GW - 040

ANNUAL REPORT

2019

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LT Environmental, Inc.
848 East Second Avenue
Durango, Colorado 81301
970.385.1096

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

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

Prepared by: _____ February 27, 2020

Stuart Hyde, LG
LTE Project Geologist

Date

Reviewed by: _____ February 27, 2020

Ashley Ager, P.G.
LTE Senior Geologist

Date

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APPENDICES

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 post-shutdown 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™ 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.
    - EDC was detected in groundwater from monitoring well GBR-24D.
    - 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.
    - 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

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FIGURES

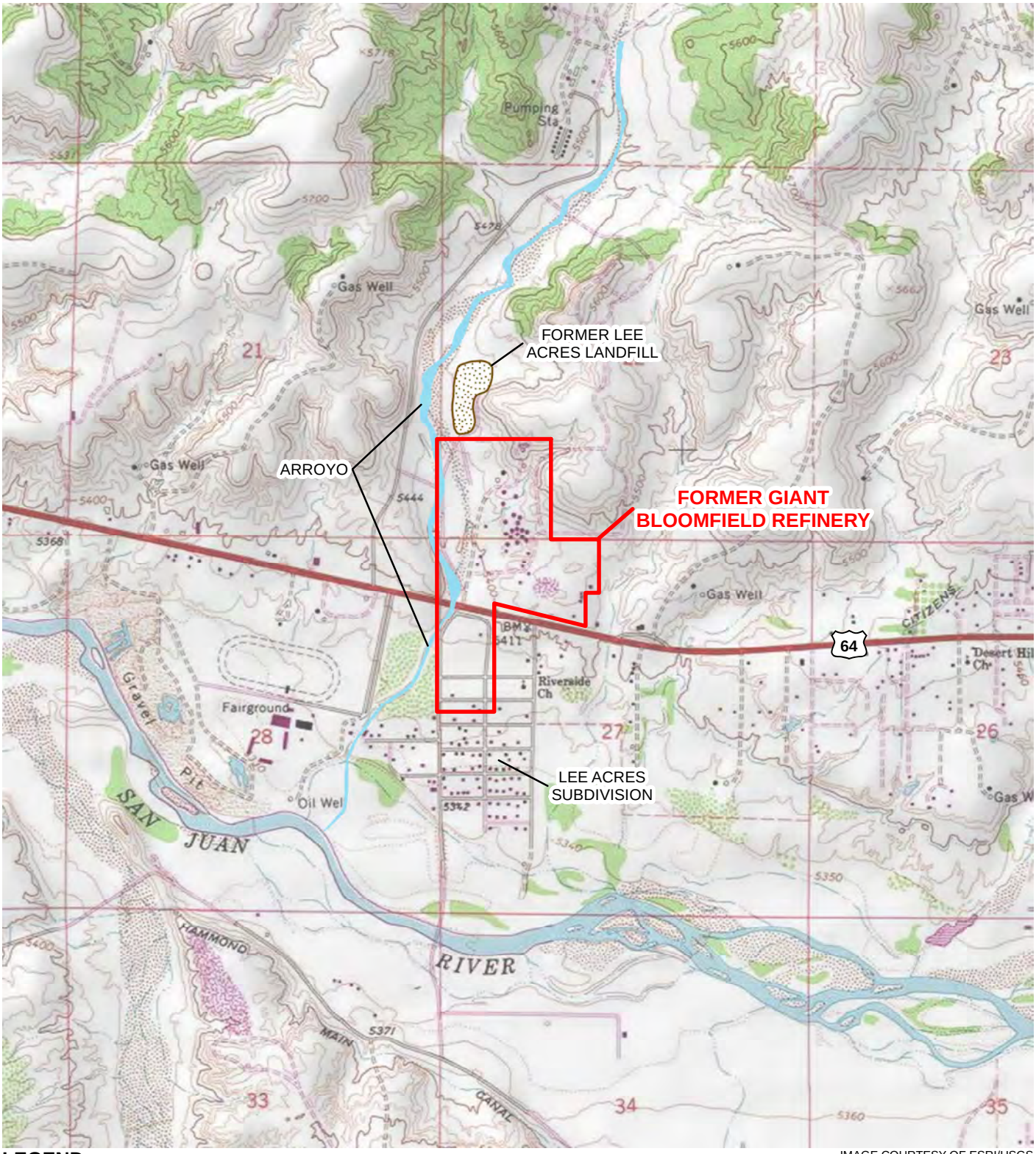


IMAGE COURTESY OF ESRI/USGS

LEGEND

- SITE LOCATION
- ARROYO
- FORMER LEE ACRES LANDFILL

NEW MEXICO

0 2,000 4,000
Feet

N

FIGURE 1
SITE LOCATION MAP
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

P:\Western Refining\GIS\MXD\029519002_GBR\029518010_GIANT_FIG01_SL.mxd

GBR-50
GBR-48
GBR-32
GBR-18
GBR-49
COUNTY RD 5500
GBR-17
GBR-24S
GBR-24D
NORTHERN AREA: DIESEL SPILL AREA
A
GBR-30
GBR-23
GRW-13
GBR-15
GBR-26
GBR-21D, GBR-21S
GBR-39
TANK 102
AST
GRW-11
GRW-12
GBR-25
GBR-31
GBR-22
B
GBR-34
GBR-33
GBR-34A
CENTRAL AREA: TRUCK FUELING AREA
GBR-35
B'
GBR-40
GRW-10
CONTROL BUILDING
GBR-41
CARBON FILTRATION TANK
INFILTRATION TRENCH
GBR-19
GBR-13
GBR-52
GBR-51
SOUTHERN AREA: FORMER SEEP
AND STORM WATER CATCHMENT AREAS
GBR-20
GRW-6
GRW-9
GBR-5
GBR-7
64
GRW-5
GRW-3
GRW-2
GRW-1
GBR-11
GBR-10
GBR-8
GRW-4
GBR-9
SHS-4
SHS-1
A'
SHS-5
SHS-8
SHS-9
SHS-2
SHS-3
SHS-6
SHS-19
64
SHS-12
SHS-10
COUNTY RD 5467
SHS-18
COUNTY RD 5466
COUNTY RD 5468
SHS-13
SHS-14
SHS-15
LEE ACRES
SUBDIVISION
COUNTY RD 5470
SHS-17
SHS-16

LEGEND

- MONITORING WELL
- INACTIVE RECOVERY WELL
- PLUGGED AND ABANDONED MONITORING WELL
- ABOVEGROUND STORAGE TANK (AST)
- CROSS SECTION A-A'
- CROSS SECTION B-B'
- ARROYO
- FORMER LEE ACRES LANDFILL
- SOURCE AREA

0 300 600
Feet

N

FIGURE 2
SITE MAP
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

P:\Western Refining\GIS\MXD\029519002_GBR\029518010_GIANT_FIG02_SITE_XSEC.mxd

NORTH

A

SOUTH

A'

ELEVATION IN FEET

5,400
5,395
5,390
5,385
5,380
5,375
5,370
5,365
5,360
5,355
5,350
5,345
5,340
5,335
5,330

GBR24D

TD =
49 FEET BGS

GBR25

TD =
48 FEET BGS

GBR22

SILTED IN

TD =
48 FEET BGS

GBR34

TD =
48' FEET BGS

GBR35

TD =
50 FEET BGS

GBR13

TD =
48 FEET BGS

GBR11

TD =
55 FEET BGS

SHS8

TD =
53 FEET BGS

SCREENED
INTERVAL
UNKNOWN

LEGEND

- SANDY SILT
- CLAYEY SAND
- SILTY SAND
- SAND
- PEBBLES/GRAVEL
- NACIMIENTO SHALE
- NACIMIENTO SANDSTONE

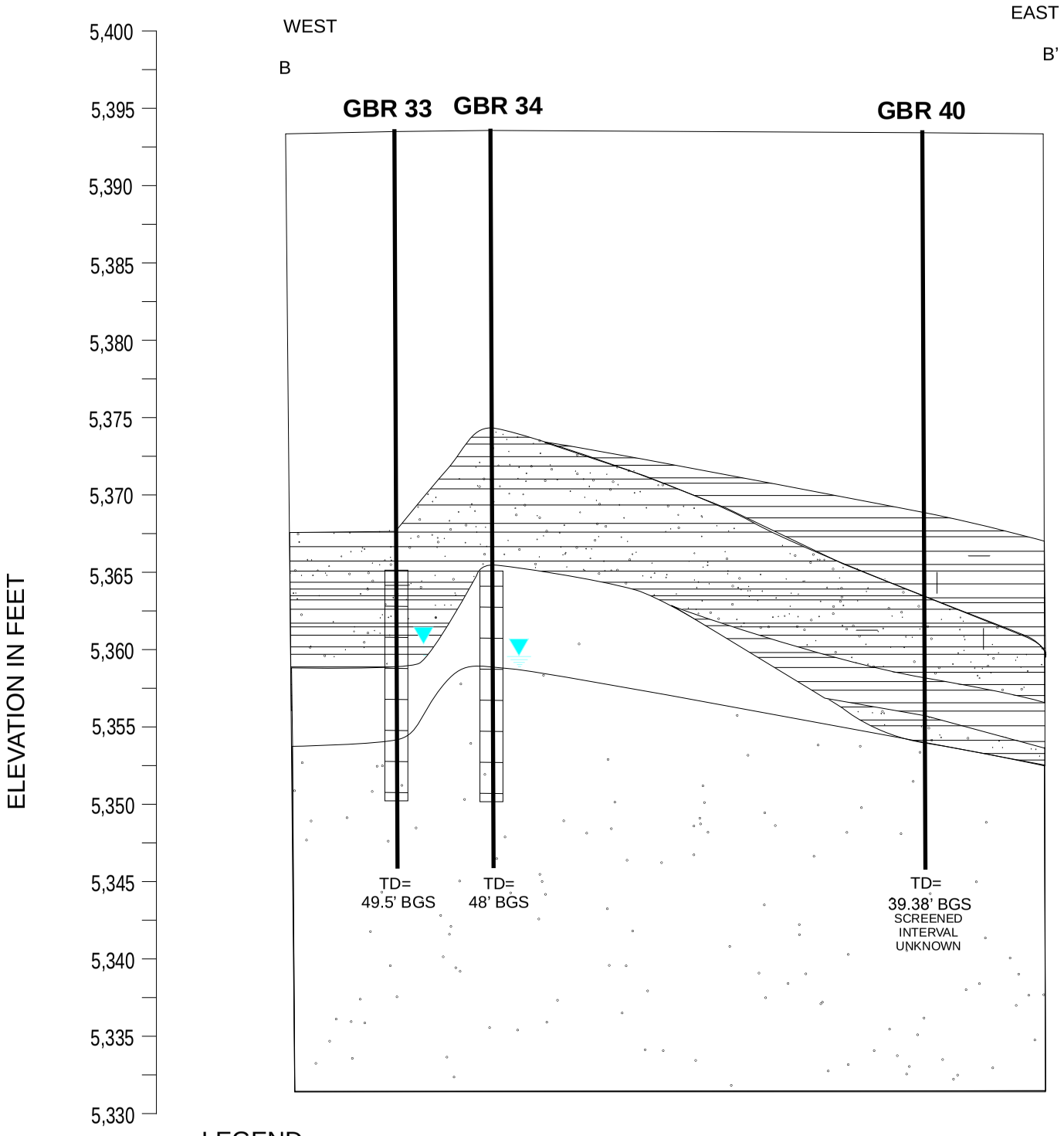
- BOREHOLE
- SCREENED INTERVAL
- BGS — BELOW GROUND SURFACE
- TD — TOTAL DEPTH IN FEET
- GROUNDWATER ELEVATION FROM OCTOBER 2018

HORIZONTAL SCALE
1" = 10 FEET

VERTICAL SCALE
1" = 90 FEET

FIGURE 3
CROSS SECTION A-A'
FORMER GIANT BLOOMFIELD REFINERY
SWSW SEC 22 &WNW SEC 27 T29N R12W
WESTERN REFINING SOUTHWEST, INC.

WR1009 1/16



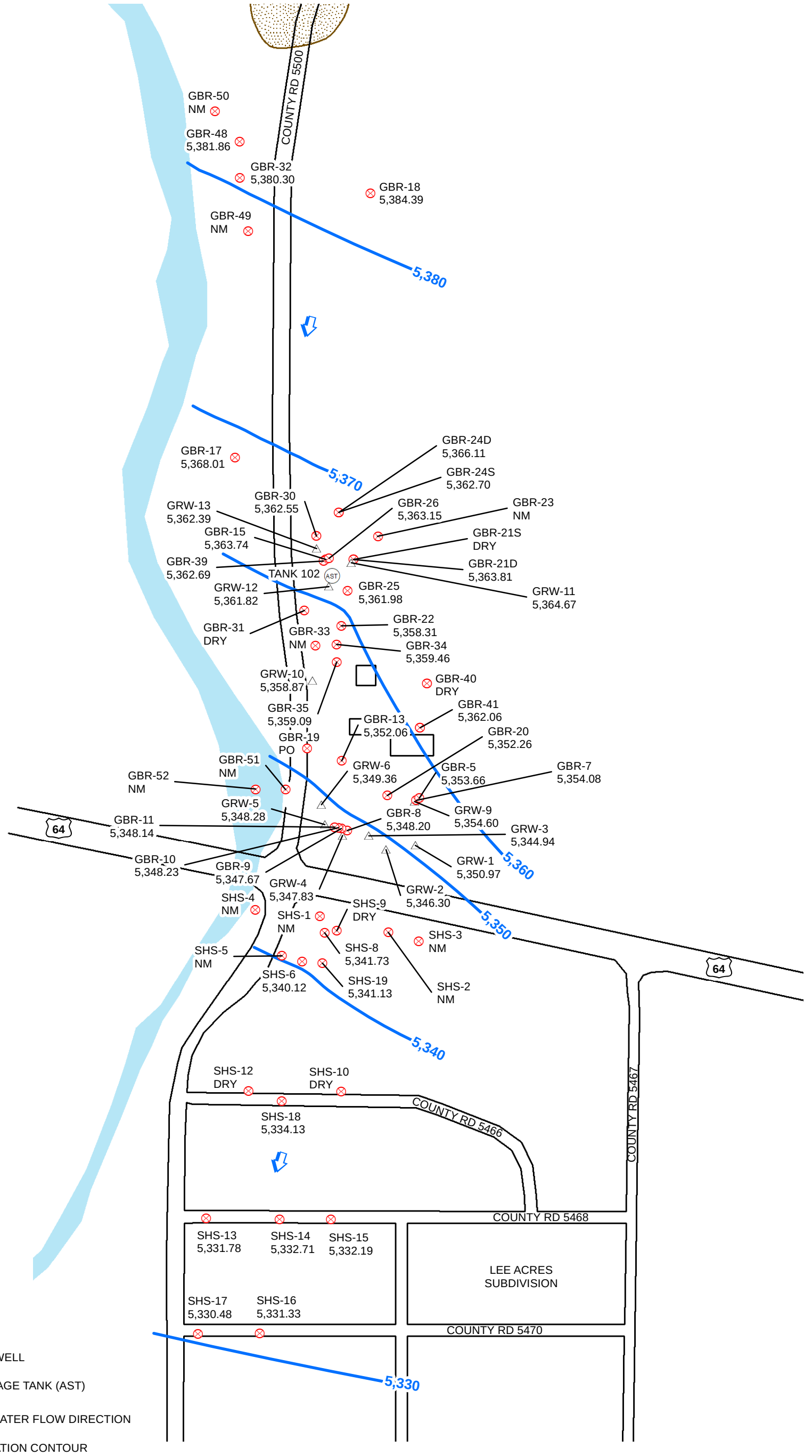
LEGEND

- CLAYEY SAND
- CLAY
- SAND
- NACIMIENTO SANDSTONE
- DRY
- BOREHOLE
- SCREENED INTERVAL
- BGS BELOW GROUND SURFACE
- TD TOTAL DEPTH IN FEET
- GROUNDWATER ELEVATION OCTOBER 2017

HORIZONTAL SCALE
1" = 10 FEET

VERTICAL SCALE
1" = 90 FEET

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



LEGEND

- MONITORING WELL
- INACTIVE RECOVERY WELL
- ABOVEGROUND STORAGE TANK (AST)
- ESTIMATED GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION CONTOUR
  CONTOUR INTERVAL = 10 FEET
  GROUNDWATER ELEVATION MEASURED IN FEET
  ABOVE MEAN SEA LEVEL IN MARCH, 2019
- ARROYO
- FORMER LEE ACRES LANDFILL

NM: NOT MEASURED
PO: PAVED OVER

FIGURE 5
GROUNDWATER POTENTIOMETRIC SURFACE MAP (MARCH 2019)
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

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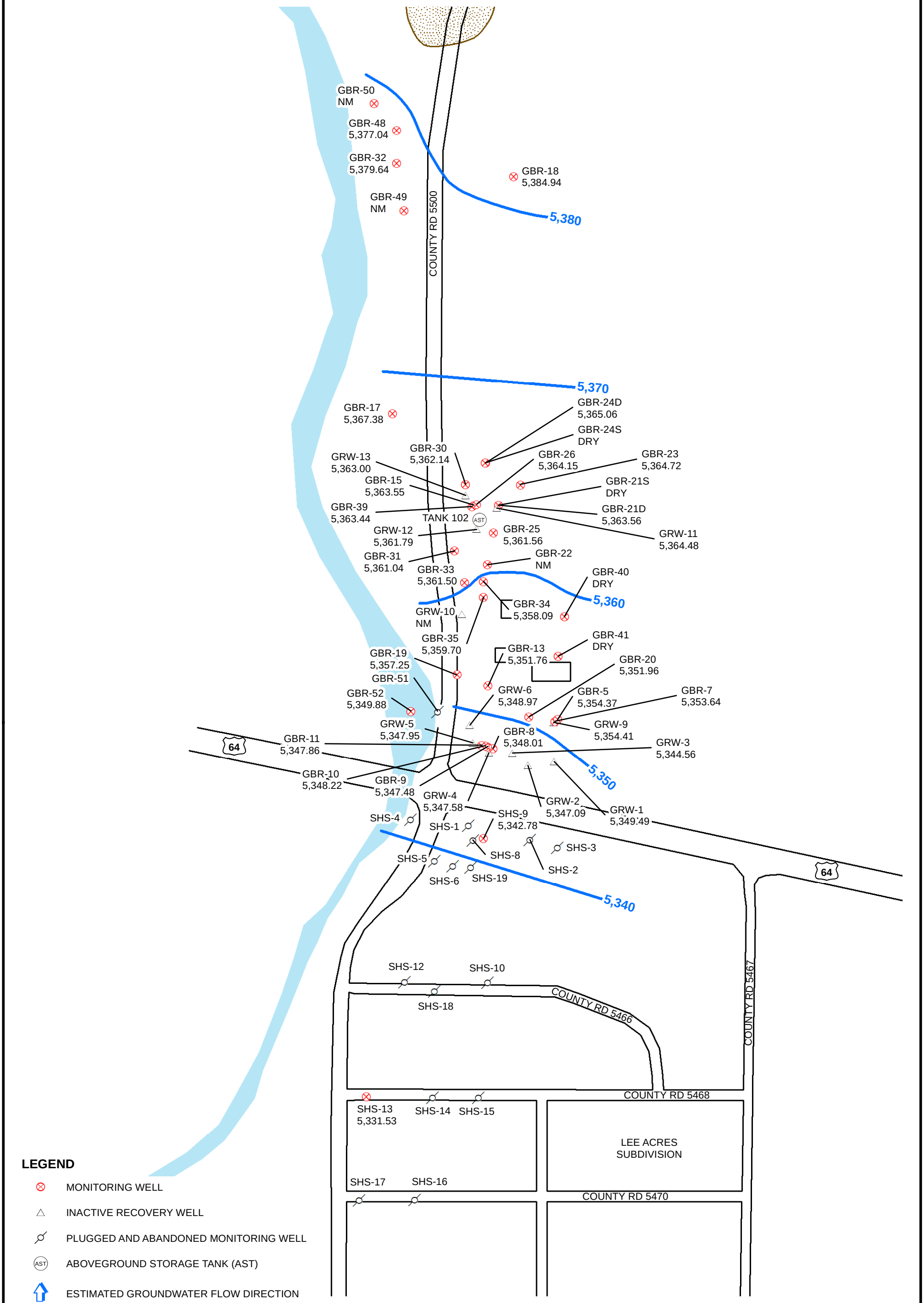

FIGURE 6
GROUNDWATER POTENTIOMETRIC SURFACE MAP (NOVEMBER 2019)
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

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TABLE 1
GROUNDWATER ELEVATIONS AND THICKNESS OF PHASE-SEPARATED HYDROCARBONS

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

Well Number	Wellhead Elevation (feet)	Total Depth (feet)	March 2019				November 2019			
			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)
GRW-1	5,394.30	73.35	43.33	-	-	5,350.97	44.81	-	-	5,349.49
GRW-2	5,391.28	61.00	44.98	-	-	5,346.30	44.19	-	-	5,347.09
GRW-3	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	-	-	5,354.41
GRW-10	5,395.02	66.02	36.15	-	-	5,358.87	NM - Well blocked at 5 feet			
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	-	-	5,361.79
GRW-13	5,396.90	61.30	34.51	-	-	5,362.39	33.90	-	-	5,363.00
GBR-5	5,395.07	47.08	41.41	-	-	5,353.66	40.70	-	-	5,354.37
GBR-7	5,395.85	51.65	41.91	41.74	0.17	5,354.08	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	Dry				Dry			
GBR-22	5,395.91	38.73	37.60	-	-	5,358.31	NM - Cap glued onto well casing			
GBR-23 (2)	5,403.72	39.45	37.54	-	-	-	39.00	-	-	5,364.72
GBR-24D	5,396.77	51.40	30.66	-	-	5,366.11	31.71	-	-	5,365.06
GBR-24S	5,396.08	37.05	33.38	-	-	5,362.70	Dry			
GBR-25	5,397.03	37.12	35.05	-	-	5,361.98	35.47	-	-	5,361.56
GBR-26	5,396.72	41.29	33.57	-	-	5,363.15	32.57	-	-	5,364.15
GBR-30	5,395.59	41.66	33.04	-	-	5,362.55	33.45	-	-	5,362.14
GBR-31	5,396.58	43.50	Dry				35.54	-	-	5,361.04
GBR-32	5,414.86	47.83	34.56	-	-	5,380.30	35.22	-	-	5,379.64
GBR-33	5,396.28	45.72	-	-	-	-	34.78	-	-	5,361.50
GBR-34	5,394.00	42.20	34.54	-	-	5,359.46	35.91	-	-	5,358.09
GBR-35	5,393.66	42.35	34.57	-	-	5,359.09	34.96	-	-	5,358.70
GBR-39	5,397.55	41.42	34.86	-	-	5,362.69	34.11	-	-	5,363.44
GBR-40	5,400.76	39.38	Dry				Dry			
GBR-41	5,396.35	34.28	34.29	-	-	5,362.06	Dry			
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

Well Number	Wellhead Elevation (feet)	Total Depth (feet)	March 2019				November 2019			
			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	-	-	-	P&A	-	-	-
SHS-6	5,378.17	52.78	38.05	-	-	5,340.12	P&A	-	-	-
SHS-8	5,380.25	50.92	38.52	-	-	5,341.73	P&A	-	-	-
SHS-9	5,380.79	46.25	Dry				38.01	-	-	5,342.78
SHS-10	5,373.80	45.80	Dry				P&A	-	-	-
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
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.

Analyte	NMWQCC Standard	Unit	GRW-3	GRW-6	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-32	GBR-48	GBR-49	GBR-50	GBR-52	SHS-9
			7-Nov	7-Nov	5-Nov	6-Nov	6-Nov	7-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov
USEPA Method 8260B - Volatiles														
benzene	**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	<2.5
toluene	**750**	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
ethylbenzene	**750**	µg/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	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-trimethylbenzene	**620**	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
1,3,5-trimethylbenzene	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-dichloroethane (EDC)	**10**	µg/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	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
naphthalene	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
1-methylnaphthalene	NE	µg/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	µg/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	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
bromobenzene	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
bromodichloromethane	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
bromoform	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
bromomethane	NE	µg/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	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
carbon disulfide	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
carbon tetrachloride	**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
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**	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
chloromethane	NE	µg/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	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
4-chlorotoluene	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-1,2-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	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
1,4-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
dichlorodifluoromethane	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
1,1-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	**5**	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-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
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 2
2019 ANNUAL COMPLIANCE - GROUNDWATER LABORATORY ANALYTICAL RESULTS

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

Analyte	NMWQCC Standard	Unit	GRW-3 7-Nov	GRW-6 7-Nov	GBR-17 5-Nov	GBR-24D 6-Nov	GBR-30 6-Nov	GBR-31 7-Nov	GBR-32 5-Nov	GBR-48 5-Nov	GBR-49 5-Nov	GBR-50 5-Nov	GBR-52 5-Nov	SHS-9 5-Nov
1,1-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
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	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
isopropylbenzene	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	6.1
4-isopropytoluene	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
4-methyl-2-pentanone	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
methylene chloride	**100**	µg/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	µg/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	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
styrene	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
tert-butylbenzene	NE	µg/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	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
1,1,2,2-tetrachloroethane	**10**	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
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	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-1,3-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
1,2,3-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	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
1,1,1-trichloroethane	**60**	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
1,1,2-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	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
vinyl chloride	**1**	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
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														
naphthalene	**30**	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
1-methylnaphthalene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NT	NT	NT	NT	NT	NT
2-methylnaphthalene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NT	NT	NT	NT	NT	NT
acenaphthylene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
acenaphthene	NE	µg/L	0.98	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
fluorene	NE	µg/L	4.3	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
phenanthrene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
anthracene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
fluoranthene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
pyrene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
benz(a)anthracene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
chrysene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT

TABLE 2
2019 ANNUAL COMPLIANCE - GROUNDWATER LABORATORY ANALYTICAL RESULTS

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

Analyte	NMWQCC Standard	Unit	GRW-3 7-Nov	GRW-6 7-Nov	GBR-17 5-Nov	GBR-24D 6-Nov	GBR-30 6-Nov	GBR-31 7-Nov	GBR-32 5-Nov	GBR-48 5-Nov	GBR-49 5-Nov	GBR-50 5-Nov	GBR-52 5-Nov	SHS-9 5-Nov
benzo(b)fluoranthene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
benzo(k)fluoranthene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
benzo(a)pyrene	**0.7**	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
dibenz(a,h)anthracene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
benzo(g,h,i)perylene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
indeno(1,2,3-cd)pyrene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
USEPA Method 300.0: Anions														
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	55	170	**280**	**290**	190	**270**	97	69	60	130
sulfate	**600**	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	0.60	<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)	NE	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
USEPA Method 200.7: Total Metals														
barium	NE	mg/L	NT	NT	NT	NT	NT	NT	0.034	0.31	0.021	0.018	NT	NT
beryllium	NE	mg/L	NT	NT	NT	NT	NT	NT	<0.010	0.0038	<0.0020	<0.0020	NT	NT
cadmium	**0.01**	mg/L	NT	NT	NT	NT	NT	NT	<0.010	<0.0020	<0.0020	<0.0020	NT	NT
calcium	NE	mg/L	180	370	450	470	540	530	470	550	400	530	470	150
chromium	**0.05**	mg/L	NT	NT	NT	NT	NT	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	53	39	53	40	52	49	48	58	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	NT	NT	NT	NT	NT	0.074	0.098	0.12	0.055	NT	NT
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	NT	NT	NT	NT	NT	NT	<0.025	<0.0050	0.0063	0.0079	NT	NT
sodium	NE	mg/L	480	380	240	7.0	490	430	480	560	410	330	310	450
zinc	**10**	mg/L	NT	NT	NT	NT	NT	NT	<0.050	0.097	0.013	<0.010	NT	NT
USEPA Method 200.8: Total Metals														
antimony	NE	mg/L	NT	NT	NT	NT	NT	NT	<0.0050	<0.0010	<0.0010	<0.0010	NT	NT
arsenic	**0.1**	mg/L	NT	NT	NT	NT	NT	NT	<0.0010	0.0076	<0.0010	<0.0010	NT	NT
copper	**1.0**	mg/L	NT	NT	NT	NT	NT	NT	0.0085	0.048	0.0043	0.0024	NT	NT
lead	**0.05**	mg/L	NT	NT	NT	NT	NT	NT	0.0012	0.031	0.00083	0.00096	NT	NT
selenium	**0.05**	mg/L	NT	NT	NT	NT	NT	NT	0.0029	0.018	0.0011	0.0083	NT	NT
thallium	NE	mg/L	NT	NT	NT	NT	NT	NT	<0.00050	0.00053	<0.00050	<0.00050	NT	NT
USEPA Method 245.1: Mercury														
mercury	**0.002**	mg/L	NT	NT	NT	NT	NT	NT	<0.00020	<0.00020	<0.00020	<0.00020	NT	NT

TABLE 2
2019 ANNUAL COMPLIANCE - GROUNDWATER LABORATORY ANALYTICAL RESULTS

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

Analyte	NMWQCC Standard	Unit	GRW-3	GRW-6	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-32	GBR-48	GBR-49	GBR-50	GBR-52	SHS-9
			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	mg/L	680	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)	NE	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	NE	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														
specific conductance	NE	µmhos/cm	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														
pH	**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														
total dissolved solids	**1,000**	mg/L	**1,990**	**2,470**	**2,150**	**3,420**	**3,040**	**3,220**	**3,200**	**3,450**	**2,710**	**2,910**	**2,600**	**1,470**

Notes:
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

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

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.

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 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.

1) GPS Well Location: Latitude: 36 deg, 42 min, 5.62 sec
Longitude: -108 deg, 5 min, 40.10 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, 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? NO If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: 38.05 (feet below land surface) feet above land surface (circle one)

6) Depth of the well: 48.42 feet

Trn. No

SHS-6

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): 32.48' to 42.85'

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 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? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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: 23.3 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

X mixed on site

STATE ENGINEER OFFICE AZTEC, NEW MEXICO 2019 JUL 13 AM 8:30

Trn. No

SHS-6

7) Grout additives requested, and percent by dry weight relative to cement: 5% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Groundwater quality
Groundwater elevation

STATE ENGINEER OFFICE
SANTA FE, NEW MEXICO
2019 JUN 13 AM 8:30

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich — Signature of Applicant

06/12/2019 — Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.
_____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 13 day of June, 2019

Tom Blaine P.E., New Mexico State Engineer

By: Miles Juett

Miles Juett, Assistant Watermaster

Trn. No

SHS-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)			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			
Additive 2 percent by dry weight relative to cement			

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STATE ENGINEER OFFICE
AZTEC, NEW MEXICO

Trn. No

SHS-6

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)			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** calculated to fill entire screened interval if bentonite pour starts at total depth of ~~casing~~. well.		1.3 Cu.Ft. or approximately 9.7 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 AM 8:30

Trn. No

SHS-8

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 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

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 AM 8:41

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, 42 min, 6.45 sec
Longitude: -108 deg, 5 min, 39.47 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, 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? NO If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: 38.52 (feet below land surface) feet above land surface (circle one)

6) Depth of the well: 52.50 feet

Trn. No

SHS-8

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): 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? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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.

6) Will the grout be: _____ batch-mixed and delivered to the site

X mixed on site

STATE ENGINEER OFFICE AZTEC, NEW MEXICO 2019 JUL 13 AM 8:11

Trn. No

SHS-8

7) Grout additives requested, and percent by dry weight relative to cement: 5% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Groundwater quality

Groundwater elevation

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 AM 10 21

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich Digitally signed by Mary Mrdjenovich Date: 2019.06.12 15:57:51 -06'00' — 06/12/2019

Signature of Applicant — Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.

_____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 13 day of June, 2019

Tom Blaine P.E., New Mexico State Engineer

By: Miles Juett

Miles Juett, OSE Aztec

Trn. No

SHS-8

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)			30.83 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: **18.82 gallons** calculated to fill casing to 2' bgs if if cement grout pour starts at top of screened interval.		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%
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

STATE ENGINEER OFFICE
2019 JUN 13 AM 11 55

Trn. No

SHS-8

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)			30.83 feet below ground surface
Bottom of proposed sealant of grout placement (ft bgl)			52.50 feet below ground surface
Theoretical volume of sealant required per interval (gallons)	OSE Note: **14.15 gallons** calculated to fill entire screened interval if bentonite pour starts at total depth of ~~casing~~well.		1.7 Cu.Ft. or approximately 12.7 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

Trn. No

SHS-10

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 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

2019 JUN 13 AM 8:19 STATE ENGINEER OFFICE AZTEC, NEW MEXICO

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, 42 min, 1.75 sec
Longitude: -108 deg, 5 min, 40.07 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, 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? NO If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: Dry (feet below land surface) feet above land surface (circle one)

6) Depth of the well: 48.6 feet

Trn. No

SHS-10

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): 31.66' 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? 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? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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: 6 gallons of water per 94 pound sack of Portland cement.

6) Will the grout be: _____ batch-mixed and delivered to the site

X mixed on site

Trn. No

SHS-10

7) Grout additives requested, and percent by dry weight relative to cement: 5% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Groundwater quality
Groundwater elevation

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 A 10:21

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich Digitally signed by Mary Mrdjenovich Date: 2019.06.12 15:59:39 -06'00' — 06/12/2019

Signature of Applicant — Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.
____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 13 day of June, 2019

Tom Blaine P.E., New Mexico State Engineer

By: Miles Jueth

Miles Jueth, OSE Aztec

Trn. No

SHS-10

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)			31.66 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: 19.36 gallons calculated to fill casing to 2' bgs if cement grout pour starts at top of screened interval.		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			
Additive 2 percent by dry weight relative to cement			

Trn. No

SHS-10

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)			31.66 feet below ground surface
Bottom of proposed sealant 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 fill entire screened interval if bentonite pour starts at total depth of ~~casing~~. well.		1.3 Cu.Ft. or approximately 9.7 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

Trn. No

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.

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 State: New Mexico Zip code: 87413

Phone number: 505-632-4166 E-mail: kelly.robinson@wnr.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

2019 JUN 13 AM 8:56
STATE ENGINEER OFFICE
AZTEC, NEW MEXICO

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, 42 min, 1.82 sec
Longitude: -108 deg, 5 min, 43.15 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, 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? NO If yes, provide additional detail, including analytical results and/or laboratory report(s): _____

5) Static water level: 39.0 (feet below land surface) feet above land surface (circle one)

6) Depth of the well: 55.0 feet

Trn. No

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? 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? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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: 31.4 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

X mixed on site

Trn. No

SHS-12

7) Grout additives requested, and percent by dry weight relative to cement: 5% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Groundwater quality
Groundwater elevation

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich Digitally signed by Mary Mrdjenovich Date: 2019.06.12 16:00:43 -06'00' — 06/12/2019

Signature of Applicant — Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.
____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 13 day of June, 2019

Tom Blaine P.E., New Mexico State Engineer

By: Miles Juett

Miles Juett, OSE Aztec

Trn. No

SHS-12

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 calculated to fill casing to 2' bgs if cement grout pour starts at top of screened interval.		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			
Additive 2 percent by dry weight relative to cement			

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 AM 10 12

Trn. No

SHS-12

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)			31.5 feet below ground surface
Bottom of proposed sealant of grout placement (ft bgl)			55.0 feet below ground surface
Theoretical volume of sealant required per interval (gallons)	OSE Note: **15.34 gallons** calculated to fill entire screened interval if bentonite pour starts at total depth of ~~casing~~ well.		1.8 Cu.Ft. or approximately 13.4 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 AM 8:56

Trn. No

SHS-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.

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 State: New Mexico Zip code: 87413

Phone number: 505-632-4166 E-mail: gjmccartney@marathon petroleum.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

2019 JUN 13 AM 9 01
JAL ENGINEER OFFICE
AZTEC, NEW MEXICO

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, 58.07 sec
Longitude: -108 deg, 5 min, 40.89 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, 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? NO If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: 34.36 (feet below land surface) feet above land surface (circle one)

6) Depth of the well: 55 feet

Trn. No

SHS-14

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 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. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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: 31.4 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

X mixed on site

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 P 1:01

Trn. No

SHS-14

7) Grout additives requested, and percent by dry weight relative to cement: 5% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Groundwater quality
Groundwater elevation

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich Digitally signed by Mary Mrdjenovich Date: 2019.06.12 16:01:21 -06'00' — 06/12/2019

Signature of Applicant — Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.
_____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 13 day of June, 2019

Tom Blaine P.E., New Mexico State Engineer

By: Miles Jueth

Miles Jueth, OSE Aztec

Trn. No

SHS-14

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 calculated to fill casing to 2' bgs if cement grout pour starts at top of screened interval.		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			5%
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

Trn. No

SHS-14

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)			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** calculated to fill entire screened interval if bentonite pour starts at total depth of ~~casing~~ well.		2.1 Cu.Ft. or approximately 15.7 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 AM 9 01

Trn. No

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.

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

2019 JUN 13 AM 9 06
STATE ENGINEER OFFICE
AZTEC, NEW MEXICO

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, 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, 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? NO If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: 34.02 (feet below land surface) feet above land surface (circle one)

6) Depth of the well: 50 feet

Trn. No

SHS-15

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): 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 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. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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: 6 gallons of water per 94 pound sack of Portland cement.

6) Will the grout be: _____ batch-mixed and delivered to the site

X mixed on site

STATE ENGINEER OFFICE AZTEC, NEW MEXICO 2016 JUN 1 AM 9 06

Trn. No

SHS-15

7) Grout additives requested, and percent by dry weight relative to cement: 5% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Groundwater quality
Groundwater elevation

2019 JUN 13 A 10:21
STATE ENGINEER OFFICE
AZTEC, NEW MEXICO

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich Digitally signed by Mary Mrdjenovich Date: 2019.06.12 16:02:00 -06'00' — 06/12/2019

Signature of Applicant — Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.
____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 13 day of June, 2019

Tom Blaine P.E., New Mexico State Engineer

By: [signature]

Miles Tveit, OSE Aztec

Trn. No

SHS-15

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)			27.4 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: **16.58** gallons calculated to fill casing to 2' bgs if cement grout pour starts at top of screened interval.		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			
Additive 2 percent by dry weight relative to cement			

Trn. No

SHS-15

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)			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** calculated to fill entire screened interval if bentonite pour starts at total depth of ~~casing~~ well.		1.8 Cu.Ft. or approximately 13.4 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 AM 9 06

Trn. No

SHS-16

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 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

2019 JUN 13 AM 9 16
STATE ENGINEER OFFICE
AZTEC, NEW MEXICO

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, 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? NO If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: 31.25 (feet below land surface) feet above land surface (circle one)

6) Depth of the well: 50 feet

Trn. No

SHS-16

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): 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 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? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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: 6 gallons of water per 94 pound sack of Portland cement.

6) Will the grout be: _____ batch-mixed and delivered to the site

X mixed on site

Trn. No

SHS-16

7) Grout additives requested, and percent by dry weight relative to cement: 5% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Groundwater quality
Groundwater elevation

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 AM 10 2

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich Digitally signed by Mary Mrdjenovich Date: 2019.06.12 16:02:56 -06'00' 06/12/2019

Signature of Applicant Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.
____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 13 day of June, 2019

Tom Blaine P.E., New Mexico State Engineer

By: Miles Tuetken OSE Aztec

Trn. No

SHS-16

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)			22.2 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: **13.19** gallons calculated to fill casing to 2' bgs if cement grout pour starts at top of screened interval.		11.9 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			
Additive 2 percent by dry weight relative to cement			

Trn. No

SHS-16

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)			22.2 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: **18.15 gallons** calculated to fill entire screened interval if bentonite pour starts at total depth of ~~casing.~~ well.		2.2 Cu.Ft. or approximately 16.4 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 AM 9 16

Trn. No

SHS-17

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 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

2019 JUN 13 AM 9 29
STATE ENGINEER OFFICE
AZTEC, NEW MEXICO

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, 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? NO If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: 33.87 (feet below land surface) feet above land surface (circle one)

6) Depth of the well: 46.21 feet

Trn. No

SHS-17

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): 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? 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? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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: 6 gallons of water per 94 pound sack of Portland cement.

6) Will the grout be: _____ batch-mixed and delivered to the site

X mixed on site

STATE ENGINEER OFFICE AZTEC, NEW MEXICO 2019 JUN 13 AM 9 29

Trn. No

SHS-17

7) Grout additives requested, and percent by dry weight relative to cement: 5% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Groundwater quality
Groundwater elevation

STATE ENGINEER OFFICE
ATTEST: NEW MEXICO
2019 JUN 13 P 1:31

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich Digitally signed by Mary Mrdjenovich Date: 2019.06.12 16:03:32 -06'00' 06/12/2019

Signature of Applicant Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.
____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 13 day of June, 2019

Tom Blaine P.E., New Mexico State Engineer

By: Miles Juett OSE Aztec

Trn. No

SHS-17

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)			35.67 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: **21.98** gallons calculated to fill casing to 2' bgs if cement grout pour starts at top of screened interval.		20.1 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			
Additive 2 percent by dry weight relative to cement			

Trn. No

SHS-17

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)			35.67 feet below ground surface
Bottom of proposed sealant of grout placement (ft bgl)			46.21 feet below ground surface
Theoretical volume of sealant required per interval (gallons)	OSE Note: **6.88 gallons** calculated to fill entire screened interval if bentonite pour starts at total depth of well.		0.84 Cu.Ft. or approximately 6.2 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 JUN 13 AM 9 29

Trn. No

SHS-18

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 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

2019 JUN 13 AM 9 34
STATE ENGINEER OFFICE
AZTEC, NEW MEXICO

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, 42 min, 1.52 sec
Longitude: -108 deg, 5 min, 40.81 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, 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? NO If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: 39.51 (feet below land surface) feet above land surface (circle one)

6) Depth of the well: 47.36 feet

Trn. No

SHS-18

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): 37.36' to 47.36'

10) What annular interval surrounding the artesian casing of this well is cement-grouted? 33.36' 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? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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: 6 gallons of water per 94 pound sack of Portland cement.

6) Will the grout be: _____ batch-mixed and delivered to the site

X mixed on site

Trn. No

SHS-18

7) Grout additives requested, and percent by dry weight relative to cement: 5% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Groundwater quality

Groundwater elevation

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich Digitally signed by Mary Mrdjenovich Date: 2019.06.12 16:04:16 -06'00' 06/12/2019

Signature of Applicant Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.

_____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 13 day of June, 2019

Tom Blaine P.E., New Mexico State Engineer

By: Miles Juett

Miles Juett, OSE Aztec

Trn. No

SHS-18

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)			37.36 feet below ground surface
Theoretical volume of grout required per interval (gallons)	OSE Note: **23.08** gallons calculated to fill casing to 2' bgs if cement grout pour starts at top of screened interval.		20.9 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			
Additive 2 percent by dry weight relative to cement			

Trn. No

SHS-18

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 sealant required per interval (gallons)	OSE Note: **6.53 gallons** calculated to fill entire screened interval if bentonite pour starts at total depth of well.		0.80 Cu.Ft. or approximately 6.0 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

Trn. No

SHS-19

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 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.

1) GPS Well Location: Latitude: 36 deg, 42 min, 5.53 sec
Longitude: -108 deg, 5 min, 39.36 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, 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? NO If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: 37.76 (feet below land surface) feet above land surface (circle one)

6) Depth of the well: 52.40 feet

STATE ENGINEER OFFICE AZTEC, NEW MEXICO 2019 JUN 13 AM 9 47

Trn. No

SHS-19

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): 32.40' to 52.40'

10) What annular interval surrounding the artesian casing 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 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. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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: 29.9 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

X mixed on site

OSE ENGINEER OFFICE AZTEC, NEW MEXICO 2019 JUL 13 AM 9 49

Trn. No

SHS-19

7) Grout additives requested, and percent by dry weight relative to cement: 5% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Groundwater quality
Groundwater elevation

2019 JUN 13 AM 9
STATE ENGINEER OFFICE
AZTEC, NEW MEXICO

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich Digitally signed by Mary Mrdjenovich Date: 2019.06.12 16:04:51 -06'00' 06/12/2019

Signature of Applicant Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.
_____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 13 day of June, 2019

Tom Blaine P.E., New Mexico State Engineer

By: Miles Tuett, OSE Aztec

Trn. No

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 to fill casing to 2' bgs if cement grout pour starts at top of screened interval.		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			
Additive 2 percent by dry weight relative to cement			

Trn. No

SHS-19

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)			32.40 feet below ground surface
Bottom of proposed sealant of grout placement (ft bgl)			52.40 feet below ground surface
Theoretical volume of sealant required per interval (gallons)	OSE Note: **13.06 gallons** calculated to fill entire screened interval if bentonite pour starts at total depth of well.		1.6 Cu.Ft. or approximately 11.9 gallons
Proposed abandonment sealant (manufacturer and trade name)			bentonite

Trn. No

DISTRICT V

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)	Latitude 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:

1. 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 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:

Date: June 13, 2019

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

GBR-51 (No OSE File no.)

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 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: Mo-Te Drilling Company

New Mexico Well Driller License No.: WD733 Expiration Date: 06/30/2021

2019 AUG -6 PM 1:29
STATE ENGINEER OFFICE
AZTEC, NEW MEXICO

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, 42 min, 10.5 sec
Longitude: -108 deg, 5 min, 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.

3) Was well used for any type of monitoring program? Yes 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? No If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: 39.76 feet below land surface / feet above land surface (circle one)

6) Depth of the well: 60.15 feet

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'

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? 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? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical 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. PLUGGING 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: 130.5 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.

6) Will the grout be: _____ batch-mixed and delivered to the site

X mixed on site

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2017 AUG -6 PM 1:30

7) Grout additives requested, and percent by dry weight relative to cement:

6% powder bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Monitored for Groundwater quality and Groundwater elevation

VIII. SIGNATURE:

I, Mary Mrdjenovich, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Mary Mrdjenovich — Signature of Applicant

07/22/2019 — Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.

_____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 7 day of August, 2019

John R. D'Antonio, Jr., P.E., ~~Tom Blaine, P.E.,~~ New Mexico State Engineer

By: Miles Juett

Miles Juett, Assistant Watermaster

GBR-51 (No OSE File no.)

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			6%
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

STATE ENGINEER OFFICE
AZTEC, NEW MEXICO
2019 AUG -6 PM 1:30

GBR-51 (No OSE File 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 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

DISTRICT V

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)	Latitude North	Longitude West
GBR-51	6-inch PVC & Steel	36° 42' 10.5"	-108° 05' 40.8"

Specific Plugging Conditions of Approval:

1. 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

LT Environmental, Inc.
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.

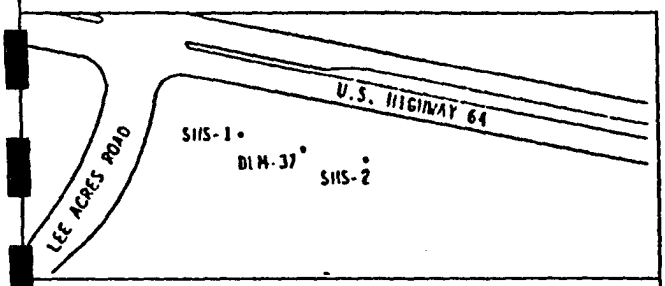
Sincerely,

LT ENVIRONMENTAL, INC.

Devin Hencmann
Project Manager

Attachment

BOREHOLE LOG (SOIL)



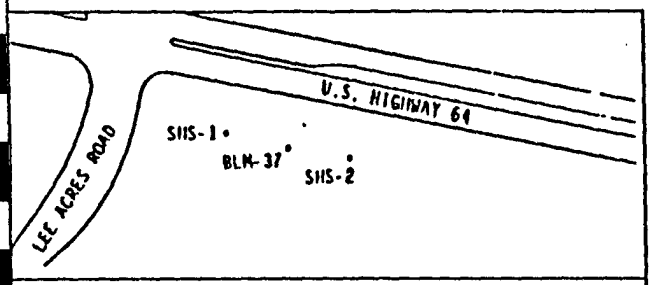
SE 1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T29N R12W

SITE ID: Lee Acres Community LOCATION ID: SHS-1
SITE COORDINATES (ft.): Coordinates are local to GBR
N 9896-34 E 11406.67
GROUND ELEVATION (ft. MSL): Approximately 5381
STATE: New Mexico COUNTY: San Juan
DRILLING METHOD: Hollow Stem Auger
DRILLING CONTR.: Western Tech
DATE STARTED: 7/31/89 DATE COMPLETED: 8/1/89
FIELD REP.: M. Nee
COMMENTS:

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0			2	1	0	3			SW	0-28' Sand Mod Brn, 10 YR 4/4, v fine to fine grained, well sorted, unconsol., slightly moist at approx. 13'. Minor pebble gravel at 11'-13'.
			5	2	3	8			CL	Silty clayey sand stringer, moderate brown, 10 YR 4/4, at approx. 15'-15.5'.
5									GP	Minor small pebble gravel 22-28'.
			3	3	8	13				28'-30' Clay, moderate olive brn, 5 Y 4/4, minor fine to coarse sand.
10									SW	30'-30.5' Sand as above (0'-28'), no gravel.
			3	4	13	18			CL	6" clay to 31' grading to v fine sand at 33' olive gray, 5 Y 3/2.
15									SC	33'-36' Silty Sandy Clay, moderate olive brn, 5 Y 4/4, approx. 33% clay, 33% sand, 33% silt.
			0	5	18	23				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.
20										
			3	6	23	28			CL	37'-1/2-39' Silty clay, olive gray 5 Y 3/2.
25									SM	39'-40' Silty sand, olive gray, 5 Y 3/2 unconsol., MW sorted.
			5	7	28	33			CL	40'-41.5' Clay, mottled, mod yllsh brn, 10 YR 5/4 - olive gray. 5 YR 3/2.
30									SW	41.5'-42.5' Sand. mod. olive brn 5 Y 4/4, f-m sand, unconsol., MW sorted.
			0	8	33	38			SC	42.5'-43.5' Sandy clay, mod brn, 5 YR 4/4.
35									SW	43'-50' Sand, mod yllsh brn, 10 YR 5/4, fine to med sand. unconsol. MW sorted, saturated
			2	9	38	43			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.
40									NA	51.5'-52' Sandstone, dusky yellow, 5 Y 6/4 to light olive brn, 5 Y 5/6, fine to med grained, well consolidated, well sorted.
			0	10	43	48				
45										
			3	11	48	52				
50										

BOREHOLE LOG (SOIL)



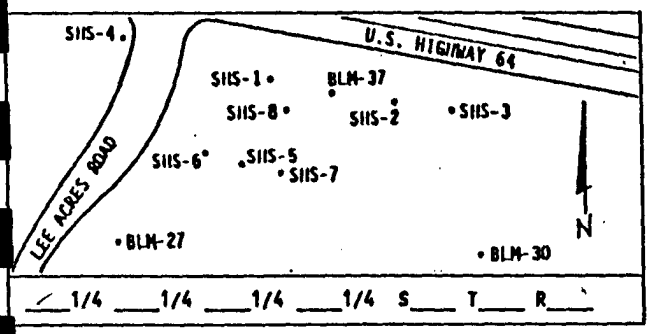
SE 1/4 SW 1/4 NW 1/4 NW 1/4 S27 T29N R12W

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. MSL): Approx. 5382
STATE: New Mexico COUNTY: San Juan
DRILLING METHOD: Hollow Stem Auger
DRILLING CONTR.: Western 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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0				1	0	3.5				0-1' Soil, Silty sand w/organics, mod. yllsh, brn 10 YR 5/4, 40% silt, 60% f sand, unconsolidated, mod well sorted, sub angular to sub rounded.
			3.5	2	3.5	3.5				
			2							1'-26' Gravelly Sand, Dark yellowish orange, 10 YR 6/6, 90% v fine - fine pred. quartz, unconsol., well sorted, sub ang to sub rounded, 10% gravel is fine to coarse pebble gravel, rounded.
5				3	8.5	13.5				
										26'-30' Sandy gravel, Dark yllsh orange, 10 YR 6/6, unconsol., rounded, pebble gravel to cobbles.
10			3	4	13.5	18.5				30'-33.5' Clayey Silty Sand, mod yllsh brn, 10 YR 5/4. Clay to fine sand, unconsol. poorly sorted.
15										
										33.5'-36' Sand, mod yllsh brn, 10 YR 5/4, fine to mod sand, unconsol. sub ang to sub rounded, mod well.
20			3	5	18.5	23.5				
										36'-37' Clayey Silt, dark yllsh brn, 10 YR 4/4, unconsol. MW sorted.
			0	6	23.5	28.5				37'-39.5' Gravelly Sand, dark yllsh brn, 10 YR 4/2, to olive black, 5 Y 2/1, at 38.5'.
25										
										80% fine sand, 20% small cobbles, ps, unconsol. sand is sub ang to sub rounded, cobbles are rounded.
			0	7	28.5	33.5				
30										39.5'-40.5' Sandstone, olive black 5 Y 2/1, MW consolidated, stained, appears to be Nacimento.
			2.5	8	33.5	38.5				40.5'-40.8' Claystone, olive gray, 5 Y 4/1, mod well consolidated.
35										
										40.8'-41.1' Sandstone, dark yllsh orange, 10 YR 6/6, med sand, MW sorted, unconsolidated.
			5	9	38.5	43.5				
40										41.1'-41.3' Claystone, olive gray, 5 Y 4/1. mod well consolidated.
										41.8'-42' Sandstone, grayish orange, 10 YR 7/4, med sand, mod consol., subang, calcium cement, moist.
45			5	10	43.5	48.5				
50			5	11	48.5	53.5				

BOREHOLE LOG (SOIL)



___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

SITE ID: OFFSITE GIANT LOCATION ID: SHS-3
SITE COORDINATES (ft.):
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECHNOLOGIES INC.
DATE STARTED: 11/29/89 DATE COMPLETED: 11/30/89
FIELD REP.: LINLEY
COMMENTS:

LOCATION DESCRIPTION:

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
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									SW	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 fraction <10%, Grv fraction ≈15% to 25%.
15										
20										
25										
30										
35									SW	35-38' SAND: (Silty wthd 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									Pt	38-38.5' COAL: Blk (N1), flaky to leaf like layering, fri, consol.
45									GM	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.

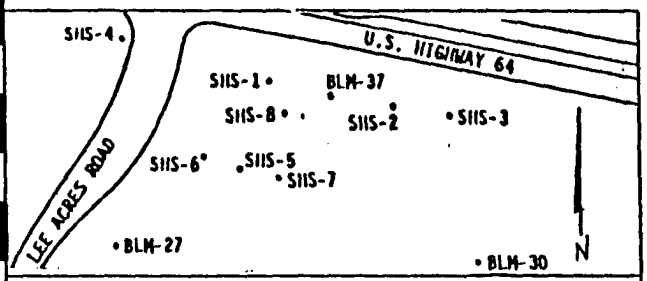
BOREHOLE LOG (SOIL)

(Continued)

LOCATION ID: SHS-3

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
50									ML	44-54' CLAY (SHALE): lt olv gry (5 Y 6/1) v fn grained, consol, intbd med crs sand horizons (dk yelsh orange (10 YR 6/6) mod sorting, sbang to sbrndd, wet upper 4" of sample & becoming dry w/depth.
55										
60										
65										
70										
75										
80										
85										
90										
95										
100										
105										
110										
115										

BOREHOLE LOG (SOIL)



___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

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 STEM AUGER
DRILLING CONTR.: WESTERN TECHNOLOGIES INC.
DATE STARTED: 11/27/89 DATE COMPLETED: 11/28/89
FIELD REP.: LINLEY
COMMENTS:

LOCATION DESCRIPTION:

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0									SW	0-27' SAND: Grysh orange (10 YR 7/4): v fn to med fn grained, sbang to sbrndd, uncons, mod sorted, moist at ≈15' BGL. 20-21' BGL Grv horizon, well rndd, ≈0.5" diam. Overall grain size incr w/depth to med-med crs sand. Grv fraction incr in Lith at ≈25' BGL.
5										
10										
15										
20										
25									GM	27-32' GRAVELLY CLAYEY SAND: Grysh orange (10 YR 7/4) v fn to crs grained, poorly sorted, sbang to sbrndd, semi to uncons, moist. Grv content ≈10-15%, clay fraction ≈25-30%.
30									GC	32-37' GRAVELLY SANDY CLAY: As above w/color change to grysh orange (10 YR 7/4) to mod yelsh brn (10 YR 5/4). Grv fraction decr w/depth to ≈5%, clay fraction ≈50% incr w/depth to ≈75%, Grv fraction 0% at 37' BGL.
35									SC	37-44' SANDY CLAY: Grysh orange (10 YR 7/4) v fn to med fn grained, poorly sorted, semiconsol, sbang to sbrndd, moist. Sand fraction ≈20-25% & decr w/depth to 15-20% & bcm fn grained.
40									SM	44-45' CLAYEY SAND: Grysh orange (10 YR 7/4) to mod yelsh brn (10 YR 5/4). V fn to med fn grained, uncons, sbang to sbrndd, poorly sorted, moist.
45									SC	45-50' SANDY CLAY: Grysh orange (10 YR 7/4) to mod yelsh brn (10 YR 5/4) v fn to med grained, poorly sorted, sbang to sbrndd, semiconsol, moist. Sand fraction ≈20% incr w/depth to ≈30-35% at 48' BGL, then decr to ≈15% & bcm fn grained. Grv horizon at 47-49' BGL.
50										

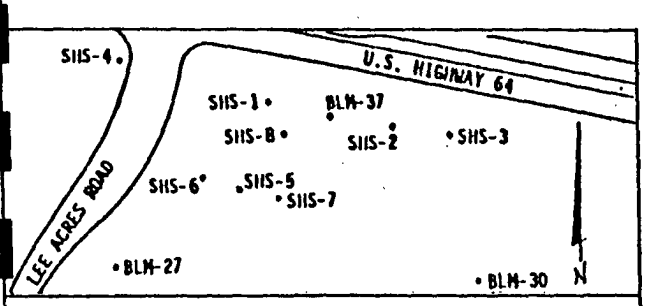
BOREHOLE LOG (SOIL)

(Continued)

LOCATION ID: SHS-4

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
50									ML	50-60' SHALE: Lt olv (10 Y 5/4) to dk gnsh yel (10 Y 6/6) v fn grained, consol, well sorted, sbrndd to rndd.
55										
60										
65										
70										
75										
80										
85										
90										
95										
100										
105										
110										
115										

BOREHOLE LOG (SOIL)



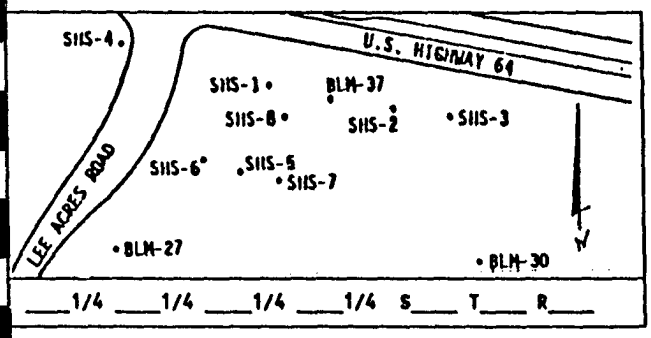
___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

SITE ID: OFFSITE GIANT LOCATION ID: SHS-5
SITE COORDINATES (ft.):
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECHNOLOGIES INC.
DATE STARTED: 1/7/90 DATE COMPLETED: 1/8/90
FIELD REP.: LINLEY
COMMENTS:

LOCATION DESCRIPTION:

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0		100%	1	1	0	3'			SW	0-31' SAND: Grysh orange (10 YR 7/4), v fn to med fn 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 through depth up to 1" diam sbang to sbrndd.
		0%	2	2	3	8'				
5										
		4%	3	3	8	14'				
10										
		40%	4	4	14	18'				
15										
		0%	5	5	18	23'				
20										
		75%	6	6	23	27'				
25										
		100%	7	7	27	33'				
30									SC	31-32' CLAYEY SILT: Mod yelsh brn (10 YR 5/4) v fn to fn med sorting uncons to semiconsol, sbang to sbrndd.
		100%	8	8	33	38'			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.
35										
		30%	9	9	38	42'			SP	38-42' SAND: Pale yelsh orange (10 YR 8/6) fn to med crs, poorly sorted, uncons sbang to sbrndd, v moist.
40										
		20%	10	10	42	47'			SC	42-43' CLAYEY SILT: Pale yelsh brn (10 YR 6/2) v fn to fn, mod sorted, semiconsol, sbang to sbrndd, sat.
45										
		20%	11	11	47	52'			SW	43-58' SAND: Pale yelsh brn (10 YR 6/2) fn to med crs sand, poorly sorted, uncons, sbang to sbrndd, sat.
50										
		10%	12	12	52	57'				

BOREHOLE LOG (SOIL)



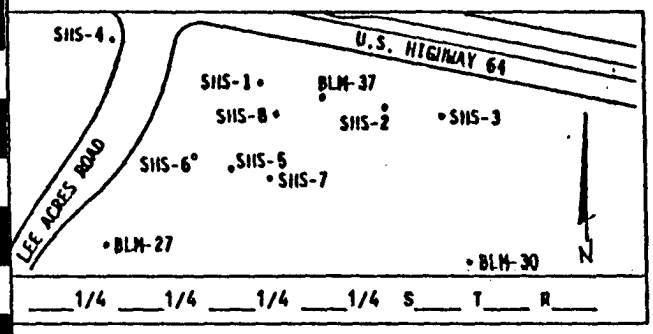
___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

SITE ID: OFFSITE GIANT LOCATION ID: SHS-6
SITE COORDINATES (ft.):
N E
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:

LOCATION DESCRIPTION:

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0		75%	1	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 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.
		50%	2	2	3	9'				
5										
		75%	3	3	9	17'				
10										
		40%	4	4	13	17'				
15										
		40%	5	5	17	22'				
20										
		75%	6	6	22	26'				
25		80%	7	7	26	31'			SM	24-26' SANDY CLAY: Lt 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		60%	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 fn sand at 28' BGL. ≈3" silt layer at 27.5" BGL. At 34' BGL 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.
35		60%	9	9	36	41'				
40		40%	10	10	41	46'			SW	45-48.5' BEDROCK-SANDSTONE: Mod yel (5 Y 7/6) to dusky yel (5 Y 6/4), med to fn grained, consol, mod sorting sbang to sbrndd, intbd silty clays. TD 48.5 auger refusal.
45		20%	11	11	46	48'				
50										

BOREHOLE LOG (SOIL)



___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

SITE ID: OFFSITE GIANT LOCATION ID: SHS-7
SITE COORDINATES (ft.):
N_____ E_____
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECHNOLOGIES INC.
DATE STARTED: 01/04/90 DATE COMPLETED: 01/06/90
FIELD REP.: LINLEY
COMMENTS:

LOCATION DESCRIPTION:

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0		100%	1	1	0	4'			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 sand, cobbles up to 5" diam, rootlets at 27' BGL. Grv up to 2.5" diam w/med crs sand at 30-35' BGL.
5		100%	2	2	4	9'				
10		50%	3	3	9	14'				
15		70%	4	4	14	18'				
20		0%	5	5	18	22'				
25		50%	6	6	22	27'				
30		60%	7	7	27	32'				
35		80%	8	8	32	37'				
40		30%	9	9	37	41'			SM	36-37' SAND SILT: Dk yelsh orange (10 YR 6/6) v fn to fn grained semiunconsol, sbang to sbrndd mod poorly sorted, clay fraction ≈15% sand fraction ≈30%, 37' BGL noted HC odor from drilling cuttings at 38' BGL noted (bottom of sampler) blk horizon w/HC odor noted H_2O at ≈42' BGL - cuttings have blk staining (?) w/HC odor. HC horizon _____.
45		40%	10	10	41	45'				
50		50%	11	11	45	50'			SC	37-40' CLAYEY SAND: Grysh olv, v fn to med crs, poorly sorted, semi to uncons sbang to sbrndd, sat. HC odor.
									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.

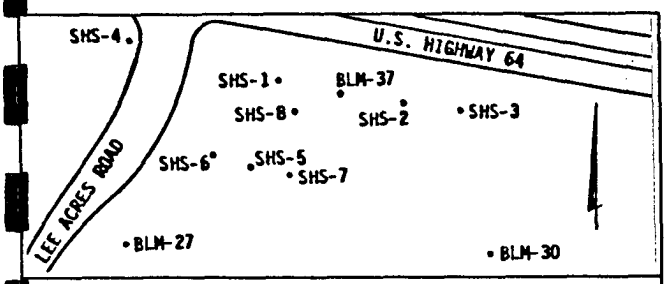
BOREHOLE LOG (SOIL)

(Continued)

LOCATION ID: SHS-7

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
50										41-54' SAND: Pale to lt olv (10Y 6/2-5/4) med crs, mod sorted uncons, sbang to sbrndd, 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.
55										
60										
65										
70										
75										
80										
85										
90										
95										
100										
105										
110										
115										

BOREHOLE LOG (SOIL)



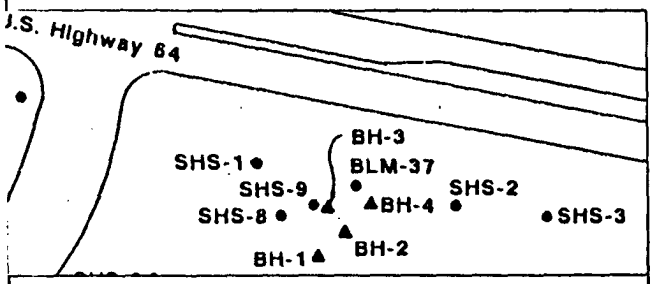
___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

SITE ID: OFFSITE GIANT LOCATION ID: SHS-8
SITE COORDINATES (ft.):
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECHNOLOGIES INC.
DATE STARTED: 01/09/90 DATE COMPLETED: 01/09/90
FIELD REP.: LINLEY
COMMENTS:

LOCATION DESCRIPTION:

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0		60%	1	1	0	4'			SM	0-6' SANDY SILT: Dk yelsh orange (10 YR 6/6) v fn to fn grained uncons, mod sorted, sbang to sbrndd, rootlets.
5		80%	2	2	4	9'			SW	6-15' SAND: Mod yelsh brn (10 YR 5/4) fn to med crs, poorly sorted, uncons sbang to sbrndd, Grv at ≈8' BGL and ≈1' thick, up to 1-2" diam, sbrndd to sbang, rootlets.
10		70%	3	3	9	14'				
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	24'			SW	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	29'				
30		70%	7	7	29	34'				
35		100%	8	8	34	39'				
40		70%	9	9	39	41'			SM	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%	10	10	41	45'			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		20%	12	12	50	53'				

BOREHOLE LOG (SOIL)



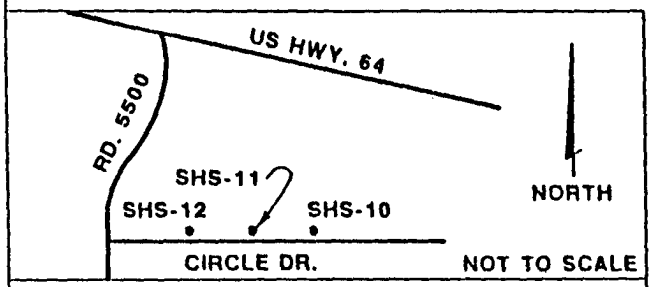
___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

SITE ID: OFFSITE GIANT LOCATION ID: SHS-9
SITE COORDINATES (ft.):
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: ROTARY (AIR)
DRILLING CONTR.: MOTE
DATE STARTED: 04/25/90 DATE COMPLETED: 04/25/90
FIELD REP.: MARTIN NEE, KYLE SUMMERS
COMMENTS:

LOCATION DESCRIPTION:

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							0-5'			Backfill, dark yllsh brn 10 YR 4/2, sand-80%, clay-20%, v. fine to med sand, subang, unconsolidated.
5							5-10'			Sand, mod yllsh brn 10 YR 5/4, clay-5%, sand-v. fine-med crs, subang., uncons.
10							10-25'			Sand, mod yllsh brn 10 YR 5/4, v. fine - medium, subang.
15										
20										
25							25-38'			Sandy clay, mod yllsh brn 10 YR 5/4 to dark yllsh brn 10 YR 4/2, v. fine-medium sand 40%, clay-60%, uncons, subang.
30										
35										
40							38-45'			Sandy clay, mod olive brn 5 Y 4/4, v. fine sand-10% clay-90%, some cobbles at 42-43', uncons., subang.
45							45-50'			Claystone, med blsh gray 5 B 5/1 to mod brn 5 YR 3/4, inter bedded with F. rich clays dk yllsh orange 10 YR 66.
50										TD = 50'

LITHOLOGIC LOG (SOIL)



___1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

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
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
			Soil headspace		
5			5-7'	0	0-10' Sand, Mod yelsh brn 10 YR 5/4, v fn to med crs mix, ang to sbang uncons, poorly sorted.
10			10-12'	0	10-15' Sand, 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' Sand, 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' Silty Sand, Mod olv brn 5 Y 4/4, Sltst-? -partially consol, some clay ≈10%, sli Cbls, poorly sorted, some grading.
25			22-24.5'	0	22.5-24.5' Silty Sand, Lt olv brn 5 Y 5/6, fn to v fn sand - 80%, some semi-consol silt lntvls which are tight drilling, poorly sorted, some graded bedding.
					24.5-30' Silty Sand, Lt olv brn 5 Y 5/6, silt to med sand, occ Grv <1% tight but not consol, silt well sorted, some grading.
30			30-32'	0	30-34.5' Sand, 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					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					38.5-40' Sand, Lt olv brn 5 Y 5/6, v fn to med sand fairly drk uncons to semi consol, fairly well sorted, graded.
50			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 Qtz, poorly sorted.
					42-45' Gravelly Sand, Dk yelsh orange 10 YR 6/6, lge Cbls, sand, poorly sorted.

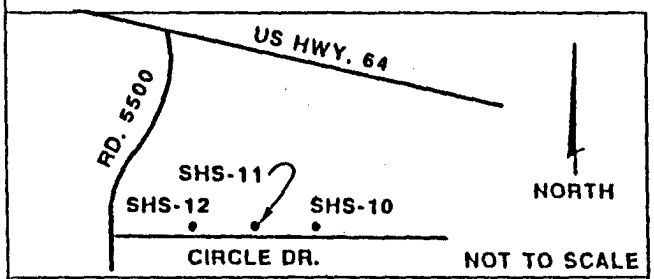
LITHOLOGIC LOG (SOIL)

(continued)

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.
					48' = TD
55					
60					
65					
70					
75					
80					
85					
90					
95					
100					
105					
110					
115					

LITHOLOGIC LOG (SOIL)



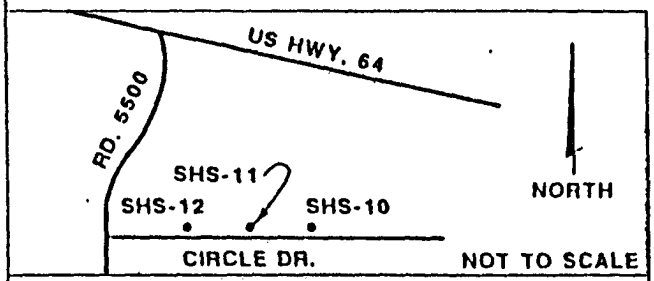
SITE ID: M&A OFFSITE LOCATION ID: SHS-11
SITE COORDINATES (ft.): 150' WEST OF SHS-10
N 9763.57 E 11358.35
GROUND ELEVATION (ft. MSL): 5378.36
STATE: NM COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH.
DATE STARTED: 6/20/90 DATE COMPLETED: 6/21/90
FIELD REP.: M. MOHORCICH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

1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

LOCATION DESCRIPTION:

Depth	Lith	Drilling Time Scale:	Sample Type and Interval	Org. Vap ppm	Lithologic Description / Remarks
		1110	0-5'	0	0-5' Sand, mod yelsh brn 10 YR 4/2, med-crs, uncons.
5					5-32' Sand, yelsh brn 10 YR 5/4, abdt qtz, subrnd, uncons, med-crs grn
10			Soil headspace 10-12'	0	
15			15-17'	0	
20			20-22'		
25			25-27'	0	
30			30-32'	0	
					32-33' Cobbly sand, sand as above w/ minor cobbles.
35			35-37'	>30	33-41' Sand, olv gry 5 Y 3/2, med-crs grnd from 33-38' w/ noticed HC stain & odor at 36'. Noticably drker HC stain from 38'-40'; with lighter dusky yel grn 5 GY 5/2 from 40-41'. H_2O at 38-40'.
			37-39'	>30	
			39-41'	2	
40					41-43' Cobbly sand, lght olv gry 5 Y 5/2, saturated, well sorted, crs grn sand w/ few 1" size cobbles, uncons.
					43-45' Sand, lght olv gry 5 Y 5/2, saturated.
45					45-55' Cobbly sand, lght olv gry 5 Y 5/2, saturated same as above (SAA) w/ minor cobbles, uncons. Pulled out 7" bit & reamed w/ 10" flights.
50					
					T.D. at 55'

LITHOLOGIC LOG (SOIL)



___1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

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 STEM 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
			Soil headspace		0-15' Sand, lt olv brn 5 Y 5/6, med grain sand, sbrndd, prim uncons.
5					
10					
15					15-37' Sand, pale yellow orange 10 YR 8/6, med-coarse grain, uncons.
20					
25					
30					No split at 30-32', just pushing a rock w/spoon down through uncons sand. Lost sand downhole, cavity at ≈ 32'.
35			*35' HNU=0ppm	0	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_2O yet, maybe a bit more moist than above at 35'.
40					39-43' Sand, dusky yel 5 Y 6/4, med-crs gr, uncons, split from 40-42 gave H_2O at 41'.
					43-43.8' Clayey Sand, dusky yel 5 Y 6/4, minor amt cly. 43.8-45' Sand, dusky yel 5 Y 6/4, unconsol.
45					45-50' Cobbly Sand, SAA w/minor cobbles surfacing.
50					50-55' Sand, SAA.

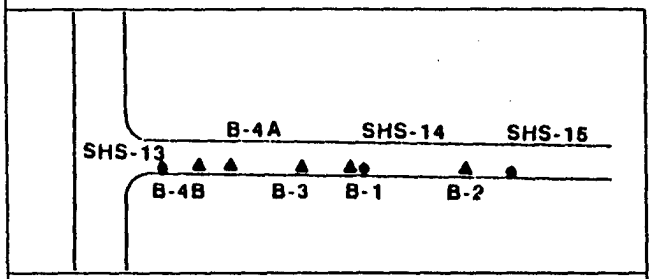
LITHOLOGIC LOG (SOIL)

(continued)

Location ID SHS-12

Depth	Lith	Drilling Time Scale:	Sample Type and Interval	Org. Vap ppm	Lithologic Description / Remarks
50					
55					T.D. 55' w/ 10" flights.
					Split 55-57' Sand, saa w/ cly zone from 56.6-57'.
60					
65					
70					
75					
80					
85					
90					
95					
100					
105					
110					
115					

BOREHOLE LOG (SOIL)



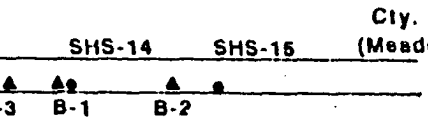
___1/4 _SW_1/4 _NW_1/4 _NW_1/4 S_27_ T_29N_ R_12W

SITE ID: OFFSITE GIANT LOCATION ID: SHS-13 Cty Rd 5468
SITE COORDINATES (ft.):
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: AIR/WATER ROTARY
DRILLING CONTR.: MOTE
DATE STARTED: 08/22/90 DATE COMPLETED: 08/22/90
FIELD REP.: M. MOHORCICH
COMMENTS: 37' east of Lee Acres Rd., 7 3/8" bit

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE 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										
10							9-16	bkg	SW	Cobbly sand, small cobbles w/ sand as above.
15							16-21	bkg	SC	Clayey sand, increase in cly, minor amounts. w/ loss of cly at 21'.
20										
25							24-26	bkg	SM	Sand, moist, uconsolidatd 10 YR 4/2, fn-med grn.
30							30-32		SW	Cobbly sand, cobbles at 30-32, 1/2-2".
							32-40		SM	Sand, 10 YR 4/2, unconsolidated, poorly sorted.
35										
40							40-50		SW	Cobbly sand, small cobbles, rig chattered down through 50'.
									SM	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										

BOREHOLE LOG (SOIL)



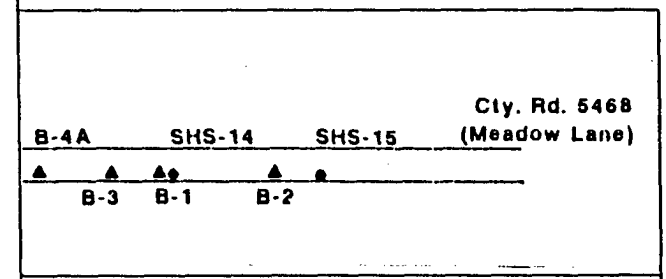
1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

SITE ID: OFFSITE GIANT LOCATION ID: SHS-14, Cty, Rd, 5468
SITE COORDINATES (ft.): 250' E 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: 08/16/90 DATE COMPLETED: 08/17/90
FIELD REP.: M. MOHORCICH
COMMENTS: South side of row, time 1400
HNU background = .02 ppm

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 0-4	HNU bkg = .02 ppm	SM	Sand, mod yelsh brn 10 YR 5/4, poorly sorted, med gr, moist at 3' minor cobbles.
5							4-9	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'

BOREHOLE LOG (SOIL)



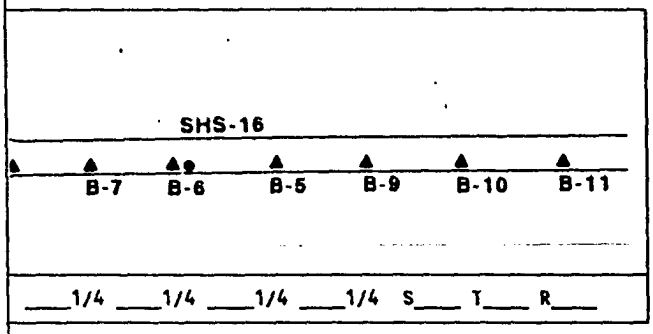
SITE ID: OFFSITE GIANT LOCATION ID: SHS-15, Cty Rd 5468
SITE COORDINATES (ft.):
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 08/18/90 DATE COMPLETED: 08/19/90
FIELD REP.: M. MOHORCICH
COMMENTS: T.D.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

1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							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.
5										
10							9'	.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_2O at 35'.
35										35-48.7 no cuttings due to slow speed of drilling but drilled like sand.
40										
45										
50										T.D. at 48.7'

BOREHOLE LOG (SOIL)



___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

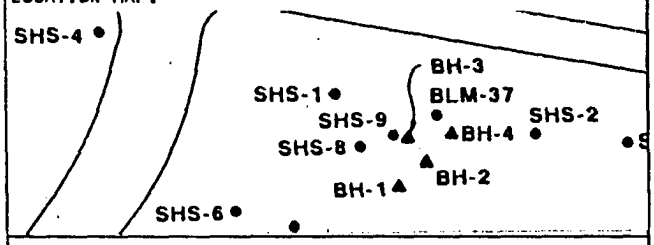
SITE ID: OFFSITE GIANT LOCATION ID: SHS-16, Cty Rd 5470
SITE COORDINATES (ft.): 200' EAST OF LEE ACRES ROAD ROW
N_____ E_____
GROUND ELEVATION (ft. MSL):_____
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: AIR/H_2O ROTARY
DRILLING CONTR.: MOTE
DATE STARTED: 08/21/90 DATE COMPLETED: 08/21/90
FIELD REP.: M. MOHORCICH
COMMENTS: Drilled 10' east of bore 6 at NE corner of woodsided shed. T.D. 50'

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 0-9	HNU bkg = .04 ppm	SM	Sand, f-med gr, dusky yel 5Y 6/4, unconsolidated, slily moist, poorly sorted. Color change to drk yelsh brn 10 YR 4/2 at 12-16.
5										
10										
15							14-16	1.6		
20							19-21	1		
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	Sand, split 29-31 - med gr, dusky yel 5Y 6/4, poorly sorted w/ H_2O at 30'.
35									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										Comment: HNU readings were taken at Bore 6-5' east of SHS-16 w/ hollow stem auger split spoon.
50										

BOREHOLE LOG (SOIL)

LOCATION MAP:



___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

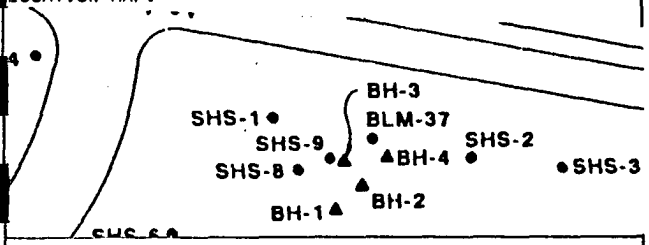
SITE ID: OFFSITE GIANT LOCATION ID: SHS-BH1
SITE COORDINATES (ft.):
N_____ E_____
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 04/23/90 DATE COMPLETED: 04/23/90
FIELD REP.: MARTIN NEE, KYLE SUMMERS
COMMENTS:

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0										
							3'			Sand, Dark yllsh brn 10 YR 4/2, v. fine to coarse sand, poorly sorted, unconsolidated, sub-angular, <10% fine pebble gravel.
5										
							6'-21'			Sand, Moderate yllsh brn, 10 YR 5/4, as above <5% clay, <10% v. fine to coarse pebble gravel.
10										
15										
20							21'			Clayey sand, Dark yllsh 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										
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										

BOREHOLE LOG (SOIL)

LOCATION MAP:



___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

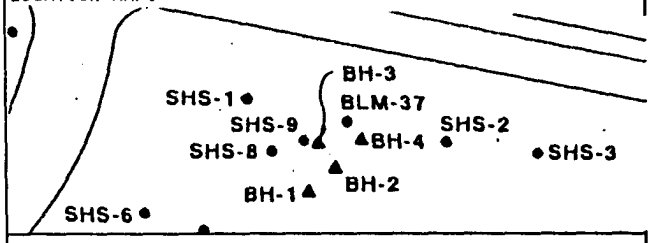
SITE ID: OFFSITE GIANT LOCATION ID: SHS-BH2
SITE COORDINATES (ft.):
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 04/23/90 DATE COMPLETED: 04/23/90
FIELD REP.: MARTIN NEE, KYLE SUMMERS
COMMENTS:

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE 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'			Cobbles/sand - no cuttings.
							41.5-43'			Claystone, moderate brown 5 YR 4/4-5 YR 3/4, mod well consolidated.
45										TD = 43'
50										

BOREHOLE LOG (SOIL)

LOCATION MAP:



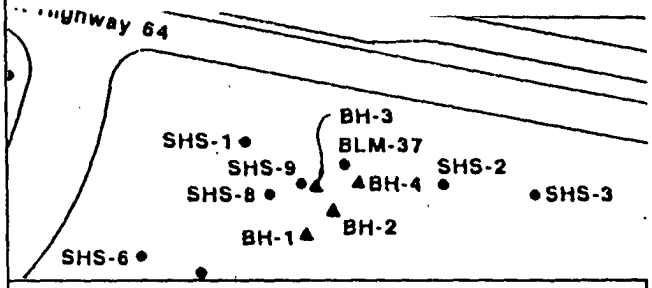
___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

SITE ID: OFFSITE GIANT LOCATION ID: SHS-BH3
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:

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							0-3'			Backfill dark yllsh brn 10 YR 4/2, 80% clay, 20% v. fine to med sand, unconsolidated, sub-angular.
							3-33'			Sand, mod yllsh brn 10 YR 5/4 - dk yllsh brn 10 YR 4/2, fine to med unconsolidated, sub-angular, sub-rounded gravel (sparse) at 15ft.
5										
10										
15										
20										
25										
30										
							33-36'			Clayey Sand, dk yllsh brn 10 YR 4/2, clay-40%, sand-60%, fine to med uncons., sub-angular sand.
35										
							36-38'			Sandy clay, 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.
40										
							38-45.5'			Sandy clay, mod olive brn 5 Y 4/4, clay-80%, sand-20%.
45							45.5'			Silty claystone, med blsh grey 5 B 5/1, consolidated.
										TD = 45.5'
50										

BOREHOLE LOG (SOIL)



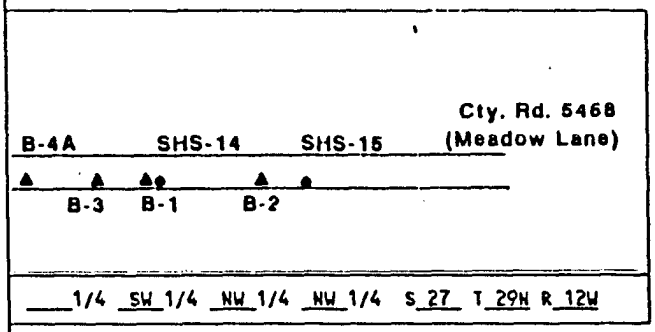
___1/4 ___1/4 ___1/4 ___1/4 S___ T___ R___

SITE ID: OFFSITE GIANT LOCATION ID: SHS-BH4
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:

LOCATION DESCRIPTION: South of NM 64 East of County Road 5500

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							0-5'			Backfill, moderate yllsh brn 10 Y 5/4, sand-90%, rounded gravel-10%. v. fine-med sand.
5							5-23'			Sand, mod yllsh brn 10 Y 5/4, v. fine-coarse, sub-angular. 5% pebble size, sub-rounded gravel at 10'-23'.
10										
15										
20										
							23-30'			Sandy clay, dk yllsh brn 10 YR 4/2, sand-50%, clay-50%, v. fine - med sand, sub-angular.
25										
30							30-37'			Sandy clay, dk yllsh brn 10 YR 4/2, clay-70%, sand-30%. sand is fine.
35										
							37-41.5'			Silty clay, olive gray 5 Y 3/2, silt to v.f. sand-10%, clay-90%.
40							41.5'			Silty claystone, dusky yellow 5 Y 6/4, consolidated
										TD = 41.5'
45										
50										

BOREHOLE LOG (SOIL)



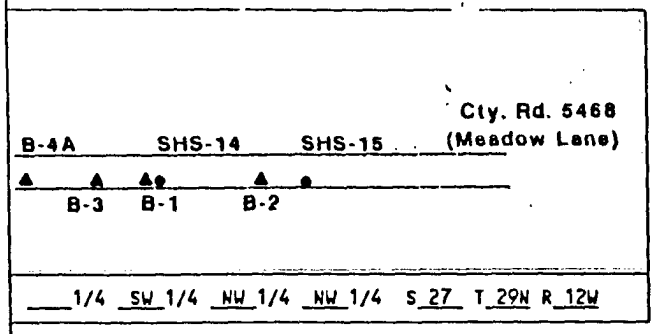
SITE ID: OFFSITE GIANT LOCATION ID: BORE-1
SITE COORDINATES (ft.): 250' EAST OF LEE ACRES RD.
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH. INC.
DATE STARTED: 08/13/90 DATE COMPLETED: 08/13/90
FIELD REP.: M. MOHORCICH
COMMENTS: County Road 5468, HNU background = 0 ppm

1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon	HNU bkg = 0 ppm	SM	0-25' Sand, unconsolidated, 10YR 4/2, poorly sorted, f-med gr, at 10' slight increase in sorting, med gr 10YR 5/4.
							4-6	0		
5										
							9-11	0		
10										
							14-16	0		Increase in qtz grains, sub angular, w/ minor marble size pebbles.
15										
							19-21	0		
20										
							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.
25										
30										
							34-36	150	GM	33-34' Cobbly sand, at 33' Rig chattered & drk soil came up at 34' in minor cobbles.
35										34.4-35.5 blk HC stain in vry shrp contact in unconsolidated sand w/ H_2O at 35.5'. Drilled to 34'.
40										
45										
50										

BOREHOLE LOG (SOIL)



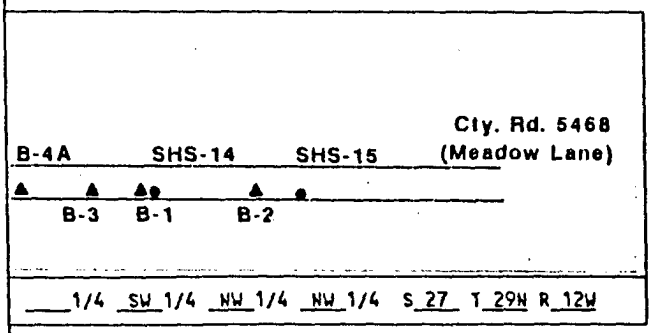
___1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

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

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split spoon 4-6'	HNU bkg = 0 ppm	SM	Sand, unconsolidated, poorly sorted, 10YR 5/4, mod yelsh brn. f to medium gr.
5										9' rig chattered through some cobbles.
10							9-11'	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 Clayey sand, f gr 15.5-15.7 2" of clayey sand - f gr drilled 16-19 just loose sand.
20							19-21'	bkg		19.0-19.4 = Clayey sand w/ poorly sorted, dusky yel 5Y6/4, 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							29-31'	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_2O at 35' in sand as above, w/ no HC stain or odor.
40										
45										
50										

BOREHOLE LOG (SOIL)



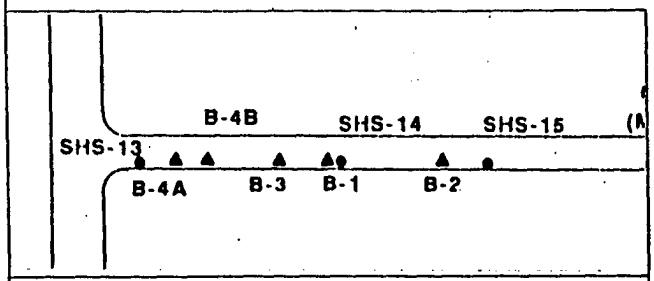
1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

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

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 4-6'	HNU bkg= .04 ppm	SM	0-5 Sand, mod yelsh brn 10 YR 5/4, poorly sorted, unconsolidated.
5										5.0-5.5: Clayey sand, w/ f gr sand.
10							9-11		SM	5.5-27 Sand, very loose sand dusky yellow 5Y 6/4. Only 1/2 of a split.
15							14-16	17		
20							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							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_2O 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										

BOREHOLE LOG (SOIL)



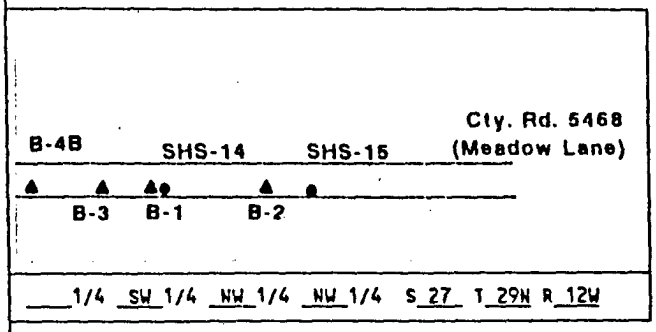
1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

SITE ID: OFFSITE GIANT LOCATION ID: BORE 4A
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: 08/18/90 DATE COMPLETED: 08/18/90
FIELD REP.: M. MOHORCICH
COMMENTS: 100' east of Lee Acres Rd.

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 0-4	HNU bkg= .02 ppm	SM	0-6 Sand, unconsolidated, dusky yel 5Y 6/4. f-med gr sand, poorly sorted.
5							4-9		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 Cobbly sand, 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: Sand
30							29-34	>20 ppm		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										

BOREHOLE LOG (SOIL)



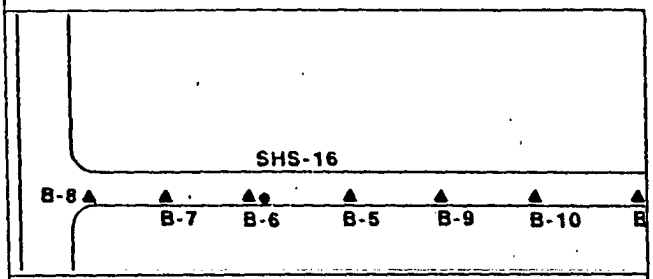
1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

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

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon	HNU bkg= .04 ppm	SM	0-10' Sand, unconsolidated, mod yelsh brn 10YR 5/4, med gr, poorly sorted.
5							4-6	20?		
10							9-11	20?	SC	10.2-10.3 Clayey sand, f gr sand drk yelsh brn 10YR 4/2.
15							14-16	40?	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	30?	SC SM	15-15.3 Clayey sand, moist, f gr. 15.3-19.4 Sand, same as above alternating f-med gr, unconsolidated.
25							24-26	25?	SC	19.4-20 Clayey sand, f gr, mod consolidated.
30							29-31	No Sample	SM	20-31 Sand, f-med alternating graded sands.
									GC	31-32 Cobbly sand, 1/4" cobbles w/ minor amounts Fe stain, mod consolidated.
35							34-36	100?	SM	32-39 Sand, 10YR 5/4, med gr, H_2O at-35.
40										Comment: HNU 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										

BOREHOLE LOG (SOIL)



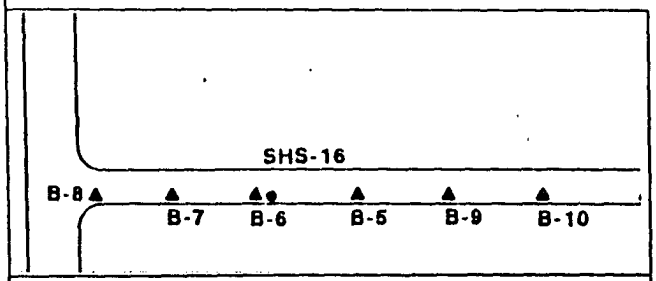
SITE ID: OFFSITE GIANT LOCATION ID: BORE 5
SITE COORDINATES (ft.):
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 08/14/90 DATE COMPLETED: 08/14/90
FIELD REP.: M. MOHORCICH
COMMENTS: Down gradient from Bore 1, County Road 5470
HNU background = .04 ppm

1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split spoon 4-6'	HNU bkg= .04 ppm none	SM	0-9.4 Sand, moist, w/ clay from 5.10-5.12.
5										
10							9-11	20?	CL SM	9.4-9.6 Clay, 2" clay w/ f gr sand. 9.6-11.0 Sand, 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?	CL GC	16-19 Clayey sand, drilling is clayey sand. 19-20.4 clayey sand as above. 23-24 Cobbly sand, drill cobbles.
25							24-26		CL CL SM	24-24.3 Clayey sand, 10YR 4/2. 24.3-24.7 Clay, very well indurated. 24.7-26 Sand, 10YR 5/4. Moist, v f gr.
30							29-31	40?	CL SM	29.0-29.6 Clayey sand, 10YR 4/2, well indurated. 29.6-31 Sand, very sharp contact w/ med-coarse dusky yel 5Y 6/4, very moist at bottom.
35							34-36			H_2O 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 naciemento? 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										

BOREHOLE LOG (SOIL)



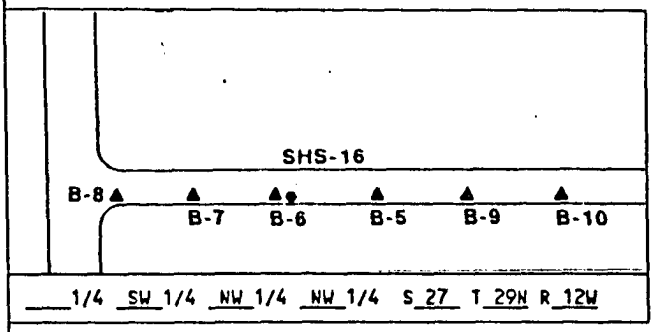
1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

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 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, East of County Road 5500, 190' East of Lee Acres Road on County Road 5470

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 4-6	HNU bkg= .06 ppm	SM	0-9 Sand, unconsolidated, mod yelsh brn 10YR 5/4 f grn, poorly sorted.
5										9-24.5
									SC	Clayey sand, 2,1" cobbles among clayey sand, f gr mod yelsh 10YR 5/4.
10							9-11			Cuttings from 11-14 changed color to a darker shade of brn.
							14-16			Split 14.2-14.5 Clayey sand, moist dusky yelsh 5Y 6/4.
15										14.5-16 abundant qtz grs med gr, poorly sorted, unconsolidated.
							19-21	bkg		19.3-19.7' Clayey sand, w/ some blk organic? streaks.
20										19.7-21 f gr sand. Unconsolidated. 5Y 6/4. Drill cuttings 21-24 were drker & looked like clay.
							24-26	bkg		Split 24.0-24.5 Clayey sand, mod consolidated.
25									SM	24.5-29 Sand, med to coarse sand, abundant qtz. 25.8-26 f gr sand, dusky yel 5Y 6/4.
									SC	29.0-29.4 Clayey sand, mod consolidated.
30										29.4-31 Sand, med-coarse w/ abundant qtz, unconsolidated, H_2O at 30.1'. T.D. at 31'.
35										
40										
45										
50										

BOREHOLE LOG (SOIL)



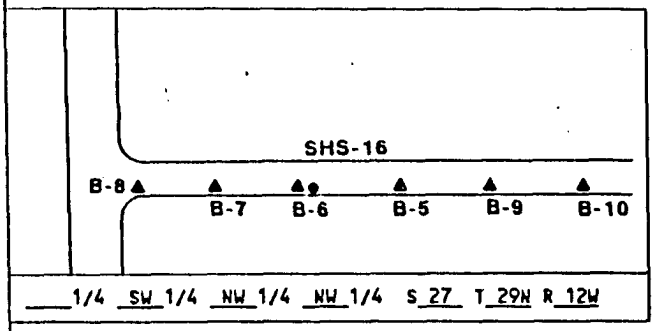
___1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

SITE ID: OFFSITE GIANT LOCATION ID: BORE 7
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: 08/14/90 DATE COMPLETED: 08/14/90
FIELD REP.: M. MOHORCICH
COMMENTS: HNU bkg =.06 ppm

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 4-6	HNU bkg= .06 ppm	SM	0-14 Sand, unconsolidated, moist, mod yelsh brn 10YR 5/4 poorly sorted.
										4-5 f gr.
5										5-6 med gr.
										4-6 moist, f gr, unconsolidated. Same as above color.
							9-11			
10										
							14-16		SC	14.2-20.3 Clayey sand, mod consolidated.
15										15.5-15.8 Clayey sand, mod consolidated w/ rest as med gr sand.
							19-21			19.4-20.3 Clayey sand, mod consolidated f gr sand. 10YR 4/2.
20									SM	20.3-24.2 Sand, med gr sand 10YR 5/4.
							24-26	bkg		24.0-24.2 Sand med.
25									SC	24.2-25.2 Clayey sand, w/ last 1" w/ brn 5YR 4/4 med brn organic.
									SM	25.2-29 Sand, med grnd.
							29-31	bkg	SC	29.0-29.5 Clayey sand, fr gr, 10YR 4/2, moist.
30									SM	29.5-34 Sand, dusky yel 5 YR 6/4. Abundant qtz, dry.
							34-36	bkg		34-36 is wet, saturated. H_2O between 31-34.
35									SC	34-34.5 Clayey sand
									SM	34.5-38 Sand, sand w/ interbedded clays, organic pale brn 5YR 5/2.
										T.D. 38'
40										
45										
50										

BOREHOLE LOG (SOIL)



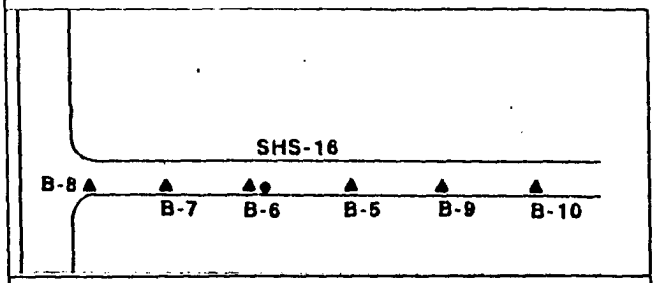
1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

SITE ID: OFFSITE GIANT LOCATION ID: BORE 8
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: 08/14/90 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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 4-6'	HNU bkg= .06 ppm	SM	0-25.5 Sand, loose unconsolidated minor 1" cobbles throughout. Dusky yellow 5YR 6/4 med gr.
5										
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 Clayey sand, moist mod consolidated light olive gry 5Y 5/2, very f sand.
30							29-31	bkg	SM SC SM	29-29.9 Sand, loose w/ small pebbles. 29.9-30.4 Clayey sand, med indurated. 30-36 Sand, moist but not saturated sand 5Y 6/4 f gr.
35							34-36	bkg		H_2O at 35', sand loose w/ cobbles at 35-35.11 1ft clay plug at 36' drk yelsh brn 10YR 4/2. T.D. at 36'
40										
45										
50										

BOREHOLE LOG (SOIL)



____1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

SITE ID: OFFSITE GIANT LOCATION 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 COMPLETED: 08/15/90
FIELD REP.: M. MOHORCICH
COMMENTS: HNU bkg = .04 ppm

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 4-6	HNU bkg = .04 ppm	SM	0-10 Sand, mod yel brn 10YR 5/4, f gr, mod consolidated, poorly sorted, dry.
5										
10							9-11		GC	10-11 Cobbly sand, drilling hit cobbles at 10-11 loose sand w/ 1" cobbles at 10, abundant qtz garins, med gr 5Y 6/4 dusky yel.
									SM	11-19.7 Sand,
15							14-16			14.0-14.5 sand as above. 14.5-16 finer gr sand, moist, mod consolidation. no stain or odor.
20							19-21	bkg		19.5-19.7 sand, med gr.
									SC	19.7-20.0 Clayey sand, moist, mod consolidated.
										20-29.3 Sand, 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		29.0-29.3 med gr sand.
									SC	29.3-29.6 Clayey sand 29.6-31 Sand, med-coarse gr 5Y 6/4. H_2O at 30.9' T.D. at 31'
35										
40										
45										
50										

BOREHOLE LOG (SOIL)

City. Rd. 5470
(Sage Street)

▲ B-5 ▲ B-9 ▲ B-10 ▲ B-11

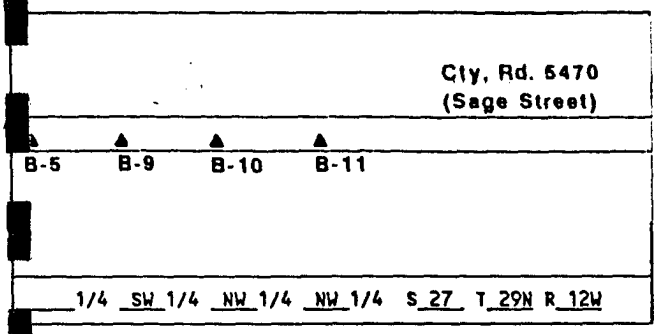
1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

SITE ID: OFFSITE GIANT LOCATION ID: BORE 10
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 COMPLETED: 08/15/90
FIELD REP.: M. MOHORCICH
COMMENTS: 100' East of Bore 9
HNU = .06 bkg

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

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 4-6	HNU bkg = .06 ppm	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.
5									CL SM	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 Clayey sand, moist, 10YR 4/2, mod consolidated. 11-14.6 Sand, drilling 12' cuttings came up darker, but still fast drilling.
15							14-16	bkg	CL SM GC	14.0-14.6 f gr sand. 14.6-15.3 Clayey sand, moist, mod-well consolidated. 15.3-19 Sand, med grain, loose 5Y 6/4 dusky yel, moist 19.0 Cobbly sand
20							19-21	bkg	SM CL	19-20.1 Sand, unconsolidated, med to coarse gr abundant qtz, poorly sorted, moist. 20.1-30 Clayey sand 20.1-24.0 very fine gr, mod-well consolidated.
25							24-26	bkg		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. H20 at 29.5' 29.5-30 saturated clayey sand. 30-31 Sand, med-coarse gr sand, saturated. T.D. at 31'
35										
40										
45										
50										

BOREHOLE LOG (SOIL)

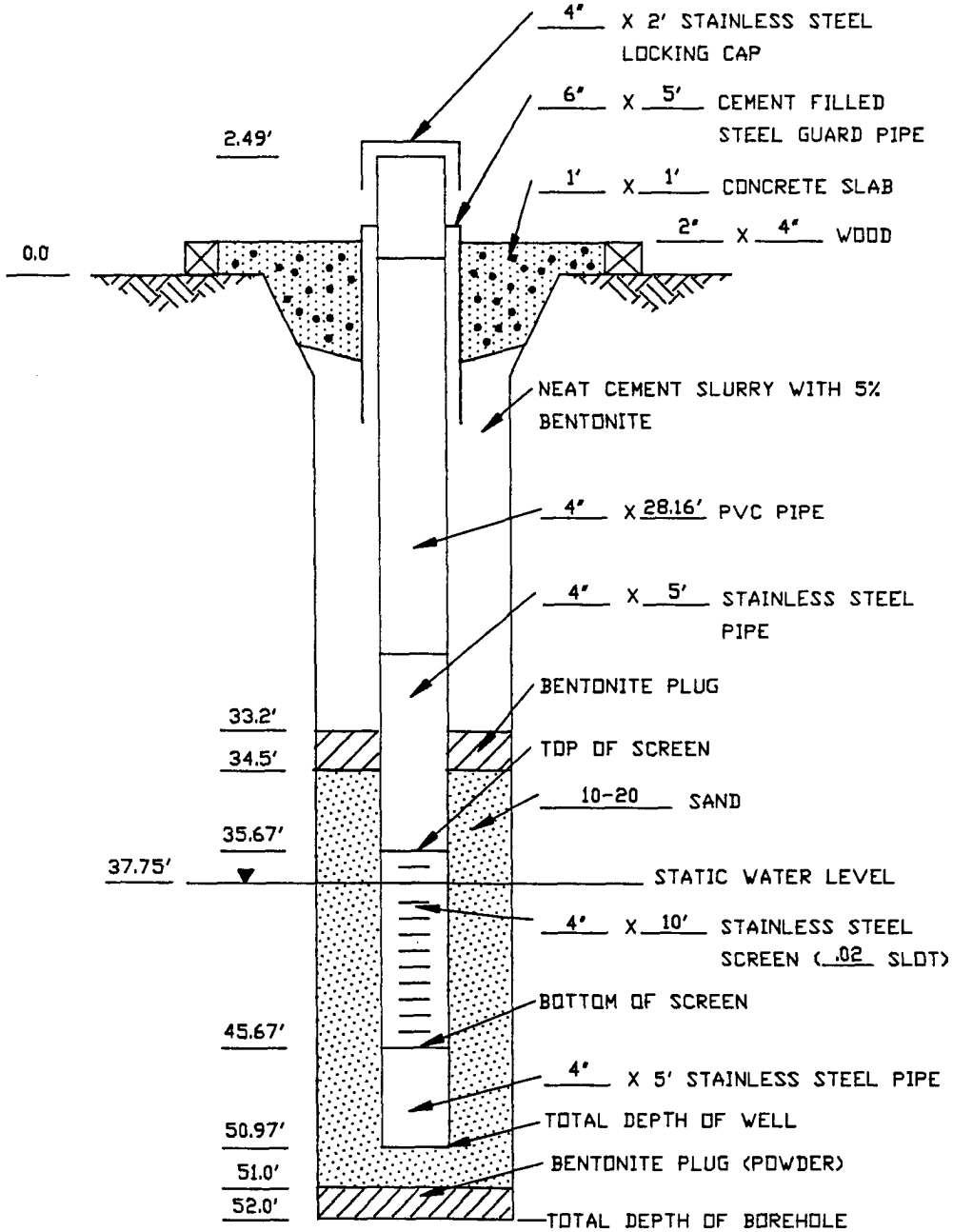


1/4 SW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12W

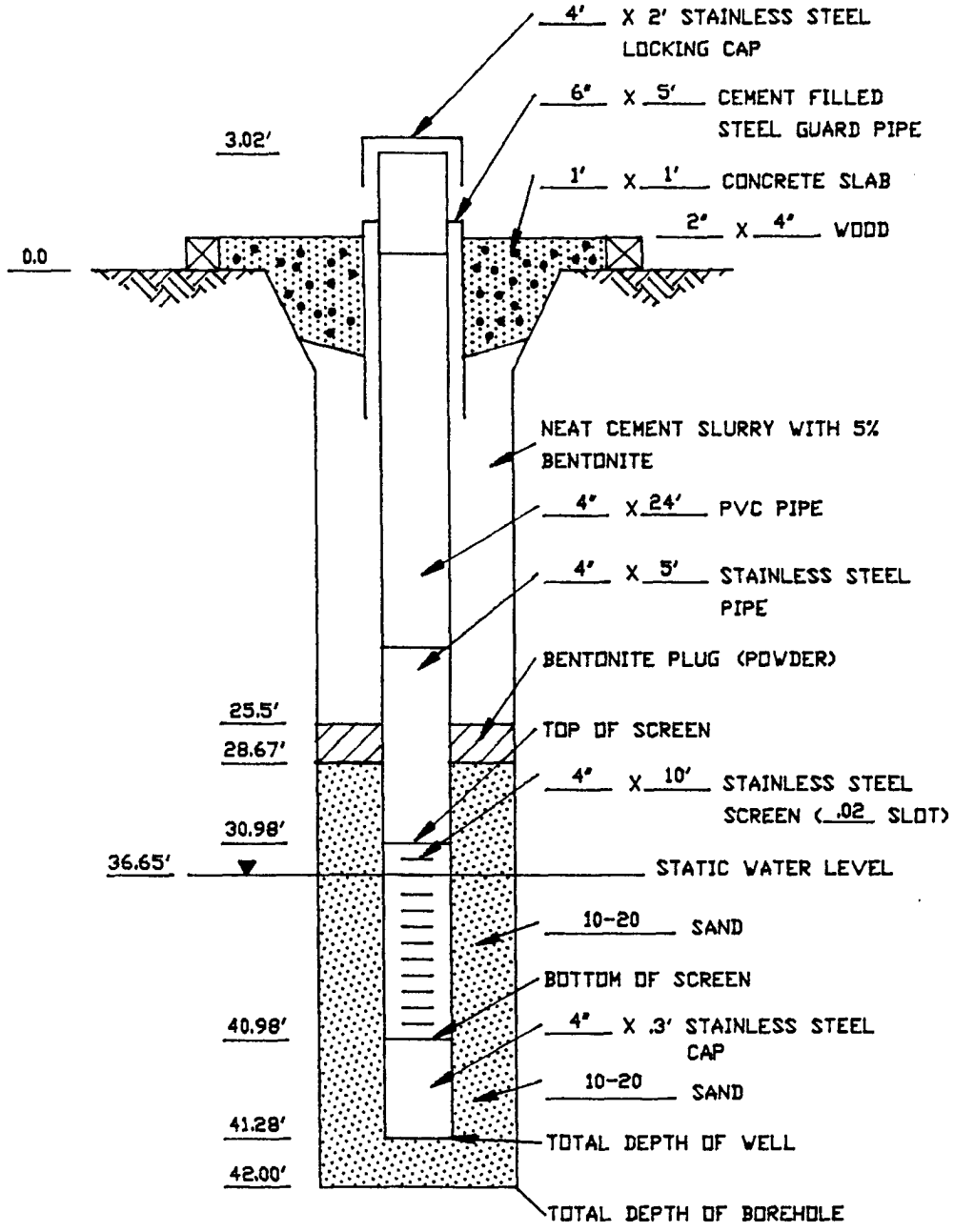
SITE ID: OFFSITE GIANT LOCATION ID: BORE 11
SITE COORDINATES (ft.):
N E
GROUND ELEVATION (ft. MSL):
STATE: NEW MEXICO COUNTY: SAN JUAN
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING CONTR.: WESTERN TECH INC.
DATE STARTED: 08/16/90 DATE COMPLETED: 08/16/90
FIELD REP.: M. MOHORCICH
COMMENTS: HNU bkg = .04 ppm
Southwest corner of 5470 and County Road 5481

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

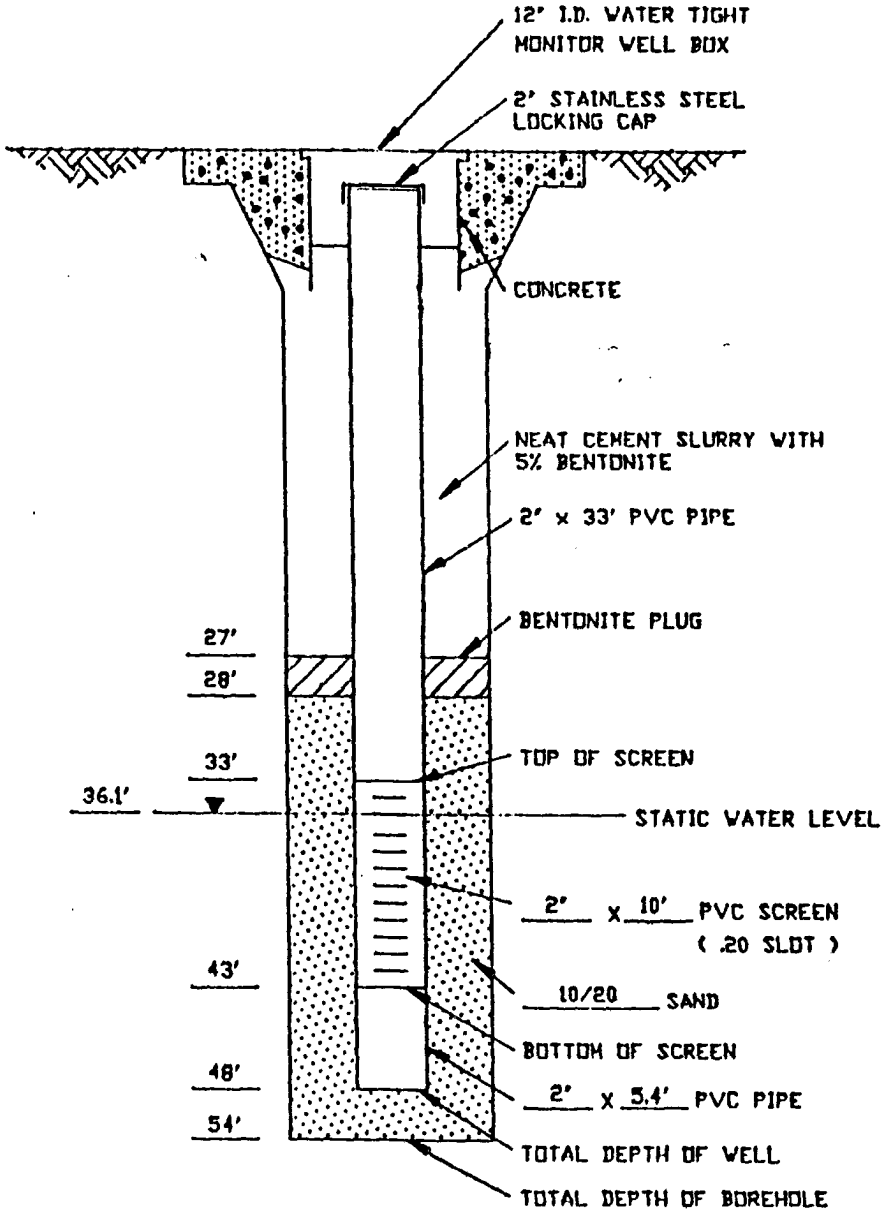
DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE I.D.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0							Split Spoon 4-6	HNU bkg = .04 ppm		0-6' Sand split 4-6', unconsolidated, med-coarse gr, moist, abundant qtz, poorly sorted, dusky yel 5Y 6/4, w/ minor amount pebbles.
5									SM GL	6-7 Cobbly sand, drilling at 6 chattered w/ cobbles, small.
									SM	7-14 Sand split 9-10.0 empty.
10							9-11	bkg		10-11 moist, sand as above.
							14-16	bkg		14.0-14.4 sand as above.
15									CL	14.4-14.10 Clayey sand, med gr clayey sand, drk yel brn 10YR 4/2.
									SM	15.0-24.5 Sand
20							19-21	bkg		19-19.5 no sample. 19.5-21 - mod-coarse, moist, loose 5Y 6/4.
										24-24.5' sand as above.
25							24-26	bkg	CL	24.5-25 - Clayey sand, moist 25-25.9 Sand, 5Y 6/4 loose, med gr, moist. 25.9-29 Clay, moist, sandy clay, H2O table is close.
										drilling 26-29 wet clay
30							29-31			H_2O in sandy clay: H_2O =27-29.
35										
40										
45										
50										



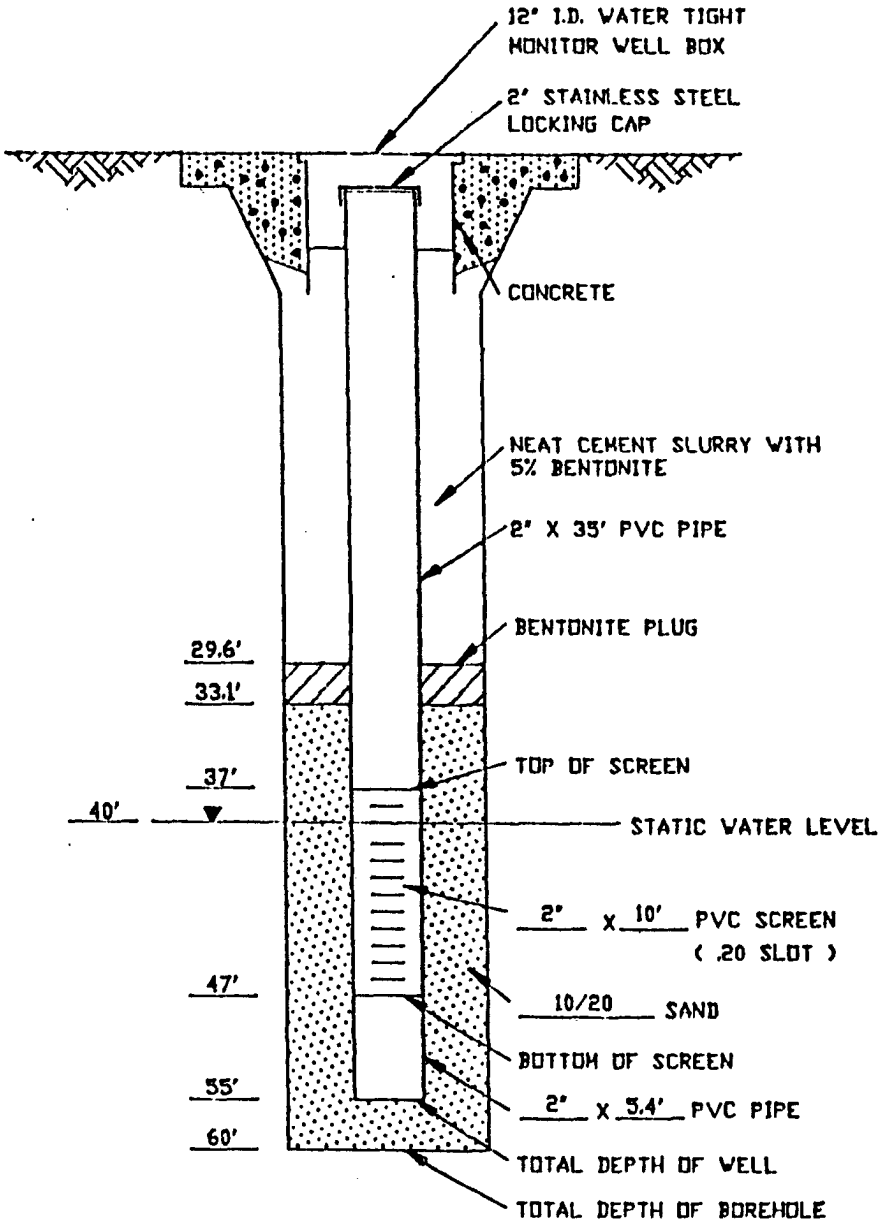
COMPLETION DIAGRAM SHS-1



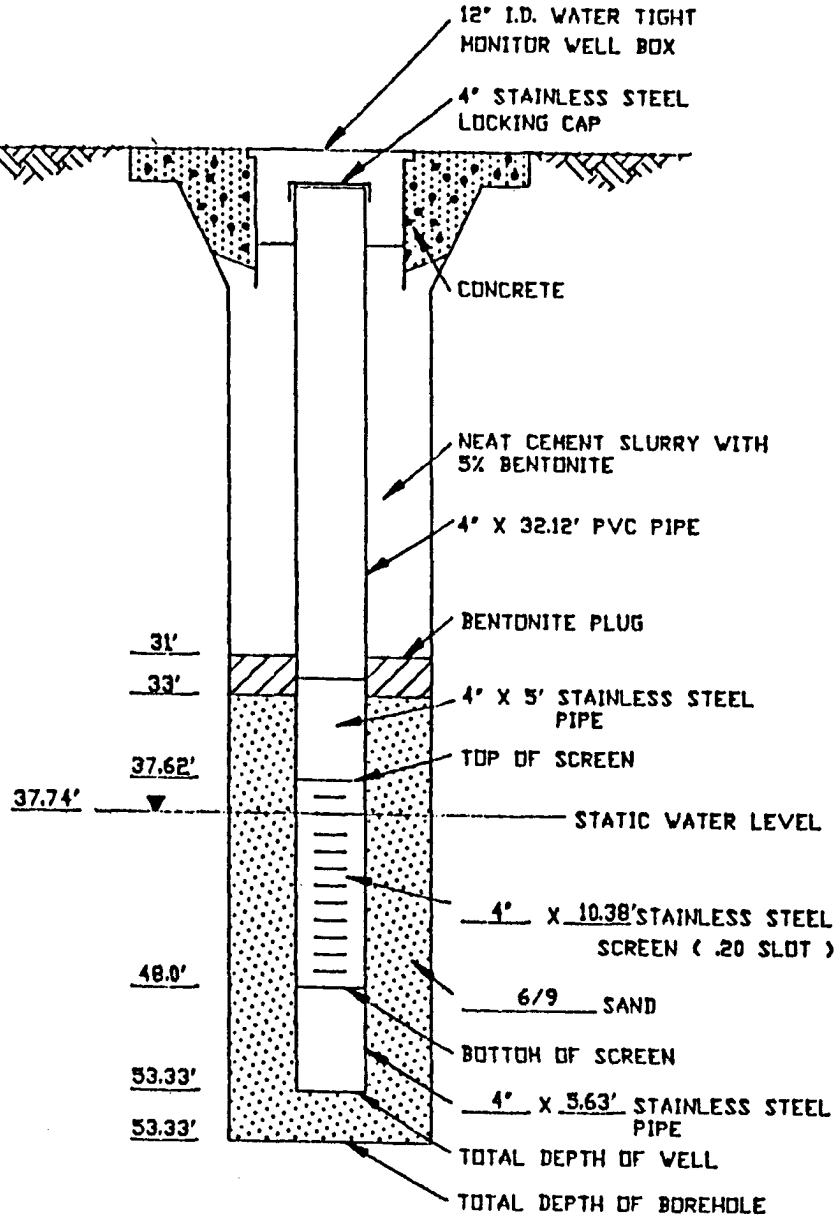
COMPLETION DIAGRAM SHS-2



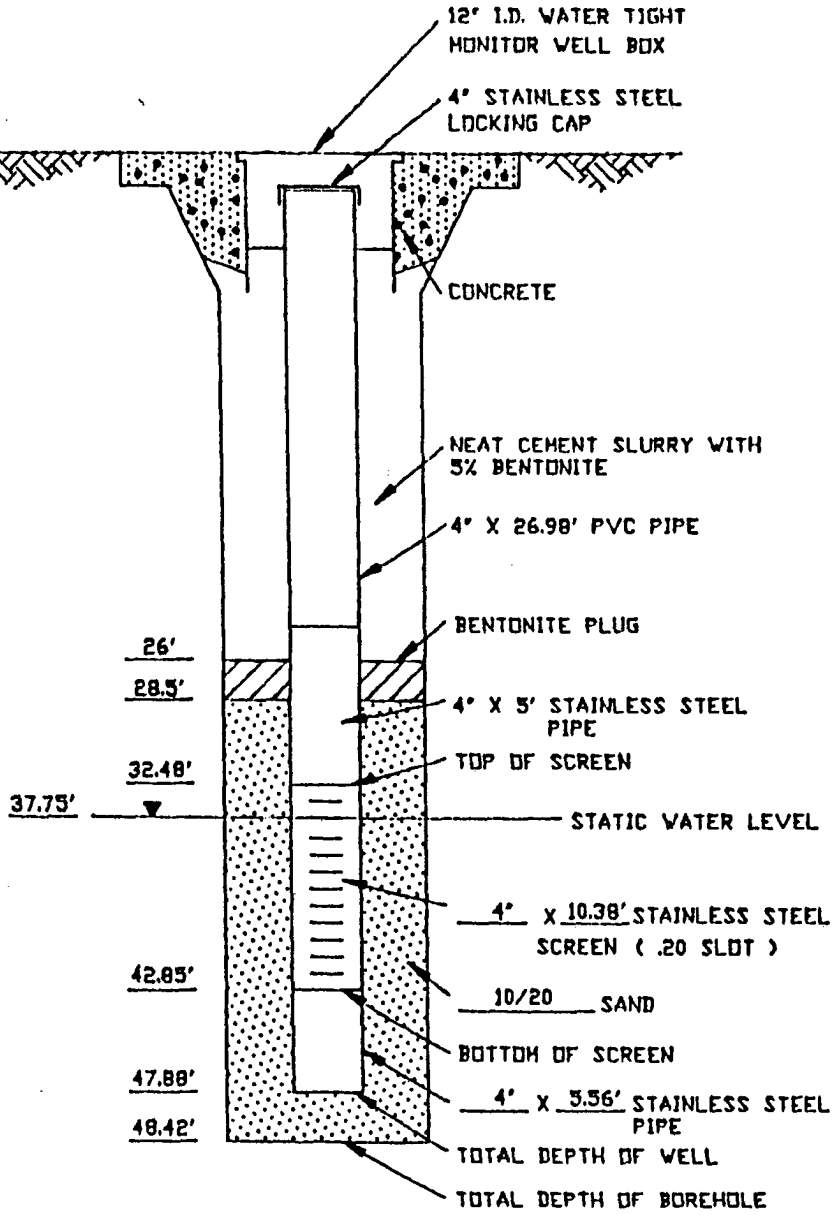
SUBGRADE COMPLETION DIAGRAM SHS-3



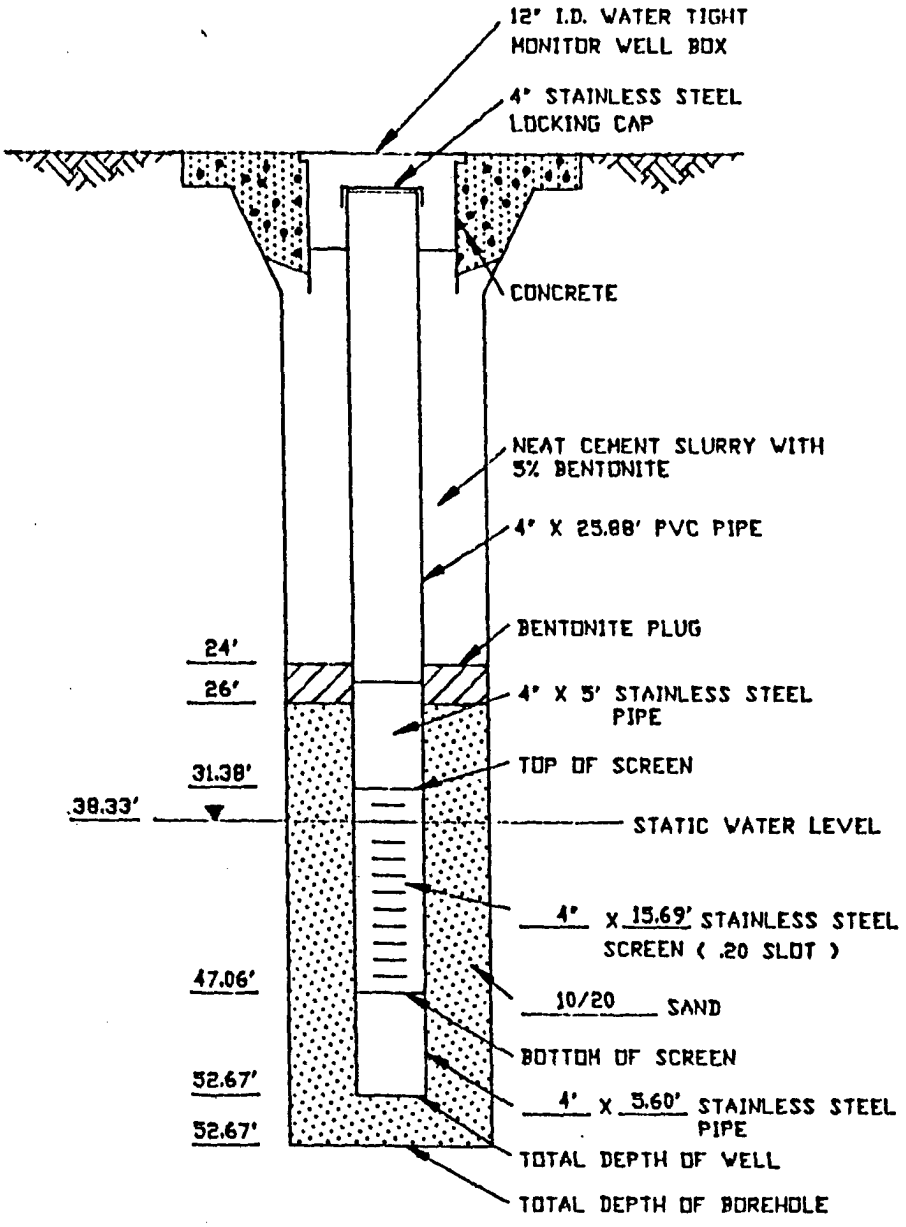
SUBGRADE COMPLETION DIAGRAM SHS-4



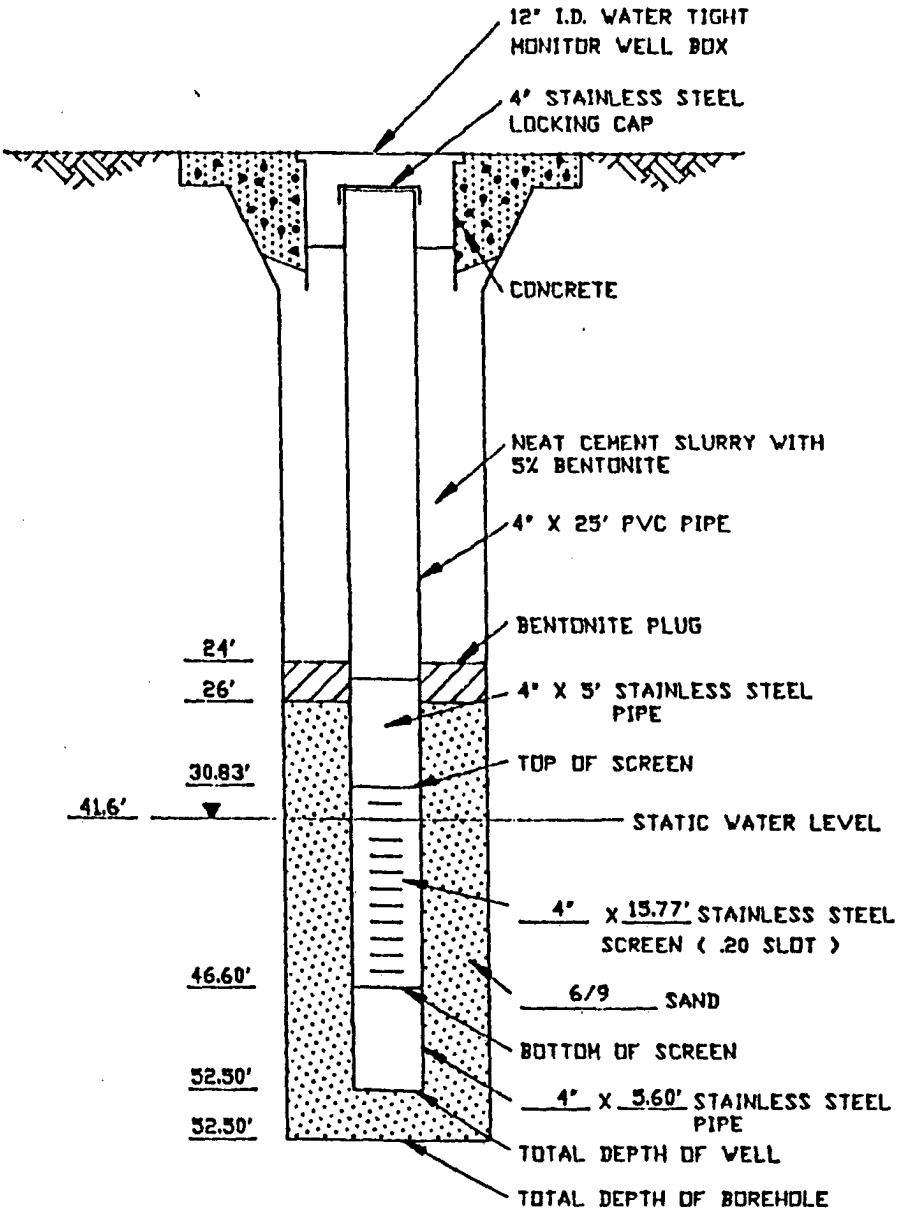
SUBGRADE COMPLETION DIAGRAM SHS-5



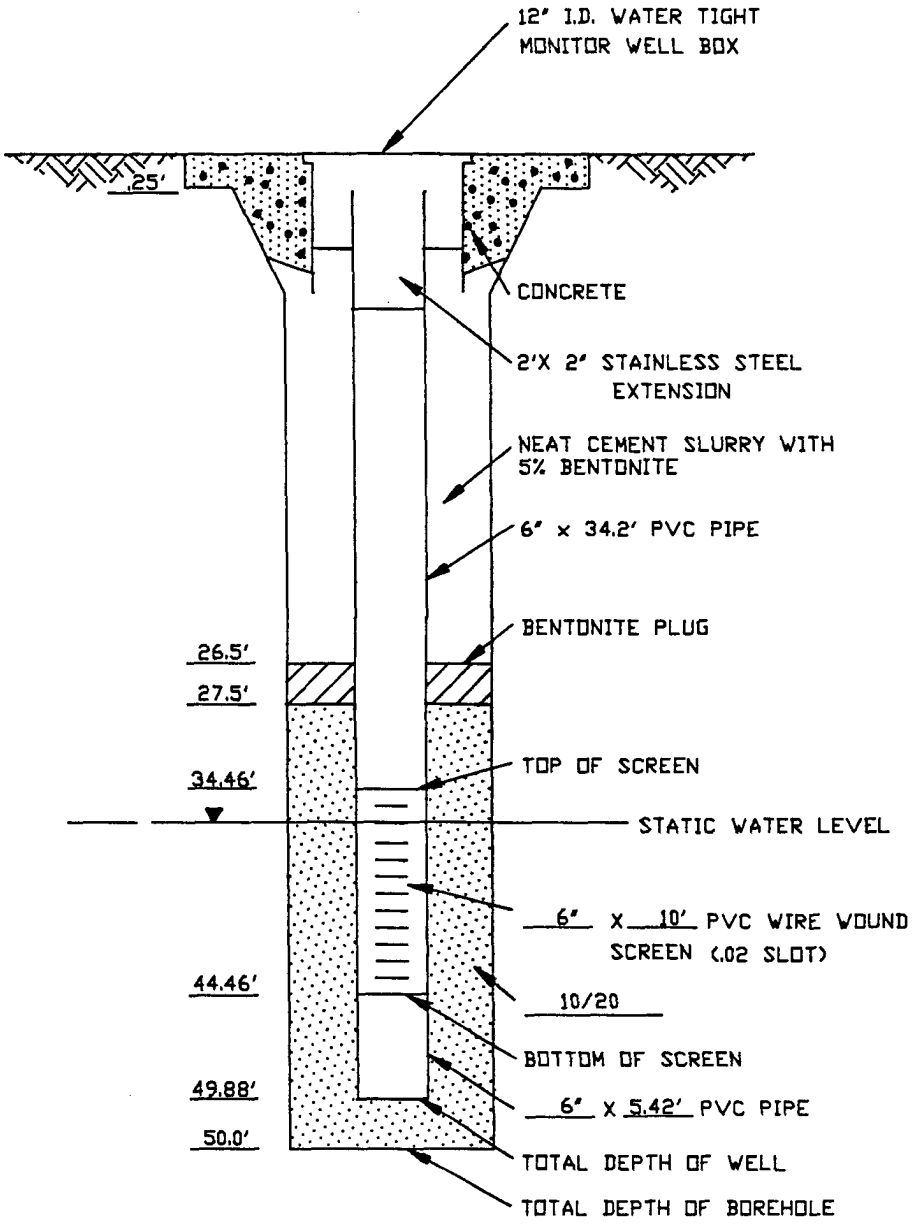
SUBGRADE COMPLETION DIAGRAM SHS-6



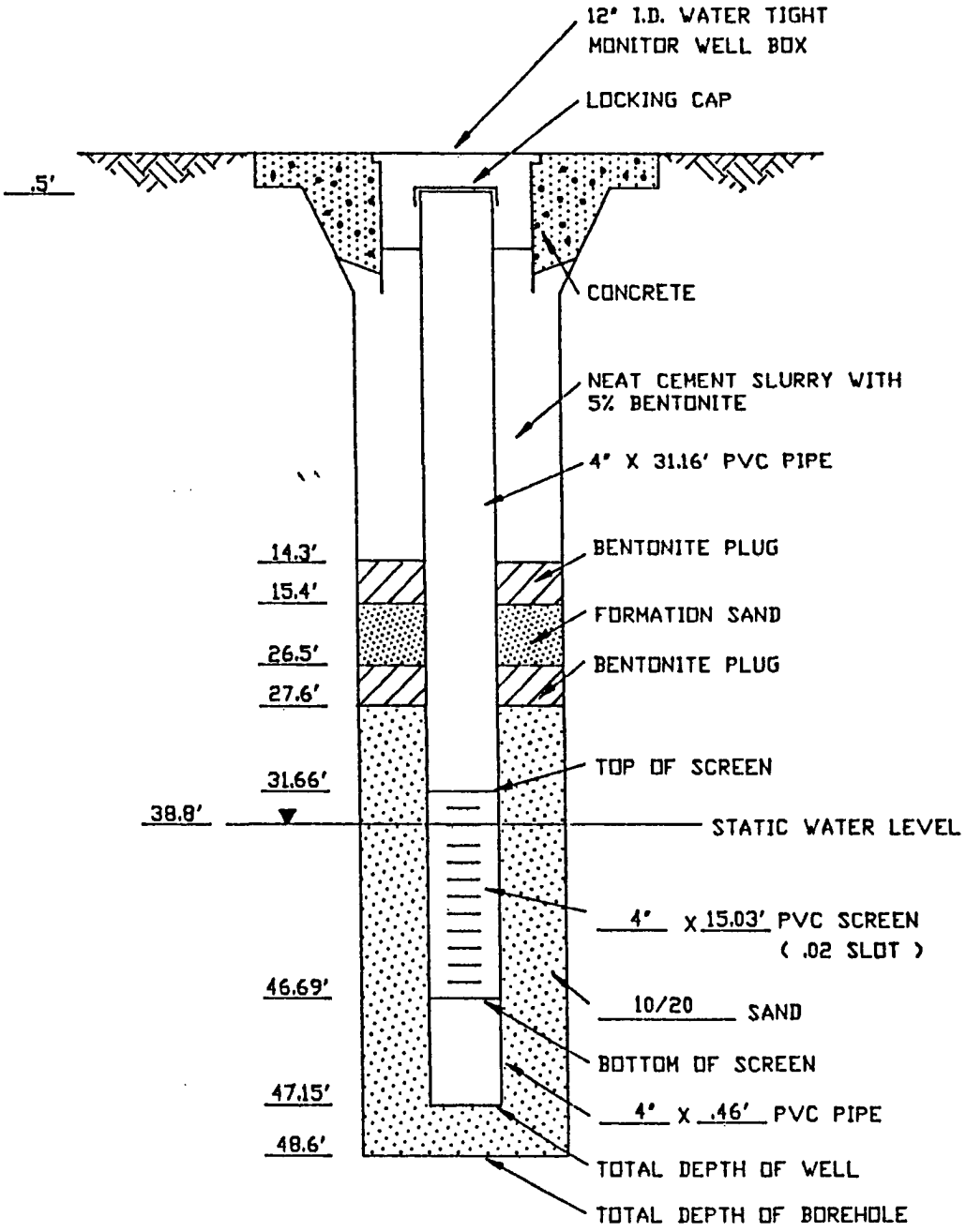
SUBGRADE COMPLETION DIAGRAM SHS-7



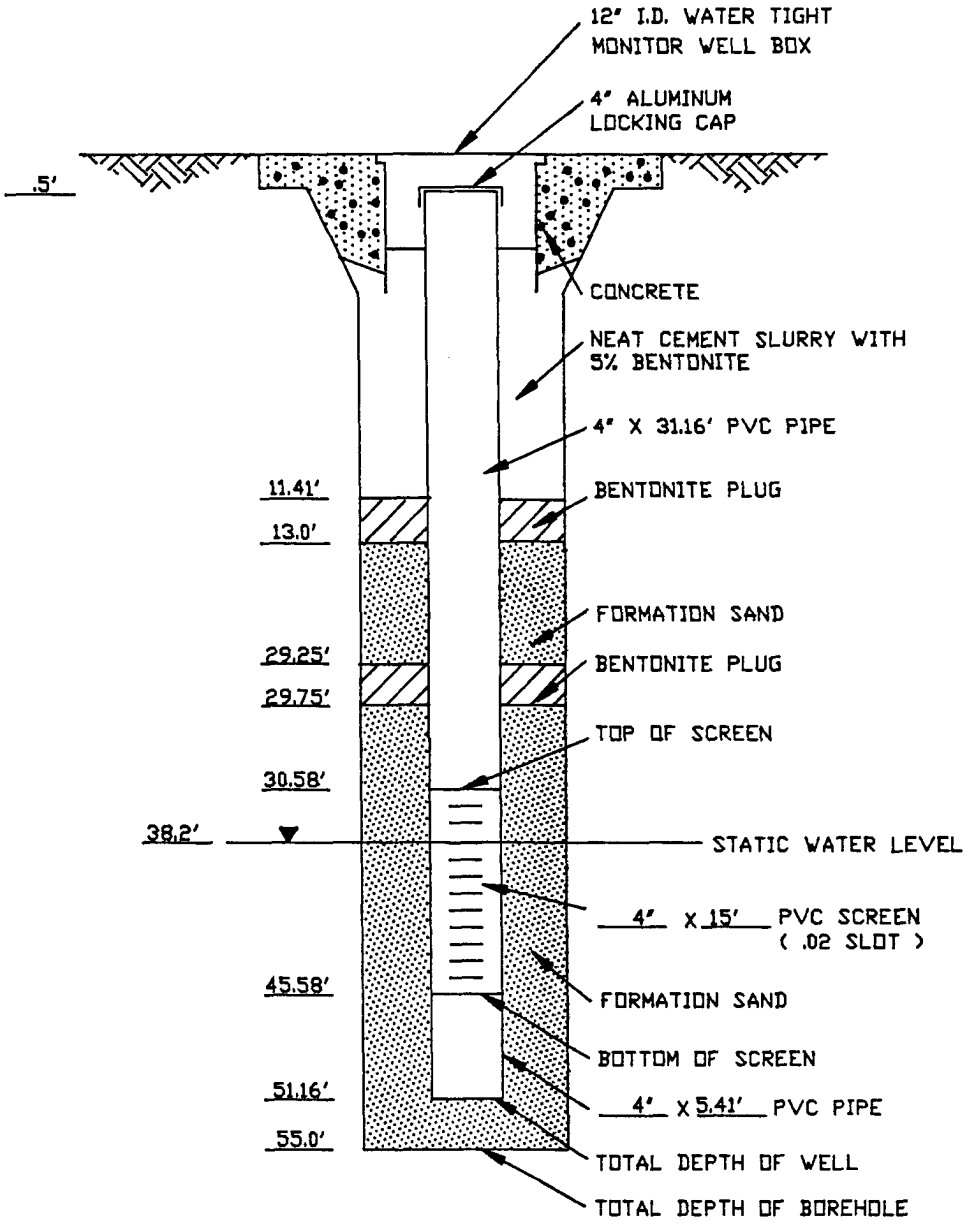
SUBGRADE COMPLETION DIAGRAM SHS-8



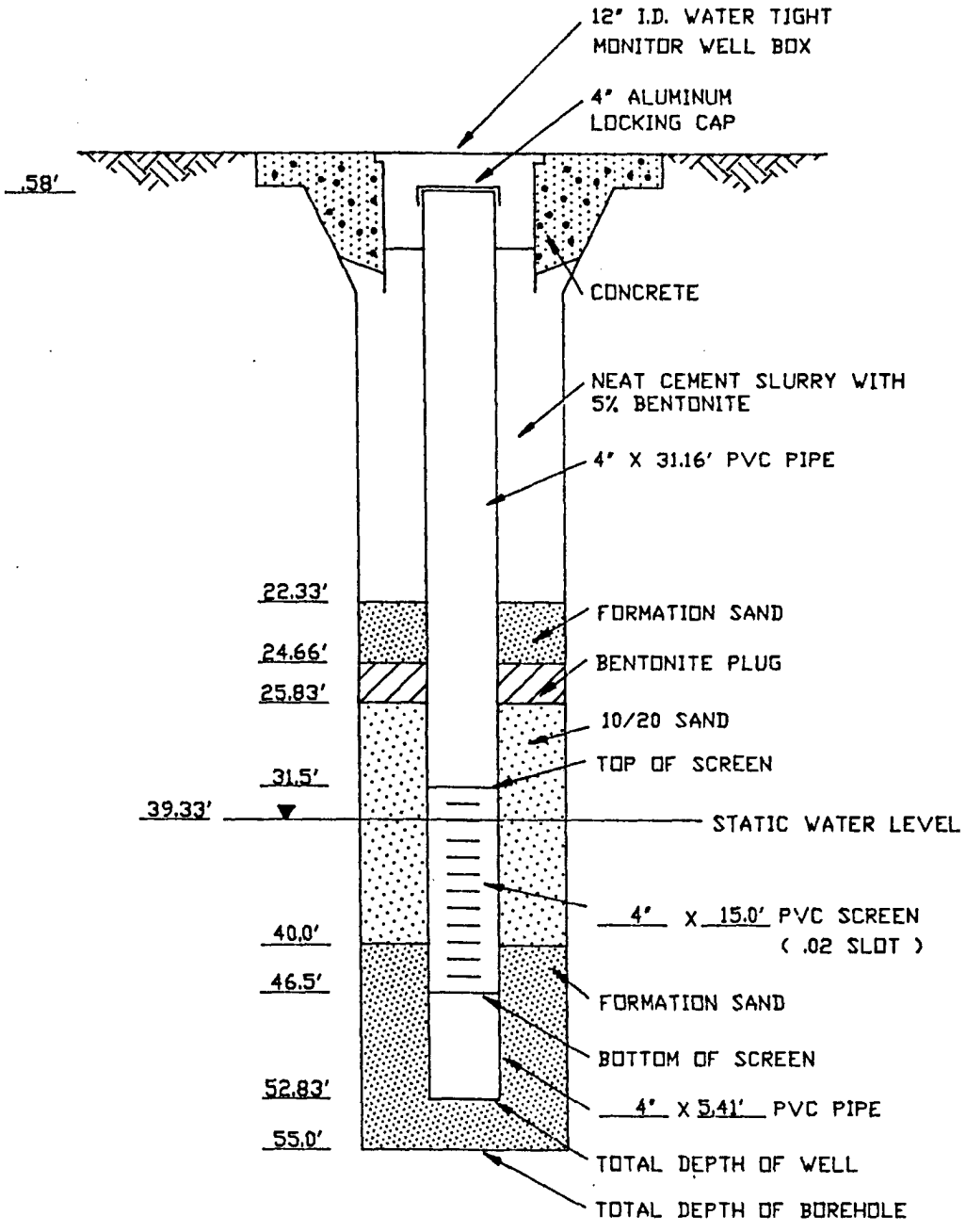
SUBGRADE COMPLETION DIAGRAM SHS-9



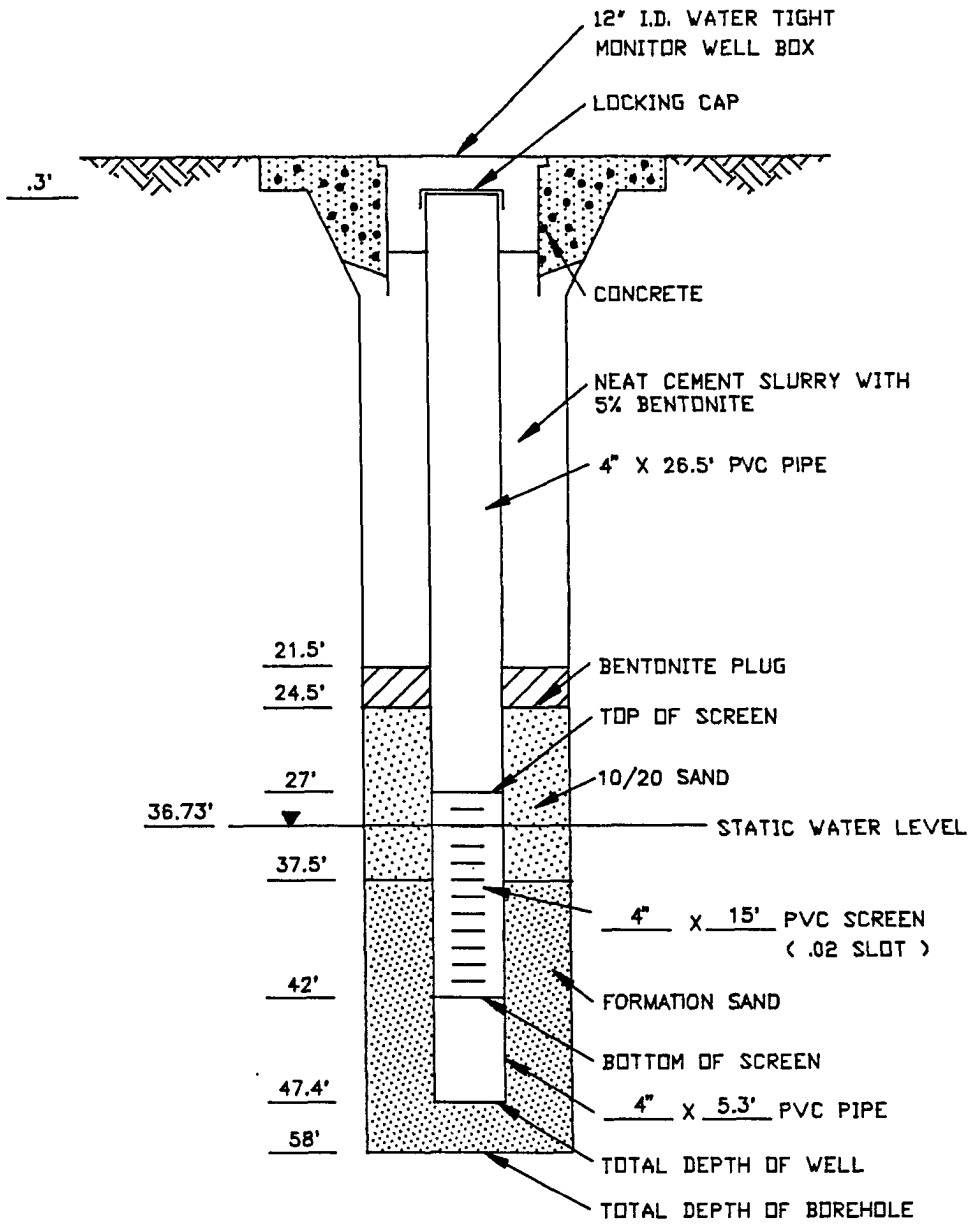
SUBGRADE COMPLETION DIAGRAM SHS-10



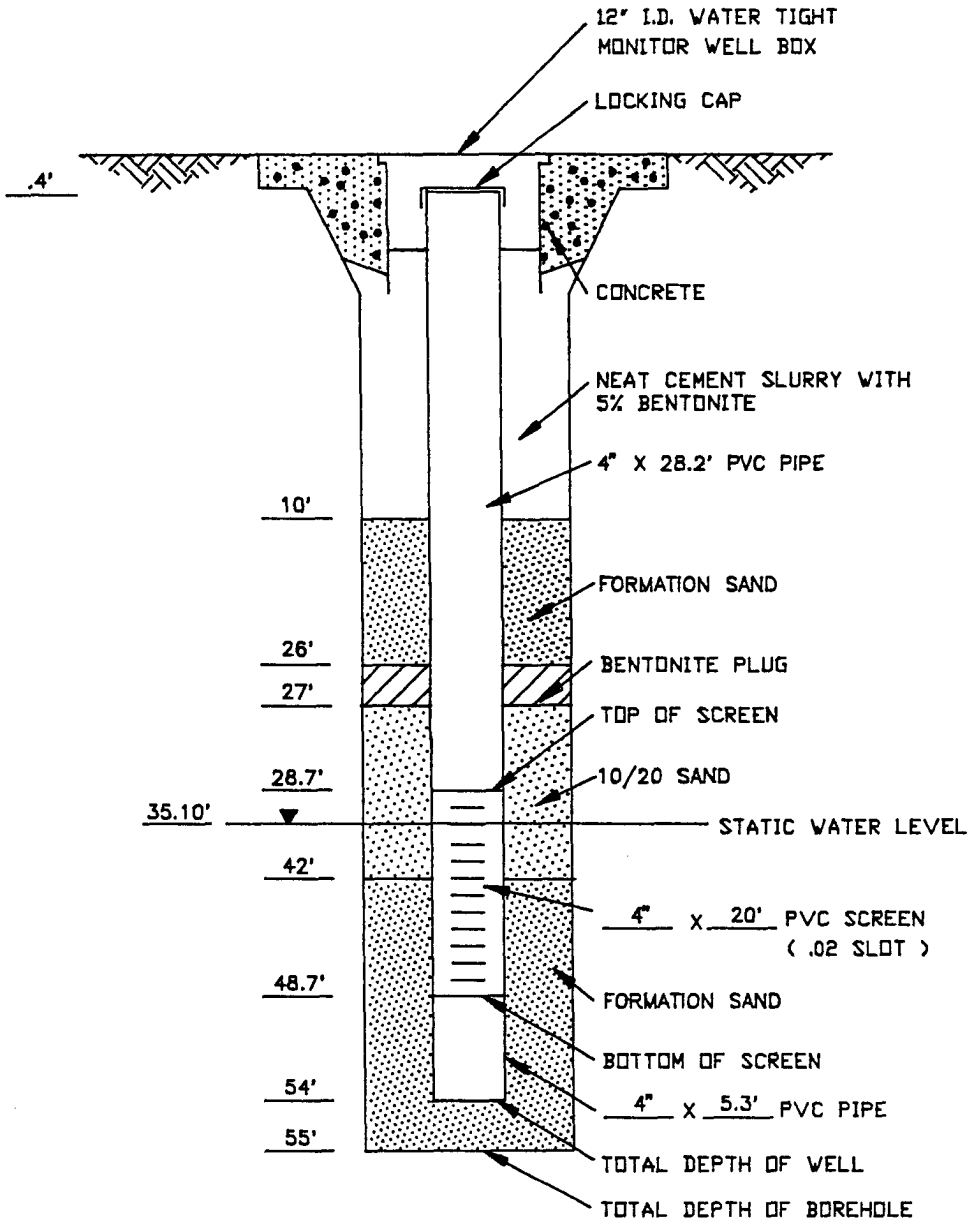
SUBGRADE COMPLETION DIAGRAM SHS-11



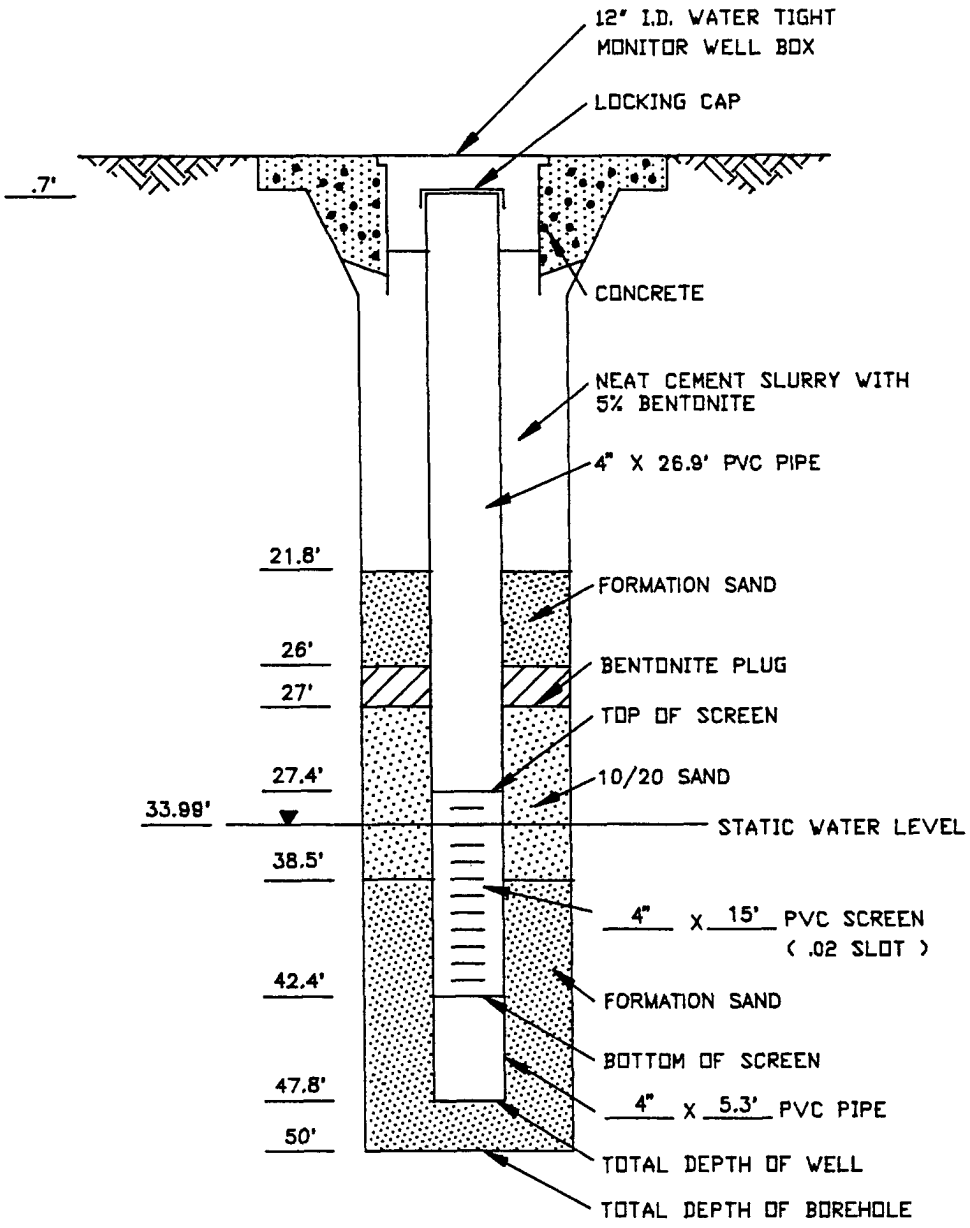
SUBGRADE COMPLETION DIAGRAM SHS-12



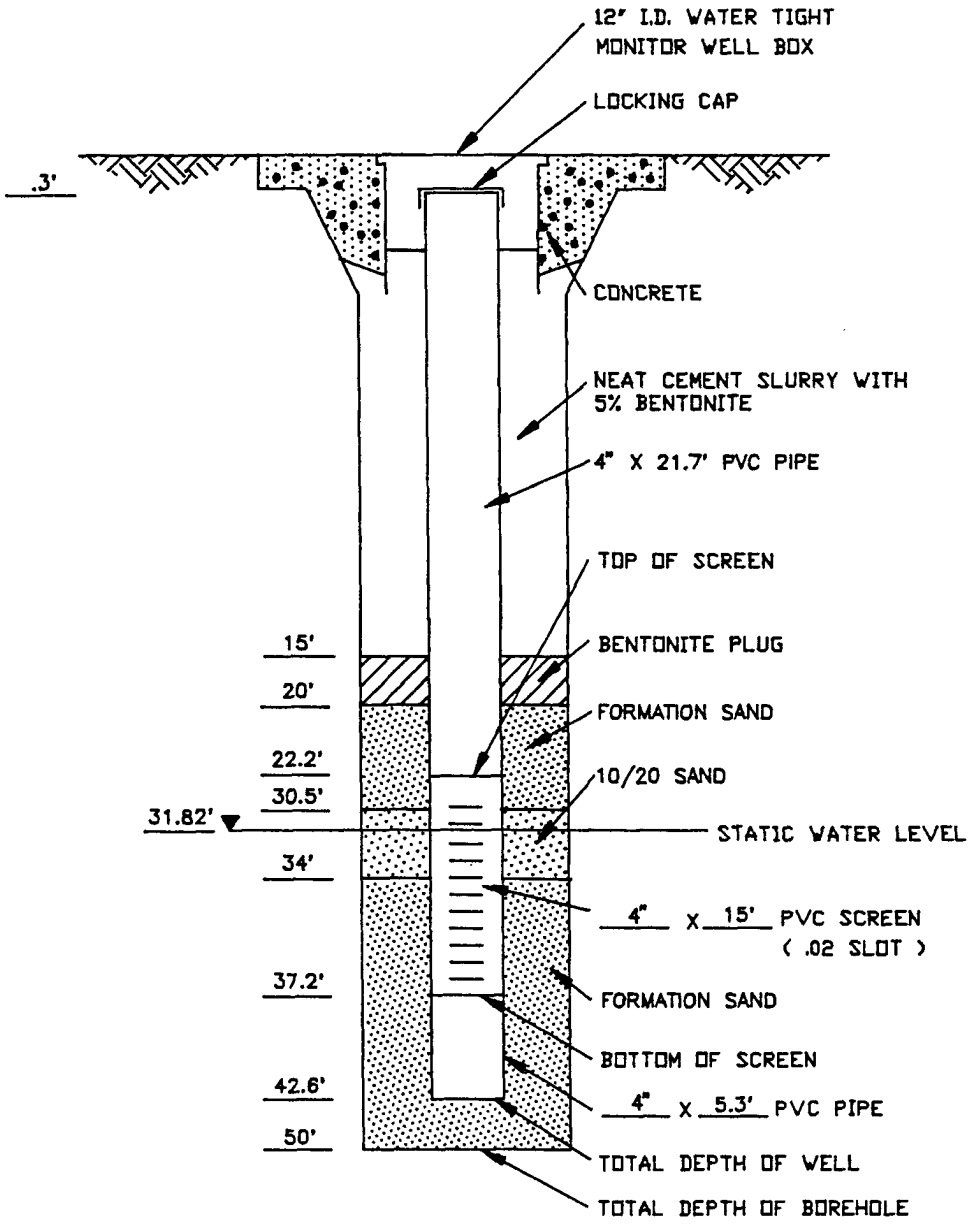
SUBGRADE COMPLETION DIAGRAM SHS-13



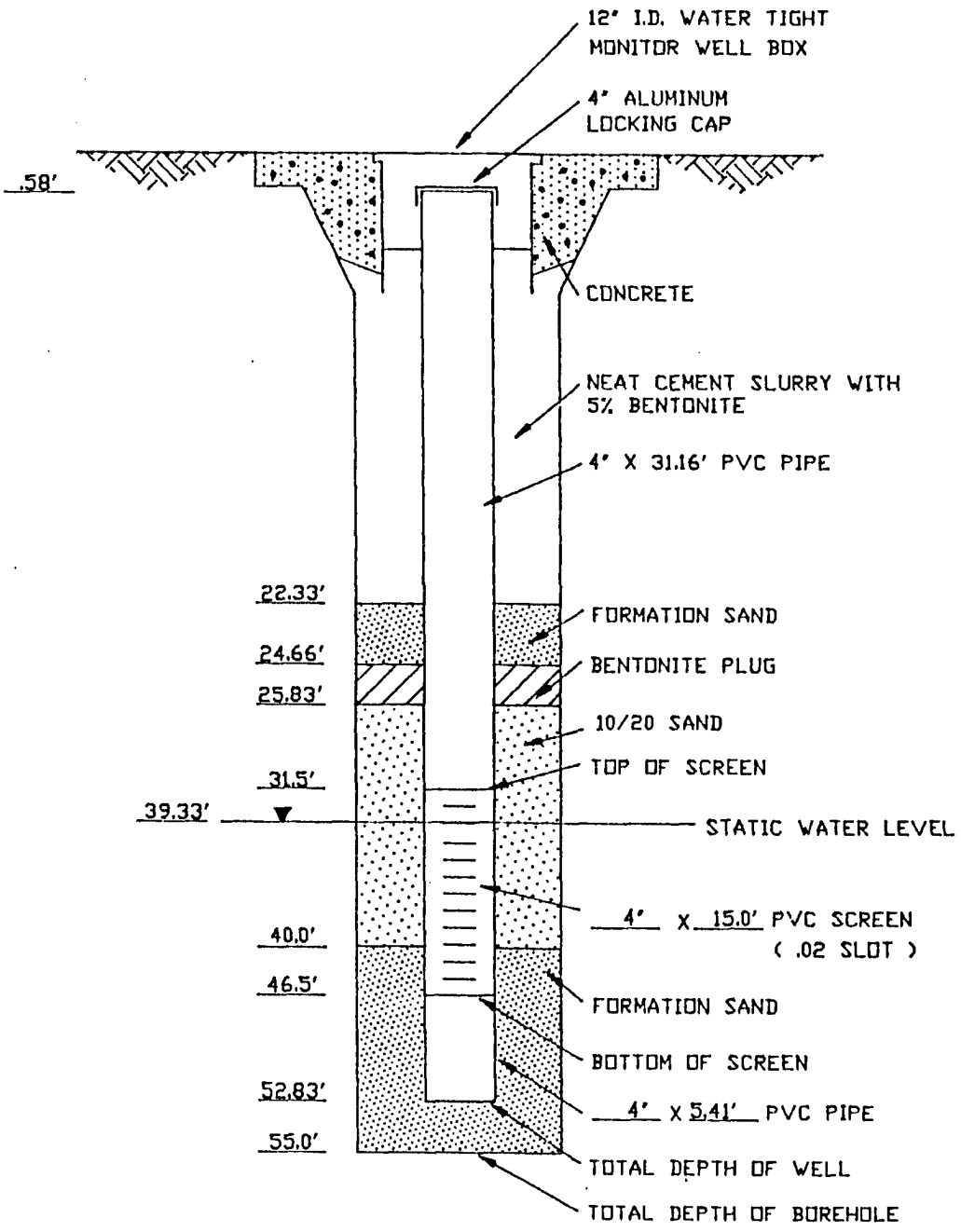
SUBGRADE COMPLETION DIAGRAM SHS-14



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

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
4901 Hawkins NE
Albuquerque, NM 87109

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: **ELS**	
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: **bcv**	
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	H	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: **JMT**	
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**	
pH	7.65		H	pH units	1	11/11/2019 4:38:52 PM	R64428
EPA METHOD 200.7: METALS						Analyst: **bcv**	
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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 METHOD 200.7: METALS						Analyst: **bcv**	
Silver	0.0079	0.0050		mg/L	1	12/2/2019 10:51:40 AM	48803
Sodium	330	10		mg/L	10	12/2/2019 10:53:40 AM	48803
Zinc	ND	0.010		mg/L	1	12/2/2019 10:51:40 AM	48803
EPA METHOD 245.1: MERCURY						Analyst: **rde**	
Mercury	ND	0.00020		mg/L	1	11/22/2019 9:31:13 AM	48954
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Benzene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Toluene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Ethylbenzene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Naphthalene	ND	2.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
1-Methylnaphthalene	ND	4.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
2-Methylnaphthalene	ND	4.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Acetone	ND	10		µg/L	1	11/11/2019 10:13:46 PM	R64405
Bromobenzene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Bromodichloromethane	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Bromoform	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Bromomethane	ND	3.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
2-Butanone	ND	10		µg/L	1	11/11/2019 10:13:46 PM	R64405
Carbon disulfide	ND	10		µg/L	1	11/11/2019 10:13:46 PM	R64405
Carbon Tetrachloride	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Chlorobenzene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Chloroethane	ND	2.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Chloroform	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Chloromethane	ND	3.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
2-Chlorotoluene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
4-Chlorotoluene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
cis-1,2-DCE	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Dibromochloromethane	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
Dibromomethane	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
1,2-Dichlorobenzene	ND	1.0		µg/L	1	11/11/2019 10:13:46 PM	R64405
1,3-Dichlorobenzene	ND	1.0		µg/L	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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 METHOD 8260B: VOLATILES						Analyst: **JMR**	
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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: **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 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	H	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: **JMT**	
Total Dissolved Solids	3450	100	*D	mg/L	1	11/11/2019 5:05:00 PM	48674
SM4500-H+B / 9040C: PH						Analyst: **JRR**	
pH	7.66		H	pH units	1	11/11/2019 5:19:18 PM	R64428
EPA METHOD 200.7: METALS						Analyst: **bcv**	
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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

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Qualifiers:

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

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 8260B: VOLATILES						Analyst: **JMR**	
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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	H	mg/L	5	11/11/2019 1:19:07 PM	R64415
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 PM	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**	
pH	7.58		H	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 PM	48803
Manganese	0.87	0.0020	*	mg/L	1	12/2/2019 11:01:51 AM	48803
Nickel	0.12	0.010	*	mg/L	1	12/2/2019 11:01:51 AM	48803
Potassium	2.9	1.0		mg/L	1	11/15/2019 10:44:11 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
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.

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 METHOD 200.7: METALS						Analyst: **bcv**	
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: **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	R64405
Toluene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Ethylbenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Naphthalene	ND	2.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1-Methylnaphthalene	ND	4.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
2-Methylnaphthalene	ND	4.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Acetone	ND	10		µg/L	1	11/11/2019 11:10:41 PM	R64405
Bromobenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Bromodichloromethane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Bromoform	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Bromomethane	ND	3.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
2-Butanone	ND	10		µg/L	1	11/11/2019 11:10:41 PM	R64405
Carbon disulfide	ND	10		µg/L	1	11/11/2019 11:10:41 PM	R64405
Carbon Tetrachloride	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Chlorobenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Chloroethane	ND	2.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Chloroform	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Chloromethane	ND	3.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
2-Chlorotoluene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
4-Chlorotoluene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
cis-1,2-DCE	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Dibromochloromethane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Dibromomethane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,2-Dichlorobenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,3-Dichlorobenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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 METHOD 8260B: VOLATILES						Analyst: **JMR**	
1,4-Dichlorobenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Dichlorodifluoromethane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,1-Dichloroethane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,1-Dichloroethene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,2-Dichloropropane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,3-Dichloropropane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
2,2-Dichloropropane	ND	2.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,1-Dichloropropene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Hexachlorobutadiene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
2-Hexanone	ND	10		µg/L	1	11/11/2019 11:10:41 PM	R64405
Isopropylbenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
4-Isopropyltoluene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
4-Methyl-2-pentanone	ND	10		µg/L	1	11/11/2019 11:10:41 PM	R64405
Methylene Chloride	ND	3.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
n-Butylbenzene	ND	3.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
n-Propylbenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
sec-Butylbenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Styrene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
tert-Butylbenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
trans-1,2-DCE	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,1,1-Trichloroethane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,1,2-Trichloroethane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Trichloroethene (TCE)	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Trichlorofluoromethane	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
1,2,3-Trichloropropane	ND	2.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Vinyl chloride	ND	1.0		µg/L	1	11/11/2019 11:10:41 PM	R64405
Xylenes, Total	ND	1.5		µg/L	1	11/11/2019 11:10:41 PM	R64405
Surr: 1,2-Dichloroethane-d4	93.5	70-130		%Rec	1	11/11/2019 11:10:41 PM	R64405
Surr: 4-Bromofluorobenzene	89.7	70-130		%Rec	1	11/11/2019 11:10:41 PM	R64405
Surr: Dibromofluoromethane	108	70-130		%Rec	1	11/11/2019 11:10:41 PM	R64405
Surr: Toluene-d8	95.3	70-130		%Rec	1	11/11/2019 11:10:41 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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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	H	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 PM	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**	
pH	7.73		H	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

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Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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 METHOD 200.7: METALS						Analyst: **bcv**	
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: **JMR**	
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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 METHOD 8260B: VOLATILES						Analyst: **JMR**	
1,4-Dichlorobenzene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
Dichlorodifluoromethane	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,1-Dichloroethane	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,1-Dichloroethene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,2-Dichloropropane	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,3-Dichloropropane	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
2,2-Dichloropropane	ND	2.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,1-Dichloropropene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
Hexachlorobutadiene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
2-Hexanone	ND	10		µg/L	1	11/11/2019 11:39:11 PM	R64405
Isopropylbenzene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
4-Isopropyltoluene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
4-Methyl-2-pentanone	ND	10		µg/L	1	11/11/2019 11:39:11 PM	R64405
Methylene Chloride	ND	3.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
n-Butylbenzene	ND	3.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
n-Propylbenzene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
sec-Butylbenzene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
Styrene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
tert-Butylbenzene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
trans-1,2-DCE	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,1,1-Trichloroethane	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,1,2-Trichloroethane	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
Trichloroethene (TCE)	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
Trichlorofluoromethane	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
1,2,3-Trichloropropane	ND	2.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
Vinyl chloride	ND	1.0		µg/L	1	11/11/2019 11:39:11 PM	R64405
Xylenes, Total	ND	1.5		µg/L	1	11/11/2019 11:39:11 PM	R64405
Surr: 1,2-Dichloroethane-d4	96.2	70-130		%Rec	1	11/11/2019 11:39:11 PM	R64405
Surr: 4-Bromofluorobenzene	92.9	70-130		%Rec	1	11/11/2019 11:39:11 PM	R64405
Surr: Dibromofluoromethane	111	70-130		%Rec	1	11/11/2019 11:39:11 PM	R64405
Surr: Toluene-d8	94.8	70-130		%Rec	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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: **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 2:36:18 PM	R64415
Chloride	60	2.5		mg/L	5	11/11/2019 2:36:18 PM	R64415
Bromide	ND	0.50		mg/L	5	11/11/2019 2:36:18 PM	R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	H	mg/L	5	11/11/2019 2:36:18 PM	R64415
Sulfate	1500	25	*	mg/L	50	11/12/2019 8:40:49 PM	R64442
Nitrate+Nitrite as N	6.9	1.0		mg/L	5	11/11/2019 11:10:45 PM	R64415
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **JRR**	
Conductivity	3100	5.0		µmhos/c	1	11/11/2019 6:00:04 PM	R64428
SM2320B: ALKALINITY						Analyst: **JRR**	
Bicarbonate (As CaCO3)	210.1	20.00		mg/L Ca	1	11/11/2019 6:00:04 PM	R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	11/11/2019 6:00:04 PM	R64428
Total Alkalinity (as CaCO3)	210.1	20.00		mg/L Ca	1	11/11/2019 6:00:04 PM	R64428
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **JMT**	
Total Dissolved Solids	2600	20.0	*	mg/L	1	11/11/2019 5:05:00 PM	48674
SM4500-H+B / 9040C: PH						Analyst: **JRR**	
pH	7.83		H	pH units	1	11/11/2019 6:00:04 PM	R64428
EPA METHOD 200.7: METALS						Analyst: **bcv**	
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	R64405
Toluene	ND	1.0		µg/L	1	11/12/2019 12:07:37 AM	R64405
Ethylbenzene	ND	1.0		µg/L	1	11/12/2019 12:07:37 AM	R64405
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/12/2019 12:07:37 AM	R64405
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2019 12:07:37 AM	R64405
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2019 12:07:37 AM	R64405
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	11/12/2019 12:07:37 AM	R64405
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	11/12/2019 12:07:37 AM	R64405
Naphthalene	ND	2.0		µg/L	1	11/12/2019 12:07:37 AM	R64405
1-Methylnaphthalene	ND	4.0		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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
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

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Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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	R64415
Chloride	55	2.5		mg/L	5	11/11/2019 3:02:02 PM	R64415
Bromide	ND	0.50		mg/L	5	11/11/2019 3:02:02 PM	R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	H	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	1	11/11/2019 6:11:50 PM	R64428
Total Alkalinity (as CaCO3)	208.8	20.00		mg/L Ca	1	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**	
pH	7.75		H	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	48992
Iron	120	10	*	mg/L	500	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	48733
Fluoranthene	ND	0.50		µg/L	1	11/14/2019 11:15:52 PM	48733
Pyrene	ND	0.50		µg/L	1	11/14/2019 11:15:52 PM	48733

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Qualifiers:

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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.

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						Analyst: **JDC**	
Benz(a)anthracene	ND	0.50		µg/L	1	11/14/2019 11:15:52 PM	48733
Chrysene	ND	0.50		µg/L	1	11/14/2019 11:15:52 PM	48733
Benzo(b)fluoranthene	ND	0.50		µg/L	1	11/14/2019 11:15:52 PM	48733
Benzo(k)fluoranthene	ND	0.50		µg/L	1	11/14/2019 11:15:52 PM	48733
Benzo(a)pyrene	ND	0.50		µg/L	1	11/14/2019 11:15:52 PM	48733
Dibenz(a,h)anthracene	ND	0.50		µg/L	1	11/14/2019 11:15:52 PM	48733
Benzo(g,h,i)perylene	ND	0.50		µg/L	1	11/14/2019 11:15:52 PM	48733
Indeno(1,2,3-cd)pyrene	ND	0.50		µg/L	1	11/14/2019 11:15:52 PM	48733
Surr: N-hexadecane	73.9	20.4-126		%Rec	1	11/14/2019 11:15:52 PM	48733
Surr: Benzo(e)pyrene	65.8	21.4-126		%Rec	1	11/14/2019 11:15:52 PM	48733
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Benzene	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Toluene	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Ethylbenzene	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Naphthalene	ND	2.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
1-Methylnaphthalene	ND	4.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
2-Methylnaphthalene	ND	4.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Acetone	ND	10		µg/L	1	11/12/2019 2:57:38 AM	R64405
Bromobenzene	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Bromodichloromethane	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Bromoform	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Bromomethane	ND	3.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
2-Butanone	ND	10		µg/L	1	11/12/2019 2:57:38 AM	R64405
Carbon disulfide	ND	10		µg/L	1	11/12/2019 2:57:38 AM	R64405
Carbon Tetrachloride	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Chlorobenzene	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Chloroethane	ND	2.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Chloroform	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
Chloromethane	ND	3.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
2-Chlorotoluene	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
4-Chlorotoluene	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
cis-1,2-DCE	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	11/12/2019 2:57:38 AM	R64405
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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**	
Surr: Dibromofluoromethane	105	70-130		%Rec	1	11/12/2019 2:57:38 AM	R64405
Surr: Toluene-d8	93.2	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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	R64415
Chloride	130	10		mg/L	20	11/11/2019 3:40:36 PM	R64415
Bromide	0.78	0.50		mg/L	5	11/11/2019 3:27:45 PM	R64415
Phosphorus, Orthophosphate (As P)	ND	2.5	H	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	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		mg/L Ca	2.5	11/13/2019 5:32:20 PM	R64497
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**	
pH	7.91		H	pH units	1	11/11/2019 6:23:35 PM	R64428
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	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	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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	H	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	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	1	11/11/2019 7:03:48 PM	R64428
Total Alkalinity (as CaCO3)	238.8	20.00		mg/L Ca	1	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		H	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	48992
Magnesium	40	1.0		mg/L	1	11/15/2019 11:03:05 PM	48802
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	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	48733
1-Methylnaphthalene	ND	1.0		µg/L	1	11/14/2019 11:39:58 PM	48733
2-Methylnaphthalene	ND	1.0		µg/L	1	11/14/2019 11:39:58 PM	48733
Acenaphthylene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Acenaphthene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Fluorene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Phenanthrene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Anthracene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Fluoranthene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Pyrene	ND	0.50		µg/L	1	11/14/2019 11:39:58 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
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.

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						Analyst: **JDC**	
Benz(a)anthracene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Chrysene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Benzo(b)fluoranthene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Benzo(k)fluoranthene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Benzo(a)pyrene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Dibenz(a,h)anthracene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Benzo(g,h,i)perylene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Indeno(1,2,3-cd)pyrene	ND	0.50		µg/L	1	11/14/2019 11:39:58 PM	48733
Surr: N-hexadecane	77.2	20.4-126		%Rec	1	11/14/2019 11:39:58 PM	48733
Surr: Benzo(e)pyrene	71.7	21.4-126		%Rec	1	11/14/2019 11:39:58 PM	48733
EPA METHOD 8260B: VOLATILES						Analyst: **JMR**	
Benzene	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Toluene	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Ethylbenzene	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
1,2-Dichloroethane (EDC)	1.6	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Naphthalene	ND	2.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
1-Methylnaphthalene	ND	4.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
2-Methylnaphthalene	ND	4.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Acetone	ND	10		µg/L	1	11/12/2019 4:50:19 AM	W64405
Bromobenzene	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Bromodichloromethane	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Bromoform	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Bromomethane	ND	3.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
2-Butanone	ND	10		µg/L	1	11/12/2019 4:50:19 AM	W64405
Carbon disulfide	ND	10		µg/L	1	11/12/2019 4:50:19 AM	W64405
Carbon Tetrachloride	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Chlorobenzene	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Chloroethane	ND	2.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Chloroform	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
Chloromethane	ND	3.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
2-Chlorotoluene	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
4-Chlorotoluene	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
cis-1,2-DCE	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	11/12/2019 4:50:19 AM	W64405
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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**	
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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	H	mg/L	5	11/11/2019 4:44:54 PM	R64415
Sulfate	1700	25	*	mg/L	50	11/12/2019 10:10:57 PM	A64442
Nitrate+Nitrite as N	1.4	1.0		mg/L	5	11/12/2019 12:40:49 AM	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	1	11/11/2019 7:17:13 PM	R64428
Total Alkalinity (as CaCO3)	259.1	20.00		mg/L Ca	1	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		H	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	48992
Magnesium	52	5.0		mg/L	5	12/2/2019 11:31:34 AM	48992
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	48733
1-Methylnaphthalene	ND	1.0		µg/L	1	11/15/2019 12:04:04 AM	48733
2-Methylnaphthalene	ND	1.0		µg/L	1	11/15/2019 12:04:04 AM	48733
Acenaphthylene	ND	0.50		µg/L	1	11/15/2019 12:04:04 AM	48733
Acenaphthene	ND	0.50		µg/L	1	11/15/2019 12:04:04 AM	48733
Fluorene	ND	0.50		µg/L	1	11/15/2019 12:04:04 AM	48733
Phenanthrene	ND	0.50		µg/L	1	11/15/2019 12:04:04 AM	48733
Anthracene	ND	0.50		µg/L	1	11/15/2019 12:04:04 AM	48733
Fluoranthene	ND	0.50		µg/L	1	11/15/2019 12:04:04 AM	48733
Pyrene	ND	0.50		µg/L	1	11/15/2019 12:04:04 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
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.

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						Analyst: **JDC**	
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						Analyst: **JMR**	
Benzene	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Toluene	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Ethylbenzene	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Naphthalene	ND	2.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
1-Methylnaphthalene	ND	4.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
2-Methylnaphthalene	ND	4.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Acetone	ND	10		µg/L	1	11/12/2019 5:18:30 AM	W64405
Bromobenzene	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Bromodichloromethane	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Bromoform	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Bromomethane	ND	3.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
2-Butanone	ND	10		µg/L	1	11/12/2019 5:18:30 AM	W64405
Carbon disulfide	ND	10		µg/L	1	11/12/2019 5:18:30 AM	W64405
Carbon Tetrachloride	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Chlorobenzene	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Chloroethane	ND	2.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Chloroform	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
Chloromethane	ND	3.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
2-Chlorotoluene	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
4-Chlorotoluene	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
cis-1,2-DCE	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	11/12/2019 5:18:30 AM	W64405
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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**	
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT
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
Magnesium	ND	1.0	0.5000	0	104	50	150			
Potassium	ND	1.0	0.5000	0	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			
Potassium	49	1.0	50.00	0	98.8	85	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**

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								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

Sample ID: **LLLCS-48803** SampType: **LCSLL** TestCode: **EPA Method 200.7: Metals**
Client ID: **BatchQC** Batch ID: **48803** RunNo: **64568**
Prep Date: **11/14/2019** Analysis Date: **11/15/2019** SeqNo: **2211029** 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** SampType: **LCS** TestCode: **EPA Method 200.7: Metals**
Client ID: **LCSW** Batch ID: **48803** RunNo: **64568**
Prep Date: **11/14/2019** Analysis Date: **11/15/2019** SeqNo: **2211031** 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: **64641**
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	RPDLimit	Qual
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
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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

Sample ID: **LLLCS-48802** SampType: **LCSLL** TestCode: **EPA Method 200.7: Metals**
Client ID: **BatchQC** Batch ID: **48802** RunNo: **64641**
Prep Date: **11/14/2019** Analysis Date: **11/20/2019** SeqNo: **2214105** 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** SampType: **LCS** TestCode: **EPA Method 200.7: Metals**
Client ID: **LCSW** Batch ID: **48802** RunNo: **64641**
Prep Date: **11/14/2019** Analysis Date: **11/20/2019** SeqNo: **2214106** 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** TestCode: **EPA Method 200.7: Metals**
Client ID: **PBW** Batch ID: **48803** RunNo: **64641**
Prep Date: **11/14/2019** Analysis Date: **11/20/2019** SeqNo: **2214107** 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								
Zinc	ND	0.010								

Sample ID: **LLLCS-48803** SampType: **LCSLL** TestCode: **EPA Method 200.7: Metals**
Client ID: **BatchQC** Batch ID: **48803** RunNo: **64641**
Prep Date: **11/14/2019** Analysis Date: **11/20/2019** SeqNo: **2214111** 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:

*	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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

Sample ID: **LLLCS-48803** SampType: **LCSLL** TestCode: **EPA Method 200.7: Metals**
Client ID: **BatchQC** Batch ID: **48803** RunNo: **64641**
Prep Date: **11/14/2019** Analysis Date: **11/20/2019** SeqNo: **2214111** 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** SampType: **LCS** TestCode: **EPA Method 200.7: Metals**
Client ID: **LCSW** Batch ID: **48803** RunNo: **64641**
Prep Date: **11/14/2019** Analysis Date: **11/20/2019** SeqNo: **2214112** 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** TestCode: **EPA Method 200.7: Metals**
Client ID: **PBW** Batch ID: **48992** RunNo: **64727**
Prep Date: **11/22/2019** Analysis Date: **11/23/2019** SeqNo: **2217986** 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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

Sample ID: **LLLCS-48992**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Metals**
Client ID: **BatchQC**	Batch ID: **48992**	RunNo: **64727**
Prep Date: **11/22/2019**	Analysis Date: **11/23/2019**	SeqNo: **2217988** 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**	SampType: **LCS**	TestCode: **EPA Method 200.7: Metals**
Client ID: **LCSW**	Batch ID: **48992**	RunNo: **64727**
Prep Date: **11/22/2019**	Analysis Date: **11/23/2019**	SeqNo: **2217990** 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			

Sample ID: **MB-48803**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Metals**
Client ID: **PBW**	Batch ID: **48803**	RunNo: **64878**
Prep Date: **11/14/2019**	Analysis Date: **12/2/2019**	SeqNo: **2224183** 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								
Zinc	ND	0.010								

Sample ID: **LLLCS-48803**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Metals**
Client ID: **BatchQC**	Batch ID: **48803**	RunNo: **64878**
Prep Date: **11/14/2019**	Analysis Date: **12/2/2019**	SeqNo: **2224184** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.0024	0.0020	0.002000	0	118	50	150			

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

Sample ID: **LLLCS-48803**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Metals**
Client ID: **BatchQC**	Batch ID: **48803**	RunNo: **64878**
Prep Date: **11/14/2019**	Analysis Date: **12/2/2019**	SeqNo: **2224184** 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**	SampType: **LCS**	TestCode: **EPA Method 200.7: Metals**
Client ID: **LCSW**	Batch ID: **48803**	RunNo: **64878**
Prep Date: **11/14/2019**	Analysis Date: **12/2/2019**	SeqNo: **2224185** 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: **MB-48992**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Metals**
Client ID: **PBW**	Batch ID: **48992**	RunNo: **64878**
Prep Date: **11/22/2019**	Analysis Date: **12/2/2019**	SeqNo: **2224187** 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
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

QC SUMMARY REPORT
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**
Prep Date: **11/22/2019**	Analysis Date: **12/2/2019**	SeqNo: **2224187** Units: **mg/L**

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**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	0.5000	0	105	50	150			
Iron	0.022	0.020	0.02000	0	111	50	150			
Magnesium	ND	1.0	0.5000	0	104	50	150			
Manganese	0.0020	0.0020	0.002000	0	101	50	150			
Potassium	ND	1.0	0.5000	0	102	50	150			
Sodium	ND	1.0	0.5000	0	118	50	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**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	52	1.0	50.00	0	104	85	115			
Iron	0.52	0.020	0.5000	0	103	85	115			
Magnesium	51	1.0	50.00	0	103	85	115			
Manganese	0.49	0.0020	0.5000	0	98.5	85	115			
Potassium	50	1.0	50.00	0	101	85	115			
Sodium	49	1.0	50.00	0	97.5	85	115			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

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**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.0010								
Arsenic	ND	0.0010								
Copper	ND	0.0010								
Lead	ND	0.00050								
Selenium	ND	0.0010								
Thallium	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**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0011	0.0010	0.001000	0	111	50	150			
Arsenic	ND	0.0010	0.001000	0	95.3	50	150			
Copper	0.0011	0.0010	0.001000	0	111	50	150			
Lead	ND	0.00050	0.0005000	0	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** TestCode: **EPA 200.8: Metals**
Client ID: **LCSW** Batch ID: **48803** RunNo: **64589**
Prep Date: **11/14/2019** Analysis Date: **11/18/2019** SeqNo: **2211814** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.026	0.0010	0.02500	0	105	85	115			
Arsenic	0.025	0.0010	0.02500	0	98.4	85	115			
Copper	0.025	0.0010	0.02500	0	101	85	115			
Lead	0.012	0.00050	0.01250	0	96.7	85	115			
Selenium	0.024	0.0010	0.02500	0	95.6	85	115			
Thallium	0.012	0.00050	0.01250	0	95.7	85	115			

Qualifiers:

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

QC SUMMARY REPORT
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**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0048	0.00020	0.005000	0	95.5	75	125	5.03	20	

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

Sample ID: **MB**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R64415**	RunNo: **64415**
Prep Date:	Analysis Date: **11/11/2019**	SeqNo: **2204593** 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**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R64415**	RunNo: **64415**
Prep Date:	Analysis Date: **11/11/2019**	SeqNo: **2204594** 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**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R64442**	RunNo: **64442**
Prep Date:	Analysis Date: **11/12/2019**	SeqNo: **2206061** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID: **LCS**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R64442**	RunNo: **64442**
Prep Date:	Analysis Date: **11/12/2019**	SeqNo: **2206062** 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**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **A64442**	RunNo: **64442**
Prep Date:	Analysis Date: **11/12/2019**	SeqNo: **2206103** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

Sample ID: **LCS**	SampType: **lcs**	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
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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

Sample ID: **100ng lcs** SampType: **LCS** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW** Batch ID: **R64405** RunNo: **64405**
Prep Date: Analysis Date: **11/11/2019** SeqNo: **2204291** 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 ID: **W64405** RunNo: **64405**
Prep Date: Analysis Date: **11/12/2019** SeqNo: **2204292** 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** SampType: **MS** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **SHS-9** Batch ID: **W64405** RunNo: **64405**
Prep Date: Analysis Date: **11/12/2019** SeqNo: **2204317** 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
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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

Sample ID: **1911311-007a msd**	SampType: **MSD**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **SHS-9**	Batch ID: **W64405**	RunNo: **64405**
Prep Date:	Analysis Date: **11/12/2019**	SeqNo: **2204318** 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								

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

QC SUMMARY REPORT
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**

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								

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

QC SUMMARY REPORT
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**

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			

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	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								

Qualifiers:

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

QC SUMMARY REPORT
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	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
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								
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

QC SUMMARY REPORT
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	PQL	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			

Qualifiers:

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

QC SUMMARY REPORT
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	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
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								
Benz(a)anthracene	ND	0.50								
Chrysene	ND	0.50								
Benzo(b)fluoranthene	ND	0.50								
Benzo(k)fluoranthene	ND	0.50								
Benzo(a)pyrene	ND	0.50								
Dibenz(a,h)anthracene	ND	0.50								
Benzo(g,h,i)perylene	ND	0.50								
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: **lcs-48733** SampType: **LCS** TestCode: **EPA Method 8270C: PAHs**
Client ID: **LCSW** Batch ID: **48733** RunNo: **64521**
Prep Date: **11/12/2019** Analysis Date: **11/14/2019** SeqNo: **2209226** 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**

10-Dec-19

Client: Western Refining Southwest, Inc.

Project: GBR

Sample ID: **lcs-48733** SampType: **LCS** TestCode: **EPA Method 8270C: PAHs**

Client ID: **LCSW** Batch ID: **48733** RunNo: **64521**

Prep Date: **11/12/2019** Analysis Date: **11/14/2019** SeqNo: **2209226** 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: **lcsd-48733** SampType: **LCSD** TestCode: **EPA Method 8270C: PAHs**

Client ID: **LCSS02** Batch ID: **48733** RunNo: **64521**

Prep Date: **11/12/2019** Analysis Date: **11/14/2019** SeqNo: **2209227** 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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911311**
10-Dec-19

Client: Western Refining Southwest, Inc.
Project: GBR

Sample ID: **lcs-1 99.1uS eC**	SampType: **lcs**	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: **lcs-2 99.1uS eC**	SampType: **lcs**	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

QC SUMMARY REPORT
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: **lcs-1 alk**	SampType: **lcs**	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: **lcs-2 alk**	SampType: **lcs**	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: **lcs-3 alk**	SampType: **lcs**	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

QC SUMMARY REPORT
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: **lcs-1 alk**	SampType: **lcs**	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: **lcs-2 alk**	SampType: **lcs**	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT
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

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

Sample Log-In Check List

Client Name: **Western Refining Southw** Work Order Number: **1911311** RcptNo: **1**

Received By: **Daniel Marquez** **11/7/2019 8:00:00 AM**

Completed By: **Erin Melendrez** **11/7/2019 5:43:45 PM**

Reviewed By: YG 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?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 18 (<2 or >12 unless noted)

Adjusted? yes

Checked by: DM 11/8/19

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

16. Additional remarks: Added ~0.5 of HNO_3 to Sample 007D for pH<2. DM 11/8/19

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.6	Good	Yes			
2	5.5	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Greg McCartney

Mailing Address: 111 Rd 4990

Bloomfield, NM 87413

Phone #: 970-385-1096

email or Fax#: Shyde@ltenv.com

QA/QC Package:

☑ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☒ Standard ☐ Rush

Project Name: GBR

Project #: 95000 81394

Project Manager: Stuart Hyde

Sampler: E. Carroll / K. Barton

On Ice: ☑ Yes ☐ No

# of Coolers: 3.7 - 0.1 = 3.6°c

Cooler Temp(including CF): 5.6 - 0.1 = 5.5°c

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 191311	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	GWC	Metals
11/5	~~1030~~ 1040	GW	GBR-50	various	various	-001								X			X	X
	1040		GBR-48			-002								X			X	X
	1120		GBR-49			-003								X			X	X
	1140		GBR-32			-004								X			X	X
	1220		GBR-52			-005								X			X	
	1220		GBR-17			-006								X	X		X	
	1430		SHS-9			-007								X	X		X	
11/6	1225		GBR-24D			-008								X	X		X	
11/6	1335		GBR-30			-009								X	X		X	

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
11/6	1540				11/6/19	1540
11/6/19	1909			Courier	11/7/19	800

Remarks: See Attached for GWC & Metals analytes

Please CC: ecarroll@ltenv.com

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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
4901 Hawkins NE
Albuquerque, NM 87109

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	R64428
SM2320B: ALKALINITY						Analyst: **JRR**	
Bicarbonate (As CaCO3)	1083	20.00		mg/L Ca	1	11/11/2019 11:05:02 PM	R64428
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	11/11/2019 11:05:02 PM	R64428
Total Alkalinity (as CaCO3)	1083	20.00		mg/L Ca	1	11/11/2019 11:05:02 PM	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**	
pH	7.89		H	pH units	1	11/11/2019 11:05:02 PM	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	48733
1-Methylnaphthalene	ND	1.0		µg/L	1	11/15/2019 12:28:12 AM	48733
2-Methylnaphthalene	ND	1.0		µg/L	1	11/15/2019 12:28:12 AM	48733
Acenaphthylene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Acenaphthene	0.98	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Fluorene	4.3	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Phenanthrene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Anthracene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Fluoranthene	ND	0.50		µg/L	1	11/15/2019 12:28:12 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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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 8270C: PAHS						Analyst: **JDC**	
Pyrene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Benz(a)anthracene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Chrysene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Benzo(b)fluoranthene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Benzo(k)fluoranthene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Benzo(a)pyrene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Dibenz(a,h)anthracene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Benzo(g,h,i)perylene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Indeno(1,2,3-cd)pyrene	ND	0.50		µg/L	1	11/15/2019 12:28:12 AM	48733
Surr: N-hexadecane	124	20.4-126		%Rec	1	11/15/2019 12:28:12 AM	48733
Surr: Benzo(e)pyrene	114	21.4-126		%Rec	1	11/15/2019 12:28:12 AM	48733
EPA METHOD 8260B: VOLATILES						Analyst: **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	R64408
Ethylbenzene	ND	1.0		µg/L	1	11/12/2019 4:44:00 PM	R64408
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/12/2019 4:44:00 PM	R64408
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2019 4:44:00 PM	R64408
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2019 4:44:00 PM	R64408
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

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Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
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ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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: **CCM**	
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

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Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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: **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

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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: **bcv**	
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: **JMT**	
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**	
pH	7.75		H	pH units	1	11/11/2019 11:42:33 PM	R64428
EPA METHOD 200.7: METALS						Analyst: **bcv**	
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:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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						Analyst: **JDC**	
Pyrene	ND	0.50		µg/L	1	11/15/2019 12:52:21 AM	48733
Benz(a)anthracene	ND	0.50		µg/L	1	11/15/2019 12:52:21 AM	48733
Chrysene	ND	0.50		µg/L	1	11/15/2019 12:52:21 AM	48733
Benzo(b)fluoranthene	ND	0.50		µg/L	1	11/15/2019 12:52:21 AM	48733
Benzo(k)fluoranthene	ND	0.50		µg/L	1	11/15/2019 12:52:21 AM	48733
Benzo(a)pyrene	ND	0.50		µg/L	1	11/15/2019 12:52:21 AM	48733
Dibenz(a,h)anthracene	ND	0.50		µg/L	1	11/15/2019 12:52:21 AM	48733
Benzo(g,h,i)perylene	ND	0.50		µg/L	1	11/15/2019 12:52:21 AM	48733
Indeno(1,2,3-cd)pyrene	ND	0.50		µg/L	1	11/15/2019 12:52:21 AM	48733
Surr: N-hexadecane	81.4	20.4-126		%Rec	1	11/15/2019 12:52:21 AM	48733
Surr: Benzo(e)pyrene	67.9	21.4-126		%Rec	1	11/15/2019 12:52:21 AM	48733
EPA METHOD 8260B: VOLATILES						Analyst: **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	R64408
Ethylbenzene	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
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	R64408
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
Naphthalene	ND	2.0		µg/L	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	R64408
Bromobenzene	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
Bromodichloromethane	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
Bromoform	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
Bromomethane	ND	3.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
2-Butanone	ND	10		µg/L	1	11/12/2019 5:08:00 PM	R64408
Carbon disulfide	ND	10		µg/L	1	11/12/2019 5:08:00 PM	R64408
Carbon Tetrachloride	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
Chlorobenzene	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
Chloroethane	ND	2.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
Chloroform	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
Chloromethane	ND	3.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
2-Chlorotoluene	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
4-Chlorotoluene	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
cis-1,2-DCE	ND	1.0		µg/L	1	11/12/2019 5:08:00 PM	R64408
cis-1,3-Dichloropropene	ND	1.0		µg/L	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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 8260B: VOLATILES						Analyst: **CCM**	
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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 8260B: VOLATILES						Analyst: **CCM**	
Surr: 4-Bromofluorobenzene	99.5	70-130		%Rec	1	11/12/2019 5:08:00 PM	R64408
Surr: Dibromofluoromethane	100	70-130		%Rec	1	11/12/2019 5:08:00 PM	R64408
Surr: Toluene-d8	97.5	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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: **bcv**	
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: **JMT**	
Total Dissolved Solids	2470	20.0	*	mg/L	1	11/14/2019 9:12:00 AM	48734
SM4500-H+B / 9040C: PH						Analyst: **JRR**	
pH	7.97		H	pH units	1	11/11/2019 11:57:11 PM	R64428
EPA METHOD 200.7: METALS						Analyst: **bcv**	
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:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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 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	R64408
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	R64408
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	R64408
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	11/12/2019 5:31:00 PM	R64408
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

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Qualifiers:

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

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: **CCM**	
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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: **CCM**	
Surr: 4-Bromofluorobenzene	100	70-130		%Rec	1	11/12/2019 5:31:00 PM	R64408
Surr: Dibromofluoromethane	98.5	70-130		%Rec	1	11/12/2019 5:31:00 PM	R64408
Surr: Toluene-d8	98.8	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

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**
Client ID: **PBW**	Batch ID: **48794**	RunNo: **64544**
Prep Date: **11/14/2019**	Analysis Date: **11/15/2019**	SeqNo: **2210018** 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								
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**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	0.5000	0	101	50	150			
Iron	0.023	0.020	0.02000	0	117	50	150			
Magnesium	ND	1.0	0.5000	0	102	50	150			
Manganese	0.0020	0.0020	0.002000	0	101	50	150			
Potassium	ND	1.0	0.5000	0	121	50	150			
Sodium	ND	1.0	0.5000	0	108	50	150			

Sample ID: **LCS-48794**	SampType: **LCS**	TestCode: **EPA Method 200.7: Metals**
Client ID: **LCSW**	Batch ID: **48794**	RunNo: **64544**
Prep Date: **11/14/2019**	Analysis Date: **11/15/2019**	SeqNo: **2210025** 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**	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**

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

QC SUMMARY REPORT
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**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	51	5.0	50.00	1.315	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: **12/2/2019** SeqNo: **2224256** 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	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:

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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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372**
06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: **MB**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R64346**	RunNo: **64346**
Prep Date:	Analysis Date: **11/8/2019**	SeqNo: **2203722** 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								
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**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R64346**	RunNo: **64346**
Prep Date:	Analysis Date: **11/8/2019**	SeqNo: **2203724** 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**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **A64442**	RunNo: **64442**
Prep Date:	Analysis Date: **11/12/2019**	SeqNo: **2206103** 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**	SampType: **lcs**	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
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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372**
06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: **100ng lcs** SampType: **LCS** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW** Batch ID: **R64408** RunNo: **64408**
Prep Date: Analysis Date: **11/12/2019** SeqNo: **2205162** 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** SampType: **MBLK** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW** Batch ID: **R64408** RunNo: **64408**
Prep Date: Analysis Date: **11/12/2019** SeqNo: **2207186** 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								

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372**
06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: **rb1**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R64408**	RunNo: **64408**
Prep Date:	Analysis Date: **11/12/2019**	SeqNo: **2207186** 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								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372**
06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: **rb1**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R64408**	RunNo: **64408**
Prep Date:	Analysis Date: **11/12/2019**	SeqNo: **2207186** 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			

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

QC SUMMARY REPORT
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	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
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								
Benz(a)anthracene	ND	0.50								
Chrysene	ND	0.50								
Benzo(b)fluoranthene	ND	0.50								
Benzo(k)fluoranthene	ND	0.50								
Benzo(a)pyrene	ND	0.50								
Dibenz(a,h)anthracene	ND	0.50								
Benzo(g,h,i)perylene	ND	0.50								
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: **lcs-48733** SampType: **LCS** TestCode: **EPA Method 8270C: PAHs**
Client ID: **LCSW** Batch ID: **48733** RunNo: **64521**
Prep Date: **11/12/2019** Analysis Date: **11/14/2019** SeqNo: **2209226** 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:

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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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372**

06-Dec-19

Client: Western Refining

Project: GBR Annual Sampling

Sample ID: **lcs-48733** SampType: **LCS** TestCode: **EPA Method 8270C: PAHs**

Client ID: **LCSW** Batch ID: **48733** RunNo: **64521**

Prep Date: **11/12/2019** Analysis Date: **11/14/2019** SeqNo: **2209226** 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: **lcsd-48733** SampType: **LCSD** TestCode: **EPA Method 8270C: PAHs**

Client ID: **LCSS02** Batch ID: **48733** RunNo: **64521**

Prep Date: **11/12/2019** Analysis Date: **11/14/2019** SeqNo: **2209227** 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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372**
06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: **lcs-1 99.1uS eC**	SampType: **lcs**	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: **lcs-2 99.1uS eC**	SampType: **lcs**	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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372**
06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

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
pH	7.99									H

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372**
06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

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: **lcs-1 alk**	SampType: **lcs**	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: **lcs-2 alk**	SampType: **lcs**	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: **lcs-3 alk**	SampType: **lcs**	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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911372**
06-Dec-19

Client: Western Refining
Project: GBR Annual Sampling

Sample ID: **1911372-003c dup** SampType: **dup** TestCode: **SM2320B: Alkalinity**
Client ID: **GRW-6** Batch ID: **R64428** RunNo: **64428**
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
Total Alkalinity (as CaCO3)	344.1	20.00						0.361	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

QC SUMMARY REPORT
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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **Western Refining Southw** Work Order Number: **1911372** RcptNo: 1

Received By: **Desiree Dominguez** **11/8/2019 8:20:00 AM** DD

Completed By: **Yazmine Garduno** **11/8/2019 2:23:17 PM** Yazmine Garduno

Reviewed By: DR 11/7/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Courier		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☑	~~No ☑~~ DAD 11/8/19	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: 6 (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted? YES
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by: DAD 11/8/19

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

16. Additional remarks: For metals analysis added ~0.5mL HNO3 to sample 001D for pH<2.

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.7	Good				

Chain-of-Custody Record

Client: Western Refining
Greg McCartney
Mailing Address: 111 Rd 4990
Bloomfield, NM 87413
Phone #:
email or Fax#: gjmccartney@marathonpetroleum.com
QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: GBR
Project #:
Project Manager: Stuart Hyde
Sampler: E. Carroll / M. Mrdjenovich
On Ice: ☒ Yes ☐ No
# of Coolers: 1
Cooler Temp(including CF): 5.0 -0.3 = 4.7°c

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1911312	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Gwc
11/7/19	1100	Gw	GRW-3	Various	Various	-001								X	X		X
	1200	Gw	GBR-31			-002								X	X		X
	1205	GW	GRW-6			-003								X	X		X

NFS

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
11/7/19	12:58	Mary Murphy	Christine Walsh		11/7/19	1258
11/7/19	1840	Christine Walsh		Courier	11/8/19	8:20

Remarks: See attached for Gwc analytes

Please cc: ecarroll@itenv.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.