly content. Sand is still f-med gr.
10							9-14			Color back to 5Y 6/4 and lose clay. Same as above, slightly moist.
15							14-19	bkg		Same as above.
20							19-24	bkg	GC	19-25 <u>Cobbly sand</u> , few 1/2-3/4" cobbles mod yel brn 10YR 5/4, f-med gr, slily moist, unconsol.
25							24-24	bkg	SM	At 25 rig chattered w/ minor small cobbles. Same as above. 25-34: <u>Sand</u>
30							29-34	>20		Same as above w/ a little darker yel brn 10YR 4/2.
35										T.D. at 34 and tripped out of hole due to stain and odor of soil.
40										
45										
50										

B-4B		SHS	-14	SHS-15	Cty. Rd. 5468 (Meadow Lane)
<b>A</b>		40	<b>A</b>	• .	
	B-3	B-1	B-2		
					- <del></del>
	1/4	SW 1/4	NW 1/4	NW 1/4	S 27 T 29N R 12W

Page <u>1</u> of <u>1</u>
SITE ID: OFFSITE GIANT LOCATION ID: BORE 4B
SITE COORDINATES (ft.): 75' east of Lee Acre Road
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 08/14/90 DATE COMPLETED: 08/14/90
FIELD REP.: M. MOHORCICH
COMMENTS: HNU background = .04 ppm

DEDTH	1.77	4 20	S		RUN		SAMPLE		Hece	VICUAL CLASCIFICATION
DEPTH	LITH.	C	A	#	FROM	то	I.D.	TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon	HNU bkg= .04 ppm	SM	0-10' S <u>and,</u> unconsolidated, mod yelsh brn 10YR 5/4, med gr, poorly sorted.
5							4-6	207		
10							9-11	207	sc	10.2-10.3 <u>Clayey sand</u> , f gr sand drk yelsh brn 10YR 4/2.
15							14-16	407	SM	10.3-15 'Sand, same as above w/ abundant qtz gr and minor amounts of small pebbles, alternating f-med gr.
20							19-21	307	SC SM	15-15.3 <u>Clayey sand</u> , moist, f gr. 15.3-19.4 <u>Sand</u> , same as above alternating f-med gr unconsolidated.
25							24-26	257	SC	19.4-20 <u>Clayey sand</u> , f gr, mod consolidated.
30							29-31	No Sample	}	20-31 <u>Sand</u> , f-med alternating graded sands.
									GC	31-32 <u>Cobbly sand</u> , 1/4" cobbles w/ minor amounts fe stain, mod consolidated.
35							34-36	1007	SM	32-39 <u>Sand</u> , 10YR 5/4, med gr, H <sub>2</sub> 0 at~35.
40	-						,			Comment: KMU readings were taken after and during a rain in which the lamp may have gotten wet. No stain or odor was observed in samples.
45										
50										

		Cus					
8-8		A•	S-16 		<u> </u>		
	B-7	B-6	B-5	B-9	B-10	В	
1/4	<u>su</u> 1/4	<u>NU</u> 1/4	<u>NW</u> 1/4	\$ <u>27</u> T_	29N R 12W		

SITE	1D: C	FFSIT	E GIANT		LOCATI	ON ID:	BORE	5	
			(ft.):_						
N					E				
GROUN	D ELEV	ATION	(ft: MS	L):					
STATE	: NEV	MEX!	co	&	JHTY:	SAN JUAN	1		
DRILL	ING ME	THOO:	HOLLOW	STEM	AUGER				
DRILL	ING CO	WTR.:	WESTER	N TECI	INC.				
DATE	STARTE	D: 0	8/14/90		DATE	COMPLET	ED:_	08/14/90	
FIELD	REP.	<u>M.</u>	MOHORCI	CH					
COMME	HTS:_	Down	gradient	from	Bore 1	, County	/ Roa	d 5470	
		HHILL L	ackacoup	d = 1	1/ ~~				

Page <u>1</u> of <u>1</u>

LOCATION DESCRIPTION: South of NM 64, East of County Road 5500, 290' East of Lee Acres Road

DEPTH	LITH.	R E	S		RUN		SAMPLE		uscs	VISUAL CLASSIFICATION
DEFIN	Litte.	C	Ĥ	#	FROM	70	1.0.	TYPE	USES	VISUAL ELASSIFICATION
5							Split spoon 4-6'	HNU bkg= .04 ppm none	SM	0-9.4 <u>Sand</u> , moist, w/ clay from 5.10-5.12.
10							9-11	207	CL SM	9.4-9.6 <u>Clay</u> , 2" clay w/ f gr sand. 9.6-11.0 <u>Sand</u> , mod gr, dusky yel 5Y 6/4, sandf w/ abundant qtz, poorly sorted.
15							14-16			14-16 is dry yel brn 10YR 4/2. Clayey sand f gr sand mod-well indurated.
20							19-21	30?	GC CL	16-19 <u>Clayey sand</u> , drilling is clayey sand. 19-20.4 clayey sand as above. 23-24 <u>Cobbly sand</u> , drill cobbles.
25							24-26		CL CL SM	24-24.3 <u>Clayey sand</u> , 10YR 4/2. 24.3-24.7 <u>Clay</u> , very well indurated. 24.7-26 <u>Sand</u> , 10YR 5/4. Moist, v f gr.
30							29-31	407	CL SM	29.0-29.6 <u>Clayey sand</u> , 10YR 4/2, well indurated. 29.6-31 <u>Sand</u> , very sharp contact w/ med-coarse dusky yel 5Y 6/4, very moist at bottom.
35							34-36			H <sub>2</sub> O at 34.4 34.0-34.4 Sand, med gr, sharp contact. 34.4-35.10 Clay, sat, drk yelsh brn 10YR 4/2. 35.10-36.0 Very hard claystone top of naclemento? brn. 10YR 4/2. T.D. at 36'
40										Comment: HNU seems to be giving false readings, no evidence of staining in samples.
45										
50										

		SH:	S-16			
B-8 🛦	<b>≜</b> B-7	<b>≜</b> • B-6	<u>Α</u> β-5	B-9	<b>≜</b> B-10	
1/4	<u>sw</u> 1/4	<u>NW</u> 1/4	NW 1/4	\$ <u>27</u> T_2	29N R 12W	

SITE ID: OFFSITE GIANT	LOCATION ID: BORE 6
SITE COORDINATES (ft.):	
N	E
GROUND ELEVATION (ft. MSL)	
STATE: NEW MEXICO	COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW S'	TEM AUGER
DRILLING CONTR.: WESTERN	TECH INC.
DATE STARTED: 08/14/90	DATE COMPLETED: 08/14/90
FIELD REP .: M. MOHORCICH	
COMMENTS: HNU bkg = .06 p	on .

Page <u>1</u> of <u>1</u>

LOCATION DESCRIPTION: South of NM 64, East of County Road 5500, 190' East of Lee Acres Road on County Road 5470

DEPTH	LITH.	RE		S		RUN		SAMPLE		usc <b>s</b>	VICIAL CLASSIFICATION
DEFIN	Liin.	C	A	*	FROM	то	1.0.	TYPE	0313	VISUAL CLASSIFICATION	
0							Split Spoon 4-6	ыни 6kg= .06 ррп	SM	0-9 <u>Sand</u> , unconsolidated, mod yelsh brn 10YR 5/4 f grn, poorly sorted.	
5	, איני						9-11		sc	9-24.5 <u>Clayey sand</u> , 2,1" cobbles among clayey sand, f gr mod yelsh 10YR 5/4.	
(0										Cuttings from 11-14 changed color to a darker shade of brn.	
15							14-16			Split 14.2-14.5 Clayey sand, moist dusky yelsh 5Y 6/4. 14.5-16 abundant qtz grs med gr, poorly sorted, unconsolidated.	
20							19-21	bkg		19.3-19.7' Clayey sand, w/ some blk organic? streaks. 19.7-21 f gr sand. Unconsolidated. 5Y 6/4. Drill cuttings 21-24 were drker & looked like clay.	
25							24-26	bkg	SM	Split 24.0-24.5 Clayey sand, mod consolidated.  24.5-29 <u>Sand</u> , med to coarse sand, abundant qtz.	
										25.8-26 f gr sand, dusky yel 5Y 6/4.	
30									\$C	29.0-29.4 <u>Clayey sand</u> , mod consolidated. 29.4-31 <u>Sand</u> , med-coarse w/ abundant qtz, unconsolidated, H <sub>2</sub> 0 at 30.1'. T.D. at 31'.	
35											
40											
45											
50											

		SH	S-16		
B-84	<u> </u>	7 B-6	<b>≜</b> B-5	<u>A</u> B-9	<b>A</b> B-10

	Page <u>1</u> of <u>1</u>
SITE ID: OFFSITE GIANT L	OCATION ID: BORE 7
SITE COORDINATES (ft.):	
N	E
GROUND ELEVATION (ft. MSL):	
STATE: NEW MEXICO COUN	TY: SAN JUAN
DRILLING METHOD: HOLLOW STEM A	UGER
DRILLING CONTR .: WESTERN TECH	INC.
DATE STARTED: 08/14/90	DATE COMPLETED: 08/14/90
FIELD REP.: M. MOHORCICH	
COMMENTS: HNU bkg = .06 pom	

LOCATION DESCRIPTION: South of NM 64, East of County Road 5500, 90' East from Lee Acres Rd.

DEDTU		R	S		RUN		SAMPLE	,	,,,,,,,,	115111 BLACOSTIDATION
DEPTH	LITH.	E	H	#	FROM	TO	1.0.	TYPE	บรตร	VISUAL CLASSIFICATION
0							Split Spoon 4-6	HNU bkg= .06	SM	0-14 <u>Sand</u> , unconsolidated, moist, mod yelsh brn 10YR 5/4 poorly sorted.
5							·	<del>bb</del> w		4-5 f gr. 5-6 med gr.
										4-6 moist, f gr, unconsolidated. Same as above color.
10							9-11			
15	//						14-16		sc	14.2-20.3 <u>Clayey sand</u> , mod consolidated. 15.5-15.8 Clayey sand, mod consolidated w/ rest as med gr sand.
20							19-21		SM	19.4-20.3 Clayey sand, mod consolidated f gr sand 10YR 4/2. 20.3-24.2 <u>Sand</u> , med gr sand 10YR 5/4.
25	,כקק.						24-26	bkg	SC SM	24.0-24.2 Sand med. 24.2-25.2 <u>Clayey sand</u> , w/ last 1" w/ brn 5YR 4/4 med brn organic. 25.2-29 <u>Sand</u> , med grnd.
30							29-31	bkg	SC SM	29.0-29.5 <u>Clayey sand</u> , fr gr, 10YR 4/2, moist. 29.5-34 <u>Sand</u> , dusky yel 5 YR 6/4. Abundant qtz, d
35							34-36	bkg	SC SM	34-36 is wet, saturated. H <sub>2</sub> 0 between 31-34. 34-34.5 <u>Clayey sand</u> 34.5-38 <u>Sand</u> , sand w/ interbedded clays, organic pale brn 5YR 5/2. T.D. 38'
40						   				
45										
50										

	:					
1 '			SHS-16	<u> </u>		
B-8	3 ▲	<b>A</b>	4.	<b>A</b>	<b>A</b>	
	$\overline{}$	B-7	B-6	B-5	B-9	B-10
 1/4	SW 1/4	NW 1/	4 <u>NW</u> 1/4	s <u>27</u>	T_29N_R_	12 <u>w</u>

Page 1 of 1

SITE ID: OFFSITE GIANT LOCATION ID: BORE 8

SITE COORDINATES (ft.): E

GROUND ELEVATION (ft. MSL):

STATE: NEW MEXICO COUNTY: SAN JUAN

DRILLING METHOD: HOLLOW STEM AUGER

DRILLING CONTR.: WESTERN TECH INC.

DATE STARTED: 08/14/90 DATE COMPLETED: 08/14/90

FIELD REP.: M. MOHORCICH

COMMENTS: HNU bkg = .06 ppm

LOCATION DESCRIPTION: South of NM 64, Intersection of County Road 5500 and County Road 5470

		R	s		RUN		SAMPLE			
DEPTH	LITH.	E	A M	#	FROM	10	1.D.	TYPE	uscs	VISUAL CLASSIFICATION
0							Split Spoon 4-6'	HNU bkg= .06 ppm	SM	0-25.5 <u>Sand</u> , loose unconsolidated minor 1" cobbles throughout. Dusky yellow 5YR 6/4 med gr.
10							9-11			Sand same as above, minor cobbles at 9.3'.
15							14-16	bkg		Same as above, 5Y 6/4, loose, med gr, same as above no cobbles.
20							19-21	bkg		Same as above.
25							24-26	bkg	sc	24-25.5 Same as above. 25.5-26 <u>Clayey sand</u> , moist mod consolidated light olive gry 5Y 5/2, very f sand.
30							29-31	bkg	SM SC SM	29-29.9 <u>Sand</u> , loose w/ small pebbles. 29.9-30.4 <u>Clayey sand</u> , med indurated. 30-36 <u>Sand</u> , moist but not saturated sand 5Y 6/4 f gr.
35							34-36	bkg		M.O at 35', sand loose w/ cobbles at 35-35.11 16 clay plug at 36' drk yelsh brn 10YR 4/2. T.D. at 36'
40										
45										
50										

		SHS-	16		
B-8 🛕	<b>≜</b> B-7	<b>A</b> • B-6	<b>≜</b> B-5	A B-9	<b>≜</b> B-10
1/4	_su_1/4_	NW 1/4	NW 1/4	S 27 T 1	29N R 12W

	Page <u>1</u> of <u>1</u>
SITE ID: OFFSITE GIANT LOCAT	ION ID: BORE 9
SITE COORDINATES (ft.):	
N E	
GROUND ELEVATION (ft. MSL):	
STATE: NEW MEXICO COUNTY:	SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER	
DRILLING CONTR .: WESTERN TECH INC.	
DATE STARTED: 08/15/90 DATE	E COMPLETED: 08/15/90
FIELD REP .: M. MOHORCICH	
COMMENTS: HHU bkg = .04 ppm	

LOCATION DESCRIPTION: South of NM 64, East of County Road 5500, 100' East of Bore 5

DEPTH	LITH.	R E	S		RUN		SAMPLE		uscs	VISUAL CLASSIFICATION .
DEPIR	Liin.	C	A M	#	FROM	10	1.0.	TYPE	uscs	VISUAL CLASSIFICATION .
0							Split Spoon 4-6	HNU bkg = .04 ppm	SM	0-10 <u>Sand</u> , mod yel brn 10YR 5/4, f gr, mod consolidated, poorly sorted, dry.
5							·			
10							9-11		GC SM	10-11 <u>Cobbly sand</u> , drilling hit cobbles at 10-11 loose sand w/ 1" cobbles at 10, abundant qtz garins, med gr 5Y 6/4 dusky yel. 11-19.7 <u>Sand</u> , 14.0-14.5 sand as above.
15							14-16			14.5-16 finer gr sand, moist, mod consolidation. no stain or odor.
20							19-21	bkg	sc	19.5-19.7 sand, med gr. 19.7-20.0 <u>Clayey sand</u> , moist, mod consolidated. 20-29.3 <u>Sand</u> , dusky yel 5Y 6/4 mod-coarse gr, dry. unconsolidated, no stain.
25							24-26	bkg		24.0-25 loose, mod yel brn 10YR 5/4, w/ cobbles at 25.0  25.0-26 dusky yel 5Y 6/4, possible smell to me?
30							29-31	bkg	sc	29.0-29.3 med gr sand. 29.3-29.6 <u>Ctayey sand</u> 29.6-31 <u>Sand</u> , med-coarse gr 5Y 6/4. H <sub>2</sub> 0 at 30.9' T.D. at 31'
35										
40										
45										
50										

				Cty, Rd. 5470 (Sage Street)
<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	
B-5	B-9	B-10	B-11	

	Page <u>1</u> of <u>1</u>
SITE ID: OFFSITE GIANT	LOCATION ID: BORE 10
SITE COORDINATES (ft.):	
N	E
GROUND ELEVATION (ft. MSL):_	
STATE: NEW MEXICO CO	DUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEN	4 AUGER
DRILLING CONTR.: WESTERN TEC	CH INC.
DATE STARTED: 08/15/90	DATE COMPLETED: 08/15/90
FIELD REP.: M. MOHORCICH	
COMMENTS: 100' East of Bore	e 9
HNII = 06 bkg	

LOCATION DESCRIPTION: South of NM 64, East of County Road 5500, on County Road 5470

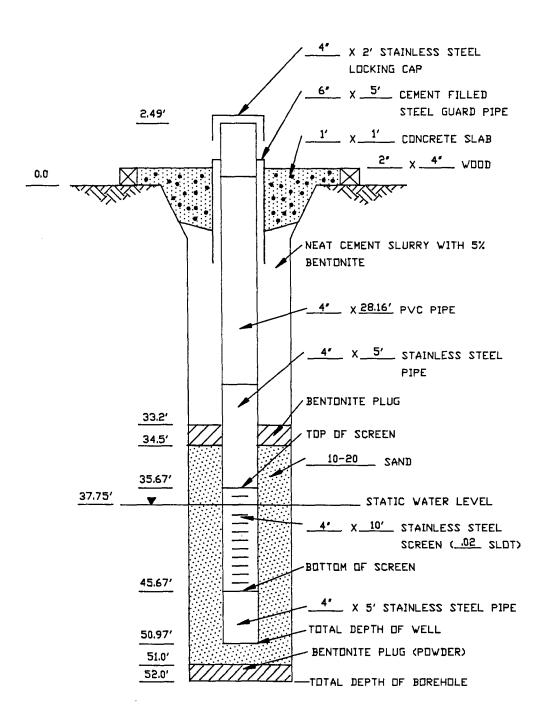
DEPTH	LITH.	R E	S		RUN		SAMPLE		uscs	VISUAL CLASSIFICATION
DE! !!!	£21	c	Ĥ	*	FROM	10	1.D.	TYPE	0303	VISUAL CENSSIFICATION
5							Split Spoon 4-6	HNU bkg = .06 ppm	SM CL SM	0-4.9 Sand 4.0-4.5 very loose f gr grysh or 10YR 7/4. 4.5-4.9 med gr sand mod consolidated, moist. 4.9-5.4 Clayey sand, f gr. 5.4-9.6 Sand 5.4-6 mod yelsh brn 10YR 5/4.
10	///						9-11	bkg	CL SM	9-9.6 f gr sand, dry. 9.6-11 <u>Clayey sand</u> , moist, 10YR 4/2, mod consolidated. 11-14.6 <u>Sand</u> , drilling 12' cuttings came up darker,
15	///						14-16	bkg	CL SM	but still fast drilling. 14.0-14.6 f gr sand. 14.6-15.3 <u>Clayey sand</u> , moist, mod-well consolidated. 15.3-19 <u>Sand</u> , med grain, loose 5Y 6/4 dusky yel,
20							19-21	bkg	GC SM CL	moist 19.0 <u>Cobbly sand</u> 19-20.1 <u>Sand</u> , unconsolidated, med to coarse gr abundant qtz, poorly sorted, moist. 20.1-30 <u>Clayey sand</u>
25							24-26	bkg		20.1-24.0 very fine gr, mod-well consolidated. 24.0-24.3 moist clayey sand w/ small size qtz pebbles. 24.3-25.8 med gr, moist sand 5Y 6/4. 25.8-26 clayey sand, moist.
30							29-31	bkg	SM	29-29.5 f gr clayey sand. H2O at 29.5' 29.5-30 saturated clayey sand. 30-31 <u>Sand</u> , med-coarse gr sand, saturated. T.D. at 31'
35										
40										
45										
50										
	Į					ļ			1	1

·			. ,	Cty, Rd. 547 (Sage Street			
3-5	4	B-9	<b>≜</b> B-10	<b>A</b> B-11			
				·			
	1/4	SU 1	/L NN 1/L	NU 1/4	\$ 27 T 20N P 12U		

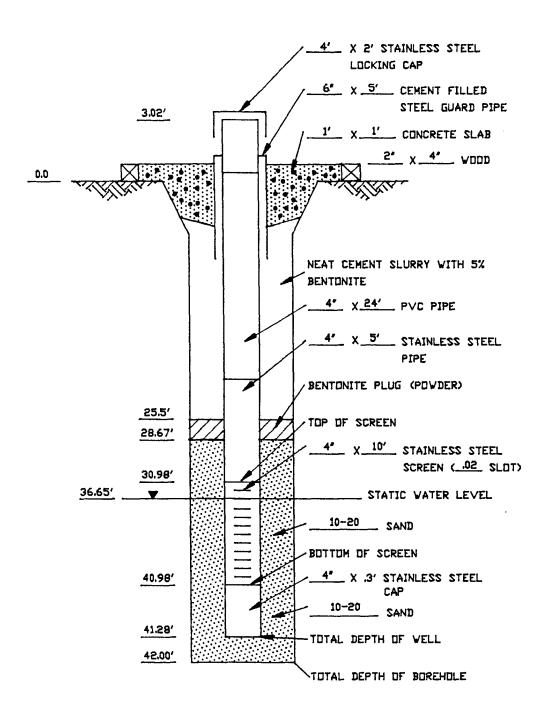
ATT IN ATTAINS ALLEY LAST IN DON'S A
SITE ID: OFFSITE GIANT LOCATION ID: BORE 11
SITE COORDINATES (ft.):
NE
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 08/16/90 DATE COMPLETED: 08/16/90
FIELD REP.: M. MOHORCICH
COMMENTS: HNU bkg = .04 ppm
6 5/70 10 1 5/64

Page <u>1</u> of <u>1</u>

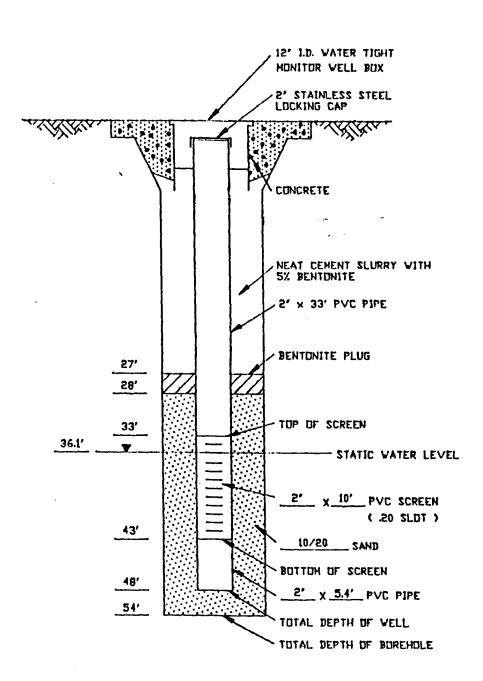
Lenzu.		R	s		RUN		SAMPLE		11000	VICUAL SIACOLFICATION
DEPTH	LITH.	E	A	#	FROM	TO	I.D.	TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 4-6	HNU bkg = .04 ppm	SM	O-6' Sand split 4-6', unconsolidated, med-coarse gr, moist, abundant qtz, poorly sorted, dusky yel 5Y 6/4, w/ minor amount pebbles.
5									GL SM	6-7 <u>Cobbly sand</u> , drilling at 6 chattered w/ cobbles, small. 7-14 <u>Sand</u> split 9-10.0 empty.
10							9-11	bkg		10-11 moist, sand as above.
15							14-16	bkg	CL	14.0-14.4 sand as above. 14.4-14.10 <u>Clayey sand</u> , med gr clayey sand, drk yel brn 10YR 4/2.
20							19-21	bkg	SM	15.0-24.5 <u>Sand</u> 19-19.5 no sample. 19.5-21 - mod-coarse, moist, loose 5Y 6/4.
25							24-26	bkg	CL	24-24.5' sand as above. 24.5-25 - <u>Clayey sand</u> , moist 25-25.9 <u>Sand</u> , 5Y 6/4 loose, med gr, moist. 25.9-29 <u>Clay</u> , moist, sandy clay, H2O table is close.
30							29-31			drilling 26-29 wet clay H <sub>2</sub> 0 in sandy clay: H <sub>2</sub> 0 ≈27-29.
35										
40										
45										
50										
							<u> </u>		<u> </u>	



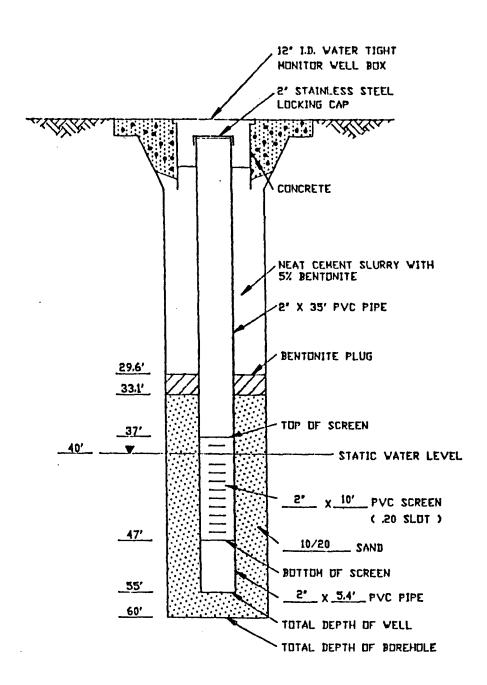
COMPLETION DIAGRAM SHS-1



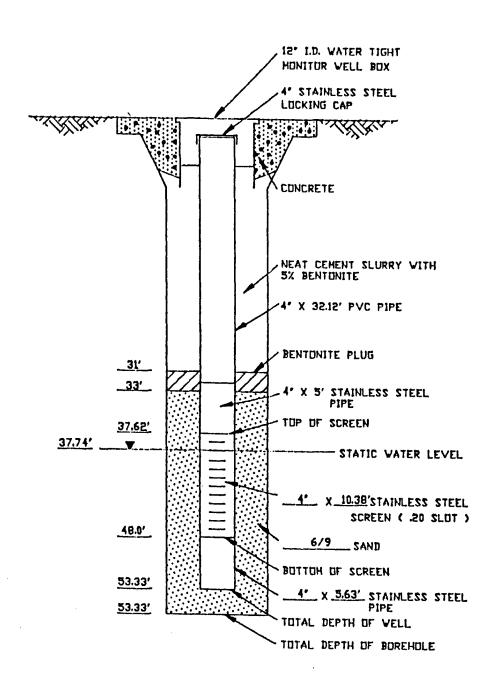
COMPLETION DIAGRAM SHS-2



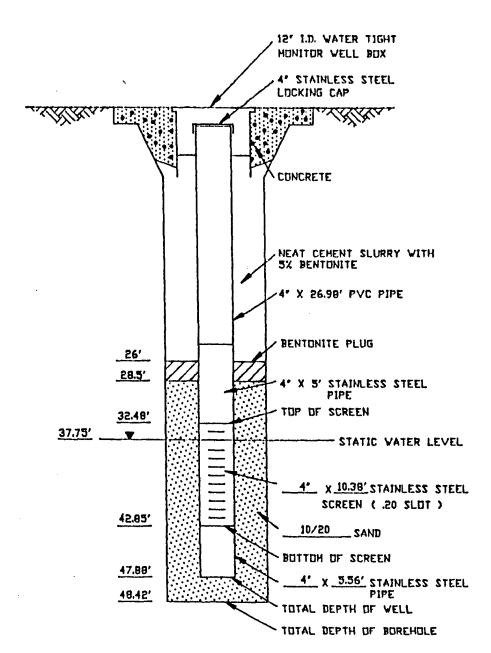
SUBGRADE COMPLETION DIAGRAM SHS-3



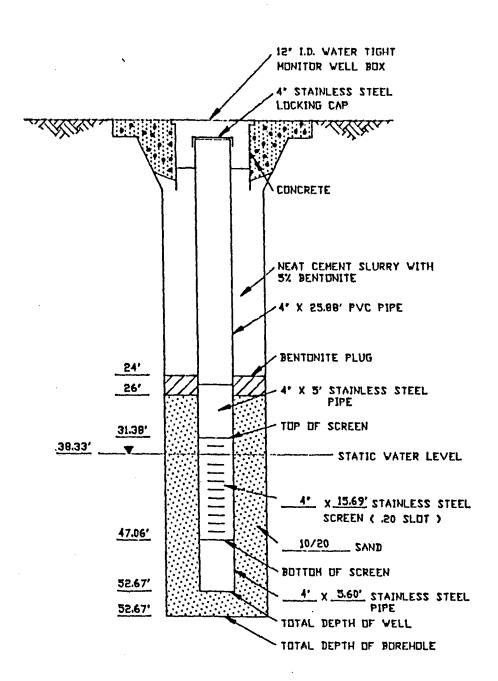
SUBGRADE COMPLETION DIAGRAM SHS-4



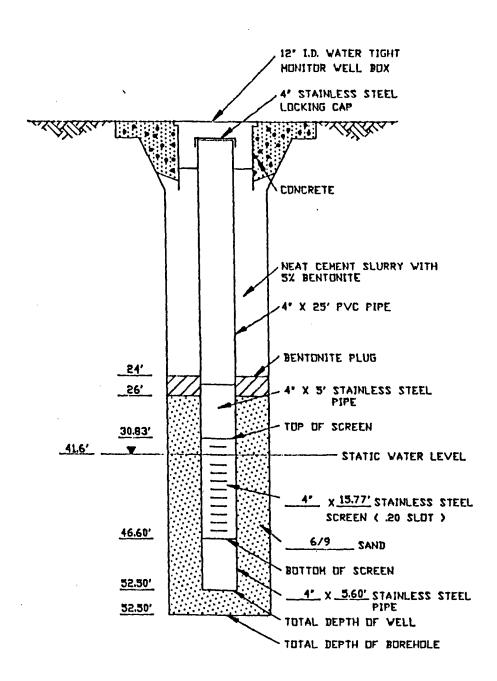
SUBGRADE COMPLETION DIAGRAM SHS-5



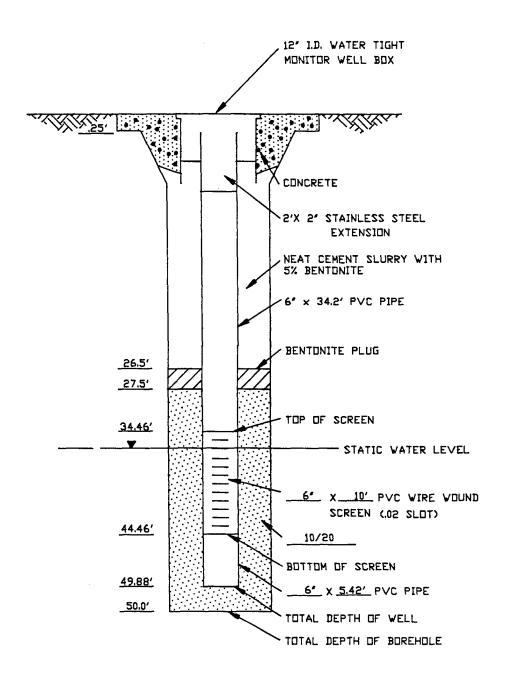
SUBGRADE COMPLETION DIAGRAM SHS-6



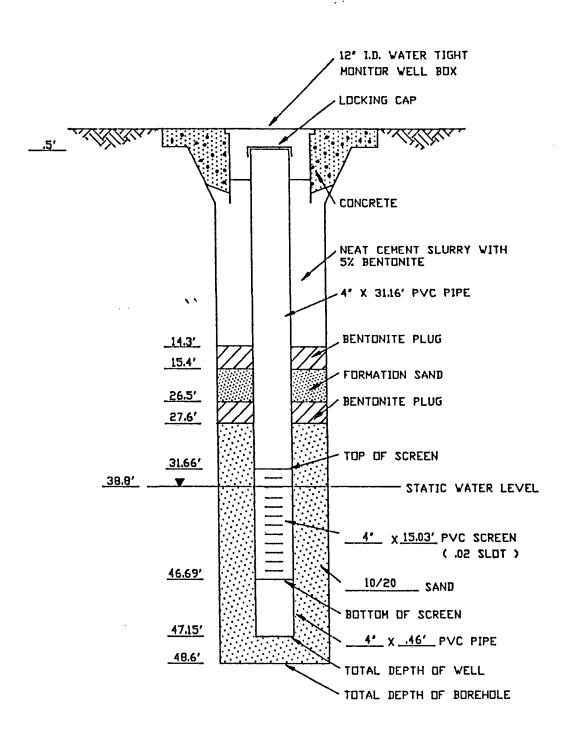
SUBGRADE COMPLETION DIAGRAM SHS-7



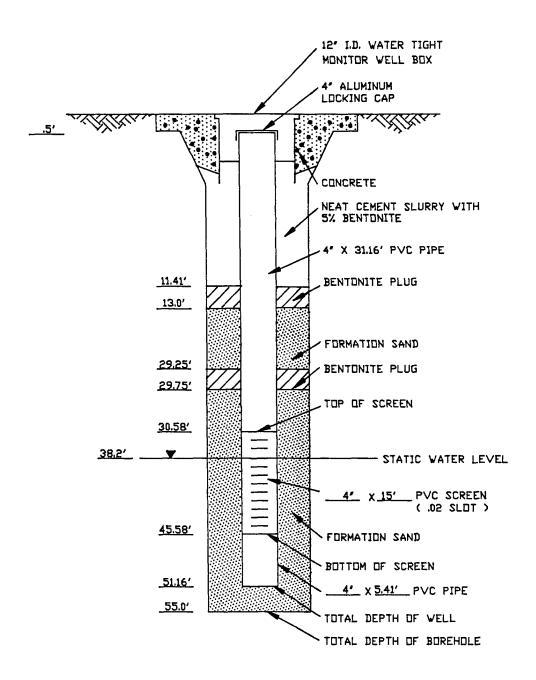
SUBGRADE COMPLETION DIAGRAM SHS-8



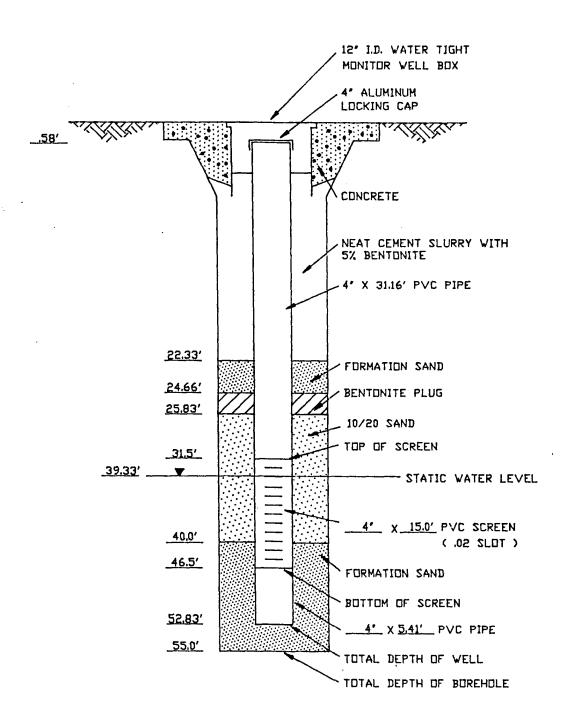
SUBGRADE COMPLETION DIAGRAM SHS-9



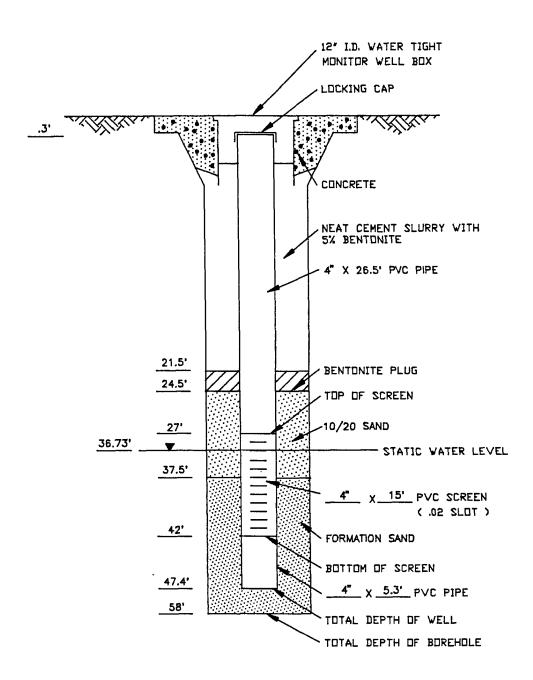
SUBGRADE COMPLETION DIAGRAM SHS-10



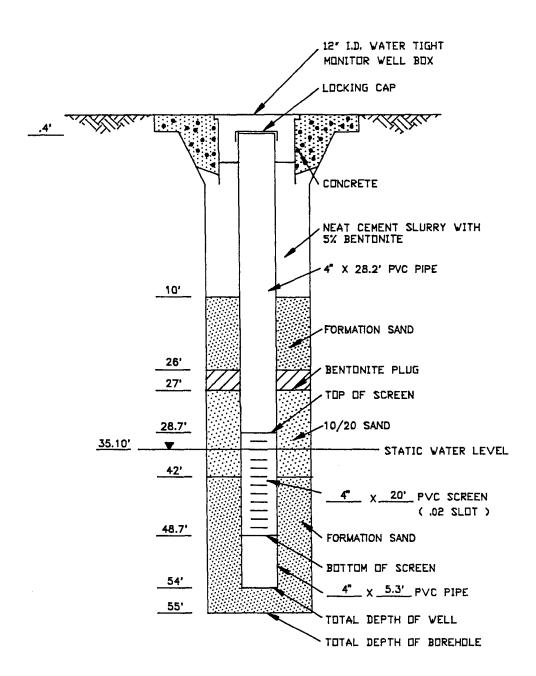
SUBGRADE COMPLETION DIAGRAM SHS-11



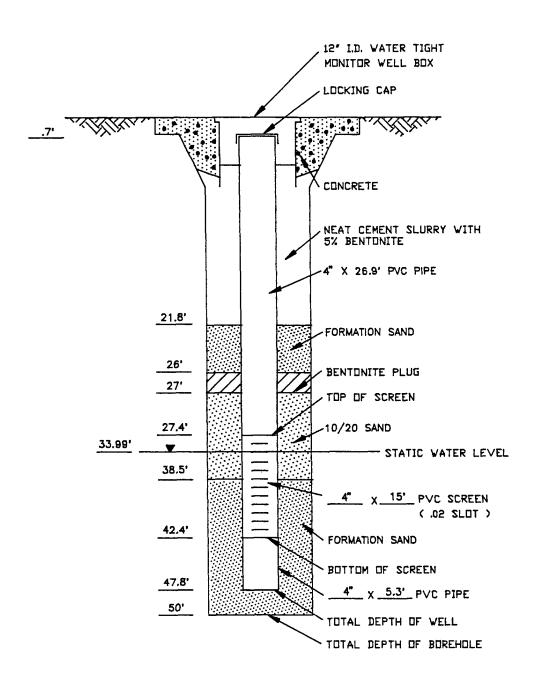
SUBGRADE COMPLETION DIAGRAM SHS-12



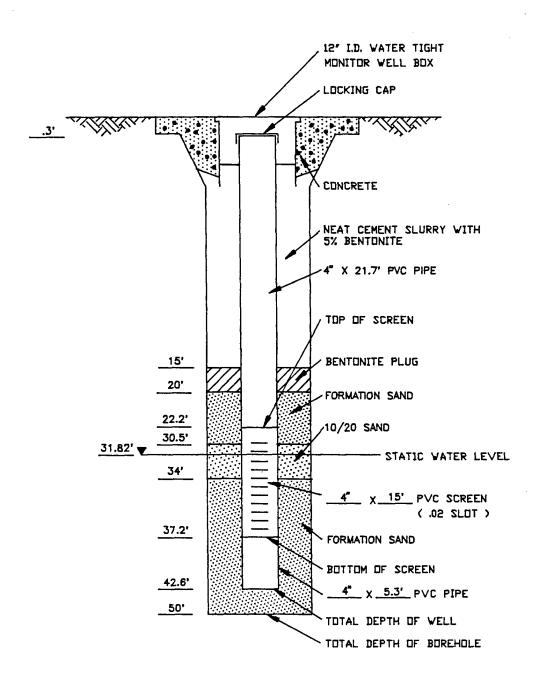
SUBGRADE COMPLETION DIAGRAM SHS-13



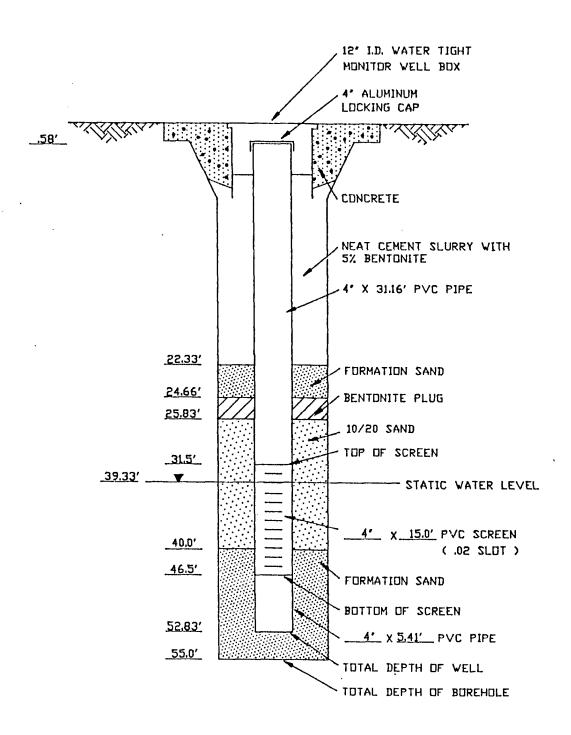
SUBGRADE COMPLETION DIAGRAM SHS-14



SUBGRADE COMPLETION DIAGRAM SHS-15



SUBGRADE COMPLETION DIAGRAM SHS-16



SUBGRADE COMPLETION DIAGRAM SHS-12

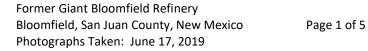




Photograph 1: SHS-6.



Photograph 2: SHS-8







Photograph 3: SHS-10



Photograph 4: SHS-12



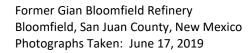




Photograph 5: SHS-14



Photograph 6: SHS-15







Photograph 7: SHS-16



Photograph 7: SHS-17





Photograph 7: SHS-18



Photograph 7: SHS-19







Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

December 10, 2019

Stuart Hyde

Western Refining Southwest, Inc.

#50 CR 4990

Bloomfield, NM 87413 TEL: (505) 632-4135 FAX: (505) 632-3911

RE: GBR OrderNo.: 1911311

### Dear Stuart Hyde:

Hall Environmental Analysis Laboratory received 9 sample(s) on 11/7/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman

Laboratory Manager

andyl

4901 Hawkins NE

Albuquerque, NM 87109

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-50

 Project:
 GBR
 Collection Date: 11/5/2019 10:30:00 AM

 Lab ID:
 1911311-001
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed Batch
EPA 200.8: METALS						Analyst: <b>ELS</b>
Antimony	ND	0.0010		mg/L	1	11/18/2019 2:17:30 PM 48803
Arsenic	ND	0.0010		mg/L	1	11/18/2019 2:17:30 PM 48803
Copper	0.0024	0.0010		mg/L	1	11/18/2019 2:17:30 PM 48803
Lead	0.00096	0.00050		mg/L	1	11/18/2019 2:17:30 PM 48803
Selenium	0.0083	0.0010		mg/L	1	11/18/2019 2:17:30 PM 48803
Thallium	ND	0.00050		mg/L	1	11/18/2019 2:17:30 PM 48803
SM2340B: HARDNESS						Analyst: <b>bcv</b>
Hardness (As CaCO3)	1500	6.6		mg/L	1	12/2/2019 8:25:00 AM R64878
EPA METHOD 300.0: ANIONS						Analyst: CAS
Fluoride	ND	0.50		mg/L	5	11/11/2019 12:27:38 PM R64415
Chloride	69	2.5		mg/L	5	11/11/2019 12:27:38 PM R64415
Bromide	ND	0.50		mg/L	5	11/11/2019 12:27:38 PM R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	Н	mg/L	5	11/11/2019 12:27:38 PM R64415
Sulfate	1700	25	*	mg/L	50	11/12/2019 7:49:23 PM R64442
Nitrate+Nitrite as N	6.9	1.0		mg/L	5	11/11/2019 10:19:19 PM R64415
SM2510B: SPECIFIC CONDUCTANCE						Analyst: JRR
Conductivity	3400	5.0		µmhos/c	1	11/11/2019 4:38:52 PM R64428
SM2320B: ALKALINITY						Analyst: JRR
Bicarbonate (As CaCO3)	195.3	20.00		mg/L Ca	1	11/11/2019 4:38:52 PM R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	11/11/2019 4:38:52 PM R64428
Total Alkalinity (as CaCO3)	195.3	20.00		mg/L Ca	1	11/11/2019 4:38:52 PM R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: <b>JMT</b>
Total Dissolved Solids	2910	40.0	*D	mg/L	1	11/11/2019 5:05:00 PM 48674
SM4500-H+B / 9040C: PH						Analyst: JRR
рН	7.65		Н	pH units	1	11/11/2019 4:38:52 PM R64428
EPA METHOD 200.7: METALS						Analyst: <b>bcv</b>
Barium	0.018	0.0020		mg/L	1	12/2/2019 10:51:40 AM 48803
Beryllium	ND	0.0020		mg/L	1	12/2/2019 10:51:40 AM 48803
Cadmium	ND	0.0020		mg/L	1	12/2/2019 10:51:40 AM 48803
Calcium	530	10		mg/L	10	12/2/2019 10:53:40 AM 48803
Chromium	0.039	0.0060		mg/L	1	12/2/2019 10:51:40 AM 48803
Iron	2.2	0.20	*	mg/L	10	12/2/2019 10:53:40 AM 48803
Magnesium	39	1.0		mg/L	1	11/15/2019 10:39:56 PM 48803
Manganese	0.14	0.0020	*	mg/L	1	12/2/2019 10:51:40 AM 48803
Nickel	0.055	0.010		mg/L	1	12/2/2019 10:51:40 AM 48803
Potassium	2.3	1.0		mg/L	1	11/15/2019 10:39:56 PM 48803

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 1 of 53

### Lab Order **1911311**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-50

 Project:
 GBR
 Collection Date: 11/5/2019 10:30:00 AM

 Lab ID:
 1911311-001
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: METALS					Analys	t: bcv
Silver	0.0079	0.0050	mg/L	1	12/2/2019 10:51:40 AM	1 48803
Sodium	330	10	mg/L	10	12/2/2019 10:53:40 AM	1 48803
Zinc	ND	0.010	mg/L	1	12/2/2019 10:51:40 AM	1 48803
EPA METHOD 245.1: MERCURY					Analys	t: rde
Mercury	ND	0.00020	mg/L	1	11/22/2019 9:31:13 AM	1 48954
EPA METHOD 8260B: VOLATILES					Analys	t: JMR
Benzene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Toluene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Ethylbenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Naphthalene	ND	2.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
1-Methylnaphthalene	ND	4.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
2-Methylnaphthalene	ND	4.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Acetone	ND	10	μg/L	1	11/11/2019 10:13:46 P	M R64405
Bromobenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Bromodichloromethane	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Bromoform	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Bromomethane	ND	3.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
2-Butanone	ND	10	μg/L	1	11/11/2019 10:13:46 P	M R64405
Carbon disulfide	ND	10	μg/L	1	11/11/2019 10:13:46 P	M R64405
Carbon Tetrachloride	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Chlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Chloroethane	ND	2.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Chloroform	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Chloromethane	ND	3.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
2-Chlorotoluene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
4-Chlorotoluene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
cis-1,2-DCE	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Dibromochloromethane	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
Dibromomethane	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46 P	M R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 2 of 53

### Lab Order **1911311**

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-50

 Project:
 GBR
 Collection Date: 11/5/2019 10:30:00 AM

 Lab ID:
 1911311-001
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL Ç	Qual Units	DF I	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Anal	yst: <b>JMR</b>
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,1-Dichloroethane	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,1-Dichloroethene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,2-Dichloropropane	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,3-Dichloropropane	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
2,2-Dichloropropane	ND	2.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,1-Dichloropropene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
Hexachlorobutadiene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
2-Hexanone	ND	10	μg/L	1	11/11/2019 10:13:46	PM R64405
Isopropylbenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
4-Isopropyltoluene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
4-Methyl-2-pentanone	ND	10	μg/L	1	11/11/2019 10:13:46	PM R64405
Methylene Chloride	ND	3.0	μg/L	1	11/11/2019 10:13:46	PM R64405
n-Butylbenzene	ND	3.0	μg/L	1	11/11/2019 10:13:46	PM R64405
n-Propylbenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
sec-Butylbenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
Styrene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
tert-Butylbenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/11/2019 10:13:46	PM R64405
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
trans-1,2-DCE	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
Trichlorofluoromethane	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/11/2019 10:13:46	PM R64405
Vinyl chloride	ND	1.0	μg/L	1	11/11/2019 10:13:46	PM R64405
Xylenes, Total	ND	1.5	μg/L	1	11/11/2019 10:13:46	PM R64405
Surr: 1,2-Dichloroethane-d4	93.2	70-130	%Rec	1	11/11/2019 10:13:46	PM R64405
Surr: 4-Bromofluorobenzene	91.4	70-130	%Rec	1	11/11/2019 10:13:46	PM R64405
Surr: Dibromofluoromethane	111	70-130	%Rec	1	11/11/2019 10:13:46	PM R64405
Surr: Toluene-d8	95.9	70-130	%Rec	1	11/11/2019 10:13:46	PM R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 3 of 53

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. Client Sample ID: GBR-48

 Project:
 GBR
 Collection Date: 11/5/2019 10:40:00 AM

 Lab ID:
 1911311-002
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed Batch
EPA 200.8: METALS						Analyst: ELS
Antimony	ND	0.0010		mg/L	1	11/18/2019 2:23:54 PM 48803
Arsenic	0.0076	0.0010		mg/L	1	11/18/2019 2:23:54 PM 48803
Copper	0.048	0.0010		mg/L	1	11/18/2019 2:23:54 PM 48803
Lead	0.031	0.0025	*	mg/L	5	11/19/2019 9:33:03 AM 48803
Selenium	0.018	0.0010		mg/L	1	11/18/2019 2:23:54 PM 48803
Thallium	0.00053	0.00050		mg/L	1	11/18/2019 2:23:54 PM 48803
SM2340B: HARDNESS						Analyst: <b>bcv</b>
Hardness (As CaCO3)	1600	6.6		mg/L	1	12/2/2019 8:25:00 AM R64878
EPA METHOD 300.0: ANIONS						Analyst: CAS
Fluoride	ND	0.50		mg/L	5	11/11/2019 12:53:23 PM R64415
Chloride	270	10	*	mg/L	20	11/11/2019 1:06:15 PM R64415
Bromide	ND	0.50		mg/L	5	11/11/2019 12:53:23 PM R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	Н	mg/L	5	11/11/2019 12:53:23 PM R64415
Sulfate	2000	25	*	mg/L	50	11/12/2019 8:02:14 PM R64442
Nitrate+Nitrite as N	1.9	1.0		mg/L	5	11/11/2019 10:32:11 PM R64415
SM2510B: SPECIFIC CONDUCTANCE						Analyst: JRR
Conductivity	4400	5.0		µmhos/c	1	11/11/2019 5:19:18 PM R64428
SM2320B: ALKALINITY						Analyst: JRR
Bicarbonate (As CaCO3)	272.6	20.00		mg/L Ca	1	11/11/2019 5:19:18 PM R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	11/11/2019 5:19:18 PM R64428
Total Alkalinity (as CaCO3)	272.6	20.00		mg/L Ca	1	11/11/2019 5:19:18 PM R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: <b>JMT</b>
Total Dissolved Solids	3450	100	*D	mg/L	1	11/11/2019 5:05:00 PM 48674
SM4500-H+B / 9040C: PH						Analyst: JRR
рН	7.66		Н	pH units	1	11/11/2019 5:19:18 PM R64428
EPA METHOD 200.7: METALS						Analyst: <b>bcv</b>
Barium	0.31	0.0020		mg/L	1	12/2/2019 10:55:56 AM 48803
Beryllium	0.0038	0.0020		mg/L	1	12/2/2019 10:55:56 AM 48803
Cadmium	ND	0.0020		mg/L	1	12/2/2019 10:55:56 AM 48803
Calcium	550	10		mg/L	10	12/2/2019 10:58:01 AM 48803
Chromium	0.23	0.0060	*	mg/L	1	12/2/2019 10:55:56 AM 48803
Iron	48	1.0	*	mg/L	50	12/2/2019 11:00:00 AM 48803
Magnesium	58	1.0		mg/L	1	11/15/2019 10:42:06 PM 48803
Manganese	1.8	0.020	*	mg/L	10	12/2/2019 10:58:01 AM 48803
Nickel	0.098	0.010		mg/L	1	12/2/2019 10:55:56 AM 48803
Potassium	10	1.0		mg/L	1	11/15/2019 10:42:06 PM 48803

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 4 of 53

### Lab Order **1911311**

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-48

 Project:
 GBR
 Collection Date: 11/5/2019 10:40:00 AM

 Lab ID:
 1911311-002
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: METALS					Analyst:	bcv
Silver	ND	0.0050	mg/L	1	12/2/2019 10:55:56 AM	48803
Sodium	560	10	mg/L	10	12/2/2019 10:58:01 AM	48803
Zinc	0.097	0.010	mg/L	1	12/2/2019 10:55:56 AM	48803
EPA METHOD 245.1: MERCURY					Analyst:	rde
Mercury	ND	0.00020	mg/L	1	11/22/2019 9:37:56 AM	48954
EPA METHOD 8260B: VOLATILES					Analyst:	JMR
Benzene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Toluene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Ethylbenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Naphthalene	ND	2.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
1-Methylnaphthalene	ND	4.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
2-Methylnaphthalene	ND	4.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Acetone	ND	10	μg/L	1	11/11/2019 10:42:14 PM	R64405
Bromobenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Bromodichloromethane	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Bromoform	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Bromomethane	ND	3.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
2-Butanone	ND	10	μg/L	1	11/11/2019 10:42:14 PM	R64405
Carbon disulfide	ND	10	μg/L	1	11/11/2019 10:42:14 PM	R64405
Carbon Tetrachloride	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Chlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Chloroethane	ND	2.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Chloroform	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Chloromethane	ND	3.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
2-Chlorotoluene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
4-Chlorotoluene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
cis-1,2-DCE	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Dibromochloromethane	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
Dibromomethane	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14 PM	R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 5 of 53

#### Lab Order **1911311**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-48

 Project:
 GBR
 Collection Date: 11/5/2019 10:40:00 AM

 Lab ID:
 1911311-002
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Anal	yst: <b>JMR</b>
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,1-Dichloroethane	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,1-Dichloroethene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,2-Dichloropropane	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,3-Dichloropropane	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
2,2-Dichloropropane	ND	2.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,1-Dichloropropene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
Hexachlorobutadiene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
2-Hexanone	ND	10	μg/L	1	11/11/2019 10:42:14	PM R64405
Isopropylbenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
4-Isopropyltoluene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
4-Methyl-2-pentanone	ND	10	μg/L	1	11/11/2019 10:42:14	PM R64405
Methylene Chloride	ND	3.0	μg/L	1	11/11/2019 10:42:14	PM R64405
n-Butylbenzene	ND	3.0	μg/L	1	11/11/2019 10:42:14	PM R64405
n-Propylbenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
sec-Butylbenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
Styrene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
tert-Butylbenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/11/2019 10:42:14	PM R64405
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
trans-1,2-DCE	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
Trichlorofluoromethane	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/11/2019 10:42:14	PM R64405
Vinyl chloride	ND	1.0	μg/L	1	11/11/2019 10:42:14	PM R64405
Xylenes, Total	ND	1.5	μg/L	1	11/11/2019 10:42:14	PM R64405
Surr: 1,2-Dichloroethane-d4	93.7	70-130	%Rec	1	11/11/2019 10:42:14	PM R64405
Surr: 4-Bromofluorobenzene	93.3	70-130	%Rec	1	11/11/2019 10:42:14	PM R64405
Surr: Dibromofluoromethane	107	70-130	%Rec	1	11/11/2019 10:42:14	PM R64405
Surr: Toluene-d8	96.1	70-130	%Rec	1	11/11/2019 10:42:14	PM R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
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- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 6 of 53

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-49

 Project:
 GBR
 Collection Date: 11/5/2019 11:20:00 AM

 Lab ID:
 1911311-003
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: METALS						Analyst:	ELS
Antimony	ND	0.0010		mg/L	1	11/18/2019 2:26:02 PM	48803
Arsenic	ND	0.0010		mg/L	1	11/18/2019 2:26:02 PM	48803
Copper	0.0043	0.0010		mg/L	1	11/18/2019 2:26:02 PM	48803
Lead	0.00083	0.00050		mg/L	1	11/18/2019 2:26:02 PM	48803
Selenium	0.0011	0.0010		mg/L	1	11/18/2019 2:26:02 PM	48803
Thallium	ND	0.00050		mg/L	1	11/18/2019 2:26:02 PM	48803
SM2340B: HARDNESS						Analyst:	bcv
Hardness (As CaCO3)	1200	6.6		mg/L	1	12/2/2019 8:25:00 AM	R64878
EPA METHOD 300.0: ANIONS						Analyst:	CAS
Fluoride	ND	0.50		mg/L	5	11/11/2019 1:19:07 PM	R64415
Chloride	97	10		mg/L	20	11/11/2019 1:31:59 PM	R64415
Bromide	ND	0.50		mg/L	5	11/11/2019 1:19:07 PM	R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	Н	mg/L	5	11/11/2019 1:19:07 PM	
Sulfate	1500	25	*	mg/L	50	11/12/2019 8:15:06 PM	R64442
Nitrate+Nitrite as N	ND	1.0		mg/L	5	11/11/2019 10:45:02 PN	/I R64415
SM2510B: SPECIFIC CONDUCTANCE						Analyst:	JRR
Conductivity	3400	5.0		µmhos/c	1	11/11/2019 5:33:38 PM	R64428
SM2320B: ALKALINITY						Analyst:	JRR
Bicarbonate (As CaCO3)	244.2	20.00		mg/L Ca	1	11/11/2019 5:33:38 PM	R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	11/11/2019 5:33:38 PM	R64428
Total Alkalinity (as CaCO3)	244.2	20.00		mg/L Ca	1	11/11/2019 5:33:38 PM	R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst:	JMT
Total Dissolved Solids	2710	40.0	*D	mg/L	1	11/11/2019 5:05:00 PM	48674
SM4500-H+B / 9040C: PH						Analyst:	JRR
рН	7.58		Н	pH units	1	11/11/2019 5:33:38 PM	R64428
EPA METHOD 200.7: METALS						Analyst:	bcv
Barium	0.021	0.0020		mg/L	1	12/2/2019 11:01:51 AM	48803
Beryllium	ND	0.0020		mg/L	1	12/2/2019 11:01:51 AM	48803
Cadmium	ND	0.0020		mg/L	1	12/2/2019 11:01:51 AM	48803
Calcium	400	10		mg/L	10	12/2/2019 11:03:46 AM	48803
Chromium	0.10	0.0060	*	mg/L	1	12/2/2019 11:01:51 AM	48803
Iron	1.4	0.20	*	mg/L	10	12/2/2019 11:03:46 AM	48803
Magnesium	37	1.0		mg/L	1	11/15/2019 10:44:11 PN	
Manganese	0.87	0.0020	*	mg/L	1	12/2/2019 11:01:51 AM	
Nickel	0.12	0.010		mg/L	1	12/2/2019 11:01:51 AM	
Potassium	2.9	1.0		mg/L	1	11/15/2019 10:44:11 PN	A 48803

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 7 of 53

### Lab Order **1911311**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-49

 Project:
 GBR
 Collection Date: 11/5/2019 11:20:00 AM

 Lab ID:
 1911311-003
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed I	Batch
EPA METHOD 200.7: METALS					Analyst: k	ocv
Silver	0.0063	0.0050	mg/L	1	12/2/2019 11:01:51 AM	48803
Sodium	410	10	mg/L	10	12/2/2019 11:03:46 AM	48803
Zinc	0.013	0.010	mg/L	1	12/2/2019 11:01:51 AM	48803
EPA METHOD 245.1: MERCURY					Analyst: r	rde
Mercury	ND	0.00020	mg/L	1	11/22/2019 9:40:11 AM	48954
EPA METHOD 8260B: VOLATILES					Analyst: •	JMR
Benzene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Toluene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Ethylbenzene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Naphthalene	ND	2.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
1-Methylnaphthalene	ND	4.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
2-Methylnaphthalene	ND	4.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Acetone	ND	10	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Bromobenzene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Bromodichloromethane	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Bromoform	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Bromomethane	ND	3.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
2-Butanone	ND	10	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Carbon disulfide	ND	10	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Carbon Tetrachloride	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Chlorobenzene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Chloroethane	ND	2.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Chloroform	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Chloromethane	ND	3.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
2-Chlorotoluene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
4-Chlorotoluene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
cis-1,2-DCE	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Dibromochloromethane	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
Dibromomethane	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 11:10:41 PM F	R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 8 of 53

#### Lab Order **1911311**

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-49

 Project:
 GBR
 Collection Date: 11/5/2019 11:20:00 AM

 Lab ID:
 1911311-003
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL Ç	Qual Units	DF 1	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Anal	yst: <b>JMR</b>
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,1-Dichloroethane	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,1-Dichloroethene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,2-Dichloropropane	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,3-Dichloropropane	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
2,2-Dichloropropane	ND	2.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,1-Dichloropropene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
Hexachlorobutadiene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
2-Hexanone	ND	10	μg/L	1	11/11/2019 11:10:4	PM R64405
Isopropylbenzene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
4-Isopropyltoluene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
4-Methyl-2-pentanone	ND	10	μg/L	1	11/11/2019 11:10:4	PM R64405
Methylene Chloride	ND	3.0	μg/L	1	11/11/2019 11:10:4	PM R64405
n-Butylbenzene	ND	3.0	μg/L	1	11/11/2019 11:10:4	PM R64405
n-Propylbenzene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
sec-Butylbenzene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
Styrene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
tert-Butylbenzene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/11/2019 11:10:4	PM R64405
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
trans-1,2-DCE	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
Trichlorofluoromethane	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/11/2019 11:10:4	PM R64405
Vinyl chloride	ND	1.0	μg/L	1	11/11/2019 11:10:4	PM R64405
Xylenes, Total	ND	1.5	μg/L	1	11/11/2019 11:10:4	PM R64405
Surr: 1,2-Dichloroethane-d4	93.5	70-130	%Rec	1	11/11/2019 11:10:4	PM R64405
Surr: 4-Bromofluorobenzene	89.7	70-130	%Rec	1	11/11/2019 11:10:4	PM R64405
Surr: Dibromofluoromethane	108	70-130	%Rec	1	11/11/2019 11:10:4	PM R64405
Surr: Toluene-d8	95.3	70-130	%Rec	1	11/11/2019 11:10:4	PM R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 9 of 53

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-32

 Project:
 GBR
 Collection Date: 11/5/2019 11:40:00 AM

 Lab ID:
 1911311-004
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: METALS						Analyst:	ELS
Antimony	ND	0.0050		mg/L	5	11/19/2019 9:37:18 AM	48803
Arsenic	ND	0.0010		mg/L	1	11/19/2019 9:35:11 AM	48803
Copper	0.0085	0.0050		mg/L	5	11/19/2019 9:37:18 AM	48803
Lead	0.0012	0.00050		mg/L	1	11/18/2019 2:28:10 PM	48803
Selenium	0.0029	0.0010		mg/L	1	11/19/2019 9:35:11 AM	48803
Thallium	ND	0.00050		mg/L	1	11/18/2019 2:28:10 PM	48803
SM2340B: HARDNESS						Analyst:	bcv
Hardness (As CaCO3)	1400	6.6		mg/L	1	12/2/2019 8:25:00 AM	R64878
EPA METHOD 300.0: ANIONS						Analyst:	CAS
Fluoride	ND	0.50		mg/L	5	11/11/2019 2:10:34 PM	R64415
Chloride	190	10		mg/L	20	11/11/2019 2:23:27 PM	R64415
Bromide	ND	0.50		mg/L	5	11/11/2019 2:10:34 PM	R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	Н	mg/L	5	11/11/2019 2:10:34 PM	R64415
Sulfate	1700	25	*	mg/L	50	11/12/2019 8:27:58 PM	R64442
Nitrate+Nitrite as N	ND	1.0		mg/L	5	11/11/2019 10:57:54 PN	/I R64415
SM2510B: SPECIFIC CONDUCTANCE						Analyst:	JRR
Conductivity	3900	5.0		µmhos/c	1	11/11/2019 5:46:31 PM	R64428
SM2320B: ALKALINITY						Analyst:	JRR
Bicarbonate (As CaCO3)	267.7	20.00		mg/L Ca	1	11/11/2019 5:46:31 PM	R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	11/11/2019 5:46:31 PM	R64428
Total Alkalinity (as CaCO3)	267.7	20.00		mg/L Ca	1	11/11/2019 5:46:31 PM	R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst:	JMT
Total Dissolved Solids	3200	40.0	*D	mg/L	1	11/11/2019 5:05:00 PM	48674
SM4500-H+B / 9040C: PH						Analyst:	JRR
рН	7.73		Н	pH units	1	11/11/2019 5:46:31 PM	R64428
EPA METHOD 200.7: METALS						Analyst:	bcv
Barium	0.034	0.010		mg/L	5	12/2/2019 11:05:57 AM	48803
Beryllium	ND	0.010		mg/L	5	12/2/2019 11:05:57 AM	48803
Cadmium	ND	0.010		mg/L	5	12/2/2019 11:05:57 AM	48803
Calcium	470	5.0		mg/L	5	12/2/2019 11:05:57 AM	48803
Chromium	0.097	0.030		mg/L	5	12/2/2019 11:05:57 AM	48803
Iron	3.6	0.10	*	mg/L	5	12/2/2019 11:05:57 AM	48803
Magnesium	48	5.0		mg/L	5	12/2/2019 11:05:57 AM	48803
Manganese	2.1	0.010	*	mg/L	5	12/2/2019 11:05:57 AM	48803
Nickel	0.074	0.050		mg/L	5	12/2/2019 11:05:57 AM	48803
Potassium	ND	5.0		mg/L	5	12/2/2019 11:05:57 AM	48803

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

of ph Not in Range
Page 10 of 53

### Lab Order **1911311**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-32

 Project:
 GBR
 Collection Date: 11/5/2019 11:40:00 AM

 Lab ID:
 1911311-004
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed Batch
EPA METHOD 200.7: METALS					Analyst: <b>bcv</b>
Silver	ND	0.025	mg/L	5	12/2/2019 11:05:57 AM 48803
Sodium	480	5.0	mg/L	5	12/2/2019 11:05:57 AM 48803
Zinc	ND	0.050	mg/L	5	12/2/2019 11:05:57 AM 48803
EPA METHOD 245.1: MERCURY					Analyst: rde
Mercury	ND	0.00020	mg/L	1	11/22/2019 9:42:26 AM 48954
EPA METHOD 8260B: VOLATILES					Analyst: <b>JMR</b>
Benzene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Toluene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Ethylbenzene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Naphthalene	ND	2.0	μg/L	1	11/11/2019 11:39:11 PM R64405
1-Methylnaphthalene	ND	4.0	μg/L	1	11/11/2019 11:39:11 PM R64405
2-Methylnaphthalene	ND	4.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Acetone	ND	10	μg/L	1	11/11/2019 11:39:11 PM R64405
Bromobenzene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Bromodichloromethane	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Bromoform	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Bromomethane	ND	3.0	μg/L	1	11/11/2019 11:39:11 PM R64405
2-Butanone	ND	10	μg/L	1	11/11/2019 11:39:11 PM R64405
Carbon disulfide	ND	10	μg/L	1	11/11/2019 11:39:11 PM R64405
Carbon Tetrachloride	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Chlorobenzene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Chloroethane	ND	2.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Chloroform	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Chloromethane	ND	3.0	μg/L	1	11/11/2019 11:39:11 PM R64405
2-Chlorotoluene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
4-Chlorotoluene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
cis-1,2-DCE	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Dibromochloromethane	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
Dibromomethane	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/11/2019 11:39:11 PM R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 11 of 53

#### Lab Order **1911311**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-32

 Project:
 GBR
 Collection Date: 11/5/2019 11:40:00 AM

 Lab ID:
 1911311-004
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL Q	ual Units	DF Da	ate Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Anal	yst: <b>JMR</b>
1,4-Dichlorobenzene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Dichlorodifluoromethane	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,1-Dichloroethane	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,1-Dichloroethene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,2-Dichloropropane	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,3-Dichloropropane	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
2,2-Dichloropropane	ND	2.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,1-Dichloropropene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Hexachlorobutadiene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
2-Hexanone	ND	10	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Isopropylbenzene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
4-Isopropyltoluene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
4-Methyl-2-pentanone	ND	10	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Methylene Chloride	ND	3.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
n-Butylbenzene	ND	3.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
n-Propylbenzene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
sec-Butylbenzene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Styrene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
tert-Butylbenzene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Tetrachloroethene (PCE)	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
trans-1,2-DCE	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
trans-1,3-Dichloropropene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,1,1-Trichloroethane	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,1,2-Trichloroethane	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Trichloroethene (TCE)	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Trichlorofluoromethane	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
1,2,3-Trichloropropane	ND	2.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Vinyl chloride	ND	1.0	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Xylenes, Total	ND	1.5	μg/L	1 1	1/11/2019 11:39:11	PM R64405
Surr: 1,2-Dichloroethane-d4	96.2	70-130	%Rec	1 1	1/11/2019 11:39:11	PM R64405
Surr: 4-Bromofluorobenzene	92.9	70-130	%Rec	1 1	1/11/2019 11:39:11	PM R64405
Surr: Dibromofluoromethane	111	70-130	%Rec	1 1	1/11/2019 11:39:11	PM R64405
Surr: Toluene-d8	94.8	70-130	%Rec	1 1	1/11/2019 11:39:11	PM R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 12 of 53

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-52

 Project:
 GBR
 Collection Date: 11/5/2019 1:20:00 PM

 Lab ID:
 1911311-005
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed Batch
SM2340B: HARDNESS						Analyst: <b>bcv</b>
Hardness (As CaCO3)	1300	6.6		mg/L	1	12/2/2019 8:25:00 AM R6487
EPA METHOD 300.0: ANIONS						Analyst: CAS
Fluoride	ND	0.50		mg/L	5	11/11/2019 2:36:18 PM R644 <sup>2</sup>
Chloride	60	2.5		mg/L	5	11/11/2019 2:36:18 PM R644 <sup>2</sup>
Bromide	ND	0.50		mg/L	5	11/11/2019 2:36:18 PM R644 <sup>2</sup>
Phosphorus, Orthophosphate (As P)	ND	2.5	Н	mg/L	5	11/11/2019 2:36:18 PM R644 <sup>2</sup>
Sulfate	1500	25	*	mg/L	50	11/12/2019 8:40:49 PM R6444
Nitrate+Nitrite as N	6.9	1.0		mg/L	5	11/11/2019 11:10:45 PM R644
SM2510B: SPECIFIC CONDUCTANCE						Analyst: JRR
Conductivity	3100	5.0		µmhos/c	1	11/11/2019 6:00:04 PM R6442
SM2320B: ALKALINITY						Analyst: JRR
Bicarbonate (As CaCO3)	210.1	20.00		mg/L Ca	1	11/11/2019 6:00:04 PM R6442
Carbonate (As CaCO3)	ND	2.000		mg/L Ca		11/11/2019 6:00:04 PM R6442
Total Alkalinity (as CaCO3)	210.1	20.00		mg/L Ca		11/11/2019 6:00:04 PM R6442
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: <b>JMT</b>
Total Dissolved Solids	2600	20.0	*	mg/L	1	11/11/2019 5:05:00 PM 48674
SM4500-H+B / 9040C: PH						Analyst: JRR
рН	7.83		Н	pH units	1	11/11/2019 6:00:04 PM R6442
EPA METHOD 200.7: METALS						Analyst: <b>bcv</b>
Calcium	470	5.0		mg/L	5	12/2/2019 11:18:47 AM 48992
Iron	1.4	0.10	*	mg/L	5	12/2/2019 11:18:47 AM 48992
Magnesium	36	1.0		mg/L	1	12/2/2019 11:10:34 AM 48992
Manganese	0.026	0.0020		mg/L	1	12/2/2019 11:10:34 AM 48992
Potassium	1.2	1.0		mg/L	1	12/2/2019 11:10:34 AM 48992
Sodium	310	5.0		mg/L	5	12/2/2019 11:18:47 AM 48992
EPA METHOD 8260B: VOLATILES						Analyst: JMR
Benzene	ND	1.0		μg/L	1	11/12/2019 12:07:37 AM R6440
Toluene	ND	1.0		μg/L	1	11/12/2019 12:07:37 AM R6440
Ethylbenzene	ND	1.0		μg/L	1	11/12/2019 12:07:37 AM R6440
Methyl tert-butyl ether (MTBE)	ND	1.0		μg/L	1	11/12/2019 12:07:37 AM R6440
1,2,4-Trimethylbenzene	ND	1.0		μg/L	1	11/12/2019 12:07:37 AM R6440
1,3,5-Trimethylbenzene	ND	1.0		μg/L	1	11/12/2019 12:07:37 AM R6440
1,2-Dichloroethane (EDC)	ND	1.0		μg/L	1	11/12/2019 12:07:37 AM R6440
1,2-Dibromoethane (EDB)	ND	1.0		μg/L	1	11/12/2019 12:07:37 AM R6440
Naphthalene	ND	2.0		μg/L	1	11/12/2019 12:07:37 AM R6440
1-Methylnaphthalene	ND	4.0		μg/L	1	11/12/2019 12:07:37 AM R6440

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 13 of 53

# Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-52

 Project:
 GBR
 Collection Date: 11/5/2019 1:20:00 PM

 Lab ID:
 1911311-005
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL (	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Anal	yst: <b>JMR</b>
2-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Acetone	ND	10	μg/L	1	11/12/2019 12:07:37	AM R64405
Bromobenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Bromodichloromethane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Bromoform	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Bromomethane	ND	3.0	μg/L	1	11/12/2019 12:07:37	AM R64405
2-Butanone	ND	10	μg/L	1	11/12/2019 12:07:37	AM R64405
Carbon disulfide	ND	10	μg/L	1	11/12/2019 12:07:37	AM R64405
Carbon Tetrachloride	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Chlorobenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Chloroethane	ND	2.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Chloroform	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Chloromethane	ND	3.0	μg/L	1	11/12/2019 12:07:37	AM R64405
2-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
4-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
cis-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Dibromochloromethane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Dibromomethane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,1-Dichloroethane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,1-Dichloroethene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,2-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,3-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
2,2-Dichloropropane	ND	2.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,1-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Hexachlorobutadiene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
2-Hexanone	ND	10	μg/L	1	11/12/2019 12:07:37	AM R64405
Isopropylbenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
4-Isopropyltoluene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
4-Methyl-2-pentanone	ND	10	μg/L	1	11/12/2019 12:07:37	AM R64405
Methylene Chloride	ND	3.0	μg/L	1	11/12/2019 12:07:37	AM R64405
n-Butylbenzene	ND	3.0	μg/L	1	11/12/2019 12:07:37	AM R64405
n-Propylbenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
sec-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 14 of 53

#### Lab Order **1911311**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-52

 Project:
 GBR
 Collection Date: 11/5/2019 1:20:00 PM

 Lab ID:
 1911311-005
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL Q	ual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analy	/st: <b>JMR</b>
Styrene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
tert-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
trans-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Trichlorofluoromethane	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Vinyl chloride	ND	1.0	μg/L	1	11/12/2019 12:07:37	AM R64405
Xylenes, Total	ND	1.5	μg/L	1	11/12/2019 12:07:37	AM R64405
Surr: 1,2-Dichloroethane-d4	88.0	70-130	%Rec	1	11/12/2019 12:07:37	AM R64405
Surr: 4-Bromofluorobenzene	89.0	70-130	%Rec	1	11/12/2019 12:07:37	AM R64405
Surr: Dibromofluoromethane	105	70-130	%Rec	1	11/12/2019 12:07:37	AM R64405
Surr: Toluene-d8	94.2	70-130	%Rec	1	11/12/2019 12:07:37	AM R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 15 of 53

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-17

 Project:
 GBR
 Collection Date: 11/5/2019 12:20:00 PM

 Lab ID:
 1911311-006
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
SM2340B: HARDNESS						Analyst:	bcv
Hardness (As CaCO3)	1300	6.6		mg/L	1	12/2/2019 8:25:00 AM	R64878
EPA METHOD 300.0: ANIONS						Analyst:	CAS
Fluoride	ND	0.50		mg/L	5	11/11/2019 3:02:02 PM	
Chloride	55	2.5		mg/L	5	11/11/2019 3:02:02 PM	
Bromide	ND	0.50		mg/L	5	11/11/2019 3:02:02 PM	R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	Н	mg/L	5	11/11/2019 3:02:02 PM	R64415
Sulfate	1200	25	*	mg/L	50	11/12/2019 8:53:41 PM	R64442
Nitrate+Nitrite as N	5.2	1.0		mg/L	5	11/11/2019 11:23:37 PM	R64415
SM2510B: SPECIFIC CONDUCTANCE						Analyst:	JRR
Conductivity	2700	5.0		µmhos/c	1	11/11/2019 6:11:50 PM	R64428
SM2320B: ALKALINITY						Analyst:	JRR
Bicarbonate (As CaCO3)	208.8	20.00		mg/L Ca	1	11/11/2019 6:11:50 PM	R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca		11/11/2019 6:11:50 PM	
Total Alkalinity (as CaCO3)	208.8	20.00		mg/L Ca		11/11/2019 6:11:50 PM	R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst:	JMT
Total Dissolved Solids	2150	40.0	*D	mg/L	1	11/11/2019 5:05:00 PM	48674
SM4500-H+B / 9040C: PH						Analyst:	JRR
рН	7.75		Н	pH units	1	11/11/2019 6:11:50 PM	R64428
EPA METHOD 200.7: METALS						Analyst:	bcv
Calcium	450	5.0		mg/L	5	12/2/2019 11:21:04 AM	
Iron	120	10	*	mg/L		) 12/7/2019 8:56:03 AM	48992
Magnesium	53	5.0		mg/L	5	12/2/2019 11:21:04 AM	48992
Manganese	3.8	0.010	*	mg/L	5	12/2/2019 11:21:04 AM	48992
Potassium	9.4	5.0		mg/L	5	12/2/2019 11:21:04 AM	48992
Sodium	240	5.0		mg/L	5	12/2/2019 11:21:04 AM	48992
EPA METHOD 8270C: PAHS						Analyst:	JDC
Naphthalene	ND	0.50		μg/L	1	11/14/2019 11:15:52 PM	48733
1-Methylnaphthalene	ND	1.0		μg/L	1	11/14/2019 11:15:52 PM	48733
2-Methylnaphthalene	ND	1.0		μg/L	1	11/14/2019 11:15:52 PM	48733
Acenaphthylene	ND	0.50		μg/L	1	11/14/2019 11:15:52 PM	48733
Acenaphthene	ND	0.50		μg/L	1	11/14/2019 11:15:52 PM	48733
Fluorene	ND	0.50		μg/L	1	11/14/2019 11:15:52 PM	48733
Phenanthrene	ND	0.50		μg/L	1	11/14/2019 11:15:52 PM	48733
Anthracene	ND	0.50		μg/L	1	11/14/2019 11:15:52 PM	
Fluoranthene	ND	0.50		μg/L	1	11/14/2019 11:15:52 PM	
Pyrene	ND	0.50		μg/L	1	11/14/2019 11:15:52 PM	48733

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 16 of 53

# Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: GBR-17

 Project:
 GBR
 Collection Date: 11/5/2019 12:20:00 PM

 Lab ID:
 1911311-006
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: PAHS					Analys	t: JDC
Benz(a)anthracene	ND	0.50	μg/L	1	11/14/2019 11:15:52 F	PM 48733
Chrysene	ND	0.50	μg/L	1	11/14/2019 11:15:52 F	PM 48733
Benzo(b)fluoranthene	ND	0.50	μg/L	1	11/14/2019 11:15:52 F	PM 48733
Benzo(k)fluoranthene	ND	0.50	μg/L	1	11/14/2019 11:15:52 F	PM 48733
Benzo(a)pyrene	ND	0.50	μg/L	1	11/14/2019 11:15:52 F	PM 48733
Dibenz(a,h)anthracene	ND	0.50	μg/L	1	11/14/2019 11:15:52 F	PM 48733
Benzo(g,h,i)perylene	ND	0.50	μg/L	1	11/14/2019 11:15:52 F	PM 48733
Indeno(1,2,3-cd)pyrene	ND	0.50	μg/L	1	11/14/2019 11:15:52 F	PM 48733
Surr: N-hexadecane	73.9	20.4-126	%Rec	1	11/14/2019 11:15:52 F	PM 48733
Surr: Benzo(e)pyrene	65.8	21.4-126	%Rec	1	11/14/2019 11:15:52 F	PM 48733
EPA METHOD 8260B: VOLATILES					Analys	t: <b>JMR</b>
Benzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Toluene	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Ethylbenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Naphthalene	ND	2.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
1-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
2-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Acetone	ND	10	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Bromobenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Bromodichloromethane	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Bromoform	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Bromomethane	ND	3.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
2-Butanone	ND	10	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Carbon disulfide	ND	10	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Carbon Tetrachloride	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Chlorobenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Chloroethane	ND	2.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
Chloroform	ND	1.0	μg/L	1	11/12/2019 2:57:38 Af	M R64405
Chloromethane	ND	3.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
2-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
4-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
cis-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/12/2019 2:57:38 Al	M R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 17 of 53

### Lab Order **1911311**

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-17

 Project:
 GBR
 Collection Date: 11/5/2019 12:20:00 PM

 Lab ID:
 1911311-006
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst:	JMR
Dibromochloromethane	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
Dibromomethane	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,1-Dichloroethane	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,1-Dichloroethene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,2-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,3-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
2,2-Dichloropropane	ND	2.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,1-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
Hexachlorobutadiene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
2-Hexanone	ND	10	μg/L	1	11/12/2019 2:57:38 AM	R64405
Isopropylbenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
4-Isopropyltoluene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
4-Methyl-2-pentanone	ND	10	μg/L	1	11/12/2019 2:57:38 AM	R64405
Methylene Chloride	ND	3.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
n-Butylbenzene	ND	3.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
n-Propylbenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
sec-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
Styrene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
tert-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
trans-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
Trichlorofluoromethane	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
Vinyl chloride	ND	1.0	μg/L	1	11/12/2019 2:57:38 AM	R64405
Xylenes, Total	ND	1.5	μg/L	1	11/12/2019 2:57:38 AM	R64405
Surr: 1,2-Dichloroethane-d4	89.1	70-130	%Rec	1	11/12/2019 2:57:38 AM	R64405
Surr: 4-Bromofluorobenzene	92.8	70-130	%Rec	1	11/12/2019 2:57:38 AM	R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 18 of 53

#### Lab Order **1911311**

Date Reported: 12/10/2019

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: GBR-17

 Project:
 GBR
 Collection Date: 11/5/2019 12:20:00 PM

 Lab ID:
 1911311-006
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL Qı	ial Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analys	t: <b>JMR</b>
Surr: Dibromofluoromethane	105	70-130	%Rec	1	11/12/2019 2:57:38 AM	1 R64405
Surr: Toluene-d8	93.2	70-130	%Rec	1	11/12/2019 2:57:38 AM	1 R64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 19 of 53

Date Reported: 12/10/2019

Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: SHS-9

**Project:** GBR
 Collection Date: 11/5/2019 2:30:00 PM

 **Lab ID:** 1911311-007
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
SM2340B: HARDNESS						Analyst	bcv
Hardness (As CaCO3)	520	6.6		mg/L	1	12/2/2019 8:25:00 AM	R64878
EPA METHOD 300.0: ANIONS						Analyst	CAS
Fluoride	0.70	0.50		mg/L	5	11/11/2019 3:27:45 PM	
Chloride	130	10		mg/L	20	11/11/2019 3:40:36 PM	
Bromide	0.78	0.50		mg/L	5	11/11/2019 3:27:45 PM	R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	Н	mg/L	5	11/11/2019 3:27:45 PM	R64415
Sulfate	35	2.5		mg/L	5	11/11/2019 3:27:45 PM	R64415
Nitrate+Nitrite as N	ND	1.0		mg/L	5	11/11/2019 11:36:30 PM	M R64415
SM2510B: SPECIFIC CONDUCTANCE						Analyst	JRR
Conductivity	2500	5.0		µmhos/c	1	11/11/2019 6:23:35 PM	R64428
SM2320B: ALKALINITY						Analyst	: JRR
Bicarbonate (As CaCO3)	1128	50.00		mg/L Ca	2.5	11/13/2019 5:32:20 PM	R64497
Carbonate (As CaCO3)	ND	5.000		mg/L Ca	2.5	11/13/2019 5:32:20 PM	R64497
Total Alkalinity (as CaCO3)	1128	50.00		-		11/13/2019 5:32:20 PM	
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst	JMT
Total Dissolved Solids	1470	100	*D	mg/L	1	11/11/2019 5:05:00 PM	48674
SM4500-H+B / 9040C: PH						Analyst	JRR
рН	7.91		Н	pH units	1	11/11/2019 6:23:35 PM	
EPA METHOD 200.7: METALS						Analyst	bcv
Calcium	150	5.0		mg/L	5	12/2/2019 11:25:01 AM	48992
Iron	74	2.0	*	mg/L	100	12/2/2019 11:27:08 AM	48992
Magnesium	36	1.0		mg/L	1	11/15/2019 11:01:07 PM	Л 48802
Manganese	0.91	0.010	*	mg/L	5	12/2/2019 11:25:01 AM	48992
Potassium	4.7	1.0		mg/L	1	11/15/2019 11:01:07 PM	Л 48802
Sodium	450	5.0		mg/L	5	12/2/2019 11:25:01 AM	48992
EPA METHOD 8260B: VOLATILES						Analyst	JMR
Benzene	ND	2.5	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Toluene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Ethylbenzene	18	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Methyl tert-butyl ether (MTBE)	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,2,4-Trimethylbenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,3,5-Trimethylbenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,2-Dichloroethane (EDC)	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,2-Dibromoethane (EDB)	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Naphthalene	ND	10	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1-Methylnaphthalene	ND	20	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 20 of 53

### Lab Order **1911311**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: SHS-9

 Project:
 GBR
 Collection Date: 11/5/2019 2:30:00 PM

 Lab ID:
 1911311-007
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst	: JMR
2-Methylnaphthalene	ND	20	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Acetone	ND	50	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Bromobenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Bromodichloromethane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Bromoform	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Bromomethane	ND	15	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
2-Butanone	ND	50	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Carbon disulfide	ND	50	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Carbon Tetrachloride	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Chlorobenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Chloroethane	ND	10	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Chloroform	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Chloromethane	ND	15	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
2-Chlorotoluene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
4-Chlorotoluene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
cis-1,2-DCE	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
cis-1,3-Dichloropropene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,2-Dibromo-3-chloropropane	ND	10	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Dibromochloromethane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Dibromomethane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,2-Dichlorobenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,3-Dichlorobenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,4-Dichlorobenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Dichlorodifluoromethane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,1-Dichloroethane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,1-Dichloroethene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,2-Dichloropropane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,3-Dichloropropane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
2,2-Dichloropropane	ND	10	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,1-Dichloropropene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Hexachlorobutadiene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
2-Hexanone	ND	50	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Isopropylbenzene	6.1	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
4-Isopropyltoluene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
4-Methyl-2-pentanone	ND	50	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Methylene Chloride	ND	15	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
n-Butylbenzene	ND	15	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
n-Propylbenzene	8.1	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
sec-Butylbenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 21 of 53

## **Analytical Report**

### Lab Order **1911311**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: SHS-9

 Project:
 GBR
 Collection Date: 11/5/2019 2:30:00 PM

 Lab ID:
 1911311-007
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst	JMR
Styrene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
tert-Butylbenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,1,1,2-Tetrachloroethane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,1,2,2-Tetrachloroethane	ND	10	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Tetrachloroethene (PCE)	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
trans-1,2-DCE	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
trans-1,3-Dichloropropene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,2,3-Trichlorobenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,2,4-Trichlorobenzene	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,1,1-Trichloroethane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,1,2-Trichloroethane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Trichloroethene (TCE)	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Trichlorofluoromethane	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
1,2,3-Trichloropropane	ND	10	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Vinyl chloride	ND	5.0	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Xylenes, Total	ND	7.5	DP	μg/L	5	11/12/2019 3:25:51 AM	W64405
Surr: 1,2-Dichloroethane-d4	92.5	70-130	DP	%Rec	5	11/12/2019 3:25:51 AM	W64405
Surr: 4-Bromofluorobenzene	92.2	70-130	DP	%Rec	5	11/12/2019 3:25:51 AM	W64405
Surr: Dibromofluoromethane	104	70-130	DP	%Rec	5	11/12/2019 3:25:51 AM	W64405
Surr: Toluene-d8	92.1	70-130	DP	%Rec	5	11/12/2019 3:25:51 AM	W64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 22 of 53

### Lab Order **1911311**

Date Reported: 12/10/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-24D

 Project:
 GBR
 Collection Date: 11/6/2019 12:25:00 PM

 Lab ID:
 1911311-008
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
SM2340B: HARDNESS						Analyst:	bcv
Hardness (As CaCO3)	1300	6.6		mg/L	1	12/2/2019 8:25:00 AM	R64878
EPA METHOD 300.0: ANIONS						Analyst:	CAS
Fluoride	0.58	0.50		mg/L	5	11/11/2019 3:53:28 PM	R64415
Chloride	170	10		mg/L	20	11/11/2019 4:06:20 PM	R64415
Bromide	ND	0.50		mg/L	5	11/11/2019 3:53:28 PM	R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	Н	mg/L	5	11/11/2019 3:53:28 PM	R64415
Sulfate	2100	25	*	mg/L	50	11/12/2019 9:58:38 PM	A64442
Nitrate+Nitrite as N	ND	1.0		mg/L	5	11/12/2019 12:27:56 AM	1 R64415
SM2510B: SPECIFIC CONDUCTANCE						Analyst:	JRR
Conductivity	4300	5.0		µmhos/c	1	11/11/2019 7:03:48 PM	R64428
SM2320B: ALKALINITY						Analyst:	JRR
Bicarbonate (As CaCO3)	238.8	20.00		mg/L Ca	1	11/11/2019 7:03:48 PM	R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca		11/11/2019 7:03:48 PM	R64428
Total Alkalinity (as CaCO3)	238.8	20.00		mg/L Ca		11/11/2019 7:03:48 PM	R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst:	JMT
Total Dissolved Solids	3420	200	*D	mg/L	1	11/11/2019 5:05:00 PM	48674
SM4500-H+B / 9040C: PH						Analyst:	JRR
pH	7.87		Н	pH units	1	11/11/2019 7:03:48 PM	R64428
EPA METHOD 200.7: METALS						Analyst:	bcv
Calcium	470	10		mg/L	10	12/2/2019 11:29:16 AM	48992
Iron	8.3	0.20	*	mg/L	10	12/2/2019 11:29:16 AM	
Magnesium	40	1.0		mg/L	1	11/15/2019 11:03:05 PM	
Manganese	1.4	0.020	*	mg/L	10	12/2/2019 11:29:16 AM	48992
Potassium	7.0	1.0		mg/L	1	11/15/2019 11:03:05 PM	1 48802
Sodium	600	10		mg/L	10	12/2/2019 11:29:16 AM	48992
EPA METHOD 8270C: PAHS						Analyst:	JDC
Naphthalene	ND	0.50		μg/L	1	11/14/2019 11:39:58 PM	1 48733
1-Methylnaphthalene	ND	1.0		μg/L	1	11/14/2019 11:39:58 PM	1 48733
2-Methylnaphthalene	ND	1.0		μg/L	1	11/14/2019 11:39:58 PM	1 48733
Acenaphthylene	ND	0.50		μg/L	1	11/14/2019 11:39:58 PM	1 48733
Acenaphthene	ND	0.50		μg/L	1	11/14/2019 11:39:58 PM	1 48733
Fluorene	ND	0.50		μg/L	1	11/14/2019 11:39:58 PM	1 48733
Phenanthrene	ND	0.50		μg/L	1	11/14/2019 11:39:58 PM	1 48733
Anthracene	ND	0.50		μg/L	1	11/14/2019 11:39:58 PM	1 48733
Fluoranthene	ND	0.50		μg/L	1	11/14/2019 11:39:58 PM	1 48733
Pyrene	ND	0.50		μg/L	1	11/14/2019 11:39:58 PM	1 48733

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 23 of 53

### Lab Order **1911311**

Date Reported: 12/10/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-24D

 Project:
 GBR
 Collection Date: 11/6/2019 12:25:00 PM

 Lab ID:
 1911311-008
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: PAHS					Analys	st: <b>JDC</b>
Benz(a)anthracene	ND	0.50	μg/L	1	11/14/2019 11:39:58 F	PM 48733
Chrysene	ND	0.50	μg/L	1	11/14/2019 11:39:58 F	PM 48733
Benzo(b)fluoranthene	ND	0.50	μg/L	1	11/14/2019 11:39:58 F	PM 48733
Benzo(k)fluoranthene	ND	0.50	μg/L	1	11/14/2019 11:39:58 F	PM 48733
Benzo(a)pyrene	ND	0.50	μg/L	1	11/14/2019 11:39:58 F	PM 48733
Dibenz(a,h)anthracene	ND	0.50	μg/L	1	11/14/2019 11:39:58 F	PM 48733
Benzo(g,h,i)perylene	ND	0.50	μg/L	1	11/14/2019 11:39:58 F	PM 48733
Indeno(1,2,3-cd)pyrene	ND	0.50	μg/L	1	11/14/2019 11:39:58 F	PM 48733
Surr: N-hexadecane	77.2	20.4-126	%Rec	1	11/14/2019 11:39:58 F	PM 48733
Surr: Benzo(e)pyrene	71.7	21.4-126	%Rec	1	11/14/2019 11:39:58 F	PM 48733
EPA METHOD 8260B: VOLATILES					Analys	st: <b>JMR</b>
Benzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AI	M W64405
Toluene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AI	M W64405
Ethylbenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AI	M W64405
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	11/12/2019 4:50:19 AI	M W64405
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AI	M W64405
1,2-Dichloroethane (EDC)	1.6	1.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
Naphthalene	ND	2.0	μg/L	1	11/12/2019 4:50:19 AI	M W64405
1-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
2-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
Acetone	ND	10	μg/L	1	11/12/2019 4:50:19 Al	M W64405
Bromobenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AI	M W64405
Bromodichloromethane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AI	M W64405
Bromoform	ND	1.0	μg/L	1	11/12/2019 4:50:19 AI	M W64405
Bromomethane	ND	3.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
2-Butanone	ND	10	μg/L	1	11/12/2019 4:50:19 Al	M W64405
Carbon disulfide	ND	10	μg/L	1	11/12/2019 4:50:19 Al	M W64405
Carbon Tetrachloride	ND	1.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
Chlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
Chloroethane	ND	2.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
Chloroform	ND	1.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
Chloromethane	ND	3.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
2-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
4-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
cis-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/12/2019 4:50:19 Al	M W64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 24 of 53

## **Analytical Report**

### Lab Order **1911311**

Date Reported: 12/10/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-24D

 Project:
 GBR
 Collection Date: 11/6/2019 12:25:00 PM

 Lab ID:
 1911311-008
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	: JMR
Dibromochloromethane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
Dibromomethane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,1-Dichloroethane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,1-Dichloroethene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,2-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,3-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
2,2-Dichloropropane	ND	2.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,1-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
Hexachlorobutadiene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
2-Hexanone	ND	10	μg/L	1	11/12/2019 4:50:19 AM	W64405
Isopropylbenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
4-Isopropyltoluene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
4-Methyl-2-pentanone	ND	10	μg/L	1	11/12/2019 4:50:19 AM	W64405
Methylene Chloride	ND	3.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
n-Butylbenzene	ND	3.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
n-Propylbenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
sec-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
Styrene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
tert-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
trans-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
Trichlorofluoromethane	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
Vinyl chloride	ND	1.0	μg/L	1	11/12/2019 4:50:19 AM	W64405
Xylenes, Total	ND	1.5	μg/L	1	11/12/2019 4:50:19 AM	W64405
Surr: 1,2-Dichloroethane-d4	90.3	70-130	%Rec	1	11/12/2019 4:50:19 AM	W64405
Surr: 4-Bromofluorobenzene	93.6	70-130	%Rec	1	11/12/2019 4:50:19 AM	W64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 25 of 53

### **Analytical Report**

### Lab Order **1911311**

Date Reported: 12/10/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-24D

 Project:
 GBR
 Collection Date: 11/6/2019 12:25:00 PM

 Lab ID:
 1911311-008
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL Qı	ıal Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	: JMR
Surr: Dibromofluoromethane	100	70-130	%Rec	1	11/12/2019 4:50:19 AM	W64405
Surr: Toluene-d8	90.8	70-130	%Rec	1	11/12/2019 4:50:19 AM	W64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 26 of 53

## Lab Order **1911311**

Date Reported: 12/10/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-30

 Project:
 GBR
 Collection Date: 11/6/2019 1:35:00 PM

 Lab ID:
 1911311-009
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
SM2340B: HARDNESS						Analyst:	bcv
Hardness (As CaCO3)	1600	6.6		mg/L	1	12/2/2019 8:25:00 AM	R64878
EPA METHOD 300.0: ANIONS						Analyst:	CAS
Fluoride	ND	0.50		mg/L	5	11/11/2019 4:44:54 PM	R64415
Chloride	280	10	*	mg/L	20	11/11/2019 4:57:46 PM	R64415
Bromide	ND	0.50		mg/L	5	11/11/2019 4:44:54 PM	R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	Н	mg/L	5	11/11/2019 4:44:54 PM	R64415
Sulfate	1700	25	*	mg/L	50	11/12/2019 10:10:57 PM	1 A64442
Nitrate+Nitrite as N	1.4	1.0		mg/L	5	11/12/2019 12:40:49 AM	1 R64415
SM2510B: SPECIFIC CONDUCTANCE						Analyst:	JRR
Conductivity	4000	5.0		µmhos/c	1	11/11/2019 7:17:13 PM	R64428
SM2320B: ALKALINITY						Analyst:	JRR
Bicarbonate (As CaCO3)	259.1	20.00		mg/L Ca	1	11/11/2019 7:17:13 PM	R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca		11/11/2019 7:17:13 PM	R64428
Total Alkalinity (as CaCO3)	259.1	20.00		mg/L Ca		11/11/2019 7:17:13 PM	R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst:	JMT
Total Dissolved Solids	3040	100	*D	mg/L	1	11/11/2019 5:05:00 PM	48674
SM4500-H+B / 9040C: PH						Analyst:	JRR
pH	7.76		Н	pH units	1	11/11/2019 7:17:13 PM	R64428
EPA METHOD 200.7: METALS						Analyst:	bcv
Calcium	540	50		mg/L	50	12/2/2019 11:33:41 AM	48992
Iron	43	1.0	*	mg/L	50	12/2/2019 11:33:41 AM	
Magnesium	52	5.0		mg/L	5	12/2/2019 11:31:34 AM	
Manganese	4.2	0.010	*	mg/L	5	12/2/2019 11:31:34 AM	48992
Potassium	7.0	5.0		mg/L	5	12/2/2019 11:31:34 AM	48992
Sodium	490	5.0		mg/L	5	12/2/2019 11:31:34 AM	48992
EPA METHOD 8270C: PAHS						Analyst:	JDC
Naphthalene	ND	0.50		μg/L	1	11/15/2019 12:04:04 AM	1 48733
1-Methylnaphthalene	ND	1.0		μg/L	1	11/15/2019 12:04:04 AM	1 48733
2-Methylnaphthalene	ND	1.0		μg/L	1	11/15/2019 12:04:04 AM	1 48733
Acenaphthylene	ND	0.50		μg/L	1	11/15/2019 12:04:04 AM	1 48733
Acenaphthene	ND	0.50		μg/L	1	11/15/2019 12:04:04 AM	1 48733
Fluorene	ND	0.50		μg/L	1	11/15/2019 12:04:04 AM	1 48733
Phenanthrene	ND	0.50		μg/L	1	11/15/2019 12:04:04 AM	1 48733
Anthracene	ND	0.50		μg/L	1	11/15/2019 12:04:04 AM	1 48733
Fluoranthene	ND	0.50		μg/L	1	11/15/2019 12:04:04 AM	
Pyrene	ND	0.50		μg/L	1	11/15/2019 12:04:04 AM	1 48733

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 27 of 53

## Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/10/2019

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-30

 Project:
 GBR
 Collection Date: 11/6/2019 1:35:00 PM

 Lab ID:
 1911311-009
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: PAHS					Analy	st: <b>JDC</b>
Benz(a)anthracene	ND	0.50	μg/L	1	11/15/2019 12:04:04	AM 48733
Chrysene	ND	0.50	μg/L	1	11/15/2019 12:04:04	AM 48733
Benzo(b)fluoranthene	ND	0.50	μg/L	1	11/15/2019 12:04:04	AM 48733
Benzo(k)fluoranthene	ND	0.50	μg/L	1	11/15/2019 12:04:04	AM 48733
Benzo(a)pyrene	ND	0.50	μg/L	1	11/15/2019 12:04:04	AM 48733
Dibenz(a,h)anthracene	ND	0.50	μg/L	1	11/15/2019 12:04:04	AM 48733
Benzo(g,h,i)perylene	ND	0.50	μg/L	1	11/15/2019 12:04:04	AM 48733
Indeno(1,2,3-cd)pyrene	ND	0.50	μg/L	1	11/15/2019 12:04:04	AM 48733
Surr: N-hexadecane	60.5	20.4-126	%Rec	1	11/15/2019 12:04:04	AM 48733
Surr: Benzo(e)pyrene	58.3	21.4-126	%Rec	1	11/15/2019 12:04:04	AM 48733
EPA METHOD 8260B: VOLATILES					Analy	st: <b>JMR</b>
Benzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Toluene	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Ethylbenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Naphthalene	ND	2.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
1-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
2-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Acetone	ND	10	μg/L	1	11/12/2019 5:18:30 A	M W64405
Bromobenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Bromodichloromethane	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Bromoform	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Bromomethane	ND	3.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
2-Butanone	ND	10	μg/L	1	11/12/2019 5:18:30 A	M W64405
Carbon disulfide	ND	10	μg/L	1	11/12/2019 5:18:30 A	M W64405
Carbon Tetrachloride	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Chlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Chloroethane	ND	2.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Chloroform	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
Chloromethane	ND	3.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
2-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
4-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
cis-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 5:18:30 A	M W64405
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/12/2019 5:18:30 A	M W64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 28 of 53

### **Analytical Report**

### Lab Order **1911311**

Date Reported: 12/10/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: GBR-30

 Project:
 GBR
 Collection Date: 11/6/2019 1:35:00 PM

 Lab ID:
 1911311-009
 Matrix: AQUEOUS
 Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	: JMR
Dibromochloromethane	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
Dibromomethane	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,1-Dichloroethane	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,1-Dichloroethene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,2-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,3-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
2,2-Dichloropropane	ND	2.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,1-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
Hexachlorobutadiene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
2-Hexanone	ND	10	μg/L	1	11/12/2019 5:18:30 AM	W64405
Isopropylbenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
4-Isopropyltoluene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
4-Methyl-2-pentanone	ND	10	μg/L	1	11/12/2019 5:18:30 AM	W64405
Methylene Chloride	ND	3.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
n-Butylbenzene	ND	3.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
n-Propylbenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
sec-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
Styrene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
tert-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
trans-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
Trichlorofluoromethane	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
Vinyl chloride	ND	1.0	μg/L	1	11/12/2019 5:18:30 AM	W64405
Xylenes, Total	ND	1.5	μg/L	1	11/12/2019 5:18:30 AM	W64405
Surr: 1,2-Dichloroethane-d4	90.5	70-130	%Rec	1	11/12/2019 5:18:30 AM	W64405
Surr: 4-Bromofluorobenzene	95.3	70-130	%Rec	1	11/12/2019 5:18:30 AM	W64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 29 of 53

## **Analytical Report**

### Lab Order 1911311

Date Reported: 12/10/2019

Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc. **Client Sample ID: GBR-30** 

GBR **Collection Date:** 11/6/2019 1:35:00 PM Project: 1911311-009 Matrix: AQUEOUS **Received Date:** 11/7/2019 8:00:00 AM Lab ID:

Analyses	Result	RL Q	ual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	: JMR
Surr: Dibromofluoromethane	101	70-130	%Rec	1	11/12/2019 5:18:30 AM	W64405
Surr: Toluene-d8	89.4	70-130	%Rec	1	11/12/2019 5:18:30 AM	W64405

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix

- Analyte detected in the associated Method Blank
- Е Value above quantitation range
- Analyte detected below quantitation limits
- Sample pH Not In Range
- Reporting Limit

Page 30 of 53

### Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: MB-48802 SampType: MBLK TestCode: EPA Method 200.7: Metals

Client ID: **PBW** Batch ID: **48802** RunNo: **64568** 

Prep Date: 11/14/2019 Analysis Date: 11/15/2019 SeqNo: 2211018 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

 Magnesium
 ND
 1.0

 Potassium
 ND
 1.0

Sample ID: LLLCS-48802 SampType: LCSLL TestCode: EPA Method 200.7: Metals

Client ID: BatchQC Batch ID: 48802 RunNo: 64568

Prep Date: 11/14/2019 Analysis Date: 11/15/2019 SeqNo: 2211023 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

50 Magnesium ND 1.0 0.5000 0 104 150 Potassium ND 0 1.0 0.5000 104 50 150

Sample ID: LCS-48802 SampType: LCS TestCode: EPA Method 200.7: Metals

Client ID: LCSW Batch ID: 48802 RunNo: 64568

Prep Date: 11/14/2019 Analysis Date: 11/15/2019 SeqNo: 2211025 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Magnesium 50 1.0 50.00 0 99.9 85 115 0 49 50.00 98.8 85 Potassium 1.0 115

Sample ID: MB-48803 SampType: MBLK TestCode: EPA Method 200.7: Metals

Client ID: PBW Batch ID: 48803 RunNo: 64568

Prep Date: 11/14/2019 Analysis Date: 11/15/2019 SeqNo: 2211027 Units: mg/L

PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte Result Qual ND 0.0020 Barium Beryllium ND 0.0020 Cadmium ND 0.0020

Calcium ND 1.0 0.0060 Chromium ND Magnesium ND 1.0 ND 0.0020 Manganese Nickel ND 0.010 Potassium ND 1.0 Silver ND 0.0050 Sodium ND 1.0 Zinc ND 0.010

### Qualifiers:

\* Value exceeds Maximum Contaminant Level

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 31 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

Project: GBR

Sample ID: LLLCS-48803	Samp	Type: <b>LC</b>	SLL	Tes	tCode: <b>EF</b>	PA Method	200.7: Metals			
Client ID: BatchQC	Bato	ch ID: 488	303	F	RunNo: 64	4568				
Prep Date: 11/14/2019	Analysis	Date: 11	/15/2019	8	SeqNo: 22	211029	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0020	0.002000	0	98.8	50	150			
Beryllium	0.0020	0.0020	0.002000	0	102	50	150			
Cadmium	0.0021	0.0020	0.002000	0	107	50	150			
Calcium	ND	1.0	0.5000	0	110	50	150			
Chromium	0.0065	0.0060	0.006000	0	108	50	150			
Magnesium	ND	1.0	0.5000	0	105	50	150			
Manganese	0.0020	0.0020	0.002000	0	102	50	150			
Nickel	ND	0.010	0.005000	0	138	50	150			
Potassium	ND	1.0	0.5000	0	106	50	150			
Silver	ND	0.0050	0.005000	0	91.7	50	150			
Sodium	ND	1.0	0.5000	0	132	50	150			
Zinc	0.011	0.010	0.01000	0	112	50	150			

Sample ID: LCS-48803	Samp	Type: <b>LC</b>	S	Tes	tCode: El	PA Method	200.7: Metals			
Client ID: LCSW	Bato	ch ID: 48	803	R	tunNo: 6	4568				
Prep Date: 11/14/2019	Analysis	Date: 11	/15/2019	S	SeqNo: 2	211031	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.49	0.0020	0.5000	0	97.9	85	115			
Beryllium	0.50	0.0020	0.5000	0	99.7	85	115			
Cadmium	0.49	0.0020	0.5000	0	98.5	85	115			
Calcium	51	1.0	50.00	0	101	85	115			
Chromium	0.48	0.0060	0.5000	0	96.6	85	115			
Magnesium	50	1.0	50.00	0	99.9	85	115			
Manganese	0.49	0.0020	0.5000	0	97.5	85	115			
Nickel	0.48	0.010	0.5000	0	96.2	85	115			
Potassium	49	1.0	50.00	0	98.7	85	115			
Silver	0.10	0.0050	0.1000	0	101	85	115			
Sodium	49	1.0	50.00	0	97.9	85	115			
Zinc	0.48	0.010	0.5000	0	95.1	85	115			

Sample ID: MB-48802	SampType: MBLK	TestCode: EPA Method 200.7: Metals	
Client ID: PBW	Batch ID: 48802	RunNo: <b>64641</b>	
Prep Date: 11/14/2019	Analysis Date: 11/20/2019	SeqNo: 2214104 Units: mg/L	
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit HighLimit %RPD RP	DLimit Qual
Magnasium	ND 10		

 Magnesium
 ND
 1.0

 Potassium
 ND
 1.0

### Qualifiers:

\* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 32 of 53

## Hall Environmental Analysis Laboratory, Inc.

ND

ND

ND

0.0050

0.010

1.0

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: LLLCS-48802	SampT	ype: <b>LC</b>	SLL	Tes	tCode: El	PA Method	200.7: Metals	;		
Client ID: BatchQC	Batch	n ID: 48	802	F	RunNo: 64	4641				
Prep Date: 11/14/2019	Analysis D	ate: 11	/20/2019	S	SeqNo: 2	214105	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.0	0.5000	0	104	50	150			
Potassium	ND	1.0	0.5000	0	85.7	50	150			

Sample ID: LCS-48802	Tes	tCode: El	PA Method	200.7: Metals						
Client ID: LCSW	Batch	n ID: 48	802	F	RunNo: 64	4641				
Prep Date: 11/14/2019	Analysis D	Date: 11	1/20/2019	S	SeqNo: 2	214106	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	50	1.0	50.00	0	101	85	115			
Potassium	50	1.0	50.00	0	100	85	115			

Sample ID: MB-48803	SampType: MBLK		Tes	tCode: El	PA Method	200.7: Metals				
Client ID: PBW	Bato	ch ID: 48	803	F	RunNo: 64	4641				
Prep Date: 11/14/2019	Analysis Date: 11/20/2019			9	SeqNo: 2	214107	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0020								
Beryllium	ND	0.0020								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Iron	ND	0.020								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Nickel	ND	0.010								
Potassium	ND	1.0								

Sample ID: LLLCS-48803	Samp	Type: <b>LC</b>	SLL	Tes	tCode: El	PA Method	200.7: Metals			
Client ID: BatchQC	Bato	h ID: 488	803	F	RunNo: 6	4641				
Prep Date: 11/14/2019	Analysis	Date: <b>11</b>	/20/2019	S	SeqNo: 2	214111	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.0023	0.0020	0.002000	0	113	50	150			
Beryllium	ND	0.0020	0.002000	0	99.5	50	150			
Cadmium	ND	0.0020	0.002000	0	90.4	50	150			
Calcium	ND	1.0	0.5000	0	105	50	150			
Chromium	ND	0.0060	0.006000	0	95.7	50	150			

### Qualifiers:

Silver

Zinc

Sodium

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 33 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

Project: GBR

Sample ID: LLLCS-48803	Samp	Type: <b>LC</b>	SLL	Tes	tCode: El	PA Method	200.7: Metals			
Client ID: BatchQC	Bato	ch ID: 488	303	F	RunNo: 6	4641				
Prep Date: 11/14/2019	Analysis	Analysis Date: 11/20/2019			SeqNo: 2	214111	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.027	0.020	0.02000	0	137	50	150			
Magnesium	ND	1.0	0.5000	0	103	50	150			
Manganese	0.0021	0.0020	0.002000	0	107	50	150			
Nickel	ND	0.010	0.005000	0	88.1	50	150			
Potassium	ND	1.0	0.5000	0	91.6	50	150			
Silver	0.0052	0.0050	0.005000	0	103	50	150			
Sodium	ND	1.0	0.5000	0	115	50	150			
Zinc	ND	0.010	0.01000	0	97.4	50	150			

Sample ID: LCS-48803	Samp	SampType: LCS TestCode: EPA Method 20					200.7: Metals			
Client ID: LCSW	Bato	ch ID: 48	803	F	RunNo: 6	4641				
Prep Date: 11/14/2019	Analysis	Date: <b>1</b> 1	1/20/2019	8	SeqNo: 2	214112	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.50	0.0020	0.5000	0	99.8	85	115			
Beryllium	0.50	0.0020	0.5000	0	101	85	115			
Cadmium	0.51	0.0020	0.5000	0	101	85	115			
Calcium	50	1.0	50.00	0	101	85	115			
Chromium	0.49	0.0060	0.5000	0	98.5	85	115			
Iron	0.56	0.020	0.5000	0	112	85	115			
Magnesium	50	1.0	50.00	0	100	85	115			
Manganese	0.49	0.0020	0.5000	0	98.3	85	115			
Nickel	0.50	0.010	0.5000	0	99.0	85	115			
Potassium	50	1.0	50.00	0	99.7	85	115			
Silver	0.10	0.0050	0.1000	0	102	85	115			
Sodium	49	1.0	50.00	0	99.0	85	115			
Zinc	0.49	0.010	0.5000	0	97.9	85	115			

Sample ID: MB-48992	SampType: MBLK					PA Method	200.7: Metals			
Client ID: PBW	R	RunNo: 64	4727							
Prep Date: 11/22/2019	Analysis [	Date: <b>11</b>	/23/2019	S	SeqNo: 2	217986	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Potassium	ND	1.0								

### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 34 of 53

## Hall Environmental Analysis Laboratory, Inc.

SampType: MBLK

ND

0.010

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

Project: GBR

Sample ID: MB-48803

Sample ID: LLLCS-48992	Samp	Type: <b>LC</b>	SLL	Tes	tCode: El	PA Method	200.7: Metals			
Client ID: BatchQC	Bato	ch ID: 48	992	F	RunNo: 6	4727				
Prep Date: 11/22/2019	Analysis	Date: <b>1</b> 1	1/23/2019	9	SeqNo: 2	217988	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	0.5000	0	104	50	150			
Magnesium	ND	1.0	0.5000	0	101	50	150			
Manganese	0.0022	0.0020	0.002000	0	110	50	150			
Potassium	ND	1.0	0.5000	0	97.0	50	150			
Sample ID: LCS-48992	Samp	Type: <b>LC</b>	s	Tes	tCode: El	PA Method	200.7: Metals			
Client ID: LCSW	Bato	ch ID: 48	992	F	RunNo: 6	4727				
Drop Doto: 44/00/0040	Analysis	Doto: 44	1/00/0040		Souther of	047000	Linita			

Sample ID: <b>LCS-48992</b>	Samp	SampType: LCS TestCode: EPA Method								
Client ID: LCSW	Bato	h ID: 48	992	F	RunNo: 64	4727				
Prep Date: 11/22/2019	Analysis I	Date: <b>1</b> 1	/23/2019	8	SeqNo: 22	217990	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	98.0	85	115			
Magnesium	50	1.0	50.00	0	99.5	85	115			
Manganese	0.47	0.0020	0.5000	0	93.2	85	115			
Potassium	49	1.0	50.00	0	98.4	85	115			

TestCode: EPA Method 200.7: Metals

•	•									
Client ID: PBW	Bato	ch ID: 48	803	F	RunNo: 64	4878				
Prep Date: 11/14/2019	Analysis	Date: 12	2/2/2019	٤	SeqNo: 22	224183	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0020								
Beryllium	ND	0.0020								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Iron	ND	0.020								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Nickel	ND	0.010								
Potassium	ND	1.0								
Silver	ND	0.0050								
Sodium	ND	1.0								

Sample ID: LLLCS-48803	SampType:	Tes	tCode: El	PA Method	200.7: Metals				
Client ID: BatchQC	Batch ID:	48803	F	RunNo: 6	4878				
Prep Date: 11/14/2019	Analysis Date:	12/2/2019	8	SeqNo: 2	224184	Units: mg/L			
Analyte	Result PQ	L SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.0024 0.002	20 0.002000	0	118	50	150		_	_

### Qualifiers:

Zinc

\* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 35 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

Project: GBR

Sample ID: LLLCS-48803	SampType: LCSLL			Tes	TestCode: EPA Method 200.7: Me					
Client ID: BatchQC	Bato	ch ID: 488	303	R	RunNo: 64	4878				
Prep Date: 11/14/2019	Analysis	Date: <b>12</b>	2/2/2019	S	SeqNo: 22	224184	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	ND	0.0020	0.002000	0	88.5	50	150			
Cadmium	ND	0.0020	0.002000	0	100	50	150			
Calcium	ND	1.0	0.5000	0	111	50	150			
Chromium	ND	0.0060	0.006000	0	81.0	50	150			
Iron	0.030	0.020	0.02000	0	148	50	150			
Magnesium	ND	1.0	0.5000	0	106	50	150			
Manganese	0.0020	0.0020	0.002000	0	102	50	150			
Nickel	ND	0.010	0.005000	0	77.5	50	150			
Potassium	ND	1.0	0.5000	0	106	50	150			
Silver	0.0054	0.0050	0.005000	0	108	50	150			
Sodium	ND	1.0	0.5000	0	95.9	50	150			
Zinc	0.012	0.010	0.01000	0	116	50	150			

Sample ID: LCS-48803	Samp	Type: LC	s	Tes	tCode: El	PA Method	200.7: Metals			
Client ID: LCSW	Bato	ch ID: 48	803	F	RunNo: 64	4878				
Prep Date: 11/14/2019	Analysis	Date: 12	2/2/2019	S	SeqNo: 2	224185	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.49	0.0020	0.5000	0	98.9	85	115			
Beryllium	0.50	0.0020	0.5000	0	99.8	85	115			
Cadmium	0.50	0.0020	0.5000	0	100	85	115			
Calcium	52	1.0	50.00	0	103	85	115			
Chromium	0.49	0.0060	0.5000	0	97.2	85	115			
Iron	0.57	0.020	0.5000	0	113	85	115			
Magnesium	51	1.0	50.00	0	101	85	115			
Manganese	0.49	0.0020	0.5000	0	97.3	85	115			
Nickel	0.49	0.010	0.5000	0	97.7	85	115			
Potassium	50	1.0	50.00	0	99.7	85	115			
Silver	0.10	0.0050	0.1000	0	99.9	85	115			
Sodium	48	1.0	50.00	0	96.3	85	115			
Zinc	0.49	0.010	0.5000	0	97.8	85	115			

Sample ID: <b>MB-48992</b>	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	200.7: Metals			
Client ID: PBW	Batch	n ID: 489	992	F	RunNo: 6	4878				
Prep Date: 11/22/2019	Analysis D	ate: 12	/2/2019	8	SeqNo: 2	224187	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Iron	ND	0.020								
Magnesium	ND	1.0								

### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 36 of 53

### Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: MB-48992 SampType: MBLK TestCode: EPA Method 200.7: Metals

Client ID: **PBW** Batch ID: **48992** RunNo: **64878** 

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

 Manganese
 ND
 0.0020

 Potassium
 ND
 1.0

 Sodium
 ND
 1.0

Sample ID: LLLCS-48992 SampType: LCSLL TestCode: EPA Method 200.7: Metals Client ID: BatchQC Batch ID: 48992 RunNo: 64878 Prep Date: 11/22/2019 Analysis Date: 12/2/2019 SeqNo: 2224188 Units: mg/L SPK Ref Val %REC %RPD Analyte PQL SPK value LowLimit HighLimit **RPDLimit** Qual 0 105 50 150 Calcium ND 1.0 0.5000 0.022 0.020 0.02000 0 111 50 150 Iron 0 104 ND 0.5000 50 Magnesium 1.0 150 Manganese 0.0020 0.0020 0.002000 0 101 50 150 0 102 ND 1.0 0.5000 50 150 Potassium ND 0.5000 0 118 50 Sodium 1.0 150

Sample ID: LCS-48992 SampType: LCS TestCode: EPA Method 200.7: Metals Client ID: LCSW Batch ID: 48992 RunNo: 64878 Prep Date: 11/22/2019 Analysis Date: 12/2/2019 SeqNo: 2224189 Units: mg/L SPK value SPK Ref Val %REC Analyte Result PQL LowLimit HighLimit %RPD **RPDLimit** Qual Calcium 52 1.0 50.00 0 104 85 115 0 103 85 0.52 0.020 0.5000 Iron 115 51 1.0 50.00 0 103 85 115 Magnesium 0.5000 0 98.5 85 Manganese 0.49 0.0020 115 Potassium 50 1.0 50.00 0 101 85 115 Sodium 49 50.00 0 97.5 85 1.0 115

### Qualifiers:

Value exceeds Maximum Contaminant Level

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 37 of 53

## Hall Environmental Analysis Laboratory, Inc.

ND

0.0010

ND 0.00050

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Selenium

Thallium

Sample ID: MB-48803 SampType: MBLK TestCode: EPA 200.8: Metals Client ID: PBW Batch ID: 48803 RunNo: 64589 Prep Date: 11/14/2019 Analysis Date: 11/18/2019 SeqNo: 2211810 Units: mg/L PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Analyte Result Antimony ND 0.0010 Arsenic ND 0.0010 Copper ND 0.0010 Lead ND 0.00050

Sample ID: MSLLLCS-48803 SampType: LCSLL TestCode: EPA 200.8: Metals Client ID: **BatchQC** Batch ID: 48803 RunNo: 64589 Prep Date: 11/14/2019 Analysis Date: 11/18/2019 SeqNo: 2211812 Units: mg/L SPK value SPK Ref Val %REC %RPD **RPDLimit** PQL HighLimit Qual Analyte Result LowLimit Antimony 0.0011 0.0010 0.001000 111 50 150 0 95.3 50 ND 0.0010 0.001000 150 Arsenic 0.0011 0.0010 0.001000 0 111 50 150 Copper 0 Lead ND 0.00050 0.0005000 99.6 50 150 Selenium ND 0.0010 0.001000 0 82.6 50 150 Thallium ND 0.00050 0.0005000 0 92.5 50 150

Sample ID: MSLCS-48803	SampType	: LCS	Tes	tCode: El	PA 200.8: N	letals			
Client ID: LCSW	Batch ID	48803	F						
Prep Date: 11/14/2019	Analysis Date	11/18/2019	9	211814	Units: mg/L				
Analyte	Result P	QL SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.026 0.0	010 0.02500	0	105	85	115			
Arsenic	0.025 0.0	010 0.02500	0	98.4	85	115			
Copper	0.025 0.0	010 0.02500	0	101	85	115			
Lead	0.012 0.00	050 0.01250	0	96.7	85	115			
Selenium	0.024 0.0	010 0.02500	0	95.6	85	115			
Thallium	0.012 0.00	050 0.01250	0	95.7	85	115			

#### Qualifiers:

Value exceeds Maximum Contaminant Level

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 38 of 53

### Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: MB7-48954 SampType: MBLK TestCode: EPA Method 245.1: Mercury

Client ID: **PBW** Batch ID: **48954** RunNo: **64701** 

Prep Date: 11/21/2019 Analysis Date: 11/22/2019 SeqNo: 2217002 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.00020

Sample ID: LLLCS7-48954 SampType: LCS TestCode: EPA Method 245.1: Mercury

Client ID: LCSW Batch ID: 48954 RunNo: 64701

Prep Date: 11/21/2019 Analysis Date: 11/22/2019 SeqNo: 2217003 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.00020 0.0001500 0 84.2 80 120

Sample ID: MB-48954 SampType: MBLK TestCode: EPA Method 245.1: Mercury

Client ID: PBW Batch ID: 48954 RunNo: 64701

Prep Date: 11/21/2019 Analysis Date: 11/22/2019 SeqNo: 2217004 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.00020

Sample ID: LCS-48954 SampType: LCS TestCode: EPA Method 245.1: Mercury

Client ID: LCSW Batch ID: 48954 RunNo: 64701

Prep Date: 11/21/2019 Analysis Date: 11/22/2019 SeqNo: 2217005 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0048 0.00020 0.005000 0 96.7 80 120

Sample ID: 1911311-001CMS SampType: MS TestCode: EPA Method 245.1: Mercury

Client ID: GBR-50 Batch ID: 48954 RunNo: 64701

Prep Date: 11/21/2019 Analysis Date: 11/22/2019 SeqNo: 2217007 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0050 0.00020 0.005000 0 100 75 125

Sample ID: 1911311-001CMSD SampType: MSD TestCode: EPA Method 245.1: Mercury

Client ID: **GBR-50** Batch ID: **48954** RunNo: **64701** 

Prep Date: 11/21/2019 Analysis Date: 11/22/2019 SeqNo: 2217008 Units: mg/L

**RPDLimit** Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD Qual 0.0048 0.00020 95.5 Mercury 0.005000 75 5.03 20

### Qualifiers:

\* Value exceeds Maximum Contaminant Level

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 39 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

Project: GBR

Project: GBR										
Sample ID: MB	SampT	ype: <b>m</b> b	olk	Tes	tCode: El	PA Method	300.0: Anions	3		
Client ID: PBW	Batch	n ID: <b>R6</b>	4415	F	RunNo: 6	4415				
Prep Date:	Analysis D	oate: 11	/11/2019	S	SeqNo: 2	204593	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Bromide	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								
Sulfate	ND	0.50								
Nitrate+Nitrite as N	ND	0.20								
Sample ID: LCS	SampT	ype: Ics	;	Tes	tCode: El	PA Method	300.0: Anions	5		
Client ID: LCSW	Batch	n ID: <b>R6</b>	4415	F	RunNo: 6	4415				
Prep Date:	Analysis D	oate: 11	/11/2019	9	SeqNo: 2	204594	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.50	0.10	0.5000	0	99.0	90	110			
Chloride	4.8	0.50	5.000	0	95.6	90	110			
Bromide	2.4	0.10	2.500	0	96.8	90	110			
Phosphorus, Orthophosphate (As P	4.7	0.50	5.000	0	93.6	90	110			
Sulfate	9.7	0.50	10.00	0	96.8	90	110			
Nitrate+Nitrite as N	3.5	0.20	3.500	0	99.0	90	110			
Sample ID: MB	SampT	ype: mb	olk	Tes	tCode: El	PA Method	300.0: Anions	5		
Client ID: PBW	Batch	n ID: <b>R6</b>	4442	F	RunNo: 6	4442				
Prep Date:	Analysis D	ate: 11	/12/2019	8	SeqNo: 2	206061	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								
Sample ID: LCS	SampT	ype: <b>Ics</b>	1	Tes	tCode: El	PA Method	300.0: Anions	\$		
Client ID: LCSW	Batch	n ID: <b>R6</b>	4442	F	RunNo: 6	4442				
Prep Date:	Analysis D	ate: 11	/12/2019	S	SeqNo: 2	206062	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.5	0.50	10.00	0	95.3	90	110			
Sample ID: MB	SampT	ype: <b>m</b> t	olk	Tes	tCode: El	PA Method	300.0: Anions	3		
Client ID: PBW	Batch	n ID: <b>A6</b>	4442	F	RunNo: 6	4442				
Prep Date:	Analysis D	oate: 11	/12/2019	8	SeqNo: 2	206103	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

### Qualifiers:

Sulfate

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded

ND

0.50

- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 40 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: LCS SampType: Ics TestCode: EPA Method 300.0: Anions

Client ID: LCSW Batch ID: A64442 RunNo: 64442

Prep Date: Analysis Date: 11/12/2019 SeqNo: 2206104 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Sulfate 9.3 0.50 10.00 0 93.2 90 110

### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 41 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: 100ng lcs	SampT	ype: <b>LC</b>	S	Tes	tCode: El	ATILES				
Client ID: LCSW	Batch	1D: <b>R6</b>	4405	F	RunNo: 6	4405				
Prep Date:	Analysis D	ate: 11	/11/2019	\$	SeqNo: 2	204291	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	103	70	130			
Toluene	19	1.0	20.00	0	92.8	70	130			
Chlorobenzene	20	1.0	20.00	0	98.2	70	130			
1,1-Dichloroethene	18	1.0	20.00	0	92.2	70	130			
Trichloroethene (TCE)	18	1.0	20.00	0	91.4	70	130			
Surr: 1,2-Dichloroethane-d4	8.9		10.00		88.5	70	130			
Surr: 4-Bromofluorobenzene	9.0		10.00		89.8	70	130			
Surr: Dibromofluoromethane	10		10.00		104	70	130			
Surr: Toluene-d8	9.4		10.00		94.4	70	130			

Sample ID: 100ng lcs2	SampType: LCS TestCode: EPA Method 8260B: VOLATILES									
Client ID: LCSW	Batch	1D: <b>W</b> 6	64405	F	RunNo: 64	4405				
Prep Date:	Analysis D	ate: 11	/12/2019	8	SeqNo: 2	204292	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	22	1.0	20.00	0	112	70	130			•
Toluene	19	1.0	20.00	0	96.4	70	130			
Chlorobenzene	20	1.0	20.00	0	99.1	70	130			
1,1-Dichloroethene	20	1.0	20.00	0	98.9	70	130			
Trichloroethene (TCE)	19	1.0	20.00	0	96.1	70	130			
Surr: 1,2-Dichloroethane-d4	9.1		10.00		91.4	70	130			
Surr: 4-Bromofluorobenzene	9.2		10.00		92.1	70	130			
Surr: Dibromofluoromethane	10		10.00		103	70	130			
Surr: Toluene-d8	9.2		10.00		92.4	70	130			

Sample ID: 1911311-007a ms	s SampType: MS TestCode: EPA Method 8260B: VOLATILES									
Client ID: SHS-9	Batch	n ID: <b>W</b> 6	64405	F	RunNo: 6	4405				
Prep Date:	Analysis D	ate: 11	/12/2019	9	SeqNo: 2	204317	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	110	5.0	100.0	0	109	70	130			
Toluene	95	5.0	100.0	0	95.3	70	130			
Chlorobenzene	96	5.0	100.0	0	95.5	70	130			
1,1-Dichloroethene	99	5.0	100.0	0	99.5	70	130			
Trichloroethene (TCE)	95	5.0	100.0	0	95.4	70	130			
Surr: 1,2-Dichloroethane-d4	46		50.00		92.2	70	130			
Surr: 4-Bromofluorobenzene	45		50.00		90.7	70	130			
Surr: Dibromofluoromethane	52		50.00		103	70	130			
Surr: Toluene-d8	45		50.00		90.2	70	130			

### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 42 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

Project: GBR

Sample ID: 1911311-007a msc	<b>d</b> SampT	ype: MS	SD	Tes	tCode: El	Code: EPA Method 8260B: VOLATILES					
Client ID: SHS-9	Batch	n ID: <b>W</b> 6	64405	F	RunNo: 6	4405					
Prep Date:	Analysis D	ate: 11	/12/2019	8	SeqNo: 2	204318	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	100	5.0	100.0	0	102	70	130	7.25	20		
Toluene	91	5.0	100.0	0	90.7	70	130	4.88	20		
Chlorobenzene	91	5.0	100.0	0	91.0	70	130	4.88	20		
1,1-Dichloroethene	91	5.0	100.0	0	91.2	70	130	8.67	20		
Trichloroethene (TCE)	89	5.0	100.0	0	89.2	70	130	6.70	20		
Surr: 1,2-Dichloroethane-d4	45		50.00		90.6	70	130	0	0		
Surr: 4-Bromofluorobenzene	46		50.00		92.1	70	130	0	0		
Surr: Dibromofluoromethane	51		50.00		103	70	130	0	0		
Surr: Toluene-d8	45		50.00		90.2	70	130	0	0		

Sample ID: rb1 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES

Client ID: PBW Batch ID: R64405 RunNo: 64405

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2204322 Units: μg/L

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: rb1 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES Client ID: PBW Batch ID: R64405 RunNo: 64405 Prep Date: Analysis Date: 11/11/2019 SeqNo: 2204322 Units: µg/L PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Analyte Result 4-Chlorotoluene ND 1.0 cis-1.2-DCE ND 1.0 ND cis-1,3-Dichloropropene 1.0 1,2-Dibromo-3-chloropropane ND 2.0 Dibromochloromethane ND 1.0 Dibromomethane ND 1.0 1,2-Dichlorobenzene ND 1.0 1,3-Dichlorobenzene ND 1.0 1,4-Dichlorobenzene ND 1.0 Dichlorodifluoromethane ND 1.0 ND 1.0 1,1-Dichloroethane ND 1.0 1,1-Dichloroethene ND 1,2-Dichloropropane 1.0 1,3-Dichloropropane ND 1.0 2,2-Dichloropropane ND 2.0 1,1-Dichloropropene ND 1.0 ND Hexachlorobutadiene 1.0 2-Hexanone ND 10 Isopropylbenzene ND 1.0 4-Isopropyltoluene ND 1.0 ND 4-Methyl-2-pentanone 10 Methylene Chloride ND 3.0 n-Butylbenzene ND 3.0 n-Propylbenzene ND 1.0 sec-Butylbenzene ND 1.0 ND 1.0 Styrene tert-Butylbenzene ND 1.0 1,1,1,2-Tetrachloroethane ND 1.0 1,1,2,2-Tetrachloroethane ND 2.0 Tetrachloroethene (PCE) ND 1.0 trans-1,2-DCE ND 1.0 ND trans-1,3-Dichloropropene 1.0 1,2,3-Trichlorobenzene ND 1.0 ND 1,2,4-Trichlorobenzene 1.0 1,1,1-Trichloroethane ND 1.0 1,1,2-Trichloroethane ND 1.0 Trichloroethene (TCE) ND 1.0 Trichlorofluoromethane ND 1.0 1,2,3-Trichloropropane ND 2.0

- \* Value exceeds Maximum Contaminant Level
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

## Hall Environmental Analysis Laboratory, Inc.

SampType: MBLK

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

Project: GBR

Sample ID: rb2

Sample ID: rb1	SampT	ype: <b>ME</b>	BLK	Tes	TestCode: EPA Method 8260B: VOLATILES					
Client ID: PBW	Batch	1D: <b>R6</b>	4405	F	RunNo: 64	4405				
Prep Date:	Analysis D	ate: 11	//11/2019	9	SeqNo: 2	204322	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.9		10.00		88.6	70	130			
Surr: 4-Bromofluorobenzene	9.1		10.00		91.3	70	130			
Surr: Dibromofluoromethane	10		10.00		102	70	130			
Surr: Toluene-d8	9.9		10.00		99.1	70	130			

TestCode: EPA Method 8260B: VOLATILES

Sample ID. 102	Sampi	ype. wii	JLK	resicode. EFA Wethou 6200B. VOL				ATILLS		
Client ID: PBW	Batch	n ID: W	64405	RunNo: <b>64405</b>						
Prep Date:	Analysis D	ate: <b>1</b>	1/12/2019	S	SeqNo: 2	204323	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: rb2 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES Client ID: PBW Batch ID: W64405 RunNo: 64405 Prep Date: Analysis Date: 11/12/2019 SeqNo: 2204323 Units: µg/L PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Analyte Result 1,2-Dibromo-3-chloropropane ND 2.0 Dibromochloromethane ND 1.0 ND Dibromomethane 1.0 1,2-Dichlorobenzene ND 1.0 1,3-Dichlorobenzene ND 1.0 1.4-Dichlorobenzene ND 1.0 Dichlorodifluoromethane ND 1.0 1,1-Dichloroethane ND 1.0 1,1-Dichloroethene ND 1.0 ND 1.0 1,2-Dichloropropane ND 1.0 1,3-Dichloropropane ND 2.0 2,2-Dichloropropane ND 1,1-Dichloropropene 1.0 Hexachlorobutadiene ND 1.0 ND 10 2-Hexanone Isopropylbenzene ND 1.0 ND 4-Isopropyltoluene 1.0 4-Methyl-2-pentanone ND 10 Methylene Chloride ND 3.0 n-Butylbenzene ND 3.0 ND n-Propylbenzene 1.0 sec-Butylbenzene ND 1.0 Styrene ND 1.0 tert-Butylbenzene ND 1.0 1,1,1,2-Tetrachloroethane ND 1.0 1,1,2,2-Tetrachloroethane ND 2.0 Tetrachloroethene (PCE) ND 1.0 trans-1,2-DCE ND 1.0 trans-1,3-Dichloropropene ND 1.0 ND 1,2,3-Trichlorobenzene 1.0 1,2,4-Trichlorobenzene ND 1.0 ND 1,1,1-Trichloroethane 1.0 1,1,2-Trichloroethane ND 1.0 ND 1.0 Trichloroethene (TCE) Trichlorofluoromethane ND 1.0 1,2,3-Trichloropropane ND 2.0 Vinyl chloride ND 1.0 Xylenes, Total ND 1.5 Surr: 1,2-Dichloroethane-d4 9.1 10.00 91.3 70 130

#### Qualifiers:

- \* Value exceeds Maximum Contaminant Level
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 46 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: rb2 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES Client ID: PBW Batch ID: W64405 RunNo: 64405 Prep Date: Analysis Date: 11/12/2019 SeqNo: 2204323 Units: µg/L Analyte Result SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Surr: 4-Bromofluorobenzene 9.3 10.00 93.3 70 130 Surr: Dibromofluoromethane 11 10.00 106 70 130 Surr: Toluene-d8 9.4 10.00 94.2 70 130

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: mb-48733 SampType: MBLK TestCode: EPA Method 8270C: PAHs Client ID: PBW Batch ID: 48733 RunNo: 64521 Prep Date: 11/12/2019 Analysis Date: 11/14/2019 SeqNo: 2209222 Units: µg/L Analyte PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Result Naphthalene ND 0.50 1-Methylnaphthalene ND 1.0 2-Methylnaphthalene ND 1.0 Acenaphthylene ND 0.50 Acenaphthene ND 0.50 Fluorene ND 0.50 Phenanthrene ND 0.50 Anthracene ND 0.50 Fluoranthene ND 0.50 Pyrene ND 0.50 ND 0.50 Benz(a)anthracene ND 0.50 Chrysene ND 0.50 Benzo(b)fluoranthene Benzo(k)fluoranthene ND 0.50 ND 0.50 Benzo(a)pyrene Dibenz(a,h)anthracene ND 0.50 ND 0.50 Benzo(g,h,i)perylene Indeno(1,2,3-cd)pyrene ND 0.50 Surr: N-hexadecane 74 87.60 84.4 20.4 126 Surr: Benzo(e)pyrene 17 20.00 84.2 21.4 126

Sample ID: Ics-48733	SampType: LCS TestCode: EPA Method 8270C: PAHs									
Client ID: LCSW	Batch	n ID: 48	733	F	RunNo: 6	4521				
Prep Date: 11/12/2019	Analysis D	oate: 11	I/14/2019	8	SeqNo: 2	209226	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	13	0.50	20.00	0	65.6	41.8	97.8			
1-Methylnaphthalene	13	1.0	20.00	0	65.7	44.7	104			
2-Methylnaphthalene	14	1.0	20.00	0	72.4	45	101			
Acenaphthylene	14	0.50	20.00	0	69.9	51.2	102			
Acenaphthene	12	0.50	20.00	0	61.2	53.2	101			
Fluorene	14	0.50	20.00	0	71.6	57.6	106			
Phenanthrene	14	0.50	20.00	0	71.0	57.6	109			
Anthracene	14	0.50	20.00	0	70.1	56.1	98.9			
Fluoranthene	16	0.50	20.00	0	79.2	61.4	114			
Pyrene	15	0.50	20.00	0	76.7	58	110			
Benz(a)anthracene	14	0.50	20.00	0	72.0	60	102			
Chrysene	14	0.50	20.00	0	69.7	50.8	93.4			
Benzo(b)fluoranthene	15	0.50	20.00	0	72.9	56.2	118			

#### Qualifiers:

Value exceeds Maximum Contaminant Level

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 48 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

Client: Western Refining Southwest, Inc.

Project: GBR

Sample ID: Ics-48733	SampType: LCS			Tes	tCode: El	PA Method				
Client ID: LCSW	Batch ID: 48733			F	RunNo: <b>64521</b>					
Prep Date: 11/12/2019	Analysis D	ate: 11	/14/2019	9	SeqNo: 2	209226	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzo(k)fluoranthene	15	0.50	20.00	0	72.7	57.7	119			
Benzo(a)pyrene	15	0.50	20.00	0	73.9	55.5	114			
Dibenz(a,h)anthracene	15	0.50	20.00	0	73.0	53	110			
Benzo(g,h,i)perylene	15	0.50	20.00	0	74.7	55	113			
Indeno(1,2,3-cd)pyrene	15	0.50	20.00	0	73.5	51.2	115			
Surr: N-hexadecane	61		87.60		70.2	20.4	126			
Surr: Benzo(e)pyrene	13		20.00		66.3	21.4	126			

Sample ID: Icsd-48733	SampType: <b>LCSD</b>				TestCode: EPA Method 8270C: PAHs					
Client ID: LCSS02	Batch	n ID: 487	733	R	RunNo: 64	4521				
Prep Date: 11/12/2019	Analysis D	ate: 11	/14/2019	S	SeqNo: 22	209227	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	13	0.50	20.00	0	65.7	41.8	97.8	0.152	25.4	
1-Methylnaphthalene	13	1.0	20.00	0	64.4	44.7	104	2.00	21.5	
2-Methylnaphthalene	14	1.0	20.00	0	68.6	45	101	5.39	25.2	
Acenaphthylene	13	0.50	20.00	0	66.2	51.2	102	5.44	30.3	
Acenaphthene	12	0.50	20.00	0	61.2	53.2	101	0	28.1	
Fluorene	14	0.50	20.00	0	69.3	57.6	106	3.26	33	
Phenanthrene	14	0.50	20.00	0	71.5	57.6	109	0.702	24.5	
Anthracene	14	0.50	20.00	0	67.6	56.1	98.9	3.63	26.9	
Fluoranthene	15	0.50	20.00	0	74.3	61.4	114	6.38	21.8	
Pyrene	14	0.50	20.00	0	69.7	58	110	9.56	27	
Benz(a)anthracene	13	0.50	20.00	0	66.2	60	102	8.39	27.4	
Chrysene	13	0.50	20.00	0	63.3	50.8	93.4	9.62	20.4	
Benzo(b)fluoranthene	13	0.50	20.00	0	65.9	56.2	118	10.1	22.5	
Benzo(k)fluoranthene	14	0.50	20.00	0	71.3	57.7	119	1.94	24.1	
Benzo(a)pyrene	13	0.50	20.00	0	67.3	55.5	114	9.35	27.3	
Dibenz(a,h)anthracene	13	0.50	20.00	0	66.8	53	110	8.87	18.5	
Benzo(g,h,i)perylene	14	0.50	20.00	0	69.8	55	113	6.78	28.4	
Indeno(1,2,3-cd)pyrene	14	0.50	20.00	0	68.8	51.2	115	6.61	21.8	
Surr: N-hexadecane	57		87.60		64.6	20.4	126	0	0	
Surr: Benzo(e)pyrene	12		20.00		61.3	21.4	126	0	0	

### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 49 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: Ics-1 99.1uS eC SampType: Ics TestCode: SM2510B: Specific Conductance

Client ID: LCSW Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2205385 Units: µmhos/cm

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Conductivity 100 5.0 99.10 0 101 85 115

Sample ID: Ics-2 99.1uS eC SampType: Ics TestCode: SM2510B: Specific Conductance

Client ID: LCSW Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2205413 Units: µmhos/cm

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Conductivity 110 5.0 99.10 0 107 85 115

#### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: mb-1 alk SampType: mblk TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2205475 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) ND 20.00

Sample ID: Ics-1 alk SampType: Ics TestCode: SM2320B: Alkalinity

Client ID: LCSW Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2205476 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) 77.24 20.00 80.00 0 96.6 90 110

Sample ID: mb-2 alk SampType: mblk TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2205498 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) ND 20.00

Sample ID: Ics-2 alk SampType: Ics TestCode: SM2320B: Alkalinity

Client ID: LCSW Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2205499 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) 77.80 20.00 80.00 0 97.3 90 110

Sample ID: mb-3 alk SampType: mblk TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2205521 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) ND 20.00

Sample ID: Ics-3 alk SampType: Ics TestCode: SM2320B: Alkalinity

Client ID: LCSW Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2205522 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) 77.88 20.00 80.00 0 97.4 90 110

### Qualifiers:

\* Value exceeds Maximum Contaminant Level

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 51 of 53

### Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: mb-1 alk SampType: mblk TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R64497 RunNo: 64497

Prep Date: Analysis Date: 11/13/2019 SeqNo: 2208023 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) ND 20.00

Sample ID: Ics-1 alk SampType: Ics TestCode: SM2320B: Alkalinity

Client ID: LCSW Batch ID: R64497 RunNo: 64497

Prep Date: Analysis Date: 11/13/2019 SeqNo: 2208024 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) 78.36 20.00 80.00 0 98.0 90 110

Sample ID: Ics-2 alk SampType: Ics TestCode: SM2320B: Alkalinity

Client ID: LCSW Batch ID: R64497 RunNo: 64497

Prep Date: Analysis Date: 11/13/2019 SeqNo: 2208047 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) 78.68 20.00 80.00 0 98.4 90 110

Sample ID: mb-2 alk SampType: mblk TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R64497 RunNo: 64497

Prep Date: Analysis Date: 11/13/2019 SeqNo: 2208052 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) ND 20.00

### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit
S Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 52 of 53

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311** 

10-Dec-19

**Client:** Western Refining Southwest, Inc.

**Project:** GBR

Sample ID: MB-48674 SampType: MBLK TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW Batch ID: 48674 RunNo: 64400

Prep Date: 11/8/2019 Analysis Date: 11/11/2019 SeqNo: 2204063 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids ND 20.0

Sample ID: LCS-48674 SampType: LCS TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: LCSW Batch ID: 48674 RunNo: 64400

Prep Date: 11/8/2019 Analysis Date: 11/11/2019 SeqNo: 2204064 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids 1030 20.0 1000 0 103 80 120

#### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107

## Sample Log-In Check List

Website: www.hallenvironmental.com Client Name: Western Refining Southw Work Order Number: 1911311 RcptNo: 1 Received By: **Daniel Marquez** 11/7/2019 8:00:00 AM uns. Completed By: Erin Melendrez 11/7/2019 5:43:45 PM Reviewed By: 11/8/19 Chain of Custody 1. Is Chain of Custody complete? Yes 🗸 No 🗌 Not Present 2. How was the sample delivered? Client Log In 3. Was an attempt made to cool the samples? No 🗌 NA 🗌 Yes 🗸 No 🗌 4. Were all samples received at a temperature of >0° C to 6.0°C Yes 🗸 NA 🗌 No 🗌 Sample(s) in proper container(s)? Yes 🗸 Sufficient sample volume for indicated test(s)? Yes 🗸 No 🗌 Yes 🗸 No 🗌 7. Are samples (except VOA and ONG) properly preserved? No 🗸 Yes NA 🗌 8. Was preservative added to bottles? 9. VOA vials have zero headspace? Yes 🗸 No 🗌 No VOA Vials Yes 🗌 10. Were any sample containers received broken? No V # of preserved bottles checked 11. Does paperwork match bottle labels? Yes 🗸 No 🗌 for pH: (Note discrepancies on chain of custody) (<2 or >12 unless noted) Adjusted? 12. Are matrices correctly identified on Chain of Custody? Yes 🗸 No 🗌 13. Is it clear what analyses were requested? Yes V No 🗌 14. Were all holding times able to be met? Yes 🗸 No 🗌 Checked by: (If no, notify customer for authorization.) Special Handling (if applicable) 15. Was client notified of all discrepancies with this order? Yes No 🗌 NA V Person Notified: Date: By Whom: eMail Phone Fax In Person Regarding: Client Instructions: ~0.5 of HNO3 to Sample 007D for 16. Additional remarks: 17. Cooler Information Temp °C Condition Seal Intact Seal No Cooler No Seal Date Signed By 3.6 Good Yes

5.5

Good

Yes

2

	Chain	J-Jo-	Chain-of-Custody Record	Turn-Around	Time:												
Client:		tern k	Western Refining	☐ X Standard	I - Rush	ų,			mber ~	HALL		Z	HE I	O S	Σ	ENVIRONMENTAL	- 1
0	Grea 1	McCortney	100	Project Name:					•	ANALTOIN		7	0	0	5	LABORATORY	×
Mailin	I W	SS: [[]]	Rd 4990	CBR				4901	Tawk	4901 Hawkins NE	$\overline{\overline{a}}$	www.naiienvironmentai.com	ment	al.cor	H 874	0	
	Bloomficted		NM 87413	Project #:				Tel. 5	05-3	505-345-3975		Fax	505	505-345-4107	1107	9	
Phone #:		970-385-1096	5-1096	450	4500081394	+					Am	Analysis		iest			
email	email or Fax#:		Shyde@ Ibenv.com	Project Manager:	iger:		_	(0				70		(11			
QA/QC	QA/QC Package: Ki Standard	46	Povel 4 (Full Validation)	Stumb	t Hyde					SMIS	05 100	0 170		nəsdA			
Accreditation NEI AC	Accreditation:	□ Az Co		Sampler: E.	0 5	/ K. Barbon				82703	NO	1.17011	()	resent/			
	□ EDD (Type)			# of Coolers:	ار ا	100 C						222	ΑΟV	<u>ط</u> ) և			
				Cooler Temp(including CF):	(including CF):	5.00 0:12.5°										5110	
Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	19 (FAL No.	BTEX /	.08:H9T 59 1808	EDB (M	d sHA9	RCRA 8	V) 0928	S) 07S8	Total Co	Mg	770W	
11/5	2030	SE.	GBR-50	Vorrions	Various	100-									X	X	
-	040	-	GBR-48			200-						×			×		
	1130		GBR-49			-003						×		^	×		
_	0h II		CBR-32			700				=		X		X	×		
-	330		6BR-52			-005						X		×	~		
_	1220		6811-17	,		-W6				==		X	×	×	_		
	1430	>1	SHS-9	7	<b>&gt;</b> j	-007						×	×	×	_		
116	1325		GBR-24D		>	-MS						×	×	×	1		
11/6	1335		GBR-30	>1	- (-	D 00-						7	×	×			
							+							+			
Date:	Time: 1540	Relinquished by:	ned by:	Received by:	via:	Date Time	Remarks		See	4 1	to	trached	105/		GWC	& Metals	015
Date:  V u  c	Time:	Relinquished by	ned by:	Received by:	Via:	Date Time		T.	Piease	7	: 33	600	2	0 =	148	ecarroll @ Itemr.com	
	If necessary	, samples suk	If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories.	contracted to other ac	credited laborator	ies. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.	possibility	. Any st	np-cont	acted da	ita will b	oe clearl	y notate	d on the	e analyt	cal report.	



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

December 06, 2019

Gregory J. McCartney
Western Refining
#50 CR 4990
Bloomfield, NM 87413
TEL:
FAX:

RE: GBR Annual Sampling OrderNo.: 1911372

Dear Gregory J. McCartney:

Hall Environmental Analysis Laboratory received 3 sample(s) on 11/8/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman

Laboratory Manager

andyl

4901 Hawkins NE

Albuquerque, NM 87109

### Lab Order **1911372**

Date Reported: 12/6/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Client Sample ID: GRW-3

Project: GBR Annual Sampling Collection Date: 11/7/2019 11:00:00 AM

Lab ID: 1911372-001 Matrix: GROUNDWA Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
SM2340B: HARDNESS						Analyst:	bcv
Hardness (As CaCO3)	680	6.6		mg/L	1	12/2/2019 8:25:00 AM	R64878
EPA METHOD 300.0: ANIONS						Analyst:	MRA
Fluoride	ND	0.50		mg/L	5	11/8/2019 9:00:32 PM	R64346
Chloride	100	10		mg/L	20	11/8/2019 9:12:56 PM	R64346
Nitrogen, Nitrite (As N)	ND	0.50		mg/L	5	11/8/2019 9:00:32 PM	R64346
Bromide	0.53	0.50		mg/L	5	11/8/2019 9:00:32 PM	R64346
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	11/8/2019 9:00:32 PM	R64346
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	11/8/2019 9:00:32 PM	R64346
Sulfate	450	10	*	mg/L	20	11/8/2019 9:12:56 PM	R64346
SM2510B: SPECIFIC CONDUCTANCE						Analyst:	JRR
Conductivity	2900	5.0		µmhos/c	1	11/11/2019 11:05:02 PM	I R64428
SM2320B: ALKALINITY						Analyst:	JRR
Bicarbonate (As CaCO3)	1083	20.00		mg/L Ca	1	11/11/2019 11:05:02 PM	I R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	11/11/2019 11:05:02 PM	I R64428
Total Alkalinity (as CaCO3)	1083	20.00		mg/L Ca	1	11/11/2019 11:05:02 PM	I R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst:	JMT
Total Dissolved Solids	1990	100	*D	mg/L	1	11/14/2019 9:12:00 AM	48734
SM4500-H+B / 9040C: PH						Analyst:	JRR
рН	7.89		Н	pH units	1	11/11/2019 11:05:02 PM	I R64428
EPA METHOD 200.7: METALS						Analyst:	bcv
Calcium	180	5.0		mg/L	5	12/2/2019 11:35:49 AM	48794
Iron	2.3	0.10	*	mg/L	5	12/2/2019 11:35:49 AM	48794
Magnesium	53	5.0		mg/L	5	12/2/2019 11:35:49 AM	48794
Manganese	1.4	0.010	*	mg/L	5	12/2/2019 11:35:49 AM	48794
Potassium	ND	5.0		mg/L	5	12/2/2019 11:35:49 AM	48794
Sodium	480	5.0		mg/L	5	12/2/2019 11:35:49 AM	48794
EPA METHOD 8270C: PAHS						Analyst:	JDC
Naphthalene	ND	0.50		μg/L	1	11/15/2019 12:28:12 AM	1 48733
1-Methylnaphthalene	ND	1.0		μg/L	1	11/15/2019 12:28:12 AM	1 48733
2-Methylnaphthalene	ND	1.0		μg/L	1	11/15/2019 12:28:12 AM	1 48733
Acenaphthylene	ND	0.50		μg/L	1	11/15/2019 12:28:12 AM	1 48733
Acenaphthene	0.98	0.50		μg/L	1	11/15/2019 12:28:12 AM	1 48733
Fluorene	4.3	0.50		μg/L	1	11/15/2019 12:28:12 AM	
Phenanthrene	ND	0.50		μg/L	1	11/15/2019 12:28:12 AM	
Anthracene	ND	0.50		μg/L	1	11/15/2019 12:28:12 AM	
Fluoranthene	ND	0.50		μg/L	1	11/15/2019 12:28:12 AM	1 48733

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 1 of 25

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/6/2019

**CLIENT:** Western Refining Client Sample ID: GRW-3

**Project:** GBR Annual Sampling Collection Date: 11/7/2019 11:00:00 AM Lab ID: 1911372-001 Matrix: GROUNDWA Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: PAHS					Analys	t: <b>JDC</b>
Pyrene	ND	0.50	μg/L	1	11/15/2019 12:28:12 A	M 48733
Benz(a)anthracene	ND	0.50	μg/L	1	11/15/2019 12:28:12 A	M 48733
Chrysene	ND	0.50	μg/L	1	11/15/2019 12:28:12 A	M 48733
Benzo(b)fluoranthene	ND	0.50	μg/L	1	11/15/2019 12:28:12 A	M 48733
Benzo(k)fluoranthene	ND	0.50	μg/L	1	11/15/2019 12:28:12 A	M 48733
Benzo(a)pyrene	ND	0.50	μg/L	1	11/15/2019 12:28:12 A	M 48733
Dibenz(a,h)anthracene	ND	0.50	μg/L	1	11/15/2019 12:28:12 A	M 48733
Benzo(g,h,i)perylene	ND	0.50	μg/L	1	11/15/2019 12:28:12 A	M 48733
Indeno(1,2,3-cd)pyrene	ND	0.50	μg/L	1	11/15/2019 12:28:12 A	M 48733
Surr: N-hexadecane	124	20.4-126	%Rec	1	11/15/2019 12:28:12 A	M 48733
Surr: Benzo(e)pyrene	114	21.4-126	%Rec	1	11/15/2019 12:28:12 A	M 48733
EPA METHOD 8260B: VOLATILES					Analys	t: CCM
Benzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Toluene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	
Ethylbenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Naphthalene	ND	2.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
1-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
2-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Acetone	ND	10	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Bromobenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Bromodichloromethane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Bromoform	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Bromomethane	ND	3.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
2-Butanone	ND	10	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Carbon disulfide	ND	10	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Carbon Tetrachloride	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Chlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Chloroethane	ND	2.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Chloroform	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
Chloromethane	ND	3.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
2-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
4-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
cis-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	/ R64408

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 2 of 25

### Lab Order **1911372**

Date Reported: 12/6/2019

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Client Sample ID: GRW-3

 Project:
 GBR Annual Sampling
 Collection Date: 11/7/2019 11:00:00 AM

 Lab ID:
 1911372-001
 Matrix: GROUNDWA
 Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst:	ССМ
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
Dibromochloromethane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
Dibromomethane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,1-Dichloroethane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,1-Dichloroethene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,2-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,3-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
2,2-Dichloropropane	ND	2.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,1-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
Hexachlorobutadiene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
2-Hexanone	ND	10	μg/L	1	11/12/2019 4:44:00 PM	R64408
Isopropylbenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
4-Isopropyltoluene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
4-Methyl-2-pentanone	ND	10	μg/L	1	11/12/2019 4:44:00 PM	R64408
Methylene Chloride	ND	3.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
n-Butylbenzene	ND	3.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
n-Propylbenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
sec-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
Styrene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
tert-Butylbenzene	2.7	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
trans-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
Trichlorofluoromethane	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
Vinyl chloride	ND	1.0	μg/L	1	11/12/2019 4:44:00 PM	R64408
Xylenes, Total	ND	1.5	μg/L	1	11/12/2019 4:44:00 PM	R64408
Surr: 1,2-Dichloroethane-d4	103	70-130	%Rec	1	11/12/2019 4:44:00 PM	R64408

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
  - S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 3 of 25

### Lab Order **1911372**

Date Reported: 12/6/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Client Sample ID: GRW-3

 Project:
 GBR Annual Sampling
 Collection Date: 11/7/2019 11:00:00 AM

 Lab ID:
 1911372-001
 Matrix: GROUNDWA
 Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL Qual Units			Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analys	t: CCM
Surr: 4-Bromofluorobenzene	95.4	70-130	%Rec	1	11/12/2019 4:44:00 PM	/ R64408
Surr: Dibromofluoromethane	99.0	70-130	%Rec	1	11/12/2019 4:44:00 PM	/ R64408
Surr: Toluene-d8	98.1	70-130	%Rec	1	11/12/2019 4:44:00 PM	/ R64408

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 4 of 25

Date Reported: 12/6/2019

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Client Sample ID: GBR-31

 Project:
 GBR Annual Sampling
 Collection Date: 11/7/2019 12:00:00 PM

 Lab ID:
 1911372-002
 Matrix: GROUNDWA
 Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed Batch
SM2340B: HARDNESS						Analyst: <b>bcv</b>
Hardness (As CaCO3)	1500	6.6		mg/L	1	12/2/2019 8:25:00 AM R64878
EPA METHOD 300.0: ANIONS						Analyst: CAS
Fluoride	ND	0.50		mg/L	5	11/12/2019 11:40:58 PM A64442
Chloride	290	10	*	mg/L	20	11/8/2019 9:37:46 PM R64346
Nitrogen, Nitrite (As N)	ND	0.50		mg/L	5	11/8/2019 9:25:21 PM R64346
Bromide	0.98	0.50		mg/L	5	11/8/2019 9:25:21 PM R64346
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	11/8/2019 9:25:21 PM R64346
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	11/8/2019 9:25:21 PM R64346
Sulfate	1600	25	*	mg/L	50	11/12/2019 11:53:49 PM A64442
SM2510B: SPECIFIC CONDUCTANCE						Analyst: JRR
Conductivity	4000	5.0		µmhos/c	1	11/11/2019 11:42:33 PM R64428
SM2320B: ALKALINITY						Analyst: JRR
Bicarbonate (As CaCO3)	300.8	20.00		mg/L Ca	1	11/11/2019 11:42:33 PM R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	11/11/2019 11:42:33 PM R64428
Total Alkalinity (as CaCO3)	300.8	20.00		mg/L Ca	1	11/11/2019 11:42:33 PM R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: <b>JMT</b>
Total Dissolved Solids	3220	40.0	*D	mg/L	1	11/14/2019 9:12:00 AM 48734
SM4500-H+B / 9040C: PH						Analyst: JRR
рН	7.75		Н	pH units	1	11/11/2019 11:42:33 PM R64428
EPA METHOD 200.7: METALS						Analyst: <b>bcv</b>
Calcium	530	20		mg/L	20	12/2/2019 11:50:48 AM 48794
Iron	15	0.40	*	mg/L	20	12/2/2019 11:50:48 AM 48794
Magnesium	49	1.0		mg/L	1	11/15/2019 11:17:38 PM 48794
Manganese	2.7	0.010	*	mg/L	5	12/2/2019 11:48:46 AM 48794
Potassium	3.4	1.0		mg/L	1	11/15/2019 11:17:38 PM 48794
Sodium	430	5.0		mg/L	5	12/2/2019 11:48:46 AM 48794
EPA METHOD 8270C: PAHS						Analyst: JDC
Naphthalene	ND	0.50		μg/L	1	11/15/2019 12:52:21 AM 48733
1-Methylnaphthalene	ND	1.0		μg/L	1	11/15/2019 12:52:21 AM 48733
2-Methylnaphthalene	ND	1.0		μg/L	1	11/15/2019 12:52:21 AM 48733
Acenaphthylene	ND	0.50		μg/L	1	11/15/2019 12:52:21 AM 48733
Acenaphthene	ND	0.50		μg/L	1	11/15/2019 12:52:21 AM 48733
Fluorene	ND	0.50		μg/L	1	11/15/2019 12:52:21 AM 48733
Phenanthrene	ND	0.50		μg/L	1	11/15/2019 12:52:21 AM 48733
Anthracene	ND	0.50		μg/L	1	11/15/2019 12:52:21 AM 48733
Fluoranthene	ND	0.50		μg/L	1	11/15/2019 12:52:21 AM 48733

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 5 of 25

Date Reported: 12/6/2019

Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Client Sample ID: GBR-31

**Project:** GBR Annual Sampling
 Collection Date: 11/7/2019 12:00:00 PM

 **Lab ID:** 1911372-002
 Matrix: GROUNDWA
 Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: PAHS					Analys	t: <b>JDC</b>
Pyrene	ND	0.50	μg/L	1	11/15/2019 12:52:21 A	M 48733
Benz(a)anthracene	ND	0.50	μg/L	1	11/15/2019 12:52:21 A	M 48733
Chrysene	ND	0.50	μg/L	1	11/15/2019 12:52:21 A	M 48733
Benzo(b)fluoranthene	ND	0.50	μg/L	1	11/15/2019 12:52:21 A	M 48733
Benzo(k)fluoranthene	ND	0.50	μg/L	1	11/15/2019 12:52:21 A	M 48733
Benzo(a)pyrene	ND	0.50	μg/L	1	11/15/2019 12:52:21 A	M 48733
Dibenz(a,h)anthracene	ND	0.50	μg/L	1	11/15/2019 12:52:21 A	M 48733
Benzo(g,h,i)perylene	ND	0.50	μg/L	1	11/15/2019 12:52:21 A	M 48733
Indeno(1,2,3-cd)pyrene	ND	0.50	μg/L	1	11/15/2019 12:52:21 A	M 48733
Surr: N-hexadecane	81.4	20.4-126	%Rec	1	11/15/2019 12:52:21 A	M 48733
Surr: Benzo(e)pyrene	67.9	21.4-126	%Rec	1	11/15/2019 12:52:21 A	M 48733
EPA METHOD 8260B: VOLATILES					Analys	t: CCM
Benzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	/ R64408
Toluene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	
Ethylbenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	/ R64408
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	Л R64408
Naphthalene	ND	2.0		1	11/12/2019 5:08:00 PM	/ R64408
1-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 5:08:00 PM	/ R64408
2-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 5:08:00 PM	/ R64408
Acetone	ND	10	μg/L	1	11/12/2019 5:08:00 PM	Л R64408
Bromobenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	Л R64408
Bromodichloromethane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	/I R64408
Bromoform	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	/I R64408
Bromomethane	ND	3.0		1	11/12/2019 5:08:00 PM	/I R64408
2-Butanone	ND	10		1	11/12/2019 5:08:00 PM	/I R64408
Carbon disulfide	ND	10	μg/L	1	11/12/2019 5:08:00 PM	/I R64408
Carbon Tetrachloride	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	/I R64408
Chlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	/I R64408
Chloroethane	ND	2.0	μg/L	1	11/12/2019 5:08:00 PM	/I R64408
Chloroform	ND	1.0		1	11/12/2019 5:08:00 PM	/ R64408
Chloromethane	ND	3.0		1	11/12/2019 5:08:00 PM	
2-Chlorotoluene	ND	1.0		1	11/12/2019 5:08:00 PM	/ R64408
4-Chlorotoluene	ND	1.0		1	11/12/2019 5:08:00 PM	
cis-1,2-DCE	ND	1.0		1	11/12/2019 5:08:00 PM	
cis-1,3-Dichloropropene	ND	1.0		1	11/12/2019 5:08:00 PM	

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 6 of 25

### Lab Order **1911372**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/6/2019

**CLIENT:** Western Refining Client Sample ID: GBR-31

**Project:** GBR Annual Sampling
 Collection Date: 11/7/2019 12:00:00 PM

 **Lab ID:** 1911372-002
 Matrix: GROUNDWA
 Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	: ССМ
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
Dibromochloromethane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
Dibromomethane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,1-Dichloroethane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,1-Dichloroethene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,2-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,3-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
2,2-Dichloropropane	ND	2.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,1-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
Hexachlorobutadiene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
2-Hexanone	ND	10	μg/L	1	11/12/2019 5:08:00 PM	R64408
Isopropylbenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
4-Isopropyltoluene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
4-Methyl-2-pentanone	ND	10	μg/L	1	11/12/2019 5:08:00 PM	R64408
Methylene Chloride	ND	3.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
n-Butylbenzene	ND	3.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
n-Propylbenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
sec-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
Styrene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
tert-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
trans-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
Trichlorofluoromethane	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
Vinyl chloride	ND	1.0	μg/L	1	11/12/2019 5:08:00 PM	R64408
Xylenes, Total	ND	1.5	μg/L	1	11/12/2019 5:08:00 PM	R64408
Surr: 1,2-Dichloroethane-d4	104	70-130	%Rec	1	11/12/2019 5:08:00 PM	R64408

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 7 of 25

### Lab Order **1911372**

Date Reported: 12/6/2019

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Client Sample ID: GBR-31

 Project:
 GBR Annual Sampling
 Collection Date: 11/7/2019 12:00:00 PM

 Lab ID:
 1911372-002
 Matrix: GROUNDWA
 Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL Qu	ıal Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analys	st: CCM
Surr: 4-Bromofluorobenzene	99.5	70-130	%Rec	1	11/12/2019 5:08:00 P	M R64408
Surr: Dibromofluoromethane	100	70-130	%Rec	1	11/12/2019 5:08:00 P	M R64408
Surr: Toluene-d8	97.5	70-130	%Rec	1	11/12/2019 5:08:00 P	M R64408

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 8 of 25

Date Reported: 12/6/2019

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining

Client Sample ID: GRW-6

Project: GBR Annual Sampling Collection Date: 11/7/2019 12:05:00 PM

Lab ID: 1911372-003 Matrix: GROUNDWA Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed Batch
SM2340B: HARDNESS						Analyst: <b>bcv</b>
Hardness (As CaCO3)	1100	6.6		mg/L	1	12/2/2019 8:25:00 AM R64878
EPA METHOD 300.0: ANIONS						Analyst: CAS
Fluoride	0.60	0.50		mg/L	5	11/13/2019 12:32:25 AM A64442
Chloride	94	10		mg/L	20	11/8/2019 10:02:36 PM R64346
Nitrogen, Nitrite (As N)	ND	0.50		mg/L	5	11/8/2019 9:50:11 PM R64346
Bromide	ND	0.50		mg/L	5	11/8/2019 9:50:11 PM R64346
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	11/8/2019 9:50:11 PM R64346
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	11/8/2019 9:50:11 PM R64346
Sulfate	1200	25	*	mg/L	50	11/13/2019 12:45:16 AM A64442
SM2510B: SPECIFIC CONDUCTANCE						Analyst: JRR
Conductivity	3100	5.0		µmhos/c	1	11/11/2019 11:57:11 PM R64428
SM2320B: ALKALINITY						Analyst: JRR
Bicarbonate (As CaCO3)	342.8	20.00		mg/L Ca	1	11/11/2019 11:57:11 PM R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	11/11/2019 11:57:11 PM R64428
Total Alkalinity (as CaCO3)	342.8	20.00		mg/L Ca	1	11/11/2019 11:57:11 PM R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: <b>JMT</b>
Total Dissolved Solids	2470	20.0	*	mg/L	1	11/14/2019 9:12:00 AM 48734
SM4500-H+B / 9040C: PH						Analyst: JRR
рН	7.97		Н	pH units	1	11/11/2019 11:57:11 PM R64428
EPA METHOD 200.7: METALS						Analyst: <b>bcv</b>
Calcium	370	10		mg/L	10	12/2/2019 11:54:52 AM 48794
Iron	8.0	0.20	*	mg/L	10	12/2/2019 11:54:52 AM 48794
Magnesium	39	1.0		mg/L	1	11/15/2019 11:28:09 PM 48794
Manganese	5.9	0.020	*	mg/L	10	12/2/2019 11:54:52 AM 48794
Potassium	2.1	1.0		mg/L	1	12/2/2019 11:52:57 AM 48794
Sodium	380	10		mg/L	10	12/2/2019 11:54:52 AM 48794
EPA METHOD 8270C: PAHS						Analyst: JDC
Naphthalene	ND	0.50		μg/L	1	11/15/2019 1:16:30 AM 48733
1-Methylnaphthalene	ND	1.0		μg/L	1	11/15/2019 1:16:30 AM 48733
2-Methylnaphthalene	ND	1.0		μg/L	1	11/15/2019 1:16:30 AM 48733
Acenaphthylene	ND	0.50		μg/L	1	11/15/2019 1:16:30 AM 48733
Acenaphthene	ND	0.50		μg/L	1	11/15/2019 1:16:30 AM 48733
Fluorene	ND	0.50		μg/L	1	11/15/2019 1:16:30 AM 48733
Phenanthrene	ND	0.50		μg/L	1	11/15/2019 1:16:30 AM 48733
Anthracene	ND	0.50		μg/L	1	11/15/2019 1:16:30 AM 48733
Fluoranthene	ND	0.50		μg/L	1	11/15/2019 1:16:30 AM 48733

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 9 of 25

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/6/2019

CLIENT: Western Refining Client Sample ID: GRW-6

Project:GBR Annual SamplingCollection Date: 11/7/2019 12:05:00 PMLab ID:1911372-003Matrix: GROUNDWAReceived Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: PAHS					Analyst	: JDC
Pyrene	ND	0.50	μg/L	1	11/15/2019 1:16:30 AM	48733
Benz(a)anthracene	ND	0.50	μg/L	1	11/15/2019 1:16:30 AM	48733
Chrysene	ND	0.50	μg/L	1	11/15/2019 1:16:30 AM	48733
Benzo(b)fluoranthene	ND	0.50	μg/L	1	11/15/2019 1:16:30 AM	48733
Benzo(k)fluoranthene	ND	0.50	μg/L	1	11/15/2019 1:16:30 AM	48733
Benzo(a)pyrene	ND	0.50	μg/L	1	11/15/2019 1:16:30 AM	48733
Dibenz(a,h)anthracene	ND	0.50	μg/L	1	11/15/2019 1:16:30 AM	48733
Benzo(g,h,i)perylene	ND	0.50	μg/L	1	11/15/2019 1:16:30 AM	48733
Indeno(1,2,3-cd)pyrene	ND	0.50	μg/L	1	11/15/2019 1:16:30 AM	48733
Surr: N-hexadecane	72.4	20.4-126	%Rec	1	11/15/2019 1:16:30 AM	48733
Surr: Benzo(e)pyrene	64.4	21.4-126	%Rec	1	11/15/2019 1:16:30 AM	48733
EPA METHOD 8260B: VOLATILES					Analyst	: CCM
Benzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Toluene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	
Ethylbenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Naphthalene	ND	2.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
2-Methylnaphthalene	ND	4.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Acetone	ND	10	μg/L	1	11/12/2019 5:31:00 PM	R64408
Bromobenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Bromodichloromethane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Bromoform	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Bromomethane	ND	3.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
2-Butanone	ND	10	μg/L	1	11/12/2019 5:31:00 PM	R64408
Carbon disulfide	ND	10	μg/L	1	11/12/2019 5:31:00 PM	R64408
Carbon Tetrachloride	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Chlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Chloroethane	ND	2.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Chloroform	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Chloromethane	ND	3.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
2-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
4-Chlorotoluene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
cis-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 10 of 25

### Lab Order **1911372**

Date Reported: 12/6/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Client Sample ID: GRW-6

**Project:** GBR Annual Sampling
 Collection Date: 11/7/2019 12:05:00 PM

 **Lab ID:** 1911372-003
 Matrix: GROUNDWA
 Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst:	ССМ
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Dibromochloromethane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Dibromomethane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,1-Dichloroethane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,1-Dichloroethene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,2-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,3-Dichloropropane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
2,2-Dichloropropane	ND	2.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,1-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Hexachlorobutadiene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
2-Hexanone	ND	10	μg/L	1	11/12/2019 5:31:00 PM	R64408
Isopropylbenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
4-Isopropyltoluene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
4-Methyl-2-pentanone	ND	10	μg/L	1	11/12/2019 5:31:00 PM	R64408
Methylene Chloride	ND	3.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
n-Butylbenzene	ND	3.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
n-Propylbenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
sec-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Styrene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
tert-Butylbenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
trans-1,2-DCE	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Trichlorofluoromethane	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Vinyl chloride	ND	1.0	μg/L	1	11/12/2019 5:31:00 PM	R64408
Xylenes, Total	ND	1.5	μg/L	1	11/12/2019 5:31:00 PM	R64408
Surr: 1,2-Dichloroethane-d4	101	70-130	%Rec	1	11/12/2019 5:31:00 PM	R64408

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
  - S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 11 of 25

### Lab Order **1911372**

Date Reported: 12/6/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Client Sample ID: GRW-6

**Project:** GBR Annual Sampling
 Collection Date: 11/7/2019 12:05:00 PM

 **Lab ID:** 1911372-003
 Matrix: GROUNDWA
 Received Date: 11/8/2019 8:20:00 AM

Analyses	Result	RL Qı	ıal Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analy	st: CCM
Surr: 4-Bromofluorobenzene	100	70-130	%Rec	1	11/12/2019 5:31:00 P	M R64408
Surr: Dibromofluoromethane	98.5	70-130	%Rec	1	11/12/2019 5:31:00 P	M R64408
Surr: Toluene-d8	98.8	70-130	%Rec	1	11/12/2019 5:31:00 P	M R64408

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 12 of 25

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372** 

06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: MB-48794 SampType: MBLK TestCode: EPA Method 200.7: Metals PBW Client ID: Batch ID: 48794 RunNo: 64544 Prep Date: 11/14/2019 Analysis Date: 11/15/2019 SeqNo: 2210018 Units: mg/L PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Analyte Result Calcium ND 1.0 Iron ND 0.020 ND Magnesium 1.0 Manganese ND 0.0020 Potassium ND 1.0 Sodium ND 1.0

Sample ID: LLLCS-48794 SampType: LCSLL TestCode: EPA Method 200.7: Metals Client ID: **BatchQC** Batch ID: 48794 RunNo: 64544 Prep Date: 11/14/2019 Analysis Date: 11/15/2019 SeqNo: 2210023 Units: mg/L SPK value SPK Ref Val %REC %RPD **RPDLimit** PQL LowLimit HighLimit Qual Analyte Result Calcium ND 1.0 0.5000 0 101 50 0 50 0.023 0.020 0.02000 117 150 Iron Magnesium ND 0.5000 0 102 50 150 1.0 0 Manganese 0.0020 0.0020 0.002000 101 50 150 Potassium ND 0.5000 0 121 50 150 1.0 Sodium ND 1.0 0.5000 0 108 50 150

Sample ID: LCS-48794	Samp	Type: <b>LC</b>	S	Tes	tCode: El	PA Method	200.7: Metals			
Client ID: LCSW	Bato	h ID: 48	794	F	RunNo: 64	<b>4544</b>				
Prep Date: 11/14/2019	Analysis	Date: 11	/15/2019	SeqNo: <b>2210025</b>			Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50	1.0	50.00	0	100	85	115			
Iron	0.49	0.020	0.5000	0	97.5	85	115			
Magnesium	50	1.0	50.00	0	99.1	85	115			
Manganese	0.49	0.0020	0.5000	0	97.2	85	115			
Potassium	50	1.0	50.00	0	99.8	85	115			
Sodium	50	1.0	50.00	0	99.4	85	115			

Sample ID: 1911372-001DMS	SampT	уре: МS	6	Tes						
Client ID: GRW-3	Batch	n ID: 487	794	F	RunNo: 64	4878				
Prep Date: 11/14/2019	Analysis D	oate: 12	2/2/2019	SeqNo: <b>2224252</b>			Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	230	5.0	50.00	183.7	102	70	130			
Iron	2.8	0.10	0.5000	2.275	99.6	70	130			
Magnesium	100	5.0	50.00	53.23	102	70	130			
Manganese	1.9	0.010	0.5000	1.407	96.9	70	130			

#### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Page 13 of 25

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1911372

06-Dec-19

**Client:** Western Refining **Project: GBR** Annual Sampling

Sample ID: 1911372-001DMS SampType: MS TestCode: EPA Method 200.7: Metals

Client ID: GRW-3 Batch ID: 48794 RunNo: 64878

Prep Date: 11/14/2019 Analysis Date: 12/2/2019 SeqNo: 2224252 Units: mg/L

Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Analyte

1.315 Potassium 51 5.0 50.00 100 70 130

Sample ID: 1911372-001DMSD SampType: MSD TestCode: EPA Method 200.7: Metals

Client ID: GRW-3 Batch ID: 48794 RunNo: 64878

Prep Date: 11/14/2019	Analysis [	Date: 12	2/2/2019	S	SeqNo: <b>2224256</b> Units:			nits: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Calcium	230	5.0	50.00	183.7	96.6	70	130	1.21	20		
Iron	2.7	0.10	0.5000	2.275	79.9	70	130	3.62	20		
Magnesium	100	5.0	50.00	53.23	102	70	130	0.116	20		
Manganese	1.9	0.010	0.5000	1.407	91.2	70	130	1.50	20		
Potassium	52	5.0	50.00	1.315	101	70	130	0.422	20		

### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Н Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

% Recovery outside of range due to dilution or matrix

Analyte detected in the associated Method Blank

Value above quantitation range

Analyte detected below quantitation limits

Sample pH Not In Range

RL Reporting Limit Page 14 of 25

# Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372** 

06-Dec-19

OI- ID MD	O T b.H-
Project:	GBR Annual Sampling
Client:	Western Refining

Sample ID: MB	SampT	ype: <b>mb</b>	lk	Tes	tCode: <b>EF</b>	;				
Client ID: PBW	Batch	n ID: <b>R6</b>	4346	F	RunNo: 64	4346				
Prep Date:	Analysis D	nalysis Date: 11/8/2019			SeqNo: <b>2203722</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								
Sulfate	ND	0.50								

Sample ID: LCS-B	SampT	ype: Ics	;	Tes	tCode: El	PA Method	300.0: Anions	3		
Client ID: LCSW	Batcl	n ID: <b>R6</b>	4346	F	RunNo: 6	4346				
Prep Date:	Analysis D	oate: 11	/8/2019	8	SeqNo: 2	203724	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.56	0.10	0.5000	0	112	90	110			S
Chloride	5.0	0.50	5.000	0	99.2	90	110			
Nitrogen, Nitrite (As N)	0.95	0.10	1.000	0	95.1	90	110			
Bromide	2.5	0.10	2.500	0	100	90	110			
Nitrogen, Nitrate (As N)	2.6	0.10	2.500	0	104	90	110			
Phosphorus, Orthophosphate (As P	4.9	0.50	5.000	0	97.1	90	110			
Sulfate	9.8	0.50	10.00	0	98.5	90	110			

Sample ID: MB	SampT	ype: <b>m</b> b	olk	Tes	tCode: El	5				
Client ID: PBW	Batch	ID: <b>A6</b>	4442	R	tunNo: 6	4442				
Prep Date:	Analysis D	ate: 11	/12/2019	S	SeqNo: 2	206103	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Sulfate	ND	0.50								

Sample ID: LCS	SampT	SampType: Ics				PA Method	5			
Client ID: LCSW	Batch	ID: <b>A6</b>	4442	R	RunNo: 64	4442				
Prep Date:	Analysis D	ate: 11	/12/2019	S	SeqNo: 2206104					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.49	0.10	0.5000	0	98.1	90	110			
Sulfate	9.3	0.50	10.00	0	93.2	90	110			

## Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 15 of 25

# Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372** 

06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: 100ng Ics	SampT	ype: <b>LC</b>	S	Tes	tCode: El	ATILES				
Client ID: LCSW	Batch	n ID: <b>R6</b>	4408	F	RunNo: 64	4408				
Prep Date:	Analysis D	ate: 11	/12/2019	S	SeqNo: 2	205162	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	20	1.0	20.00	0	98.1	70	130			
Toluene	19	1.0	20.00	0	97.2	70	130			
Chlorobenzene	20	1.0	20.00	0	99.3	70	130			
1,1-Dichloroethene	19	1.0	20.00	0	95.9	70	130			
Trichloroethene (TCE)	18	1.0	20.00	0	91.8	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		102	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		98.1	70	130			
Surr: Dibromofluoromethane	10		10.00		101	70	130			
Surr: Toluene-d8	9.9		10.00		99.1	70	130			

Sample ID: rb1	SampT	ype: <b>ME</b>	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: R6	4408	F	RunNo: 6	4408				
Prep Date:	Analysis D	ate: <b>1</b> 1	1/12/2019	8	SeqNo: 2	207186	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								

Е	thylbenzene	ND	1.0	
N	lethyl tert-butyl ether (MTBE)	ND	1.0	
1	,2,4-Trimethylbenzene	ND	1.0	
1	,3,5-Trimethylbenzene	ND	1.0	
1	,2-Dichloroethane (EDC)	ND	1.0	
1	,2-Dibromoethane (EDB)	ND	1.0	
Ν	laphthalene	ND	2.0	
1	-Methylnaphthalene	ND	4.0	
2	-Methylnaphthalene	ND	4.0	
Α	cetone	ND	10	
В	romobenzene	ND	1.0	
В	romodichloromethane	ND	1.0	
В	romoform	ND	1.0	
В	romomethane	ND	3.0	
2	-Butanone	ND	10	
C	Carbon disulfide	ND	10	
C	Carbon Tetrachloride	ND	1.0	
C	Chlorobenzene	ND	1.0	
C	chloroethane	ND	2.0	
C	Chloroform	ND	1.0	
C	Chloromethane	ND	3.0	
2	-Chlorotoluene	ND	1.0	

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

# Hall Environmental Analysis Laboratory, Inc.

SampType: MBLK

WO#: 1911372

06-Dec-19

**Client:** Western Refining **Project: GBR** Annual Sampling

Sample ID: rb1

Client ID: PBW Batch ID: R64408 RunNo: 64408

TestCode: EPA Method 8260B: VOLATILES

Client ID: PBW	Batci	n ID: <b>R6</b>	4408	ŀ	Runno: 64	4408				
Prep Date:	Analysis D	Date: 11	1/12/2019	5	SeqNo: 22	207186	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Н Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix

- Analyte detected in the associated Method Blank
- Value above quantitation range
- Analyte detected below quantitation limits
- Sample pH Not In Range
- RL Reporting Limit

# Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372** 

06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: rb1	SampT	Гуре: <b>МЕ</b>	BLK	Tes	tCode: El					
Client ID: PBW	Batcl	h ID: <b>R6</b>	4408	F	RunNo: 6	4408				
Prep Date:	Analysis D	nalysis Date: 11/12/2019				207186	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		101	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		99.6	70	130			
Surr: Dibromofluoromethane	10		10.00		102	70	130			
Surr: Toluene-d8	9.9		10.00		98.9	70	130			

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1911372

06-Dec-19

**Client:** Western Refining **Project: GBR** Annual Sampling

Sample ID: mb-48733 SampType: MBLK TestCode: EPA Method 8270C: PAHs Client ID: PBW Batch ID: 48733 RunNo: 64521 Prep Date: 11/12/2019 Analysis Date: 11/14/2019 SeqNo: 2209222 Units: µg/L Analyte PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Result Naphthalene ND 0.50 1-Methylnaphthalene ND 1.0 2-Methylnaphthalene ND 1.0 Acenaphthylene ND 0.50 Acenaphthene ND 0.50 Fluorene ND 0.50 Phenanthrene ND 0.50 Anthracene ND 0.50 Fluoranthene ND 0.50 Pyrene ND 0.50 ND 0.50 Benz(a)anthracene 0.50 ND Chrysene ND 0.50 Benzo(b)fluoranthene Benzo(k)fluoranthene ND 0.50 Benzo(a)pyrene ND 0.50 Dibenz(a,h)anthracene ND 0.50 ND 0.50 Benzo(g,h,i)perylene Indeno(1,2,3-cd)pyrene ND 0.50 Surr: N-hexadecane 74 87.60 84.4 20.4 126 Surr: Benzo(e)pyrene 17 20.00 84.2 21.4 126

Sample ID: Ics-48733	SampType: LCS TestCode: EPA Method 8270C: PAHs											
Client ID: LCSW	Batch	n ID: 48	733									
Prep Date: 11/12/2019	Analysis D	)ate: 11	/14/2019	S	SeqNo: 2	209226	Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Naphthalene	13	0.50	20.00	0	65.6	41.8	97.8					
1-Methylnaphthalene	13	1.0	20.00	0	65.7	44.7	104					
2-Methylnaphthalene	14	1.0	20.00	0	72.4	45	101					
Acenaphthylene	14	0.50	20.00	0	69.9	51.2	102					
Acenaphthene	12	0.50	20.00	0	61.2	53.2	101					
Fluorene	14	0.50	20.00	0	71.6	57.6	106					
Phenanthrene	14	0.50	20.00	0	71.0	57.6	109					
Anthracene	14	0.50	20.00	0	70.1	56.1	98.9					
Fluoranthene	16	0.50	20.00	0	79.2	61.4	114					
Pyrene	15	0.50	20.00	0	76.7	58	110					
Benz(a)anthracene	14	0.50	20.00	0	72.0	60	102					
Chrysene	14	0.50	20.00	0	69.7	50.8	93.4					
Benzo(b)fluoranthene	15	0.50	20.00	0	72.9	56.2	118					

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- D Sample Diluted Due to Matrix
- Н Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix

- Analyte detected in the associated Method Blank
- Е Value above quantitation range
- Analyte detected below quantitation limits
- Sample pH Not In Range
- RL Reporting Limit

Page 19 of 25

# Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372** 

06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: Ics-48733 SampType: LCS TestCode: EPA Method 8270C: PAHs Client ID: LCSW Batch ID: 48733 RunNo: 64521 SeqNo: 2209226 Prep Date: 11/12/2019 Analysis Date: 11/14/2019 Units: µg/L Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Benzo(k)fluoranthene 15 0.50 20.00 0 72.7 57.7 119 Benzo(a)pyrene 15 0.50 20.00 0 73.9 55.5 114 15 0.50 20.00 0 73.0 53 Dibenz(a,h)anthracene 110 15 0 74.7 Benzo(g,h,i)perylene 0.50 20.00 55 113 0 Indeno(1,2,3-cd)pyrene 15 0.50 20.00 73.5 51.2 115 Surr: N-hexadecane 61 87.60 70.2 20.4 126 Surr: Benzo(e)pyrene 13 20.00 66.3 21.4 126

Sample ID: Icsd-48733	SampT	ype: <b>LC</b>	SD	Tes	tCode: El	PA Method	8270C: PAHs			
Client ID: LCSS02	Batch	ID: <b>48</b> 7	733	F	RunNo: 64	4521		hits: μg/L    lighLimit		
Prep Date: 11/12/2019	Analysis D	ate: 11	/14/2019	8	SeqNo: 2	209227	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	13	0.50	20.00	0	65.7	41.8	97.8	0.152	25.4	
1-Methylnaphthalene	13	1.0	20.00	0	64.4	44.7	104	2.00	21.5	
2-Methylnaphthalene	14	1.0	20.00	0	68.6	45	101	5.39	25.2	
Acenaphthylene	13	0.50	20.00	0	66.2	51.2	102	5.44	30.3	
Acenaphthene	12	0.50	20.00	0	61.2	53.2	101	0	28.1	
Fluorene	14	0.50	20.00	0	69.3	57.6	106	3.26	33	
Phenanthrene	14	0.50	20.00	0	71.5	57.6	109	0.702	24.5	
Anthracene	14	0.50	20.00	0	67.6	56.1	98.9	3.63	26.9	
Fluoranthene	15	0.50	20.00	0	74.3	61.4	114	6.38	21.8	
Pyrene	14	0.50	20.00	0	69.7	58	110	9.56	27	
Benz(a)anthracene	13	0.50	20.00	0	66.2	60	102	8.39	27.4	
Chrysene	13	0.50	20.00	0	63.3	50.8	93.4	9.62	20.4	
Benzo(b)fluoranthene	13	0.50	20.00	0	65.9	56.2	118	10.1	22.5	
Benzo(k)fluoranthene	14	0.50	20.00	0	71.3	57.7	119	1.94	24.1	
Benzo(a)pyrene	13	0.50	20.00	0	67.3	55.5	114	9.35	27.3	
Dibenz(a,h)anthracene	13	0.50	20.00	0	66.8	53	110	8.87	18.5	
Benzo(g,h,i)perylene	14	0.50	20.00	0	69.8	55	113	6.78	28.4	
Indeno(1,2,3-cd)pyrene	14	0.50	20.00	0	68.8	51.2	115	6.61	21.8	
Surr: N-hexadecane	57		87.60		64.6	20.4	126	0	0	
Surr: Benzo(e)pyrene	12		20.00		61.3	21.4	126	0	0	

### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 20 of 25

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372** 

06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: Ics-1 99.1uS eC SampType: Ics TestCode: SM2510B: Specific Conductance

Client ID: LCSW Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2205385 Units: µmhos/cm

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Conductivity 100 5.0 99.10 0 101 85 115

Sample ID: Ics-2 99.1uS eC SampType: Ics TestCode: SM2510B: Specific Conductance

Client ID: LCSW Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/11/2019 SeqNo: 2205413 Units: µmhos/cm

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Conductivity 110 5.0 99.10 0 107 85 115

#### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

# Hall Environmental Analysis Laboratory, Inc.

7.99

WO#: **1911372** 

Н

06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

рΗ

Sample ID: 1911372-003c dup SampType: dup TestCode: SM4500-H+B / 9040C: pH

Client ID: GRW-6 Batch ID: R64428 RunNo: 64428

Prep Date: Analysis Date: 11/12/2019 SeqNo: 2205472 Units: pH units

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 22 of 25

# Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372** 

06-Dec-19

	Western Refining GBR Annual Sampling													
Sample ID: mb-1 alk	SampType: mblk Test	TestCode: SM2320B: Alkalinity												
Client ID: PBW	Batch ID: R64428	RunNo: 64428												
Prep Date:	Analysis Date: 11/11/2019 S	SeqNo: 2205475 Units: mg/L CaCO3												
Analyte	Result PQL SPK value SPK Ref Val	l %REC LowLimit HighLimit %RPD RPDLimit Qual												
Total Alkalinity (as CaCO3)	ND 20.00													
Sample ID: Ics-1 alk	EID: Ics-1 alk SampType: Ics TestCode: SM2320B: Alkalinity													
Client ID: LCSW	Batch ID: R64428	RunNo: 64428												
Prep Date:	Analysis Date: 11/11/2019 S	SeqNo: 2205476 Units: mg/L CaCO3												
Analyte	Result PQL SPK value SPK Ref Val	l %REC LowLimit HighLimit %RPD RPDLimit Qual												
Total Alkalinity (as CaCO3	8) 77.24 20.00 80.00 0	96.6 90 110												
Sample ID: mb-2 alk	Sample ID: mb-2 alk SampType: mblk TestCode: SM2320B: Alkalinity													
Client ID: PBW	Batch ID: <b>R64428</b>	RunNo: 64428												
Prep Date:	Analysis Date: 11/11/2019 S	SeqNo: 2205498 Units: mg/L CaCO3												
Analyte	Result PQL SPK value SPK Ref Val	I %REC LowLimit HighLimit %RPD RPDLimit Qual												
Total Alkalinity (as CaCO3	ND 20.00													
Sample ID: Ics-2 alk	SampType: Ics Tes	stCode: SM2320B: Alkalinity												
Client ID: LCSW	Batch ID: <b>R64428</b>	RunNo: <b>64428</b>												
Prep Date:	Analysis Date: 11/11/2019 S	SeqNo: <b>2205499</b> Units: <b>mg/L CaCO3</b>												
Analyte	Result PQL SPK value SPK Ref Val	l %REC LowLimit HighLimit %RPD RPDLimit Qual												
Total Alkalinity (as CaCO3	3) 77.80 20.00 80.00 0	97.3 90 110												
Sample ID: mb-3 alk	SampType: mblk Tes	stCode: SM2320B: Alkalinity												
Client ID: PBW	Batch ID: R64428	RunNo: <b>64428</b>												
Prep Date:	Analysis Date: 11/11/2019 S	SeqNo: <b>2205521</b> Units: <b>mg/L CaCO3</b>												
Analyte	Result PQL SPK value SPK Ref Val	l %REC LowLimit HighLimit %RPD RPDLimit Qual												
Total Alkalinity (as CaCO3	ND 20.00													
Sample ID: Ics-3 alk	SampType: Ics Tes	stCode: SM2320B: Alkalinity												
Client ID: LCSW	Batch ID: R64428	RunNo: <b>64428</b>												
Prep Date:	Analysis Date: 11/11/2019 S	SeqNo: 2205522 Units: mg/L CaCO3												
Analyte	Result PQL SPK value SPK Ref Val	l %REC LowLimit HighLimit %RPD RPDLimit Qual												
Total Alkalinity (as CaCO3	3) 77.88 20.00 80.00 0	97.4 90 110												

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

# Hall Environmental Analysis Laboratory, Inc.

344.1

WO#: 1911372

0.361

20

06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Total Alkalinity (as CaCO3)

Sample ID: 1911372-003c dup SampType: dup TestCode: SM2320B: Alkalinity

Client ID: GRW-6 Batch ID: R64428 RunNo: 64428

20.00

Prep Date: Analysis Date: 11/12/2019 SeqNo: 2205529 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

## Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

Page 24 of 25

## Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372** 

06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: MB-48734 SampType: MBLK TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW Batch ID: 48734 RunNo: 64490

Prep Date: 11/12/2019 Analysis Date: 11/14/2019 SeqNo: 2207771 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids ND 20.0

Sample ID: LCS-48734 SampType: LCS TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: LCSW Batch ID: 48734 RunNo: 64490

Prep Date: 11/12/2019 Analysis Date: 11/14/2019 SeqNo: 2207772 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids 1010 20.0 1000 0 101 80 120

#### Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109

TEL: 505-345-3975 FAX: 505-345-4107

# Sample Log-In Check List

Website: www.hallenvironmental.com

Client Name:	Western Refining Southw	Work Order Num	ber: 191	1372		RcptN	RcptNo: 1				
Received By:	Desiree Dominguez	11/8/2019 8:20:00	AM		1						
Completed By:	Yazmine Garduno	11/8/2019 2:23:17	РМ		Apaymin leftraut						
Reviewed By:	or 11/7/19				0 0						
Chain of Cus	<u>tody</u>										
1. Is Chain of Cu	ustody complete?		Yes	~	No 🗌	Not Present					
2. How was the	sample delivered?		Cour	<u>ier</u>							
Log In											
A STATE OF THE ABOVE THE REAL PROPERTY.	pt made to cool the samples?		Yes	<b>V</b>	No 🗌	NA 🗆					
4. Were all samp	oles received at a temperature	of >0° C to 6.0°C	Yes	<b>~</b>	No 🗌	NA 🗆					
5. Sample(s) in p	proper container(s)?		Yes	<b>~</b>	No 🗌						
3. Sufficient sam	ple volume for indicated test(s	)?	Yes	<b>V</b>	No 🗌						
7. Are samples (e	except VOA and ONG) proper	y preserved?	Yes	<b>V</b>	No 🗌	1/2/19					
	ive added to bottles?		Yes		No V	DAD 11/8/19					
O. VOA vials have	e zero headspace?		Yes	<b>V</b>	No 🗌	No VOA Vials					
0. Were any sam	ple containers received broke	n?	Yes		No 🗸						
						# of preserved bottles checked	,				
	rk match bottle labels? ncies on chain of custody)		Yes	<b>V</b>	No 🗌	for pH:	r >12 unless noted)				
	orrectly identified on Chain of	Custody?	Yes	<b>V</b>	No 🗌		YES				
3. Is it clear what	analyses were requested?		Yes	<b>~</b>	No 🗌						
	g times able to be met? stomer for authorization.)		Yes	<b>~</b>	No 🗆	Checked by: T	DAD 11/8/19				
	ng (if applicable)										
	ified of all discrepancies with	this order?	Yes		No 🗌	NA 🗹					
Person I	Notified:	Date		SALES NO.	-						
By Whor	m:	Via:	eMa	il 🗆 F	hone Fax	☐ In Person					
Regardir	ng:		the state of the s	and the state of							
Client In	structions:										
6. Additional ren	narks: For metals au	halysis added	10.5	nc. H	NO3 to Se	mple ODID for	PHZZ.				
7. Cooler Inform	nation										
Cooler No	I was a second of the second o	eal Intact Seal No	Seal Da	te	Signed By						
1	4.7 Good										

I ATMOMMODIAN		www.hallenvironmental.com	4901 Hawkins NE - Albuquerque, NM 87109	Tel. 505-345-3975 Fax 505-345-4107	Analysis Request	†O9	PCB's	S808\ <sub>1</sub> (Γ.40) (Γ.40) (Γ.40) (Γ.40) (Γ.80) (Α.40) (Α.40)	GGR idess ides io io io io io io io io io io io io io	estic Metho by 83 8 Me 3r, <i>N</i> VOA)	8081 P PAHs E RCRA CI, F, I	X	<i>X x x</i>	* × ×					Remarks: See attached for GWC analytes	Pipase CC: ecarroll@itemp.com	1840 Mincha Malle Commendation of the properties of this contract of the properties of the contract of the properties of the contract of the properties of the
Turn-Around Time:	☐ Standard □ Rush □	Project Name:	GBR	Project #:		Brgject Manager:	Stiurt Hyde	Sampler: E. Carroll / M. Mrduemorich	olers: \	Cooler Temp(including cF): 5,0-0,3 < 4,7%	Container Type and # Type		-002	U V -003					Received by: Via: Date Time	Via: Date T	Courter 11/8/19 8:20
Chain-of-Custody Record	Client: Western Refining	Grea Mclastoney	Mailing Address: 111 Rd 4990	Bisomsied, NM 87413	Phone #:	email or Fax#: S J MCC CLTME & MURTHANDERPLUM ETGlect Manager:	QA/QC Package:	Accreditation:   Az Compliance	(be)		Date Time Matrix Sample Name	11/7/19 1100 Gin GRW-3	1200 GW GBR-31	1205 GW GRW-6					Date: Time: Relinquished by:	Date: Time: Relinquished by:	17/19 1840 Mistry 12/10/12