REVIEWED
By Mike Buchanan at 4:38 pm, Jun 06, 2024

ARCADIS

Mr. Glenn von Gonten
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New Mexico Oil Conservation Division
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Date: March 28, 2022
Our Ref: 30091090
Subject: 2021 Annual Groundwater Report
Former Brickland Refinery Site
Sunland Park, New Mexico
Huntsman International LLC
Case No. AP-01

Review of the 2021 Former Brickland Refinery Groundwater Monitoring Report: Content Satisfactory
1. Continue LNAPL removal as appropriate by bailing or pumping at quarterly intervals
2. Continue to conduct groundwater monitoring at the site for benzene
3. continue monitoring for PAHs in MW-8 to evaluate trends and report findings to OCD
4. Continue ongoing evaluations for the site as planned in report.
5. Submit the 2022 and 2023 Groundwater reports unless they've already been submitted.
6. Submit the 2024 Annual Groundwater Monitoring Report by April 1, 2025
7. Well plugging reports accepted for the record.

Dear Mr. von Gonten:

On behalf of Huntsman International LLC (Huntsman), Arcadis U.S., Inc., is submitting one copy of the above-referenced report. As agreed upon on February 11, 2003, this report is being submitted on or before April 1 for the previous year. An additional copy is being provided to the District office in Artesia.

If you have any questions regarding the enclosed report, please contact the undersigned at (225) 802-8261 or Mr. Scott Wagaman with the Huntsman facility at (281) 719-3038.

Sincerely,
Arcadis U.S., Inc.

Timothy D. Ratchford, P.G. (LA/TX)
Associate Vice President/Regulatory Compliance Specialist

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CC. NMOCD District 2 – Artesia
Scott Wagaman – Huntsman (electronic)

HUNTSMAN/30091090/C/2/lf

ARCADIS

HUNTSMAN

Enriching lives through innovation

2021 Annual Groundwater Monitoring Report

Former Brickland Refinery

Sunland Park, New Mexico

March 28, 2022

2021 Annual Groundwater Monitoring Report

Former Brickland Refinery
Sunland Park, New Mexico

March 28, 2022

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Associate Vice President/Regulatory Compliance Specialist

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Executive Summary

This 2021 Annual Groundwater Monitoring Report documents the results of four groundwater monitoring events conducted at the former Brickland Refinery site in Sunland Park, New Mexico. The 2021 quarterly groundwater monitoring events were conducted in March (March 8), June (June 1), September (September 8-9), and December (December 8-9). This report contains summaries of groundwater elevation and analytical data from the 2021 groundwater monitoring events and historical records.

This monitoring program was conducted in accordance with the Groundwater Monitoring Plan included as Section 3.5 of the Stage 2 Abatement Plan approved by Mr. Bill Olson of the New Mexico Oil Conservation Division (NMOCD) in a letter dated December 17, 1998, and revised in 2006. A request was sent to NMOCD in a letter dated November 7, 2014, to modify the existing sampling performed at the site. The request was approved by Mr. Glenn von Gonten in correspondence dated April 24, 2015, and the Addendum to Abatement Plan AP-001 for the former Brickland Refinery was submitted to NMOCD on June 3, 2015. The modification to the plan requires quarterly sampling for designated wells.

In accordance with the Stage 2 Abatement Plan, quarterly sampling events include water-level and product-thickness measurements in all monitoring wells and analysis of benzene for all sampled wells. In addition, each sampling event includes analysis for polycyclic aromatic hydrocarbons (PAHs) at Monitoring Well MW-8 only.

During the 2021 monitoring events, the following samples were collected:

- Five off-site well samples (MW-3S, MW-3D, MW-6S, MW-6D, and MW-9S).
- Five on-site well samples (MW-5, MW-8, MW-10, MW-11, and MW-17).

The laboratory-reported benzene concentrations for samples collected from MW-5 and MW-8 during the March, June, September, and December 2021 monitoring events were above the New Mexico Water Quality Control Commission (NMWQCC) standard of 10 micrograms per liter (µg/L).

The laboratory-reported total PAHs were below the NMWQCC standard of 30 µg/L for all samples collected at MW-8 during the March, June, September, and December 2021 monitoring events.

Historically, there appears to be a relationship between the magnitude for benzene detections reported at MW-5 and MW-8 and the seasonal river stage for the Rio Grande during the June/September sampling event. The hydrographs evaluated during 2021 show that water levels in all site monitoring wells rise concurrently with the elevated river stage, which results during June or September when water is released from Elephant Butte Dam (upstream from Sunland Park near Truth or Consequences, New Mexico) to the Rio Grande. Because Rio Grande river stages were not measured for most of September, it is assumed that the river stage was high at this time based on observations from previous years. Historically, the detections of benzene at Monitoring Wells MW-5 and MW-8 seasonally increase at the same time as the rise in water levels. However, during 2021, it appears that only the benzene concentration at Monitoring Well MW-8 followed this trend. The benzene concentration at Monitoring Well MW-5 was highest in December as opposed to June or September. The same relationship between the magnitude for PAH detections and the river stage for the Rio Grande has existed at MW-8. This trend is mostly consistent in 2021. Even though the highest detection of PAHs occurred during the March event, the PAH concentration was higher in September compared to the concentrations in June and December.

The hydraulic gradient beneath the former Brickland Refinery varies slightly across the site in response to river stages. In March, June, September, and December 2021, the gradient was approximately 0.001, 0.0003, 0.002, and 0.0007 foot per foot, respectively. The groundwater flow direction was generally to the southeast, parallel to the river.

During the March, June, September, and December 2021 sampling events, no measurable amount of light non-aqueous phase liquid (LNAPL) was observed in MW-10 or in any of the other monitoring wells.

Monitoring Well MW-9S was damaged sometime between March and June 2019. Monitoring Well MW-6S was also damaged sometime between December 2019 and March 2020. The well could not be sampled due to shifting in the foundation. These wells are located on land owned by the International Boundary and Water Commission (IBWC). As discussed in a memorandum dated August 18, 2021, Arcadis U.S., Inc., obtained all necessary permits and approvals to replace the wells. On August 5 and 6, 2021, a licensed driller was retained to plug and abandon the existing wells and reinstall them. Sampling of Monitoring Wells MW-9S and MW-6S recommenced during the September 2021 sampling event.

Based on the results of ongoing monitoring, the following actions are recommended:

- Install bollards to protect the wells accessible to the public and located on IBWC land.
- Continue LNAPL removal, if present, at MW-10 by bailing or pumping at quarterly intervals.
- Continue groundwater monitoring of benzene at MW-3S, MW-3D, MW-5, MW-6S, MW-6D, MW-8, MW-9S, MW-10, MW-11, and MW-17.
- Continue groundwater monitoring of PAHs at MW-8 to evaluate trends in groundwater concentrations.
- Continue evaluations of the relationship between river stages, elevated water-level measurements, and seasonal increases in concentrations of benzene (at MW-5 and MW-8) and PAHs (at MW-8) during future sampling events.

1 Introduction

1.1 Background

The former Brickland Refinery site is located in Sunland Park, New Mexico, and consists of approximately 33 acres situated along the west bank of the Rio Grande (Figure 1). Huntsman International LLC (Huntsman) currently owns the site. From 1933 to 1958, the site was operated by previous owners as a petroleum refinery, producing both gasoline and jet fuel. The site was closed and the plant dismantled by the previous owners in 1958. Between 1964 and 1989, the site was leased by the previous owners to various parties to service trucks, conduct automobile salvage operations, graze livestock, and store used bricks.

Petroleum hydrocarbons have been reported in soil and groundwater at the site since the sampling program was initiated in December 1993. The distribution of petroleum hydrocarbons was investigated, and these investigations provided the basis for the Stage 2 Abatement Plan approved by Mr. Bill Olson of the New Mexico Oil Conservation Division (NMOCD) on December 17, 1998. The Stage 2 Abatement Plan provides the methods for abating contamination of groundwater and soil in compliance with New Mexico Water Quality Control Commission (NMWQCC) regulations on prevention and abatement of water pollution (20 New Mexico Administrative Code 6.2, Subpart IV) and NMOCD requirements to protect public health and the environment with respect to wastes from the refinement of crude oil (Section 70 2 12.8 [22] New Mexico Statute Annotated 1978).

The sampling protocol was modified in 2006, and modifications were implemented during the June 2006 monitoring event. A request to further modify sampling performed at the site was sent to NMOCD in a letter dated November 7, 2014. The request was approved by Mr. Glenn von Gonten in correspondence dated April 24, 2015, and the Addendum to Abatement Plan AP-001 for the former Brickland Refinery was submitted to NMOCD on June 3, 2015. The revised protocol is in general accordance with applicable NMOCD, New Mexico Environment Department, and U.S. Environmental Protection Agency (USEPA) regulations, procedures, and guidelines.

Huntsman maintained a stand-alone light non-aqueous phase liquid (LNAPL) recovery system at the site (at MW-10) as part of the Stage 2 Abatement Plan. The system was installed in December 1998 and shut down in June 2008 because no free-phase product was removed from MW-10 in 2006, 2007, or 2008.

The current groundwater monitoring program conducted as part of Abatement Plan AP-001 includes:

- Collection of water levels and groundwater samples on a quarterly basis at the locations of five off-site monitoring wells (MW-3S, MW-3D, MW-6S, MW-6D, and MW-9S) and five on-site wells (MW-5, MW-8, MW-10, MW-11, and MW-17).
- Analysis of groundwater for benzene at all monitoring well locations.
- Analysis of groundwater for polycyclic aromatic hydrocarbons (PAHs) at MW-8 only.
- Monitoring for LNAPL at all monitoring wells.
- Extraction of LNAPL at Recovery Well MW-10 (when present).
- Submittal of an annual groundwater monitoring report.

The site layout and monitoring well and sampling locations are shown on Figure 2.

Monitoring Well MW-9S was damaged sometime between March and June 2019. Monitoring Well MW-6S was also damaged sometime between December 2019 and March 2020. The well could not be sampled due to shifting in the foundation. These wells are located on land owned by the International Boundary and Water Commission (IBWC). As discussed in a memorandum dated August 18, 2021, Arcadis U.S., Inc. (Arcadis) obtained all necessary permits and approvals to replace the wells. On August 5 and 6, 2021, a licensed driller was retained to plug and abandon the existing wells and reinstall them. The memorandum is included as Appendix A of this report. Sampling of Monitoring Wells MW-9S and MW-6S recommenced during the September 2021 sampling event.

1.2 Scope of Services

Arcadis performed quarterly groundwater monitoring at the site in March, June, September, and December 2021. Table 1 provides a summary of the water sampling methods, purging methods, and laboratory analyses that were performed during the quarterly sampling events. The following activities were included during quarterly monitoring, as required by the Groundwater Monitoring Plan and 2015 Addendum to Stage 2 Abatement Plan as approved by NMOCD:

- Depth-to-groundwater measurements were recorded for five on-site monitoring wells and five off-site monitoring wells. Historical groundwater elevations for the monitoring wells are provided in Table 2, and groundwater elevation contour maps for the 2021 monitoring events are depicted on Figures 3, 4, 5, and 6.
- Groundwater sampling was conducted in March, June, September, and December 2021 at each of the five off-site monitoring wells (MW-3S, MW-3D, MW-6S, MW-6D, and MW-9S) and five on-site wells (MW-5, MW-8, MW-10, MW-11, and MW-17). It should be noted that Monitoring Wells MW-6S and MW-9S were not sampled during the March and June 2021 sampling events due to damages. Sampling of these wells recommenced in September 2021 upon approval from IBWC to replace the wells.
- Analytical testing for the samples included benzene in all wells sampled and PAHs for MW-8 only (using USEPA Test Methods 8260C and 8270D, respectively) during the March, June, September, and December 2021 events. The analytical results for benzene and PAHs are shown in Tables 3 and 4, respectively.
- Ten monitoring wells were monitored for the presence of LNAPL, and a summary of the LNAPL thicknesses is graphed on Figure 7 and also included in Table 5.

Extraction system operations and maintenance reports were not prepared because the extraction system was shut down in June 2008 due to an absence of LNAPL in Recovery Well MW-10.

2 Groundwater Elevation, Hydraulic Gradient, and Flow Direction

The hydraulic gradient beneath the former Brickland Refinery varies slightly across the site. This variability is in part a response to river-stage fluctuations. In March, June, September, and December 2021, the gradient was approximately 0.001, 0.0003, 0.002, and 0.0007 foot per foot, respectively. The groundwater flow direction was generally to the southeast, parallel to the river.

Historical groundwater elevations for the monitoring wells are provided in Table 2. Water levels are not listed for the well points because the well points were specifically designed to detect LNAPL at a discrete depth and the screened intervals do not correlate with the monitoring well screens. Groundwater elevation contour maps for the March, June, September, and December 2021 monitoring events are depicted on Figures 3, 4, 5, and 6, respectively. Monitoring wells MW-6S and MW-9S were not resurveyed after being reinstalled in August 2021, and this is taken into account on the potentiometric flow maps.

Groundwater levels in the monitoring wells are influenced by the stage of the Rio Grande, which borders the site. Due to observed seasonal fluctuations in the river, water levels in the monitoring wells may vary as much as 2 feet over the course of a year. Monitoring of groundwater elevations since June 2003 indicates a consistent pattern of higher water elevations in the wells and the river during summer sampling events and lower water elevations during winter sampling events.

3 LNAPL Product Thickness and Removal

3.1 LNAPL Product Thickness

The occurrence of LNAPL in MW-10 was tested with an oil/water interface meter. The potential occurrence of LNAPL in other monitoring wells was evaluated visually during gauging of water levels with an electronic water-level meter. Measurable thicknesses of LNAPL were not found in any wells during the four 2021 monitoring events. Recent and historical measurements dating back to June 2003 are graphed on Figure 7 and listed in Table 5. LNAPL thickness maps were not prepared for this report because none of the wells contained measurable amounts of LNAPL during the four events.

3.2 LNAPL Removal

Historically, approximately 235 gallons of LNAPL have been removed from MW-10 since December 1998, when the product recovery system was installed. LNAPL yields were no longer recovered in measurable amounts during 2006 and 2007, and the recovery system was shut down/disconnected in June 2008. Subsequently, no LNAPL was removed from MW-10 in 2008, 2009, 2010, or 2011. In 2012, manual LNAPL removal was initiated for MW-10 in response to a measurable thickness present in MW-10 as of December 2011. During the March, June, September, and December 2021 sampling events, no product thickness was present in MW-10.

4 Sample Collection and Laboratory Analytical Testing Procedures

4.1 Decontamination for Fluid-Level Measurements

The interface probe was decontaminated prior to each use and between each well to prevent the introduction of external contamination or artifacts into a well. A wash and double-rinse decontamination procedure was used. The procedure consisted of washing the probe with Liquinox, a mild, non-phosphate detergent, and then rinsing twice with water.

4.2 Calibration of Multi-Probe Water Analyzer

The multi-probe analyzer was calibrated by Geotech for each sampling event prior to use at the site. Each calibration was carried out in accordance with the equipment manufacturer's procedures and recommendations.

4.3 Well Purging and Field Parameter Measurements

The monitoring wells were purged using low-flow/low-stress techniques prior to sampling. Low-flow purging involves removing small volumes of groundwater at very low pumping rates until certain field parameters have stabilized. Field parameter measurements were recorded while each well was purged through the multi-probe flow cell. The groundwater temperature, pH, specific conductance, dissolved oxygen, oxidation reduction (redox) potential, and turbidity were documented on the Groundwater Sampling Logs provided in Appendix B. Purging of each well was continued until three consecutive readings for three field parameters (dissolved oxygen, redox potential, and turbidity) stabilized within 10 percent of one another. When stabilization was achieved, well purging was discontinued and the well was sampled. The total volume of water purged prior to sample collection was recorded on the Groundwater Sampling Log for each well. The purged water was containerized for disposal.

Approximately 2 gallons of water were removed from each well. Field data collected during the purging of each well are provided in Appendix B. Groundwater odor, color, and other physically apparent characteristics were documented. Monitoring well integrity was also documented (see the Daily Field Reports provided in Appendix B).

During the March, June, September, and December 2021 sampling events, all wells sampled were purged with peristaltic pumps. All tubing used with the peristaltic pumps was dedicated and/or replaced at each well. A combined total ranging from approximately 8 to 20 gallons of water were purged from the sampled monitoring wells during each of the four monitoring events. The purged water collected during these monitoring events will be collected by Rhino Environmental Services for subsequent nonhazardous disposal at an approved facility.

4.4 Groundwater Sample Collection

Samples were collected for laboratory analysis in the order of volatility of the analytical parameters (benzene first and PAHs second). All samples were labeled with the sampling location, date, time, and testing requirements on self-adhering labels provided by the laboratory.

4.4.1 Benzene

The groundwater samples were analyzed by USEPA Method 8260C for benzene in the March, June, September, and December 2021 monitoring events. Three 40-milliliter (mL) unpreserved glass vials were used as sample containers for volatile organic compounds. Water was collected from the well via tubing directly into the glass vial until a convex meniscus formed above the lip of the bottle. Once capped, the vial was checked for air bubbles (headspace) by turning it upside down, tapping the cap of the inverted bottle, and visually inspecting the bottle contents. No bubbles were observed in the vials shipped to the laboratory.

4.4.2 Polycyclic Aromatic Hydrocarbons

Samples collected from Monitoring Well MW-8 in the March, June, September, and December 2021 monitoring events were analyzed by USEPA Method 8270D for the presence of PAHs. Three 40-mL glass vials with no

preservative were used as sample containers for PAHs. Water was collected from the well via tubing placed directly into the sample container until filled to the neck.

4.5 Field Quality Assurance/Quality Control (QA/QC)

The field QA/QC program includes collection of field blanks, equipment blanks, and duplicate samples. The water samples collected during the monitoring events were placed in ice-filled coolers immediately after collection and shipped to ALS Environmental in Houston, Texas, for analysis. In each event, chain of-custody forms documenting sample identification numbers, the required analysis for each sample, collection times, and delivery times to the laboratories were completed for each set of samples. Copies of chain-of-custody forms are provided in Appendix C. Descriptions of the QA/QC samples and evaluation of QA/QC results for 2021 are presented below.

4.5.1 Field Blanks

Field blanks were used to determine potential absorption of volatile organics from ambient air into the water samples. The blanks for volatile organics were collected by filling three 40-mL glass vials with distilled water at the time of sampling. Field blanks were analyzed for benzene and/or PAHs during the March, June, September, and December 2021 sampling events. None of the constituents were detected in the field blanks collected during the four sampling events, with the exception of the field blank collected in December 2021 with a detection of naphthalene.

4.5.2 Equipment Blanks

Equipment blanks were collected on non-dedicated or new sampling equipment. During the March, June, September, and December 2021 sampling events, equipment blanks were collected for the Teflon® dipper and the water-level indicator. Immediately following decontamination, equipment blanks were collected by pouring distilled water over the equipment and then filling three 40-mL glass vials with water from the equipment. Equipment blanks were analyzed for benzene and/or PAHs during the March, June, September, and December 2021 sampling events. None of the constituents were detected in the equipment blanks collected during the four sampling events, with the exception of the equipment blank collected in December 2021 with a detection of naphthalene.

4.5.3 Duplicate Samples

Two duplicate samples were collected during each of the four 2021 monitoring events. During the March, June, September, and December sampling events, duplicate samples were collected from Monitoring Wells MW-3D (benzene) and MW-8 (PAHs).

For the March, June, September, and December 2021 sampling events, the non-detect analytical result for benzene in the duplicate sample was consistent with the non-detect original result in MW-3D. The duplicate sample result for PAHs was within a 55 percent difference of the original MW-8 result.

5 Groundwater Analytical Results

5.1 Benzene

According to the Stage 2 Abatement Plan, benzene concentrations are measured quarterly during the March, June, September, and December sampling events. Benzene was reported in concentrations above the NMWQCC standard of 10 micrograms per liter (µg/L) in samples collected from Wells MW-5 and MW-8 in March, June, September, and December 2021 events. Laboratory results for benzene analyses are shown in Table 3, and copies of the laboratory reports are provided in Appendix C.

5.2 Polycyclic Aromatic Hydrocarbons

Samples collected from MW-8 were analyzed for PAHs in March, June, September, and December 2021. Concentrations were reported below the NMWQCC standard of 30 µg/L for total PAHs during all four events. Laboratory results for PAH analyses are shown in Table 4, and copies of the laboratory reports are provided in Appendix C.

5.3 Trend Analyses and Seasonal Concentration Increases

Graphs showing trends for detected concentrations of benzene and PAHs are provided as Figures 8 and 9, respectively. Measurements for stages in the Rio Grande from IBWC were used to evaluate the relationship between high river stages, water-level elevations in site monitoring wells, and detections of benzene and PAHs. These hydrographs are provided as Figures 10 through 12. River levels for the Rio Grande from August through December were provided by the IBWC, but they are still under review. There is also a large data gap from September through December due to a sewage spill that occurred. Water measurements have not been conducted since September; therefore, some comparisons could not be made.

Historically, there appears to be a relationship between the magnitude for benzene detections reported at MW-5 and MW-8 and the seasonal river stage for the Rio Grande during the June/September sampling event. Figure 10 shows the relationship between elevated seasonal river stages and the water-level elevations measured in the monitoring wells. The hydrographs evaluated during 2021 show that water levels in all site monitoring wells rise concurrently with the elevated river stage, which results during June or September when water is released from Elephant Butte Dam (upstream from Sunland Park near Truth or Consequences, New Mexico) to the Rio Grande. Because Rio Grande River stages were not measured for most of September, it is assumed that the river stage was high at this time based on observations from previous years.

The detections of benzene at Monitoring Wells MW-5 and MW-8 seasonally increase at the same time as the rise in water levels. As shown on Figure 11, it appears that only the benzene concentration at Monitoring Well MW-8 followed this trend. The benzene concentration at Monitoring Well MW-5 was highest in December as opposed to June or September. The same relationship between the magnitude for PAH detections and the river stage for the Rio Grande has existed at MW-8 (Figure 12). This trend is mostly consistent in 2021. Even though the highest detection of PAHs occurred during the March event, the PAH concentration was higher in September compared to the concentrations in June and December.

Overall, it appears that detections of benzene at Monitoring Wells MW-5 and MW-8 and PAH at MW-8 seasonally increase due to the rise in water levels into vadose zone sediments, where residual concentrations are already present. Evaluations of this relationship will continue during future sampling events.

6 Remediation Performance

6.1 Bioremediation Pilot Testing

Absorbent socks were used during 2011 and the first half of 2012 as a pilot test evaluating bioremediation by enhancing natural attenuation. The absorbent socks use a patented calcium peroxide (45 to 70 percent composition) and calcium hydroxide (10 to 20 percent composition) solid granular material to react with water to release oxygen slowly, which stimulates aerobic biodegradation of groundwater contaminants. During the June 2012 sampling event, the “O-Sox” were removed from MW-5 and MW-8 and have not been replaced.

6.2 Product Recovery

During the March, June, September, and December 2021 sampling events, no measurable amount of LNAPL was observed in MW-10 or in any of the other monitoring wells.

7 Conclusions

Overall, the reported concentrations in groundwater appear to be stable or decreasing. During the 2021 reporting period, benzene concentrations from two wells (MW-5 and MW-8) exceeded NMWQCC standards. PAHs at MW-8 were reported below NMWQCC standards. Review of laboratory results shows general consistency in benzene concentrations in MW-5 and MW-8. This stable/decreasing trend will be verified with future sampling events.

Historically, there appears to be a relationship between the magnitude for benzene detections reported at MW-5 and MW-8 and the seasonal river stage for the Rio Grande during the June/September sampling event. The hydrographs evaluated during 2021 show that water levels in all site monitoring wells rise concurrently with the elevated river stage, which results during June or September when water is released from Elephant Butte Dam (upstream from Sunland Park near Truth or Consequences, New Mexico) to the Rio Grande. Because Rio Grande river stages were not measured for most of September, it is assumed that the river stage was high at this time based on observations from previous years. Historically, the detections of benzene at Monitoring Wells MW-5 and MW-8 seasonally increase at the same time as the rise in water levels. However, during 2021, it appears that only the benzene concentration at Monitoring Well MW-8 followed this trend. The benzene concentration at Monitoring Well MW-5 was highest in December as opposed to June or September. The same relationship between the magnitude for PAH detections and the river stage for the Rio Grande has existed at MW-8. This trend is mostly consistent in 2021. Even though the highest detection of PAHs occurred during the March event, the PAH concentration was higher in September compared to the concentrations in June and December.

During the March, June, September, and December 2021 sampling events, no measurable amount of LNAPL was observed in MW-10 or in any of the other monitoring wells.

Monitoring Well MW-9S was damaged sometime between March and June 2019. Monitoring Well MW-6S was also damaged sometime between December 2019 and March 2020. The well could not be sampled due to shifting in the foundation. These wells are located on land owned by the IBWC. As discussed in a memorandum dated August 18, 2021, Arcadis obtained all necessary permits and approvals to replace the wells. On August 5 and 6, 2021, a licensed driller was retained to plug and abandon the existing wells and reinstall them. Sampling of Monitoring Wells MW-9S and MW-6S recommenced during the September 2021 sampling event.

8 Recommendations

Based upon data collected during the 2021 sampling program, the following recommendations are proposed for the remediation system and monitoring operations at the former Brickland Refinery:

- Continue LNAPL removal, if present, at MW-10 by bailing or pumping at quarterly intervals.
- Continue groundwater monitoring of benzene at MW-3S, MW-3D, MW-5, MW-6S, MW-6D, MW-8, MW-9S, MW 10, MW-11, and MW-17.
- Continue groundwater monitoring of PAHs at MW-8 to evaluate trends in groundwater concentrations.
- Continue evaluations of the relationship between river stages, elevated water-level measurements, and seasonal increases in concentrations of benzene (at MW-5 and MW-8) and PAHs (at MW-8) during future sampling events.

Tables

Table 1
Water Sampling and Purging Methods
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well Number	Sample Date	Purge Method	Sampling Method	Purge Volume	Laboratory Analytes
MW-3S	3/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene
	6/1/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene
	9/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene
	12/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
MW-3D	3/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	6/1/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene
	9/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	12/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
MW-5	3/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	6/1/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene
	9/9/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	12/9/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
MW-6S[(1)]	--	--	--	--	--
	--	--	--	--	--
	9/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene
	12/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
MW-6D	3/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	6/1/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene
	9/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene
	12/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
MW-8	3/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene, PAH
	6/1/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene, PAH
	9/9/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene, PAH
	12/9/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene, PAH

Table 1
Water Sampling and Purging Methods
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well Number	Sample Date	Purge Method	Sampling Method	Purge Volume	Laboratory Analytes
	--	--	--	--	--
	--	--	--	--	--
MW-9S[(2)]	9/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	12/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
MW-10	3/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	6/1/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	9/9/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	12/9/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
MW-11	3/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	6/1/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene
	9/9/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	12/9/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
MW-17	3/8/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	6/1/2021	Low-Flow Purge	Peristaltic Pump	Approximately 1 gallon	Benzene
	9/9/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene
	12/9/2021	Low-Flow Purge	Peristaltic Pump	Approximately 2 gallons	Benzene

Notes:
[(1)]Foundation shifted, and monitoring well could not be sampled.
[(2)]Monitoring well destroyed and could not be sampled.

Total volume purged during quarterly monitoring event in March 2021:	13 gallons
Total volume purged during quarterly monitoring event in June 2021:	8 gallons
Total volume purged during quarterly monitoring event in September 2021:	16 gallons
Total volume purged during quarterly monitoring event in December 2021:	20 gallons
Total volume purged during all 2021 quarterly monitoring events:	57 gallons

Abbreviation:
PAH - Polycyclic aromatic hydrocarbon.

Table 2
Monitoring Well Groundwater Elevations
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well ID	TOC	6/18/2003	12/16/2003	6/16/2004	12/16/2004	6/15/2005	12/14/2005	6/13/2006	12/14/2006	6/13/2007	12/11/2007	6/25/2008	1/7/2009	6/30/2009	12/9/2009	6/21/2010	12/7/2010	6/28/2011	12/13/2011	6/19/2012	12/11/2012	6/11/2013	12/3/2013	6/9/2014	12/9/2014	6/8/2015	9/14/2015	12/2/2015
MW-1	3730.57	3725.55	3723.69	3725.56	3723.6	3726.5	3724.01	3725.89	3724.29	3726.74	3724.57	3726.88	3724.4	3726.94	3724.20	3726.79	3724.08	3726.27	3723.93	3725.83	3724.01	3725.80	3724.07	3726.26	3723.96	3726.46	Plugged 7/15	Plugged 7/15
MW-2	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99
MW-3S	3730.00	3724.65	3722.69	3724.61	3722.71	3725.56	3723.1	3725.02	3723.34	3725.82	3723.49	3725.99	3723.53	3725.98	3723.24	3725.88	3723.15	3725.35	3723.05	3724.86	3723.03	3724.68	3723.08	3725.27	3722.84	3725.70	3725.16	3722.57
MW-3D	3730.00	3724.57	3722.61	3724.62	3722.64	3725.49	3723.04	3724.96	3723 29	3725.78	3723.57	3725.96	3723.5	3725.92	3723.68	3725.83	3723.07	3725.37	3722.93	3724.96	3722.91	3724.81	3723.28	3725.37	3722.74	3725.62	3725.27	3722.48
MW-4	3728.86	3724.87	3722.88	3724.76	3722.96	3725.75	3723.37	3725.21	3723.62	3726.06	3723.77	3726.26	3723.82	3726.22	3723.52	3726.41	3723.41	3725.51	3723.26	3725.11	3723.20	3724.73	3723.34	3725.35	3723.05	3725.72	Plugged 7/15	Plugged 7/15
MW-5	3729.70	3724.91	3722.85	3724.83	3722.98	3725.68	3723.38	3725.15	3723.65	3726.02	3723.84	3726.14	3723.85	3726.21	3723.51	3726.13	3723.54	3725.50*	3722.13*	3724.91*	3723.27	3724.66	3723.37	3725.22	3723.14	3725.60	3725.40	3722.79
MW-6S	3730.65	3724.4	3722.38	3724.4	3722.45	3725.21	3722.9	3724.76	3722.99	3725.53	3723.13	3725.7	3723.29	3725.68	3722.99	3725.70	3722.83	3725.11	3722.69	3724.70	3722.71	3724.50	3722.61	3725.07	3722.50	3725.32	3725.03	3722.35
MW-6D	3730.62	3724.36	3722.33	3724.38	3722.41	3725.22	3722.86	3724.74	3722.98	3725.58	3723.28	3725.76	3723.25	3725.69	3722.95	3725.62	3722.85	3725.06	3722.76	3724.67	3722.70	3724.54	3722.59	3725.19	3722.46	3725.39	3724.99	3722.26
MW-7	3728.96	3724.76	3722.69	3724.75	3722.82	3725.53	3723.24	3725.06	3723.45	3725.92	3723.78	3726.05	3723.64	3726.39	3723.42	3725.99	3723.26	3725.43	3723.04	3724.99	3723.08	3724.73	3723.06	3725.39	3722.93	3725.70	Plugged 7/15	Plugged 7/15
MW-8	3729.22	3724.67	3722.63	3724.62	3722.84	3725.28	3723.25	3724.91	3723.46	3725.53	3723.67	3725.79	3723.62	3725.78	3723.39	3725.53	3723.22	3725.25*	3721.89*	3724.76*	3723.05	3723.87	3723.04	3724.46	3722.89	3724.76	3725.24	3722.59
MW-9S	3730.01	3724.04	3722.02	3723.97	3722.18	3724.85	3722.65	3724.39	3722.89	3725.4	3723.17	3725.41	3723.17	3725.41	3722.88	3725.35	3723.23	3725.16	3722.32	3724.33	3722.49	3723.98	3722.38	3724.68	3722.32	3724.92	3724.74	3722.14
MW-9D	3730.08	Dry	Dry	Dry	Dry	Dry	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05
MW-10	3732.54	3725.67	3722.31	3724.41	3722.56	3725.24	3723.11	3724.53	3723.29	3725.83	3723.54	3732.54	3723.47	3725.82	3723.22	3725.73	3722.91	3724.87*	3722.21*	3724.34	3722.55	3724.56	3722.79	3724.88	3722.72	3725.01	3725.08	3722.36
MW-11	3731.40	3724.51	3721.17	3724.42	3722.74	3725.24	3723.21	3724.65	3723.43	3725.77	3723.62	3725.74	3723.53	3725.76	3723.30	3725.69	3723.17	3724.95	3722.94	3724.64	3722.98	3723.80	3722.95	3724.48	3722.78	3724.69	3725.08	3722.54
MW-12	3730.35	3725.93	3724.09	3725.9	3723.86	3726.74	3724.4	3726.24	3724.66	3727.1	3724.8	3726.95	3724.79	3727.28	3724.49	3727.08	3724.52	3726.70	3724.79	3726.21	3724.33	3726.00	3724.30	3726.54	3724.14	3726.73	Plugged 7/15	Plugged 7/15
MW-13	3732.36	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99
MW-14	3730.46	3725.3	3722.79	3724.81	3722.88	3725.67	3723.3	3725.17	3723.55	3726.03	3723.82	3726.13	3723.77	3726.14	3723.45	3726.06	3723.58	3725.49	3723.44	3725.09	3724.84	3724.70	3724.16	3725.31	3723.01	3725.66	Plugged 7/15	Plugged 7/15
MW-15	3738.62	3724.35	3722.38	3724.28	3722.58	3725.16	3723.04	3724.69	3723.42	3725.75	3723.57	3725.73	3723.58	3725.74	3723.26	3725.62	3723.26	3724.99	3723.15	3724.63	3722.81	3724.19	3722.74	3724.83	3722.60	3725.06	Plugged 7/15	Plugged 7/15
MW-16	3736.78	3724.17	3722.14	3724.13	3722.34	3725	3722.78	3724.48	3723.05	3725.53	3723.29	3725.51	3723.28	3725.51	3722.99	3725.43	3722.78	3724.87	3724.76	3724.64	3724.71	3724.12	**	3724.73	3722.70	3724.99	Plugged 7/15	Plugged 7/15
MW-17	3731.98	3724.67	3722.61	3724.67	3722.71	3725.53	3723.15	3725.06	3723.33	3725.93	3723.63	3726	3723.63	3726.02	3723.28	3726.02	3723.17	3725.40	3723.02	3724.95	3723.05	3724.80	3722.91	3725.44	3722.77	3725.69	3725.28	3722.56

Notes:
*Oxygen-releasing compound sleeves/socks (O-Sox) were utilized to enhance natural attenuation. Water elevations may be artificially lowered due to displacement caused by the O-So›
**Roots on probe.
Measurements are reported in feet mean sea level.
Dry - Monitoring point was dry.
Plugged - Plugged and abandoned as of specified date.

Abbreviation:
TOC - Top of casing.

ARCADIS

Table 2
Monitoring Well Groundwater Elevations
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well ID	TOC	3/8/2016	6/6/2016	9/12/2016	12/13/2016	3/7/2017	6/6/2017	9/26/2017	12/5/2017	3/6/2018	6/26/2018	9/20/2018	12/11/2018	3/5/2019	6/4/2019	9/18/2019	12/10/2019	3/17/2020	6/1/2020	9/21/2020	12/18/2020	3/8/2021	6/1/2021	9/8/2021	12/8/2021
MW-1	3730.57	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15
MW-2	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99
MW-3S	3730.00	3722.45	3724.81	3723.79	3722.32	3722.24	3724.65	3724.50	3721.87	3721.80	3724.61	3724.08	3721.85	3721.65	3721.63	3724.57	3722.24	3723.95	3724.37	3723.82	3722.08	3722.00	3721.79	3722.80	3722.48
MW-3D	3730.00	3722.35	3724.75	3723.63	3722.24	3722.14	3724.60	3724.43	3721.81	3721.71	3724.59	3724.01	3721.75	3721.72	3721.58	3724.32	3722.18	3724.00	3724.23	3723.63	3722.04	3721.95	3721.71	3722.75	3722.40
MW-4	3728.86	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15
MW-5	3729.70	3722.75	3724.95	3724.23	3722.57	3722.49	3724.89	3724.72	3721.10	3722.11	3724.70	3724.25	3722.29	3722.14	3721.80	3724.62	3722.73	3723.57	3724.40	3724.01	3722.39	3722.29	3722.05	3723.13	3722.78
MW-6S	3730.65	3722.24	3724.60	3723.55	3722.15	3722.00	3724.41	3724.25	3721.60	3721.57	3724.38	3723.81	3721.69	3721.57	3721.54	3724.15	3722.05	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	3722.22	3722.29
MW-6D	3730.62	3722.22	3724.53	3723.40	3722.09	3721.98	3724.34	3724.20	3721.53	3721.51	3724.39	3723.80	3721.64	3721.52	3721.49	3724.10	3721.96	3723.75	3723.94	3723.40	3721.77	3721.72	3721.54	3722.62	3721.89
MW-7	3728.96	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15
MW-8	3729.22	3722.59	3724.62	3724.12	3722.44	3722.31	3724.59	3724.40	3721.97	3721.90	3724.39	3723.52	3722.04	3721.84	3721.77	3724.37	3722.39	3723.08	3724.12	3723.90	3722.16	3722.08	3721.81	3722.48	3722.61
MW-9S	3730.01	3722.00	3724.26	3723.42	3721.99	3721.91	3724.01	3724.01	3721.45	3721.47	3724.00	3723.56	3721.60	3721.51	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	3720.54	3719.98
MW-9D	3730.08	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05	Plugged 7/05
MW-10	3732.54	3722.23	3724.52	3724.15	3722.25	3722.22	3724.32	3724.40	3721.90	3721.82	3724.48	3723.95	3721.96	3721.84	3721.74	3724.26	3722.23	3723.62	3723.93	3723.60	3721.95	3721.93	3721.74	3722.99	3722.58
MW-11	3731.40	3722.53	3724.56	3724.02	3722.42	3722.28	3724.39	3724.38	3721.98	3721.84	3724.32	3723.98	3721.99	3721.80	3721.78	3724.24	3722.27	3722.97	3724.05	3723.72	3722.07	3721.97	3721.80	3722.95	3722.60
MW-12	3730.35	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15
MW-13	3732.36	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99	Plugged 6/99
MW-14	3730.46	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15
MW-15	3738.62	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15
MW-16	3736.78	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15	Plugged 7/15
MW-17	3731.98	3722.48	3724.86	3723.78	3722.41	3722.30	3724.64	3724.49	3721.86	3721.83	3724.66	3724.10	3721.96	3721.82	3721.80	3724.39	3722.28	3723.98	3724.26	3723.70	3722.09	3722.48	3721.79	3722.88	3722.58

Notes:
*Oxygen-releasing compound sleeves/socks (O-Sox) were utilized to enhance natural attenuation. Water elevations may be artificially lowered due to displacement caused by the O-So›
**Roots on probe.
Measurements are reported in feet mean sea level.
Dry - Monitoring point was dry.
Plugged - Plugged and abandoned as of specified date.

Abbreviation:
TOC - Top of casing.

Table 3
Benzene Concentrations in Monitoring Wells
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well	Date	Benzene (µg/L)
MW-3S	6/19/2003	ND
	12/17/2003	ND
	6/16/2004	ND
	12/16/2004	ND
	6/15/2005	ND
	12/16/2005	ND
	6/15/2006	ND
	12/14/2006	ND
	6/14/2007	ND
	12/17/2007	ND
	6/24/2008	<1
	1/8/2009	<1
	7/1/2009	<1
	12/10/2009	<1
	6/23/2010	<0.20
	12/7/2010	<0.20
	6/29/2011	<1
	12/14/2011	<1
	6/19/2012	<0.20
	12/11/2012	<0.20
	6/12/2013	<1
	12/4/2013	<5
	6/9/2014	<0.60
	12/10/2014	<1
	6/10/2015	<1
	9/14/2015	<1
	12/2/2015	<1
	3/7/2016	<1
	6/6/2016	<1
	9/13/2016	<1
	12/14/2016	<1
	3/7/2017	<1
	6/6/2017	<1
	9/26/2017	<1
	12/5/2017	<1
	3/6/2018	<1
	6/26/2018	<1
	9/20/2018	<1
	12/11/2018	<1
	3/5/2019	<1
	6/4/2019	<1
	9/18/2019	<1
	12/10/2019	<1
	3/17/2020	<1
	6/1/2020	<1
	9/21/2020	<1
	12/18/2020	<1
	3/8/2021	<1
	6/1/2021	<1
	9/8/2021	<1
	12/8/2021	<1
NMWQCC Standard (µg/L)		**10**

Table 3
Benzene Concentrations in Monitoring Wells
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well	Date	Benzene (µg/L)
MW-3D[1]	6/19/2003	ND
	12/17/2003	ND; ND
	6/16/2004	ND
	12/16/2004	ND
	6/15/2005	ND
	12/16/2005	ND
	6/15/2006	ND
	12/14/2006	ND
	6/14/2007	ND
	12/17/2007	ND
	6/24/2008	<1
	1/8/2009	<1
	7/1/2009	<1
	12/10/2009	<1
	6/23/2010	<0.20
	12/7/2010	<1
	6/29/2011	<1
	12/14/2011	<1
	6/19/2012	<0.20
	12/11/2012	<0.20
	6/12/2013	<1
	12/4/2013	<5
	6/9/2014	<0.60
	12/10/2014	<1
	6/10/2015	<1
	9/14/2015	<1
	12/2/2015	<1
	3/7/2016	<1
	6/6/2016	<1
	9/13/2016	<1
	12/14/2016	<1
	3/7/2017	<1
	6/6/2017	<1
	9/26/2017	<1
	12/5/2017	<1
	3/6/2018	<1
	6/26/2018	<1
	9/20/2018	<1
	12/11/2018	<1
	3/5/2019	<1
	6/4/2019	<1
	9/18/2019	<1
	12/10/2019	<1
	3/17/2020	<1
	6/1/2020	<1; <1
	9/21/2020	<1; <1
	12/18/2020	<1; <1
	3/8/2021	<1; <1
	6/1/2021	<1; <1
	9/8/2021	<1; <1
	12/8/2021	<1; <1
NMWQCC Standard (µg/L)		**10**

Table 3
Benzene Concentrations in Monitoring Wells
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well	Date	Benzene (µg/L)
MW-5[1]	6/21/2010	**2,200**
	6/30/2011	**870**
	12/13/2011	**2,000**
	7/20/2012	**400**
	12/13/2012	**1,100; 910**
	6/13/2013	**1,200**
	12/4/2013	**140**
	6/10/2014	**420**
	12/10/2014	**580**
	6/9/2015	**1,900**
	9/15/2015	**73**
	12/3/2015	**450**
	3/8/2016	**460**
	6/7/2016	**1,200**
	9/13/2016	**400**
	12/14/2016	**510**
	3/8/2017	**230**
	6/7/2017	**920**
	9/27/2017	**3,500**
	12/6/2017	**1,600**
	3/7/2018	**120**
	6/27/2018	**2,300**
	9/21/2018	**1,500**
	12/12/2018	**120**
	3/6/2019	**990**
	6/5/2019	**1,200**
	9/19/2019	**910**
	12/11/2019	**1,900**
	3/18/2020	**1,700**
	6/2/2020	**1,000**
	9/22/2020	**750**
	12/18/2020	**959**
	3/8/2021	**370**
	6/1/2021	**150**
	9/9/2021	**300**
	12/9/2021	**470**
NMWQCC Standard (µg/L)		**10**

Table 3
Benzene Concentrations in Monitoring Wells
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well	Date	Benzene (µg/L)
MW-6S[1]	6/19/2003	ND
	12/17/2003	ND
	6/16/2004	ND; ND
	12/16/2004	ND; ND
	6/15/2005	0.8
	12/16/2005	ND
	6/15/2006	ND; ND
	12/14/2006	**11**; 6.1
	6/14/2007	ND; ND
	12/17/2007	ND; ND
	6/25/2008	<1
	1/8/2009	<1
	7/1/2009	1.7; 1.8
	12/11/2009	<10,000; <10,000
	6/24/2010	<1; <1
	12/8/2010	<0.20
	6/29/2011	0.61J; <1
	12/16/2011	<1; <1
	6/21/2012	<1; <1
	12/12/2012	<0.20
	6/12/2013	<1; <1
	12/4/2013	<10; <10
	6/10/2014	<0.60; <0.60
	12/9/2014	<1
	6/10/2015	<1; <1
	9/15/2015	<1
	12/3/2015	<1
	3/7/2016	<1
	6/6/2016	<1
	9/12/2016	<1
	12/13/2016	<1
	3/8/2017	<1
	6/7/2017	<1
	9/27/2017	<1
	12/5/2017	<1
	3/6/2018	<1
	6/26/2018	<1
	9/20/2018	<1
	12/11/2018	<1
	3/5/2019	<1
	6/4/2019	<1
	9/18/2019	<1
	12/10/2019	<1
	3/17/2020	(2)
	6/1/2020	(2)
	9/21/2020	(2)
	12/18/2020	(2)
	3/8/2021	(2)
	6/1/2021	(2)
	9/8/2021	1.7
	12/8/2021	<1
NMWQCC Standard (µg/L)		**10**

Table 3
Benzene Concentrations in Monitoring Wells
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well	Date	Benzene (µg/L)
MW-6D[1]	6/19/2003	ND
	12/17/2003	ND
	6/16/2004	ND
	12/16/2004	ND
	6/15/2005	ND
	12/16/2005	ND
	6/15/2006	ND
	12/14/2006	ND
	6/14/2007	ND
	12/17/2007	ND
	6/25/2008	<1
	1/8/2009	<1
	7/1/2009	<1
	12/11/2009	<1
	6/24/2010	<0.20
	12/8/2010	<1
	6/29/2011	<1
	12/16/2011	<1
	6/21/2012	<0.20
	12/12/2012	<0.20
	6/12/2013	<1
	12/4/2013	<5
	6/10/2014	<0.60
	12/9/2014	<1; <1
	6/10/2015	<1
	9/15/2015	<1
	12/3/2015	<1
	3/8/2016	<1
	6/7/2016	<1
	9/12/2016	<1
	12/13/2016	<1
	3/8/2017	<1
	6/7/2017	<1
	9/27/2017	<1
	12/5/2017	<1; <1
	3/6/2018	<1; <1
	6/26/2018	<1; <1
	9/20/2018	<1; <1
	12/11/2018	<1; <1
	3/5/2019	<1; <1
	6/4/2019	<1; <1
	9/18/2019	<1; <1
	12/10/2019	<1; <1
	3/17/2020	<1; <1
	6/1/2020	<1
	9/21/2020	<1
	12/18/2020	<1
	3/8/2021	<1
	6/1/2021	<1
	9/8/2021	<1
	12/8/2021	<1
NMWQCC Standard (µg/L)		**10**

Table 3
Benzene Concentrations in Monitoring Wells
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well	Date	Benzene (µg/L)
MW-8[1]	6/22/2010	**6,800**
	6/30/2011	**460**
	12/14/2011	**9,900**
	7/20/2012	**2,700**
	12/13/2012	**5,500**
	6/13/2013	**4,700**
	12/4/2013	**270**
	6/10/2014	**3,300**
	12/10/2014	**1,600**
	6/9/2015	**5,100**
	9/16/2015	**2,400**
	12/4/2015	**970**
	3/8/2016	**1,300**
	6/7/2016	**5,000**
	9/13/2016	**3,800**
	12/14/2016	**1,100**
	3/8/2017	**150**
	6/7/2017	**2,400; 2,400**
	9/27/2017	**3,800**
	12/6/2017	**1,900**
	3/7/2018	<1
	6/27/2018	<1
	9/21/2018	**630**
	12/12/2018	<1
	3/6/2019	<1
	6/5/2019	<1
	9/19/2019	**190**
	12/11/2019	<1
	3/18/2020	<1
	6/2/2020	**630**
	9/22/2020	**720**
	12/18/2020	**136**
	3/8/2021	**550**
	6/1/2021	**220**
	9/9/2021	**1,500**
	12/9/2021	**41**
NMWQCC Standard (µg/L)		**10**

Table 3
Benzene Concentrations in Monitoring Wells
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well	Date	Benzene (µg/L)
MW-9S[1]	6/19/2003	ND; ND
	12/17/2003	ND
	6/16/2004	ND
	12/16/2004	ND
	6/15/2005	ND
	12/16/2005	ND
	6/15/2006	ND
	12/14/2006	ND
	6/14/2007	ND
	12/17/2007	ND
	6/24/2008	<1
	1/8/2009	<1
	7/2/2009	<1
	12/10/2009	<1
	6/23/2010	<0.20
	12/8/2010	<0.20
	6/29/2011	<1
	12/15/2011	<1
	6/21/2012	<0.20
	12/12/2012	<0.20
	6/12/2013	<1
	12/4/2013	<25
	6/9/2014	<0.60
	12/9/2014	<1
	6/10/2015	<1
	9/15/2015	<1
	12/3/2015	<1
	3/8/2016	<1
	6/7/2016	<1
	9/12/2016	<1
	12/13/2016	<1
	3/7/2017	<1
	6/6/2017	<1
	9/26/2017	<1
	12/5/2017	<1
	3/6/2018	<1
	6/26/2018	<1
	9/20/2018	<1
	12/11/2018	<1
	3/5/2019	<1
	6/5/2019[2]	NS
	9/19/2019[2]	NS
	12/11/2019[2]	NS
	3/17/2020	[2]
	6/1/2020	[2]
	9/21/2020	[2]
	12/18/2020	[2]
	3/8/2021	[2]
	6/1/2021	[2]
	9/8/2021	<1
	12/8/2021	<1
NMWQCC Standard (µg/L)		**10**

Table 3
Benzene Concentrations in Monitoring Wells
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well	Date	Benzene (µg/L)
MW-10	6/24/2010	<0.20
	6/30/2011	<1
	12/14/2011	**30**
	7/20/2012	**12**
	12/13/2012	**15**
	6/13/2013	2.8
	12/5/2013	<25
	6/11/2014	<0.60
	12/11/2014	<1
	6/8/2015	**23**
	9/16/2015	<1
	12/4/2015	<1
	3/8/2016	<1
	6/7/2016	4.6
	9/13/2016	1.6
	12/14/2016	<1
	3/8/2017	1.1
	6/7/2017	2.1
	9/27/2017	1.5
	12/6/2017	<1
	3/7/2018	<1
	6/27/2018	<1
	9/21/2018	<1
	12/12/2018	<1
	3/6/2019	<1
	6/5/2019	<1
	9/19/2019	<1
	12/11/2019	<1
	3/18/2020	<1
	6/2/2020	<1
	9/22/2020	<1
	12/18/2020	0.65J
	3/8/2021	<5
	6/1/2021	<1
	9/9/2021	<1
	12/9/2021	<1
NMWQCC Standard (µg/L)		**10**

Table 3
Benzene Concentrations in Monitoring Wells
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well	Date	Benzene (µg/L)
MW-11	6/22/2010	<0.20
	6/28/2011	4.7
	12/15/2011	NS
	6/19/2012	NS
	12/12/2012	NS
	6/11/2013	<1
	12/3/2013	<25
	6/9/2014	<0.60
	12/11/2014	<1
	6/9/2015	1.3
	9/14/2015	<1
	12/2/2015	<1
	3/7/2016	2.5
	6/6/2016	<1
	9/12/2016	<1
	12/13/2016	<1
	3/7/2017	<1
	6/6/2017	<1
	9/26/2017	<1
	12/5/2017	<1
	3/7/2018	<1
	6/27/2018	<1
	9/21/2018	<1
	12/12/2018	<1
	3/6/2019	<1
	6/5/2019	<1
	9/19/2019	<1
	12/11/2019	<1
	3/18/2020	<1
	6/2/2020	<1
	9/22/2020	<1
	12/18/2020	<1
	3/8/2021	<5
	6/1/2021	<1
	9/9/2021	<1
	12/9/2021	<1
NMWQCC Standard (µg/L)		**10**

Table 3
Benzene Concentrations in Monitoring Wells
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well	Date	Benzene (µg/L)
MW-17[1]	6/22/2010	<0.20
	6/28/2011	<1
	12/15/2011	NS
	6/19/2012	NS
	12/12/2012	NS
	6/11/2013	6.8
	12/4/2013	<25
	6/9/2014	<0.60
	12/10/2014	<1
	6/9/2015	<1
	9/14/2015	<1; <1
	12/2/2015	<1; <1
	3/7/2016	<1; <1
	6/6/2016	<1; <1
	9/12/2016	2.7; 2.5
	12/13/2016	<1; <1
	3/7/2017	1.3; <1
	6/6/2017	<1; <1
	9/26/2017	<1; <1
	12/5/2017	<1
	3/7/2018	<1
	6/27/2018	<1
	9/21/2018	<1
	12/12/2018	<1
	3/6/2019	<1
	6/4/2019	<1
	9/18/2019	<1
	12/11/2019	<1
	3/17/2020	<1
	6/1/2020	<1
	9/21/2020	<1
	12/18/2020	<1
	3/8/2021	<1
	6/1/2021	<1
	9/9/2021	2.3
	12/9/2021	<1
NMWQCC Standard (µg/L)		**10**

Notes:

[1]Monitoring Wells MW-3D, MW-5, MW-6S, MW-6D, MW-8, MW-9S, and MW-17 and respective duplicate samples are reported in the same cell and separated by a semicolon.

[2]Well damaged/destroyed and could not be sampled.

Results are reported in micrograms per liter (µg/L).

BOLD - Concentrations in bold type indicate levels exceed NMWQCC standards.

J - Analyte detected below quantitation limit.

Abbreviations:

ND - Not detected.

NS - Not sampled.

NMWQCC - New Mexico Water Quality Control Commission.

Table 4
Total Polycyclic Aromatic Hydrocarbon Concentrations in Monitoring Well MW-8
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Total PAH Concentration											
Well ID	**12/8/1993**	**3/25/1994**	**7/12/1994**	**9/28/1994**	**12/13/1994**	**3/28/1995**	**6/21/1995**	**9/1/1995**	**6/21/1996**	**6/26/1997**	**6/25/1998**
MW-8	--	**250**	**93**	**366**	**236**	**180**	--	**140**	--	--	--

Total PAH Concentration											
Well ID	**6/3/1999**	**6/14/2000**	**7/27/2001**	**6/27/2002**	**6/19/2003**	**6/16/2004**	**6/15/2005**	**6/14/2006**	**6/14/2007**	**6/25/2008**	**7/2/2009**
MW-8	--	--	--	--	--	--	--	--	--	--	--

Total PAH Concentration											
Well ID	**7/21/2010**	**6/28/2011**	**6/19/2012**	**6/11/2013**	**6/9/2014**	**6/9/2015**	**9/16/2015**	**12/4/2015**	**3/8/2016**	**6/7/2016**	**9/13/2016**
MW-8	2.21	<0.20	--	**43.33**	3.279	1.67; 0.86	9.723; 10.742	9.203; 8.707	1.26; 1.63	**32.62; 30.139**	5.286; 6.543

Total PAH Concentration											
Well ID	**12/14/2016**	**3/8/2017**	**6/7/2017**	**9/27/2017**	**12/6/2017**	**3/7/2018**	**6/27/2018**	**9/21/2018**	**12/12/2018**	**3/6/2019**	**6/5/2019**
MW-8	4.857; 5.335	4.251; 4.184	20.251; 16.463	3.211; 3.208	3.654; 5.934	1.565; 1.369	8.195; 7.655	2.741; 2.27	4.269; 3.882	4.257; 2.73	9.529; 6.184

Total PAH Concentration										
Well ID	**9/19/2019**	**12/11/2019**	**3/18/2020**	**6/1/2020**	**9/22/2020**	**12/18/2020**	**3/8/2021**	**6/1/2021**	**9/9/2021**	**12/9/2021**
MW-8	2.141; 1.452	1.353; 0.896	5.806; 8.092	0.193; 0.909	4.004; 7.017	2.907; 1.652	5.266; 9.532	0.494; 0.297	1.493; 1.804	0.993; 1.011

2021 Quarterly Data Detail					
March 2021 Data Detail					
Well	**Acenaphthene**	**Acenaphthylene**	**Fluorene**	**Naphthalene**	**Phenanthrene**
MW-8	<0.102, 0.173	<0.102, <0.102	0.156, 0.260	5.11, 8.99	<0.102, 0.109

June 2021 Data Detail					
Well	**Acenaphthene**	**Acenaphthylene**	**Fluorene**	**Naphthalene**	**Phenanthrene**
MW-8	0.201, 0.149	0.106, <0.105	<0.106, <0.105	0.187, 0.148	<0.106, <0.105

September 2021 Data Detail					
Well	**Acenaphthene**	**Acenaphthylene**	**Fluorene**	**Naphthalene**	**Phenanthrene**
MW-8	0.203, 0.214	<0.104, <0.105	<0.104, <0.105	1.29, 1.59	<0.104, <0.105

December 2021 Data Detail					
Well	**Acenaphthene**	**Acenaphthylene**	**Fluorene**	**Naphthalene**	**Phenanthrene**
MW-8	0.824, 0.836	<0.102, <0.102	<0.102, <0.102	0.169, 0.175	<0.102, <0.102

Notes:
Results are reported in micrograms per liter (µg/L).
Total PAH concentration is the sum of the low-level PAH concentrations listed in the data detail section. Non-detects were not included.
Duplicate result reported following the semicolon.
-- Not sampled.
BOLD - Concentrations in bold type indicate levels exceed the New Mexico Water Quality Control Commission standard for PAH concentrations (30 µg/L).

Abbreviations:
PAH - Polycyclic aromatic hydrocarbon.

ARCADIS

Table 5
LNAPL Thickness Measurements
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well ID	Jun-03	Dec-03	Jun-04	Dec-04	Jun-05	Dec-05	Jun-06	Dec-06	Jun-07	Dec-07	Jun-08	Jan-09	Jul-09	Dec-09	Jun-10	Dec-10	Jun-11	Dec-11	Jun-12	Dec-12	Jun-13	Dec-13	Jun-14	Dec-14	Jun-15	Sep-15	Dec-15	Mar-16	Jun-16	Sep-16	Dec-16
MW-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	P&A	P&A	P&A	P&A	P&A	P&A
MW-2	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-3S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-3D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	P&A	P&A	P&A	P&A	P&A	P&A
MW-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sheen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-6S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-6D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	P&A	P&A	P&A	P&A	P&A	P&A
MW-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-9S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-10	0.00	**0.13**	**0.08**	**0.05**	**0.10**	0.00	Trace	Trace	0.00	Trace	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.20**	**0.11**	**0.04**	**0.04**	Sheen	Sheen	0.00	**0.42**	0.00	0.00	0.00	0.00	0.00	0.00
MW-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	P&A	P&A	P&A	P&A	P&A	P&A
MW-13	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	P&A	P&A	P&A	P&A	P&A	P&A
MW-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	P&A	P&A	P&A	P&A	P&A	P&A
MW-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NM[1]	0.00	0.00	0.00	P&A	P&A	P&A	P&A	P&A	P&A
MW-17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sheen	Sheen	0.00	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Trace	0.00	0.00	Sheen	0.00	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Dry	0.00	Dry	0.00	Dry	Dry	Dry	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Trace	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sheen	Sheen	0.00	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-14	Tar	Tar	Tar	Tar	Tar	Tar	Tar	Tar	Tar	Tar	Trace	0.00	0.00	0.00	0.00	0.00	**0.02**	0.00	Tar	Tar	**0.33**	Tar	0.00	Tar/Dry	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-25	Dry	Dry	Dry	Dry	Dry	Dry	**0.70**	**0.52**	**0.54**	**0.52**	**0.45**	**0.08**	**0.07**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sheen	0.00	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-26S	**0.35**	**0.60**	**0.63**	**0.66**	**0.66**	**0.52**	**0.58**	**0.47**	**0.48**	**0.35**	**0.73**	**0.38**	**0.25**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sheen	Sheen	0.00	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-26D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sheen	Sheen	0.00	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-27S	**0.01**	0.00	0.00	0.00	0.00	0.00	Trace	**0.02**	0.00	Trace	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sheen	0.00	0.00	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-27D	**0.12**	**0.26**	**0.06**	**0.11**	0.00	**0.04**	0.00	**0.04**	0.00	**0.03**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sheen	Sheen	0.00	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Dry	0.00	Dry	0.00	0.00	0.00	0.00	NM	NM	NM	NM	NM	0.00	NM[2]	NM[2]	NM[2]	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-32	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Trace	Dry	Dry	NM	NM	NM	NM	NM	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Trace	0.00	0.00	Sheen	0.00	P&A	P&A	P&A	P&A	P&A	P&A	P&A

Notes:

[1]Roots on probe.

[2]Cap could not be removed.

Measurements are reported in feet.

BOLD - Measurable amount of LNAPL observed.

Dry - Monitoring point was dry.

Sheen - Thin layer of LNAPL or oxidation observed; too thin to measure. See field notes for details.

Tar - Thickness measurement not obtainable because of presence of thick, tar-like substance in well point.

Trace - Traces of LNAPL observed; too thin to measure.

Abbreviations:

LNAPL - Light Non-Aqueous Phase Liquid.

NM - Not measured.

P&A - Plugged and abandoned.

ARCADIS

Table 5
LNAPL Thickness Measurements
2021 Annual Groundwater Monitoring Report
Former Brickland Refinery
Huntsman International LLC
Sunland Park, New Mexico

Well ID	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19	Mar-20	Jun-20	Sep-20	Dec-20	Mar-21	Jun-21	Sep-21	Dec-21
MW-1	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-2	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-3S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-3D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-4	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-5	0.00	0.00	0.00	Heavy sheen	**0.05**	Heavy sheen	Sheen	Heavy sheen	**0.01**	**0.19**	**0.02**	0.00	0.00	0.00	Heavy sheen	0.00	0.00	0.00	0.00	0.00
MW-6S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	0.00	0.00
MW-6D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-7	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-8	0.00	0.00	0.00	0.00	0.00	Sheen	0.00	Light sheen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-9S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	0.00	0.00
MW-10	0.00	0.00	Light sheen	Light sheen	0.00	Sheen	0.00	Light sheen	0.00	0.00	Slight sheen	0.00	0.00	0.00	Slight sheen	0.00	0.00	0.00	0.00	0.00
MW-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-12	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-13	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-14	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-15	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-16	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP-1	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-2	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-3	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-7	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-14	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-25	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-26S	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-26D	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-27S	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-27D	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-30	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-31	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-32	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
WP-33	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A

Notes:

(1)Roots on probe.

(2)Cap could not be removed.

Measurements are reported in feet.

BOLD - Measurable amount of LNAPL observed.

Dry - Monitoring point was dry.

Sheen - Thin layer of LNAPL or oxidation observed; too thin to measure. See field notes for details.

Tar - Thickness measurement not obtainable because of presence of thick, tar-like substance in well point.

Trace - Traces of LNAPL observed; too thin to measure.

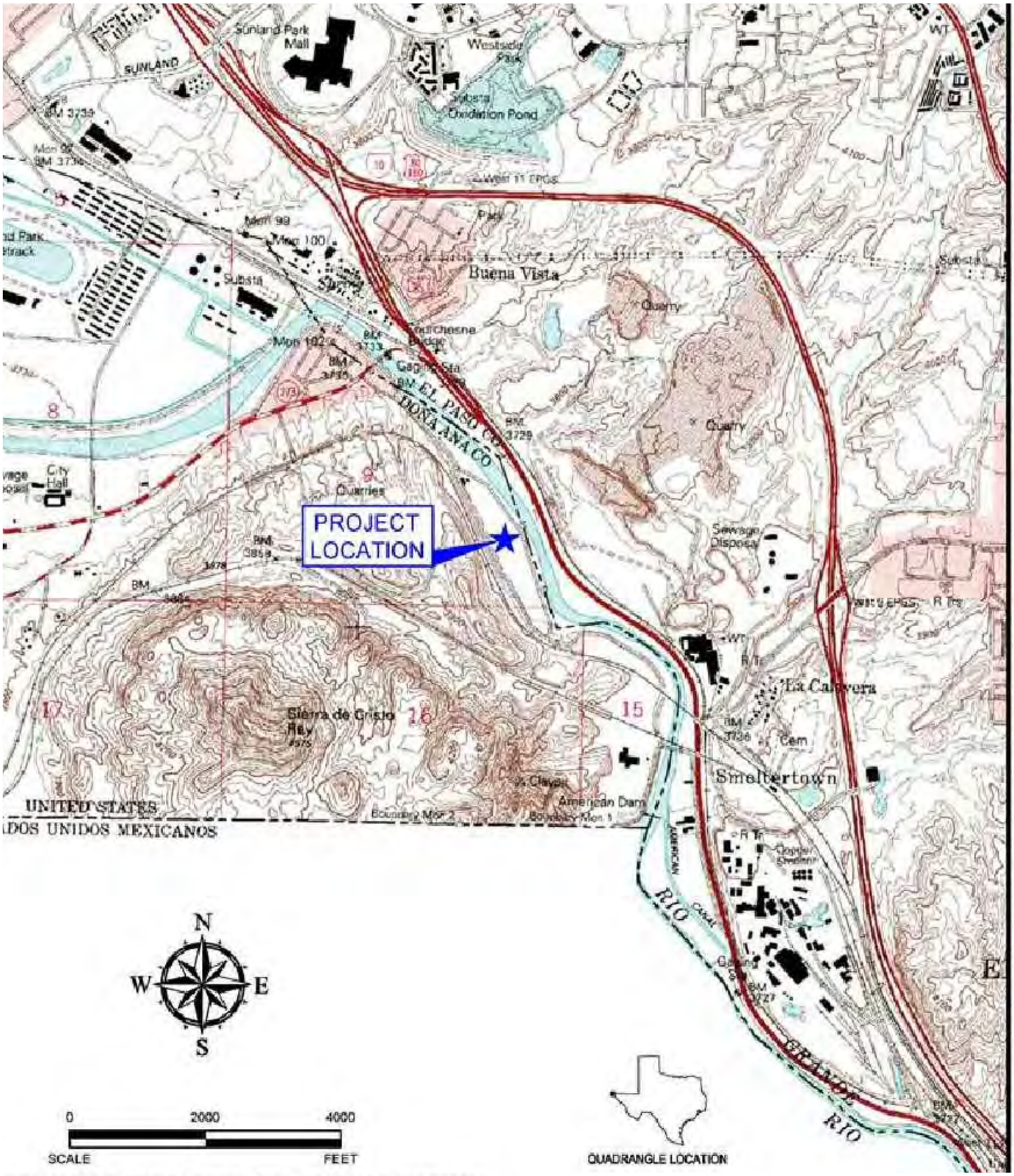
Abbreviations:

LNAPL - Light Non-Aqueous Phase Liquid.

NM - Not measured.

P&A - Plugged and abandoned.

Figures



SOURCE: U.S.G.S. 7.5' QUADRANGLE, SMELTERTOWN, TX, 1994 (o31106G5).

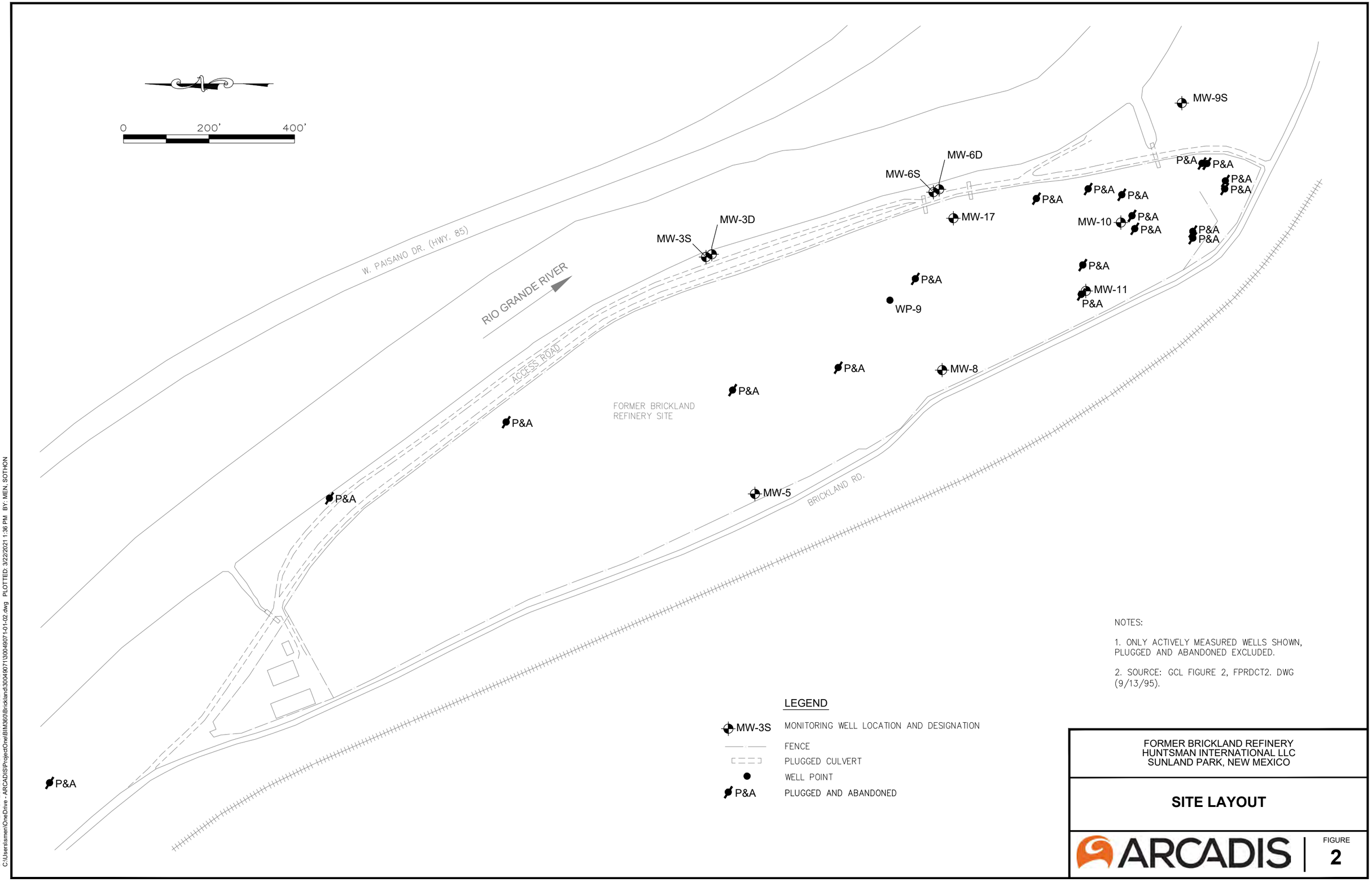
FORMER BRICKLAND REFINERY
HUNTSMAN INTERNATIONAL LLC
SUNLAND PARK, NEW MEXICO

SITE LOCATION MAP

ARCADIS

FIGURE
1

DRAWN BY: S. MEN CHECKED BY: TDR PROJECT MANAGER: DRE
C:\Users\smen\OneDrive - ARCADIS\ProjectOne\BIM360\Brickland\30049071\30049071-01-01.dwg PLOTTED: 3/22/2021 1:34 PM BY: MEN, SOTHON



NOTES:

1. ONLY ACTIVELY MEASURED WELLS SHOWN, PLUGGED AND ABANDONED EXCLUDED.

2. SOURCE: GCL FIGURE 2, FPRDCT2. DWG (9/13/95).

LEGEND

MW-3S	MONITORING WELL LOCATION AND DESIGNATION
	FENCE
	PLUGGED CULVERT
	WELL POINT
P&A	PLUGGED AND ABANDONED

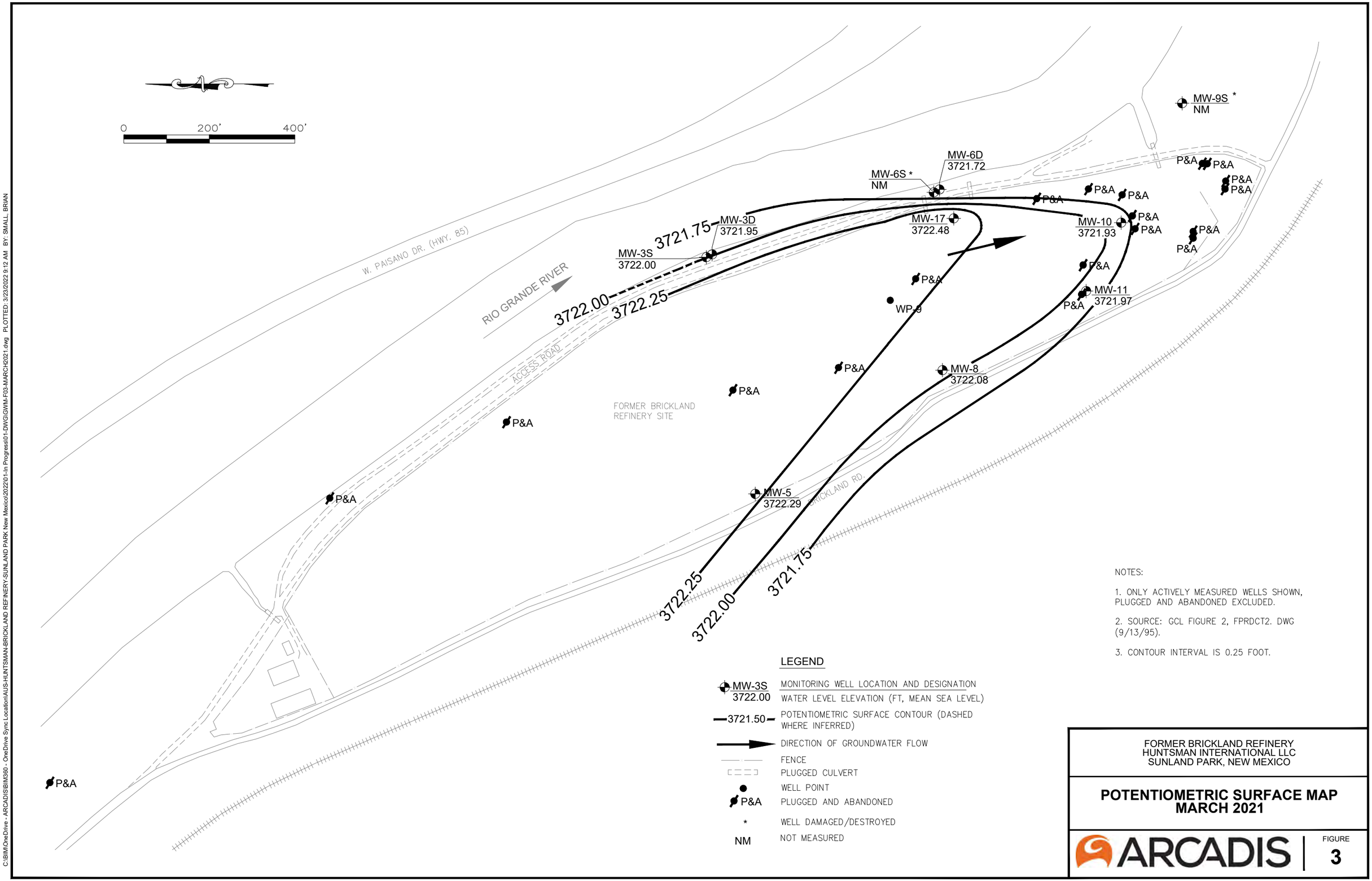
FORMER BRICKLAND REFINERY
HUNTSMAN INTERNATIONAL LLC
SUNLAND PARK, NEW MEXICO

SITE LAYOUT

ARCADIS

FIGURE
2

DRAWN BY: S. MEN CHECKED BY: TDR PROJECT MANAGER: DRE
C:\Users\smen\OneDrive - ARCADIS\Project One\BIM360\Brickland\30049071\30049071-01-02.dwg PLOTTED: 3/22/2021 1:38 PM BY: MEN, SOTHON



NOTES:

1. ONLY ACTIVELY MEASURED WELLS SHOWN, PLUGGED AND ABANDONED EXCLUDED.
2. SOURCE: GCL FIGURE 2, FPRDCT2. DWG (9/13/95).
3. CONTOUR INTERVAL IS 0.25 FOOT.

LEGEND

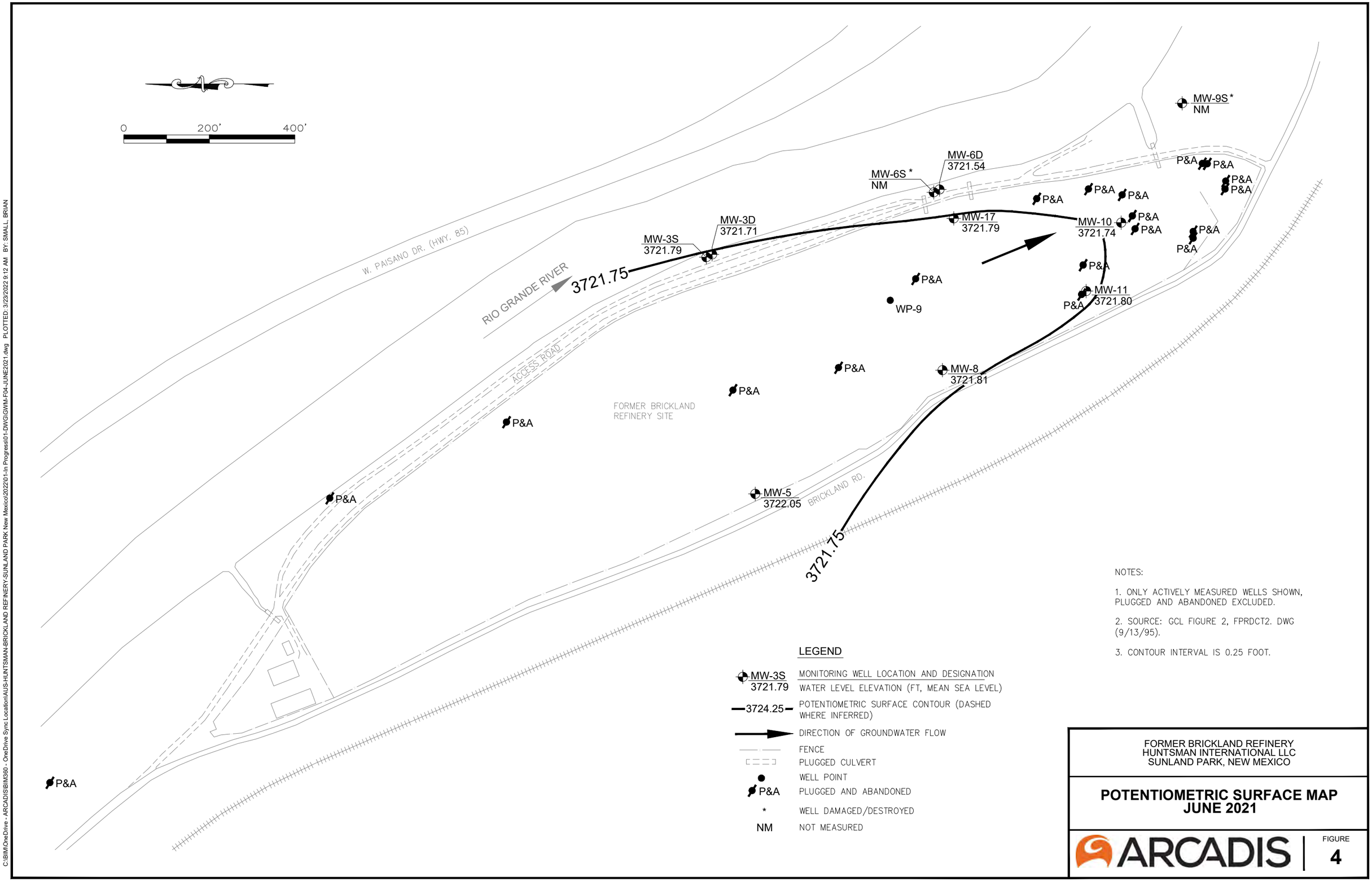
MW-3S 3722.00	MONITORING WELL LOCATION AND DESIGNATION WATER LEVEL ELEVATION (FT, MEAN SEA LEVEL)
3721.50	POTENTIOMETRIC SURFACE CONTOUR (DASHED WHERE INFERRED)
	DIRECTION OF GROUNDWATER FLOW
	FENCE
	PLUGGED CULVERT
	WELL POINT
P&A	PLUGGED AND ABANDONED
*	WELL DAMAGED/DESTROYED
NM	NOT MEASURED

FORMER BRICKLAND REFINERY
HUNTSMAN INTERNATIONAL LLC
SUNLAND PARK, NEW MEXICO

POTENTIOMETRIC SURFACE MAP MARCH 2021

ARCADIS

FIGURE 3



NOTES:

1. ONLY ACTIVELY MEASURED WELLS SHOWN, PLUGGED AND ABANDONED EXCLUDED.

2. SOURCE: GCL FIGURE 2, FPRDCT2. DWG (9/13/95).

3. CONTOUR INTERVAL IS 0.25 FOOT.

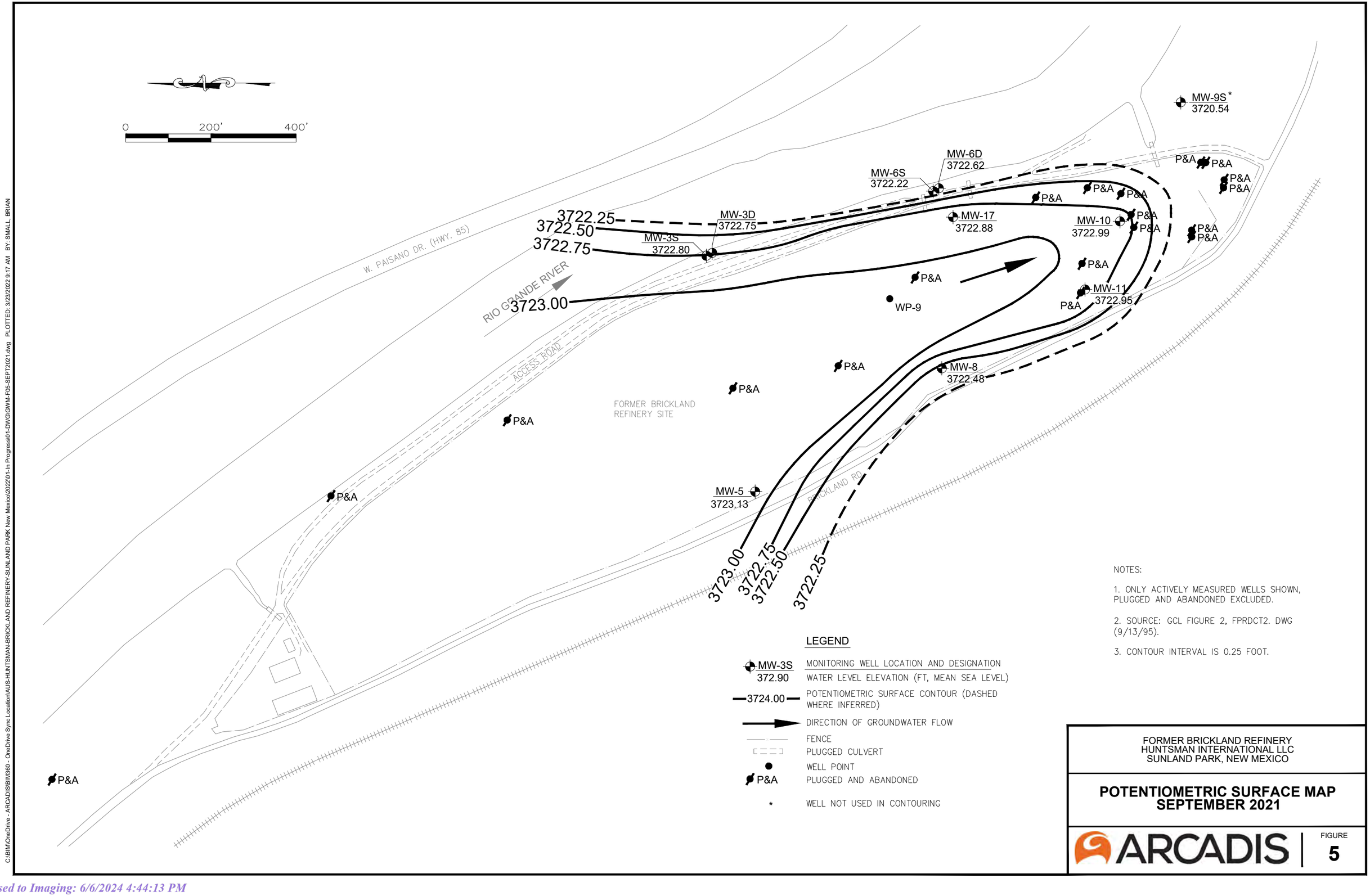
FORMER BRICKLAND REFINERY
HUNTSMAN INTERNATIONAL LLC
SUNLAND PARK, NEW MEXICO

**POTENTIOMETRIC SURFACE MAP
JUNE 2021**

ARCADIS

FIGURE
4

C:\BIM\OneDrive - ARCADIS\BIM360 - OneDrive Sync Location\AUS-HUNTSMAN-BRICKLAND REFINERY-SUNLAND PARK New Mexico\2022\01-In Progress\01-DWG\GWM-F04-JUNE2021.dwg PLOTTED: 3/23/2022 9:12 AM BY: SMALL, BRIAN



NOTES:

1. ONLY ACTIVELY MEASURED WELLS SHOWN, PLUGGED AND ABANDONED EXCLUDED.

2. SOURCE: GCL FIGURE 2, FPRDCT2. DWG (9/13/95).

3. CONTOUR INTERVAL IS 0.25 FOOT.

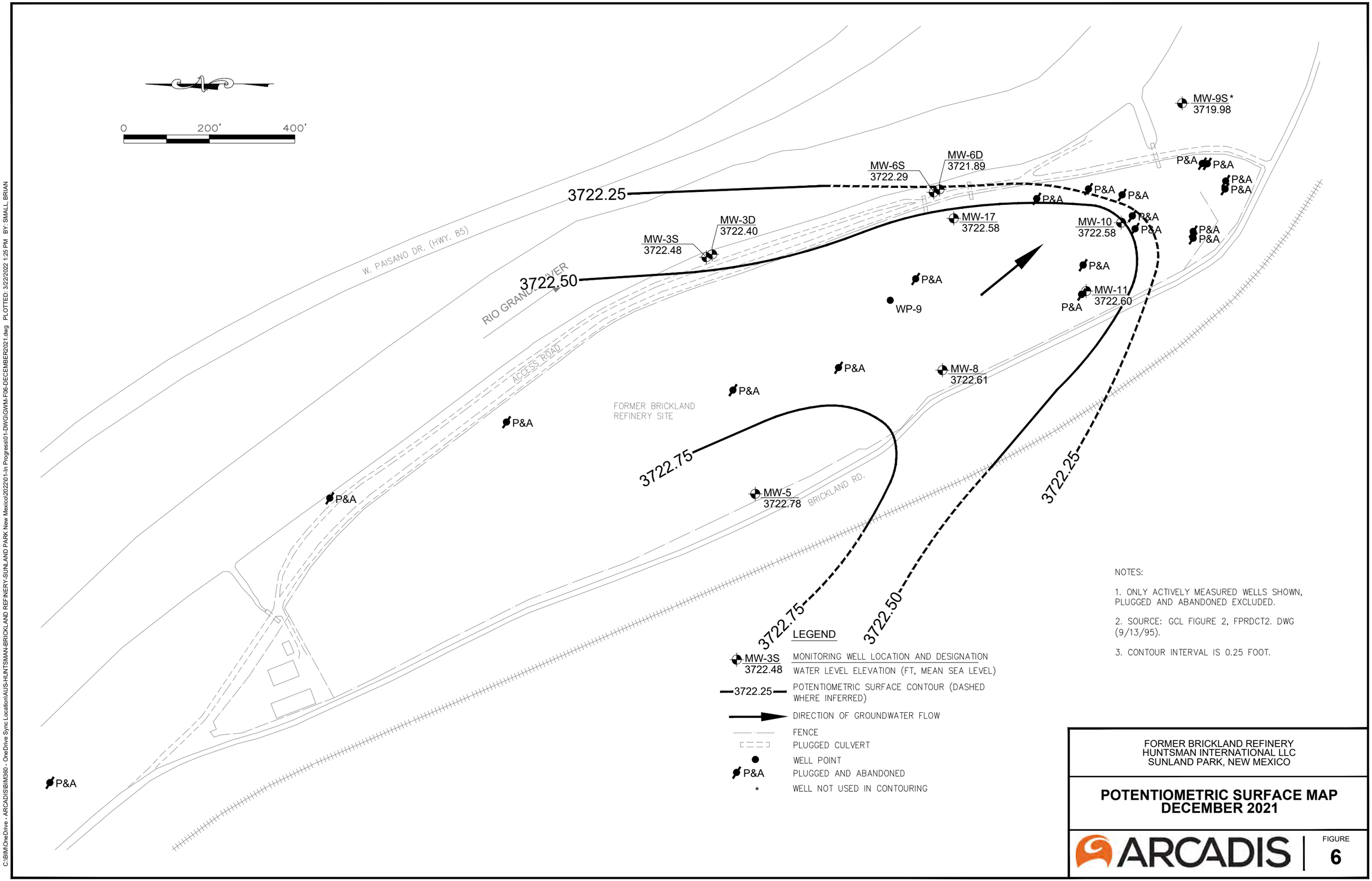
FORMER BRICKLAND REFINERY
HUNTSMAN INTERNATIONAL LLC
SUNLAND PARK, NEW MEXICO

POTENTIOMETRIC SURFACE MAP SEPTEMBER 2021

ARCADIS

FIGURE
5

C:\BIM\OneDrive - ARCADIS\BIM360 - OneDrive Sync Location\AUS-HUNTSMAN-BRICKLAND REFINERY-SUNLAND PARK New Mexico\2022\01-In Progress\01-DWG\GWM-F05-SEPT2021.dwg PLOTTED: 3/23/2022 9:17 AM BY: SMALL, BRIAN



NOTES:

1. ONLY ACTIVELY MEASURED WELLS SHOWN, PLUGGED AND ABANDONED EXCLUDED.

2. SOURCE: GCL FIGURE 2, FPRDCT2. DWG (9/13/95).

3. CONTOUR INTERVAL IS 0.25 FOOT.

FORMER BRICKLAND REFINERY
HUNTSMAN INTERNATIONAL LLC
SUNLAND PARK, NEW MEXICO

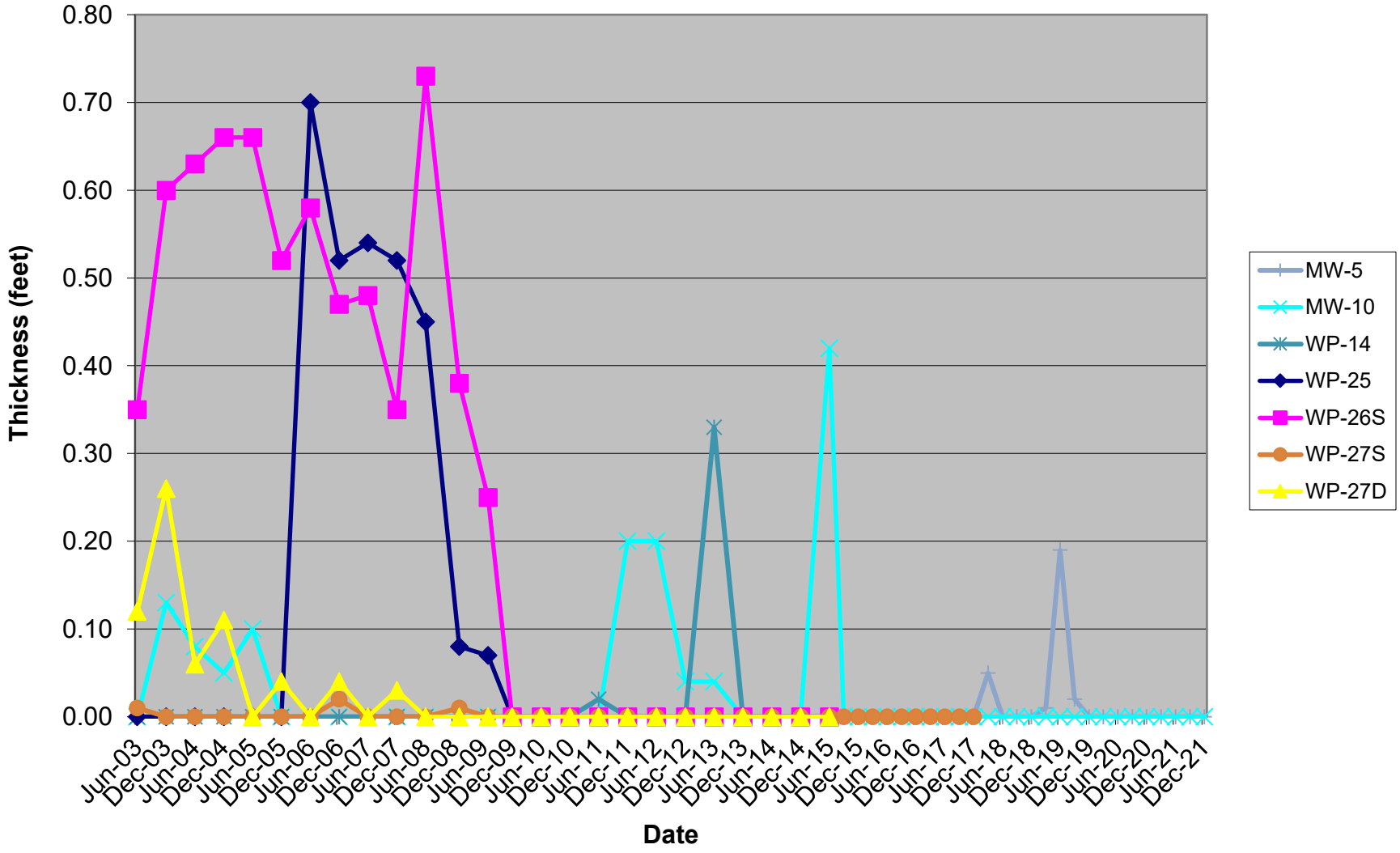
POTENTIOMETRIC SURFACE MAP DECEMBER 2021

ARCADIS

FIGURE 6

ARCADIS

Figure 7 - Historical LNAPL Thickness



Note: WP-14, WP-25, WP-26S, WP-27S, and WP-27D were plugged and abandoned in June 2015.

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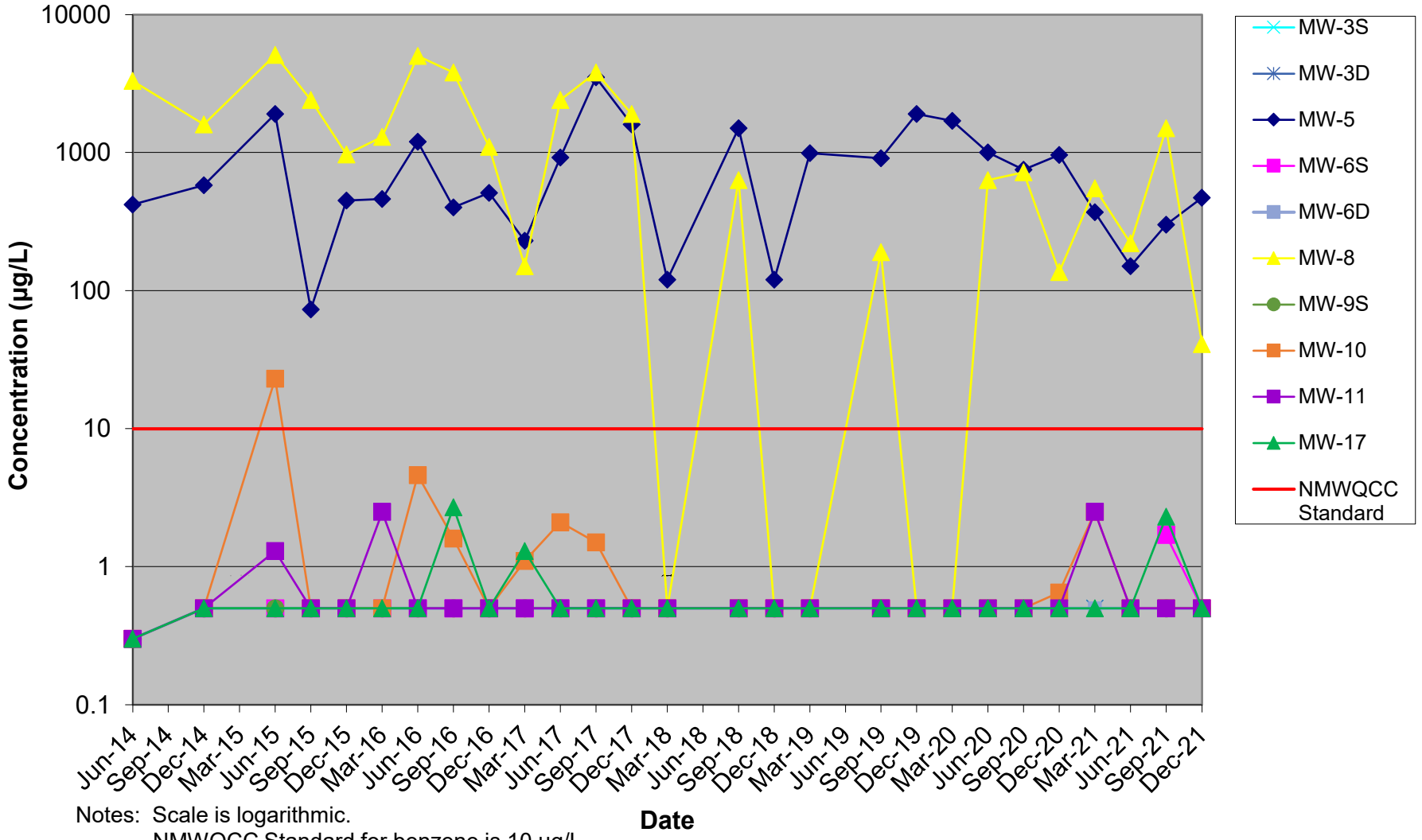
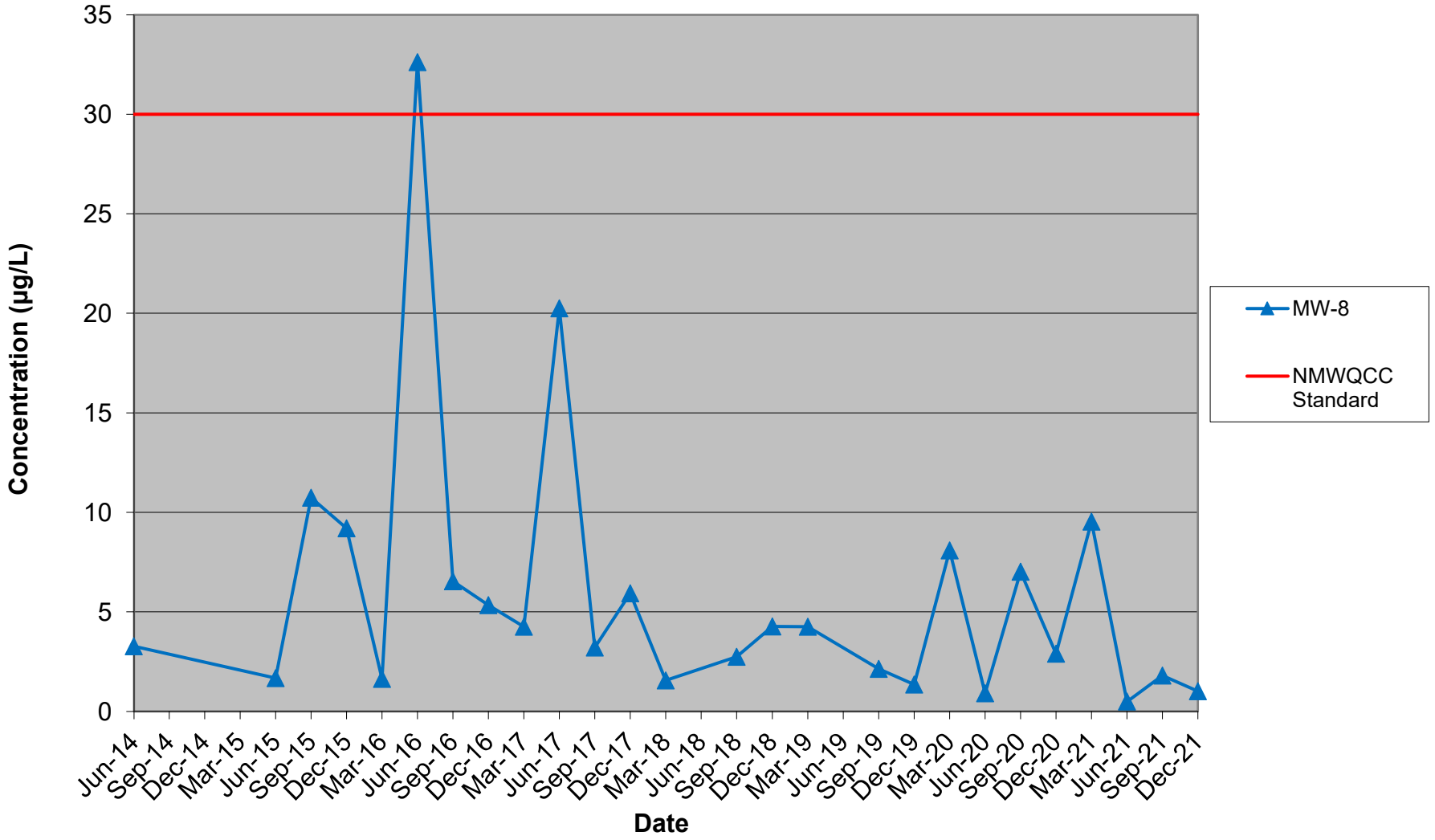
Figure 8 - Quarterly Benzene Concentrations in Monitoring Wells (2014-2021)



Notes: Scale is logarithmic.
NMWQCC Standard for benzene is 10 µg/L.
Nondetects are graphed at half the reporting limit.

ARCADIS

Figure 9 - Quarterly Total PAH Concentrations in Monitoring Well MW-8 (2014-2021)



Notes: NMWQCC Standard for total PAH is 30 µg/L.
The higher detection between the parent and duplicate samples is graphed.

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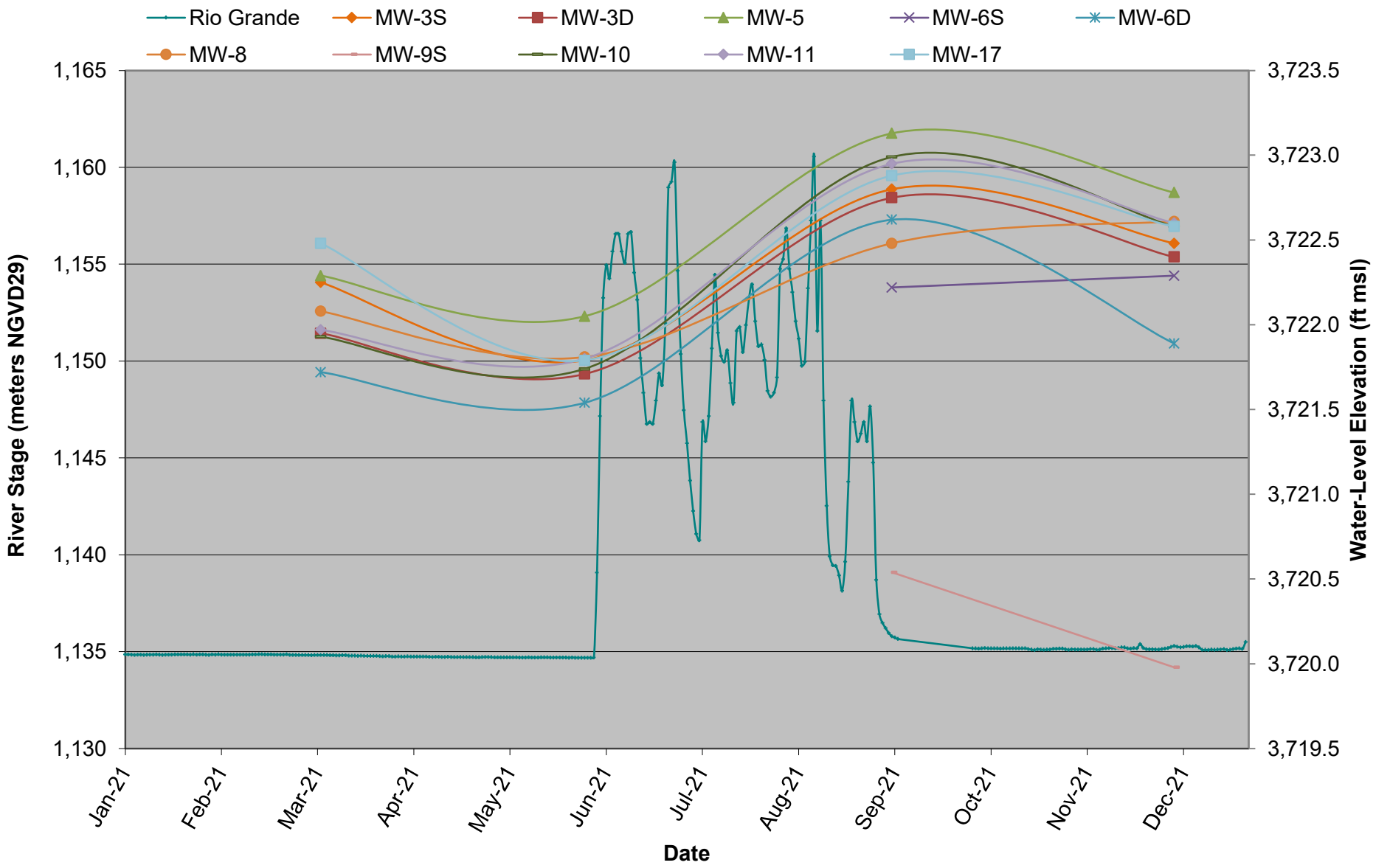
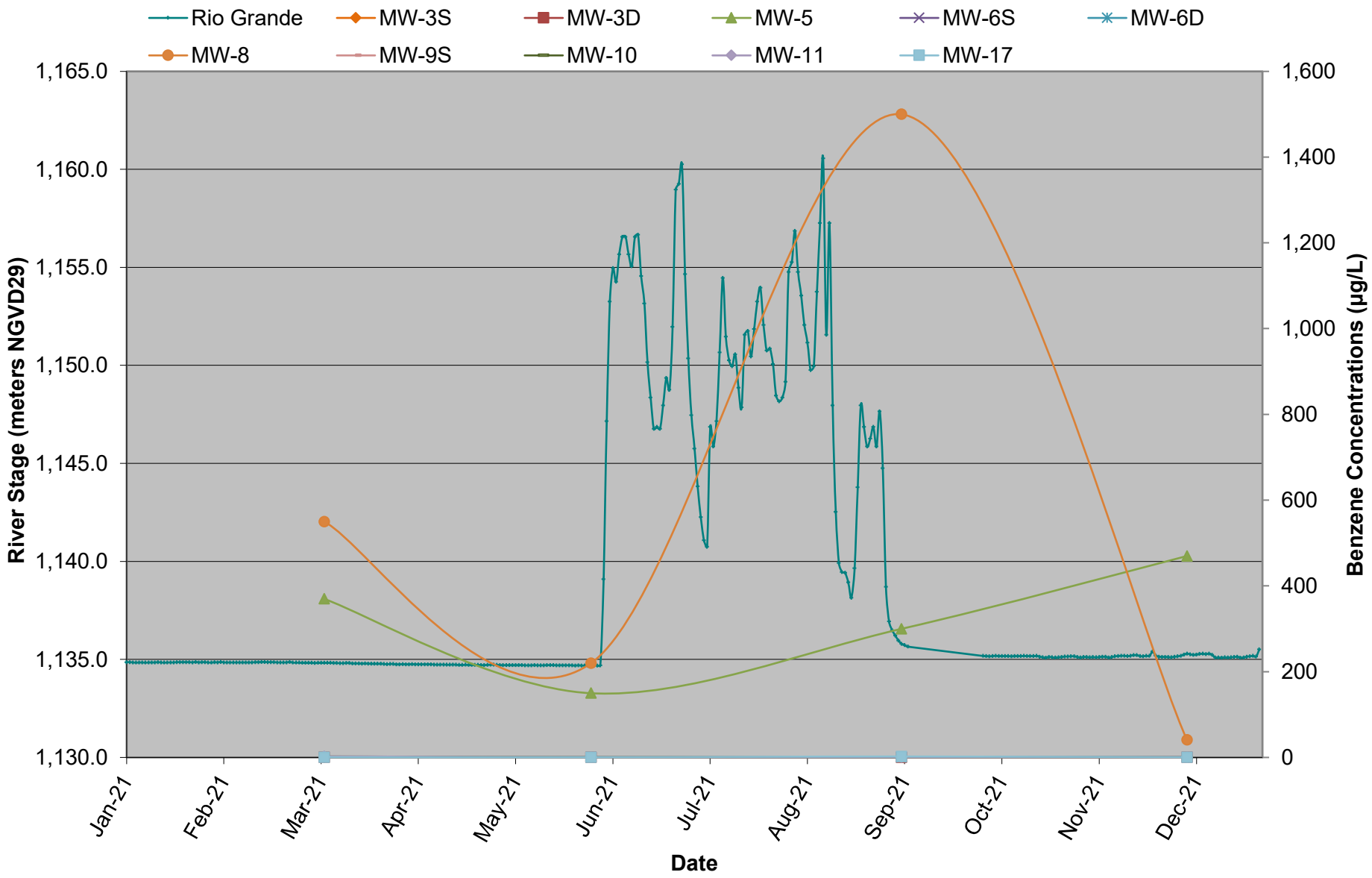
Figure 10 - 2021 Rio Grande at El Paso, Texas, River Stage with Monitoring Well Water-Level Elevations



HUNTSMAN/30091090/T/3/10-River Stage vs. Water Levels/lf

ARCADIS

Figure 11 - 2021 Rio Grande at El Paso, Texas, River Stage with Benzene Concentrations in Monitoring Wells

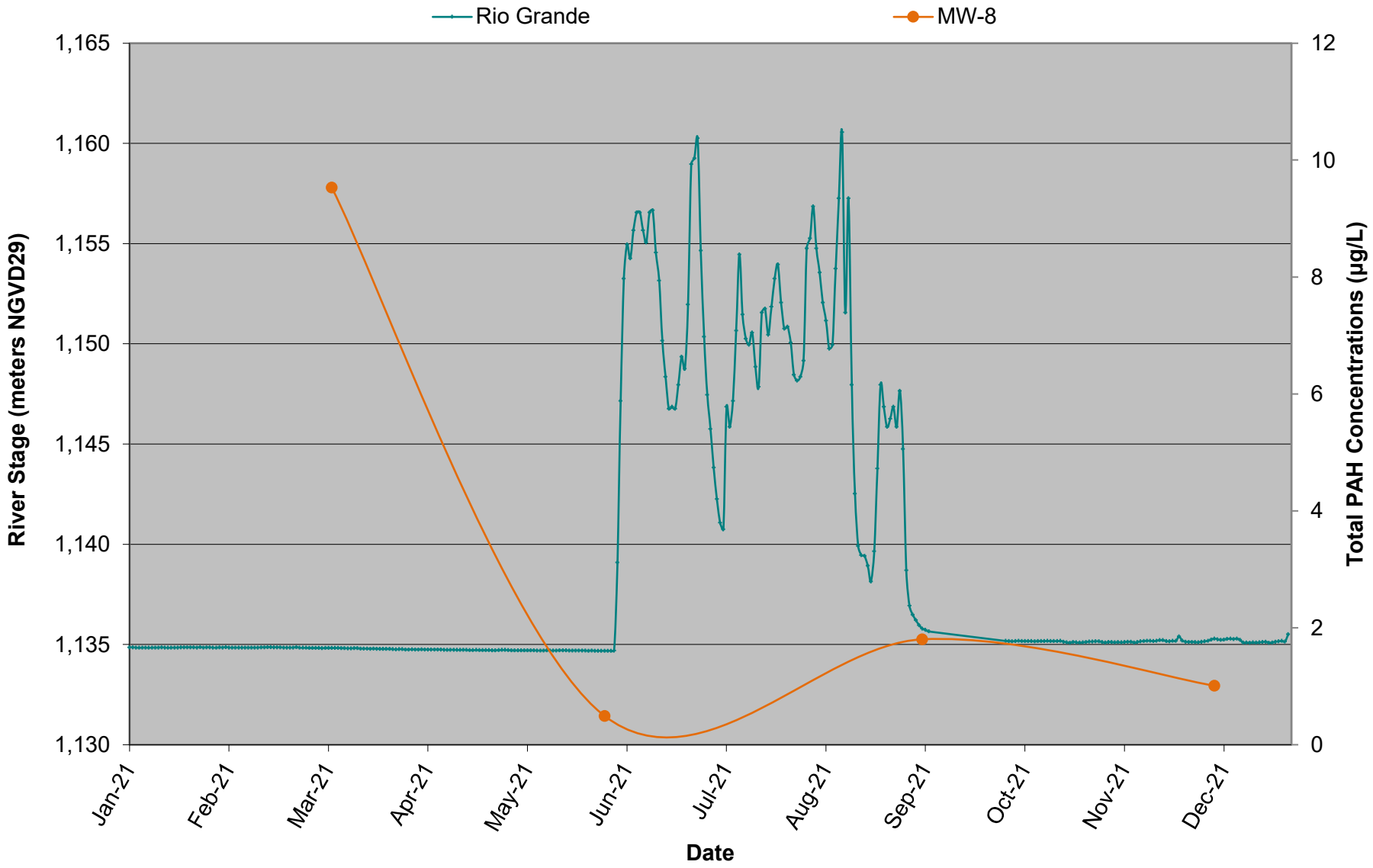


Non-detects graphed at one-half the reporting limit.

HUNTSMAN/30091090/T/3/11-River Stage vs Benzene Conc./lf

ARCADIS

Figure 12 - 2021 Rio Grande at El Paso, Texas, River Stage with Total PAH Concentrations in Monitoring Well MW-8



HUNTSMAN/30091090/T/3/12-River Stage vs. Total PAH/lf

Appendix A

Plugging and Abandonment and Installations of Replacement Wells Memorandum

Memo

SUBJECT
Compliance Plan
Plugging and Abandonment and Installations of
Replacement Monitor Wells MW-6S and MW-9S
Former Brickland Refinery
Brickland, New Mexico

TO
Scott Wagaman

DATE
August 18, 2021

OUR REF
Brickland

DEPARTMENT
Environment

PROJECT NUMBER
30091090.450

COPIES TO
File

NAME
Timothy Ratchford
Cell: 225-802-8261; Email: tim.ratchford@arcadis.com

This memorandum has been prepared to serve as a Compliance Plan for the plugging and abandonment (P&A) of damaged wells and for the installation of Replacement Monitoring Wells MW-6S and MW-9S at the location of the Former Brickland Refinery located in Brickland, New Mexico. P&A and replacement-well installation were necessary due to damages sustained by existing wells at the site. The two damaged wells and two replacement wells are located on land owned by the International Boundary and Water Commission (IBWC).

For P&A of the damaged wells and installation of the replacement wells, it was necessary to obtain a Permit to Drill a Well with No Water Right from the New Mexico Office of the State Engineer (OSE). The P&A and installation activities were conducted on August 5 and 6, 2021. Terracon Consultants (Terracon), a driller licensed in the State of New Mexico, was retained by Arcadis U.S., Inc. (Arcadis) for the P&A and installation tasks.

Attachments to this Compliance Plan include:

- Attachment A – Applications and OSE-Issued Permits to Drill MW-6S and MW-9S
- Attachment B – Photographic Log
- Attachment C – Arcadis Field Logs
- Attachment D – Well Records & Logs for Replacement Wells MW-6S and MW-9S
- Attachment E – Plugging Reports (for the Damaged Wells)

The permits include Conditions of Approval and Specific Conditions of Approval for the wells. This Compliance Plan lists the provisions stated in the permit and provides a summary of the required actions for each item.

Conditions of Approval

Plugging Plan of Operations and Plugging Record – *If use of this well is temporary in nature and the well will be plugged at the end of well usage, the OSE must initially approve of the plugging. If plugging approval is not conditioned in this permit, the applicant must submit a Plugging Plan of Operations for approval prior to the well being plugged. The Plugging Record must be properly completed and submitted to the OSE within 30 days of well plugging.*

Required Action – A Plugging Plan of Operations will be provided to the OSE for approval prior to any future abandonment of Replacement Wells MW-6S and MW-9S. The Plugging Record will be submitted to the OSE

Scott Wagaman
August 18, 2021

within 30 days of well plugging. It should be noted that the locations for the previously damaged wells were abandoned. Copies of the Plugging Records for abandonment of the previously damaged wells are provided as Attachment E.

Well ID Tag – *If the final intended purpose and condition requires a well identification (ID) tag and meter installation, the applicant must immediately send a completed meter report form to the OSE.*

Required Action – Meters to gauge volumes of extracted water will not be installed on Replacement Wells MW-6S and 9S. The wells will only be used to collect groundwater-quality data pursuant to the groundwater monitoring program approved by the New Mexico Oil Conservation Division (NMOCD) and specified in the site's Stage 2 Abatement Plan. The wells will be evacuated prior to sampling though low-flow purging. Due to these conditions, well ID tags and meters will not be installed. However, the well ID numbers will be marked on the exterior of the wells' protective casings. Attachment B provides photographs of the newly installed replacement wells.

Well Record & Log – *The Well Record & Log must be submitted to the OSE within 30 days of completion of the well or if the attempt was a dry hole.*

Required Action –The field activities for the project were completed on August 6, 2021. Terracon prepared the Well Record & Log for each well and submitted the documentation to the OSE on August 10, 2021. The licensed driller also prepared and submitted a Plugging Record for the abandonment of the damaged wells on August 10, 2021. The time frame for submitting the documentation to the OSE fell within the 30-day requirement. Copies of the required documentation submitted to the OSE are provided as Attachments D and E.

Permit Expiration – *This permit expires and will be cancelled if no well is drilled and/or a well log is not received by the date set forth in the conditions of approval.*

Required Action – The field activities for the project were completed on August 6, 2021. Terracon prepared Plugging Records for the abandonment of the two damaged wells and Well Records & Logs for the newly installed replacement wells. The documents were submitted to the OSE on August 10, 2021.Copies of the required documentation submitted to the OSE are provided as Attachments D and E.

Specific Conditions of Approval

17-4 – *No water shall be appropriated and beneficially used under this permit.*

Required Action – Replacement Wells MW-6S and MW-9S will only be used to collect groundwater-quality data pursuant to the NMOCD-approved Stage 2 Abatement Plan groundwater monitoring program for the site. The collection of groundwater quality is for monitoring purposes, not beneficial water use. Hence, there is no action required for Specific Conditions of Approval 17-4.

17-6E – *Wells that do not encounter a water-bearing stratum shall be immediately plugged by filling the well with drill cuttings or clean native fill to within ten (10) feet of land surface and by plugging the remaining ten (10) feet of the well to land surface with a plug of a sealing material approved by the State Engineer.*

Required Action – During drilling, the water-bearing stratum for each well was encountered and the wells were installed as proposed in the application. Hence, plugging of the boreholes was not required pursuant to this specific condition. Attachment C includes boring logs that provide descriptions of sediments observed during installation of the replacement wells.

Scott Wagaman
August 18, 2021

17-7 – *The permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.*

Required Action – Replacement Wells MW-6S and MW-9S will only be used to collect groundwater-quality data pursuant to the NMOCD-approved Stage 2 Abatement Plan groundwater monitoring program for the site. Each well will be evacuated prior to sampling using low-flow purging. Low-flow purging is the best technology to ensure conservation of water. The evacuation of approximately 2 gallons of water from each well is anticipated using low-flow purging.

17-B – *The well shall be drilled by a driller licensed in the State of New Mexico in accordance with 72-12-12 NMSA 1978. A licensed driller shall not be required for the construction of a well driven without the use of a drill rig, provided that the casing shall not exceed two and three-eighths (2 3/8) inches outside diameter.*

Required Action –Terracon was retained by Arcadis for the plugging and abandonment and for the installation of replacement wells. Terracon is a licensed driller (License No. WD 1265) in the State of New Mexico.

17-C – *The well driller must file the well record with the State Engineer and the applicant within 30 days after the well is drilled or driven. It is the well owner's responsibility to ensure that the well driller files the well record. The well driller may obtain the well record form from any District Office or Office of the State Engineer website.*

Required Action – The field activities for the project were completed on August 6, 2021. Terracon prepared the Well Record & Log for each well and submitted the documentation to the OSE on August 10, 2021. The time frame for submitting the documentation to the OSE falls within the 30-day requirement. Attachment D provides copies of the Well Record & Log documents for the two replacement wells.

17-C1 – *The well driller must file the well record with the State Engineer and the applicant within 30 days after the well is drilled or driven. Test data shall be filed not later than twenty (20) days after completion of the test(s). It is the well owner's responsibility to ensure that the well driller files the well record. The well driller may obtain the well record form from any District Office or Office of the State Engineer website.*

Required Action – The field activities for the project were completed on August 6, 2021. Terracon prepared the Well Record & Log for each well and submitted the documentation to the OSE on August 10, 2021. The time frame for submitting the documentation to the OSE falls within the 30-day requirement. The well test described on the Well Record & Log form is for the measurement discharge and drawdown of water required for water supply wells. The two replacement wells will not be used for water supply purposes. As previously stated, the replacement wells were installed to monitor groundwater quality as part of the Stage 2 Abatement Plan, and sampling results will be included in the Annual Groundwater Report that is due to NMOCD on April 1, 2022.

17-C2 – *No water shall be diverted from this well except for testing purposes, which shall not exceed ten (10) cumulative days, and well shall be plugged or capped on or before, unless a permit to use water from this well is acquired from the Office of the State Engineer.*

Required Action – Replacement Wells MW-6S and MW-9S will only be used to collect groundwater-quality data required as part of the NMOCD-approved Stage 2 Abatement Plan groundwater monitoring program. No water will be diverted or extracted from these wells except for the purpose of collecting groundwater-quality data.

17-Q – *The State Engineer retains jurisdiction over this permit.*

Required Action – The permittee acknowledges this condition.

Scott Wagaman
August 18, 2021

17-R – *Pursuant to Section 72-8-1 NMSA 1978, the permittee shall allow the State Engineer and OSE representatives entry upon private property for the performance of their respective duties, including access to the ditch or acequia to measure flow and also to the well for meter reading and water-level measurement.*

Required Action – The permittee shall allow site access to the State Engineer and OSE representatives as specified under this condition.

LOG – *The Point of Diversion LRG 16012 POD23/POD24 must be completed and the Well Log filed on or before 07/06/2022.*

Required Action – The replacement wells installed at the site will not be used for diversion purposes. Terracon prepared the Well Record & Log for each well and submitted the documentation to the OSE on August 10, 2021. Terracon also prepared and submitted a Plugging Record for the abandonment of the damaged wells on August 10, 2021. Copies of the required documentation submitted to the OSE are provided as Attachments D and E.

Enclosures:

Attachment A – Applications and OSE-Issued Permits to Drill MW-6S and MW-9S
Attachment B – Photographic Log
Attachment C – Arcadis Field Logs
Attachment D – Well Record & Logs for Replacement Wells MW-6S and MW-9S
Attachment E – Plugging Reports (for the damaged wells)

Attachment A

Applications and OSE-Issued Permits to Drill MW-6S and MW-9S

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

District 4 Office
1680 Hickory Loop, Suite J
Las Cruces, NM 88005-6598
Phone: (575) 524-6161
Fax: (575) 524-6160

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

Trn Nbr: 699467
File Nbr: LRG-16012-POD23

Jul. 06, 2021

HUNTSMAN INTERNATIONAL LLC
SCOTT A. WAGAMAN
8600 GOSLING ROAD
THE WOODLANDS, TX 77381

Greetings:

Your approved copy of the above numbered permit to drill a well for non-consumptive purposes is enclosed. You must obtain an additional permit if you intend to use the water. It is your responsibility to provide the contracted well driller with a copy of the permit that must be made available during well drilling activities.

Carefully review the attached conditions of approval for all specific permit requirements.

* If use of this well is temporary in nature and the well will be plugged at the end of the well usage, the OSE must initially approve of the plugging. If plugging approval is not conditioned in this permit, the applicant must submit a Plugging Plan of Operations for approval prior to the well being plugged. The Plugging Record must be properly completed and submitted to the OSE within 30 days of the well plugging.
* If the final intended purpose and condition requires a well ID tag and meter installation, the applicant must immediately send a completed meter report form to this office.
* The well record and log must be submitted within 30 days of the completion of the well or if the attempt was a dry hole.
* This permit expires and will be cancelled if no well is drilled and/or a well log is not received by the date set forth in the conditions of approval.

Appropriate forms can be downloaded from the OSE website www.ose.state.nm.us.

Sincerely,

Sarah Rodriguez
Water Resource Professional III
(575)524-6161

Enclosure

explore

File No. LRG-16012

NEW MEXICO OFFICE OF THE STATE ENGINEER

WR-07 APPLICATION FOR PERMIT TO DRILL

A WELL WITH NO WATER RIGHT

(check applicable box):

For fees, see State Engineer website: http://www.ose.state.nm.us/

Purpose:	☐	Pollution Control And/Or Recovery	☐	Ground Source Heat Pump	
☐ Exploratory Well (Pump test)	☐	Construction Site/Public Works Dewatering	☐	Other(Describe):	
☒ Monitoring Well	☐	Mine Dewatering			

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AUG - 3 2020
STATE ENGINEER OFFICE

A separate permit will be required to apply water to beneficial use regardless if use is consumptive or nonconsumptive.

☐ Temporary Request - Requested Start Date: 8-15-2020 Requested End Date: 8-15-2030

Plugging Plan of Operations Submitted? ☐ Yes ☒ No

1. APPLICANT(S)

Name: Huntsman, C/O Scott A Wagaman	Name:
Contact or Agent: check here if Agent ☐ Scott A Wagaman	Contact or Agent: check here if Agent ☐
Mailing Address: 8600 Gosling	Mailing Address:
City: Woodlands	City:
State: Texas Zip Code: 77381	State: Zip Code:
Phone: 281-719-3038 ☐ Home ☐ Cell Phone (Work):	Phone: ☐ Home ☐ Cell Phone (Work):
E-mail (optional):	E-mail (optional):

FOR OSE INTERNAL USE Application for Permit, Form WR-07, Rev 11/17/16

File No.: LRG-16012	Trn. No.: 699467	Receipt No.:
Trans Description (optional): LRG-16012-POD23		
Sub-Basin: LRG	POW/LOG Due Date: 7-6-2022	

2. WELL(S) Describe the well(s) applicable to this application.

Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above.

☐ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☐ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

■ Lat/Long (WGS84) (to the nearest 1/10th of second)

Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
Replacement MW- 6S LRG-16012-POD23	31. 47 37.032	-106. 32 0.3834	Sec. 9, T29S, R4E

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NOTE: If more well locations need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional well descriptions are attached: ☐ **Yes** ■ **No** **If yes, how many**_____

Other description relating well to common landmarks, streets, or other:

Well is on land owned by: IBWC

Well Information: NOTE: If more than one (1) well needs to be described, provide attachment. Attached? ☐ **Yes** ■ **No**
If yes, how many_____

Approximate depth of well (feet): 17	Outside diameter of well casing (inches): 4.50
Driller Name: Manuel Duenez	Driller License Number: WD 1265

3. ADDITIONAL STATEMENTS OR EXPLANATIONS

FOR OSE INTERNAL USE

Application for Permit, Form WR-07

File No.: LRG-16012	Trn No.: 699467

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application:

Exploratory:	**Pollution Control and/or Recovery:**	**Construction De-Watering:**	**Mine De-Watering:**
☐ Include a description of any proposed pump test, if applicable.	☐ Include a plan for pollution control/recovery, that includes the following: ☐ A description of the need for the pollution control or recovery operation. ☐ The estimated maximum period of time for completion of the operation. ☐ The annual diversion amount. ☐ The annual consumptive use amount. ☐ The maximum amount of water to be diverted and injected for the duration of the operation. ☐ The method and place of discharge.	☐ Include a description of the proposed dewatering operation, ☐ The estimated duration of the operation, ☐ The maximum amount of water to be diverted, ☐ A description of the need for the dewatering operation, and, ☐ A description of how the diverted water will be disposed of.	☐ Include a plan for pollution control/recovery, that includes the following: ☐ A description of the need for mine dewatering. ☐ The estimated maximum period of time for completion of the operation. ☐ The source(s) of the water to be diverted. ☐ The geohydrologic characteristics of the aquifer(s). ☐ The maximum amount of water to be diverted per annum. ☐ The maximum amount of water to be diverted for the duration of the operation. ☐ The quality of the water. ☐ The method of measurement of water diverted. ☐ The recharge of water to the aquifer. ☐ Description of the estimated area of hydrologic effect of the project. ☐ The method and place of discharge. ☐ An estimation of the effects on surface water rights and underground water rights from the mine dewatering project. ☐ A description of the methods employed to estimate effects on surface water rights and underground water rights. ☐ Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.
Monitoring: ■ Include the reason for the monitoring well, and, ☐ The duration of the planned monitoring.	☐ The method of measurement of water produced and discharged. ☐ The source of water to be injected. ☐ The method of measurement of water injected. ☐ The characteristics of the aquifer. ☐ The method of determining the resulting annual consumptive use of water and depletion from any related stream system. ☐ Proof of any permit required from the New Mexico Environment Department. ☐ An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located.	**Ground Source Heat Pump:** ☐ Include a description of the geothermal heat exchange project, ☐ The number of boreholes for the completed project and required depths. ☐ The time frame for constructing the geothermal heat exchange project, and, ☐ The duration of the project. ☐ Preliminary surveys, design data, and additional information shall be included to provide all essential facts relating to the request.	

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AUG - 3 2021
STATE ENGINEER

ACKNOWLEDGEMENT

I, We (name of applicant(s)), Manuel Duenez
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Manuel Duenez
Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☑ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this 6th day of July 20 21, for the State Engineer,

John R. D'Antonio, Jr. PE, State Engineer

By: [signature] Sarah Rodriguez
Signature Print

Title: Water Resource Professional, III
Print

STATE OF NEW MEXICO
STATE ENGINEER

FOR OSE INTERNAL USE Application for Permit, Form WR-07

File No.: LRG-16012	Trn No.: 699467

NEW MEXICO STATE ENGINEER OFFICE
PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

17-4 No water shall be appropriated and beneficially used under this permit.

17-6E Wells that do not encounter a water bearing stratum shall be immediately plugged by filling the well with drill cuttings or clean native fill to within ten (10) feet of land surface and by plugging the remaining ten (10) feet of the well to land surface with a plug of a sealing material approved by the State Engineer.

17-7 The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.

17-B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with 72-12-12 NMSA 1978. A licensed driller shall not be required for the construction of a well driven without the use of a drill rig, provided that the casing shall not exceed two and three-eighths (2 3/8) inches outside diameter.

17-C The well driller must file the well record with the State Engineer and the applicant within 30 days after the well is drilled or driven. It is the well owner's responsibility to ensure that the well driller files the well record.
The well driller may obtain the well record form from any District Office or the Office of the State Engineer website.

17-C1 The well driller must file the well record with the State Engineer and the applicant within 30 days after the well is drilled or driven. Test data shall be filed not later than twenty (20) days after completion of the test(s).
It is the well owner's responsibility to ensure that the well driller files the well record. The well driller may obtain the well record form from any District Office or the Office of the State Engineer website.

Trn Desc: LRG 16012 POD23

File Number: LRG 16012
Trn Number: 699467

NEW MEXICO STATE ENGINEER OFFICE
PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL (Continued)

17-C2 No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) cumulative days, and well shall be plugged or capped on or before , unless a permit to use water from this well is acquired from the Office of the State Engineer.

17-Q The State Engineer retains jurisdiction over this permit.

17-R Pursuant to section 72-8-1 NMSA 1978, the permittee shall allow the State Engineer and OSE representatives entry upon private property for the performance of their respective duties, including access to the ditch or acequia to measure flow and also to the well for meter reading and water level measurement.

LOG The Point of Diversion LRG 16012 POD23 must be completed and the Well Log filed on or before 07/06/2022.

ACTION OF STATE ENGINEER

Notice of Intention Rcvd:	Date Rcvd. Corrected:
Formal Application Rcvd: 08/03/2020	Pub. of Notice Ordered:
Date Returned - Correction:	Affidavit of Pub. Filed:

This application is approved provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state; and further subject to the specific conditions listed previously.

Witness my hand and seal this 06 day of Jul A.D., 2021

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

By: Sarah Rodriguez

STATE OF NEW MEXICO STATE ENGINEER

Trn Desc: LRG 16012 POD23

File Number: LRG 16012
Trn Number: 699467

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

District 4 Office
1680 Hickory Loop, Suite J
Las Cruces, NM 88005-6598
Phone: (575) 524-6161
Fax: (575) 524-6160

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

Trn Nbr: 699549
File Nbr: LRG-16012-POD24

Jul. 06, 2021

HUNTSMAN INTERNATIONAL LLC
SCOTT A. WAGAMAN
8600 GOSLING ROAD
THE WOODLANDS, TX 77381

Greetings:

Your approved copy of the above numbered permit to drill a well for non-consumptive purposes is enclosed. You must obtain an additional permit if you intend to use the water. It is your responsibility to provide the contracted well driller with a copy of the permit that must be made available during well drilling activities.

Carefully review the attached conditions of approval for all specific permit requirements.

* If use of this well is temporary in nature and the well will be plugged at the end of the well usage, the OSE must initially approve of the plugging. If plugging approval is not conditioned in this permit, the applicant must submit a Plugging Plan of Operations for approval prior to the well being plugged. The Plugging Record must be properly completed and submitted to the OSE within 30 days of the well plugging.
* If the final intended purpose and condition requires a well ID tag and meter installation, the applicant must immediately send a completed meter report form to this office.
* The well record and log must be submitted within 30 days of the completion of the well or if the attempt was a dry hole.
* This permit expires and will be cancelled if no well is drilled and/or a well log is not received by the date set forth in the conditions of approval.

Appropriate forms can be downloaded from the OSE website www.ose.state.nm.us.

Sincerely,

Sarah Rodriguez
Water Resource Professional III
(575)524-6161

Enclosure

explore

File No. LRG-16012

NEW MEXICO OFFICE OF THE STATE ENGINEER

WR-07 APPLICATION FOR PERMIT TO DRILL

A WELL WITH NO WATER RIGHT

(check applicable box):

For fees, see State Engineer website: http://www.ose.state.nm.us/

Purpose:	☐ Pollution Control And/Or Recovery	☐ Ground Source Heat Pump
☐ Exploratory Well (Pump test)	☐ Construction Site/Public Works Dewatering	☐ Other(Describe):
☒ Monitoring Well	☐ Mine Dewatering	

A separate permit will be required to apply water to beneficial use regardless if use is consumptive or nonconsumptive.

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☐ Temporary Request - Requested Start Date: 8-15-2020	Requested End Date: 8-15-2030
Plugging Plan of Operations Submitted? ☐ Yes ☒ No	

1. APPLICANT(S)

Name: Huntsman, C/O Scott A Wagaman	Name:
Contact or Agent: check here if Agent ☐ Scott A Wagaman	Contact or Agent: check here if Agent ☐
Mailing Address: 8600 Gosling	Mailing Address:
City: Woodlands	City:
State: Texas Zip Code: 77381	State: Zip Code:
Phone: 281-719-3038 ☐ Home ☐ Cell Phone (Work):	Phone: ☐ Home ☐ Cell Phone (Work):
E-mail (optional):	E-mail (optional):

FOR OSE INTERNAL USE — Application for Permit, Form WR-07, Rev 11/17/16

File No.: LRG-16012	Trn. No.: 699549	Receipt No.:
Trans Description (optional): LRG-16012 POD24		
Sub-Basin: LRS	PCW/LOG Due Date: 7-6-2022	

2. WELL(S) Describe the well(s) applicable to this application.

Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above.

☐ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☐ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

■ Lat/Long (WGS84) (to the nearest 1/10th of second)

Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
MW- 9S	31. 47 31. 308	-106. 31.57. 8994	

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STATE ENGINEER OFFICE

NOTE: If more well locations need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional well descriptions are attached: ☐ **Yes** ■ **No** **If yes, how many**_____

Other description relating well to common landmarks, streets, or other:

Well is on land owned by: ~~IBWC~~ American Engy Brick Co. / IBWC

Well Information: NOTE: If more than one (1) well needs to be described, provide attachment. Attached? ☐ **Yes** ■ **No**
If yes, how many_____

Approximate depth of well (feet): 15.5	Outside diameter of well casing (inches): 4.50
Driller Name: Manuel Duenez	Driller License Number: WD 1265

3. ADDITIONAL STATEMENTS OR EXPLANATIONS

FOR OSE INTERNAL USE

Application for Permit, Form WR-07

File No.: LRG-16012	Trn No.: 699549

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application:

Exploratory: ☐ Include a description of any proposed pump test, if applicable. **Monitoring:** ■ Include the reason for the monitoring well, and, ☐ The duration of the planned monitoring.	**Pollution Control and/or Recovery:** ☐ Include a plan for pollution control/recovery, that includes the following: ☐ A description of the need for the pollution control or recovery operation. ☐ The estimated maximum period of time for completion of the operation. ☐ The annual diversion amount. ☐ The annual consumptive use amount. ☐ The maximum amount of water to be diverted and injected for the duration of the operation. ☐ The method and place of discharge. ☐ The method of measurement of water produced and discharged. ☐ The source of water to be injected. ☐ The method of measurement of water injected. ☐ The characteristics of the aquifer. ☐ The method of determining the resulting annual consumptive use of water and depletion from any related stream system. ☐ Proof of any permit required from the New Mexico Environment Department. ☐ An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located.	**Construction De-Watering:** ☐ Include a description of the proposed dewatering operation, ☐ The estimated duration of the operation, ☐ The maximum amount of water to be diverted, ☐ A description of the need for the dewatering operation, and, ☐ A description of how the diverted water will be disposed of. **Ground Source Heat Pump:** ☐ Include a description of the geothermal heat exchange project, ☐ The number of boreholes for the completed project and required depths. ☐ The time frame for constructing the geothermal heat exchange project, and, ☐ The duration of the project. ☐ Preliminary surveys, design data, and additional information shall be included to provide all essential facts relating to the request.	**Mine De-Watering:** ☐ Include a plan for pollution control/recovery, that includes the following: ☐ A description of the need for mine dewatering. ☐ The estimated maximum period of time for completion of the operation. ☐ The source(s) of the water to be diverted. ☐ The geohydrologic characteristics of the aquifer(s). ☐ The maximum amount of water to be diverted per annum. ☐ The maximum amount of water to be diverted for the duration of the operation. ☐ The quality of the water. ☐ The method of measurement of water diverted. ☐ The recharge of water to the aquifer. ☐ Description of the estimated area of hydrologic effect of the project. ☐ The method and place of discharge. ☐ An estimation of the effects on surface water rights and underground water rights from the mine dewatering project. ☐ A description of the methods employed to estimate effects on surface water rights and underground water rights. ☐ Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.

ACKNOWLEDGEMENT

I, We (name of applicant(s)), Manuel Duenez
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

RECEIVED
AUG - 3 2020
STATE ENGINEER OFFICE

Manuel Duenez
Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☑ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this 6th day of July 20 21, for the State Engineer,

John R. D'Antonio, Jr. PE, State Engineer

By: Sarah Rodriguez
Signature Print

Title: Water Resource Professional III
Print

STATE OF NEW MEXICO
STATE ENGINEER

FOR OSE INTERNAL USE Application for Permit, Form WR-08

File No.: LRG-16012	Trn No.: 699549

NEW MEXICO STATE ENGINEER OFFICE
PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

17-4 No water shall be appropriated and beneficially used under this permit.

17-6E Wells that do not encounter a water bearing stratum shall be immediately plugged by filling the well with drill cuttings or clean native fill to within ten (10) feet of land surface and by plugging the remaining ten (10) feet of the well to land surface with a plug of a sealing material approved by the State Engineer.

17-7 The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.

17-B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with 72-12-12 NMSA 1978. A licensed driller shall not be required for the construction of a well driven without the use of a drill rig, provided that the casing shall not exceed two and three-eighths (2 3/8) inches outside diameter.

17-C The well driller must file the well record with the State Engineer and the applicant within 30 days after the well is drilled or driven. It is the well owner's responsibility to ensure that the well driller files the well record.
The well driller may obtain the well record form from any District Office or the Office of the State Engineer website.

17-C1 The well driller must file the well record with the State Engineer and the applicant within 30 days after the well is drilled or driven. Test data shall be filed not later than twenty (20) days after completion of the test(s).
It is the well owner's responsibility to ensure that the well driller files the well record. The well driller may obtain the well record form from any District Office or the Office of the State Engineer website.

Trn Desc: LRG 16012 POD24

File Number: LRG 16012
Trn Number: 699549

NEW MEXICO STATE ENGINEER OFFICE
PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL (Continued)

17-C2 No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) cumulative days, and well shall be plugged or capped on or before , unless a permit to use water from this well is acquired from the Office of the State Engineer.

17-Q The State Engineer retains jurisdiction over this permit.

17-R Pursuant to section 72-8-1 NMSA 1978, the permittee shall allow the State Engineer and OSE representatives entry upon private property for the performance of their respective duties, including access to the ditch or acequia to measure flow and also to the well for meter reading and water level measurement.

LOG The Point of Diversion LRG 16012 POD24 must be completed and the Well Log filed on or before 07/06/2022.

ACTION OF STATE ENGINEER

Notice of Intention Rcvd:	Date Rcvd. Corrected:
Formal Application Rcvd: 08/03/2020	Pub. of Notice Ordered:
Date Returned - Correction:	Affidavit of Pub. Filed:

This application is approved provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state; and further subject to the specific conditions listed previously.

Witness my hand and seal this 06 day of Jul A.D., 2021

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

By: Sarah Rodriguez

STATE OF NEW MEXICO STATE ENGINEER

Trn Desc: LRG 16012 POD24

File Number: LRG 16012
Trn Number: 699549

Attachment B

Photographic Log

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 1

Date: 07/29/2021

Description:
Initiate well abandonment

Location:
MW-9S

Direction:
North

Photo: 2

Date: 07/29/2021

Description:
Broken pvc approximately 5-6’

Location:
MW-9S

Direction:
North

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 3

Date: 07/29/2021

Description:
Initiate pressure grout

Location:
MW-9S

Direction:
North

Photo: 4

Date: 07/29/2021

Description:
Initiate pressure grout

Location:
MW-9S

Direction:
North

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 5

Date: 07/29/2021

Description:
Vegetation clearance at MW-6S

Location:
MW-6S

Direction:
North

Photo: 6

Date: 07/29/2021

Description:
Shroud removal

Location:
MW-6S

Direction:
North

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 7

Date: 07/29/2021

Description:
Shroud removal

Location:
MW-6S

Direction:
North

Photo: 8

Date: 07/29/2021

Description:
Vegetation clearance for bollard install

Location:
MW-3S/3R

Direction:
Southeast

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 9

Date: 07/29/2021

Description:
Bollard install

Location:
MW-3S/3R

Direction:
Southeast

Photo: 10

Date: 07/29/2021

Description:
6 bollard installation

Location:
MW-3S/3R

Direction:
Southeast

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 11

Date: 07/29/2021

Description:
Grouted well

Location:
MW-6S

Direction:
East

Photo: 12

Date: 07/29/2021

Description:
MW-9S grouted well

Location:
MW-9S

Direction:
South

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 1

Date: 08/05/2021

Description:
Initiate drilling for well replacement

Location:
MW-9S

Direction:
North

Photo: 2

Date: 08/05/2021

Description:
Well install / bollards complete. Well development complete.

Location:
MW-6S

Direction:
North

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 1

Date: 08/06/2021

Description:
Well and bollard install complete. Well development complete

Location:
MW-6S

Direction:
South

Photo: 2

Date: 08/06/2021

Description:
Well and bollard installation complete

Location:
MW-9S

Direction:
North

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 3

Date: 08/06/2021

Description:
Berm earthwork

Location:
Fenced area

Direction:
Northeast

Photo: 4

Date: 08/06/2021

Description:
Bollard install at 3S/3R complete

Location:
MW-3S/3R

Direction:
North

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 5

Date: 08/06/2021

Description:
Well And Bollard Install complete

Location:
MW-6S

Direction:
South

Photo: 6

Date: 08/06/2021

Description:
Well and Bollard install complete. 5 IDW Drums left on site. 4 soil, 1 water

Location:
MW-9S

Direction:
Southeast

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 7

Date: 08/06/2021

Description:
Berm work along southeast fence complete.

Location:
SE corner of fence

Direction:
Northwest

Photo: 8

Date: 08/06/2021

Description:
Berm work along southeast fence complete.

Location:
SE corner of fence

Direction:
Northwest

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 9

Date: 08/06/2021

Description:
Berm work along southeast fence complete.

Location:
SE corner of fence

Direction:
Northwest

Photo: 10

Date: 08/06/2021

Description:
Berm work along southeast fence complete.

Location:
SE corner of fence

Direction:
Northwest

PROJECT PHOTOGRAPHS

Huntsman International LLC
Sunland Park, NM

Photo: 11

Date: 08/06/2021

Description:
Berm work along southeast fence complete.

Location:
SE corner of fence

Direction:
Northwest

Attachment C

Arcadis Field Logs

Daily Log

Project Name : Huntsman Well Replacement
Project Number : 30091090
Purpose : Well abandonment and replacement
PPE : Level D
Equipment:

Weather(°F) : Sunny
Prepared By: Sergio Celis

Date	Time	Description of Activities
07/29/2021	08:25	Initiate well abandonment at MW-9S
07/29/2021	09:16	Pressure grout MW-9S
07/29/2021	09:38	Mobilize to MW-6S conduct vegetation clearance
07/29/2021	10:32	Vegetation clearance at MW-3S/3R for bollard install

Signature:

Waste Management:

Drums On Site

Date	Are there any waste drums on site?	Number of Drums upon Arrival	Size of Drums	Type of Drums	Condition of Drums	Waste Drummed Today?	Number of drums Created	Size of drums	Condition of Drums	General Waste Comments
07/29/2021	no					no				Terracon will remove abandonment waste

Other Photos

null

null

Attachment D

Well Records & Logs for Replacement Wells MW-6S and MW-9S

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NO. (WELL NO.)	WELL TAG ID NO.	OSE FILE NO(S).
MW-6S		LRG-16012- POD-23

WELL OWNER NAME(S)	PHONE (OPTIONAL)
Hunstman C/O Scott A Wagner	281-719-3038

WELL OWNER MAILING ADDRESS	CITY	STATE	ZIP
8600 Gosling	Woodlands	Tx	77381

WELL LOCATION (FROM GPS)		DEGREES	MINUTES	SECONDS	
	LATITUDE	31	47	37.032	N
	LONGITUDE	-106	32	0.3834	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS – PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

Section 9. Township 29S, Range 4E

2. DRILLING & CASING INFORMATION

LICENSE NO.	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD 1265	Manuel Duenez	Terracon Consultants

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
8-5-21	8-5-21	16	16	4.5

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 4.0

DRILLING FLUID: ☐ AIR ☐ MUD ADDITIVES – SPECIFY:

DRILLING METHOD: ☐ ROTARY ☐ HAMMER ☐ CABLE TOOL ☑ OTHER – SPECIFY: Hollow Stem Auger

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE (add coupling diameter)	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	6	9	4" PVC Schedule 40	Threaded	4.0	0.50	Riser
6	16	9	4"PVC Schedule 40	Threaded	4.0	0.50	Screen

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
2.0	4.0	9	Bentonite Chips		Tremie
4.0	16.0	9	Silica Sand		Tremie

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 04/30/19)

FILE NO.	POD NO.	TRN NO.	
LOCATION		WELL TAG ID NO.	PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES **(attach supplemental sheets to fully describe all units)**	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0.0	2.0	2.0	Clayey Sand, Brown, Moist	Y N	
2.0	16.0	14.0	Sand, Poorly Graded, Black, Saturated	Y N	
			- Possible Hydrocarbon below 2.0'	Y N	
			- Water Table @4.0'	✓ Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA.

☐ PUMP ☐ AIR LIFT ☐ BAILER ☐ OTHER – SPECIFY: NA

TOTAL ESTIMATED WELL YIELD (gpm): 0.00

5. TEST; RIG SUPERVISION

WELL TEST: TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

6. SIGNATURE

BY SIGNING BELOW, I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED WELL. I ALSO CERTIFY THAT THE WELL TAG, IF REQUIRED, HAS BEEN INSTALLED AND THAT THIS WELL RECORD WILL ALSO BE FILED WITH THE PERMIT HOLDER WITHIN 30 DAYS AFTER THE COMPLETION OF WELL DRILLING.

Manuel Duenez — 8-10-21

SIGNATURE OF DRILLER / PRINTED SIGNEE NAME — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 04/30/2019)

FILE NO.	POD NO.	TRN NO.	
LOCATION		WELL TAG ID NO.	PAGE 2 OF 2

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NO. (WELL NO.)	WELL TAG ID NO.	OSE FILE NO(S).
MW-9S		LRG-16012- POD-24

WELL OWNER NAME(S)	PHONE (OPTIONAL)
Hunstman C/O Scott A Wagner	281-719-3038

WELL OWNER MAILING ADDRESS	CITY	STATE	ZIP
8600 Gosling	Woodlands	Tx	77381

WELL LOCATION (FROM GPS)		DEGREES	MINUTES	SECONDS	
	LATITUDE	31	47	31.308	N
	LONGITUDE	-106	31.57	0.8994	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS – PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

Section 16. Township 29S, Range 4E

2. DRILLING & CASING INFORMATION

LICENSE NO.	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD 1265	Manuel Duenez	Terracon Consultants

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
7-29-21	7-29-21	14	16	4.5

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 4.0

DRILLING FLUID: ☐ AIR ☐ MUD ADDITIVES – SPECIFY:

DRILLING METHOD: ☐ ROTARY ☐ HAMMER ☐ CABLE TOOL ☑ OTHER – SPECIFY: Hollow Stem Auger

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE (add coupling diameter)	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	4	9	4" PVC Schedule 40	Threaded	4.0	0.50	Riser
4	14	9	4"PVC Schedule 40	Threaded	4.0	0.50	Screen

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
1.5	3.0	9	Bentonite Chips		Tremie
3.0	14.0	9	Silica Sand		Tremie

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 04/30/19)

FILE NO.	POD NO.	TRN NO.	
LOCATION		WELL TAG ID NO.	PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES **(attach supplemental sheets to fully describe all units)**	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0.0	2.0	2.0	Claycy Sand, Brown, Moist	Y N	
4.0	14.0	10.0	Sand, Poorly Graded, Brown, Saturated	✓ Y N	
				Y N	
			- Water Table @4.0'	✓ Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA:

☐ PUMP ☐ AIR LIFT ☐ BAILER ☐ OTHER – SPECIFY: NA

TOTAL ESTIMATED WELL YIELD (gpm): 0.00

5. TEST; RIG SUPERVISION

WELL TEST: TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

6. SIGNATURE

BY SIGNING BELOW, I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED WELL. I ALSO CERTIFY THAT THE WELL TAG, IF REQUIRED, HAS BEEN INSTALLED AND THAT THIS WELL RECORD WILL ALSO BE FILED WITH THE PERMIT HOLDER WITHIN 30 DAYS AFTER THE COMPLETION OF WELL DRILLING.

Manuel Duenez — 8-10-21

SIGNATURE OF DRILLER / PRINT SIGNEE NAME — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 04/30/2019)

FILE NO.	POD NO.	TRN NO.	
LOCATION		WELL TAG ID NO.	PAGE 2 OF 2

Attachment E

Plugging Reports (for the damaged wells)

PLUGGING RECORD

NOTE: **A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC**

I. GENERAL / WELL OWNERSHIP:

State Engineer Well Number: LRG-16012-PODS-21

Well owner: Hunstman C/O Scott A Wagman Phone No.: 281-719-3038

Mailing address: 8600 Gosling

City: Woodlands State: Tx Zip code: 77381

II. WELL PLUGGING INFORMATION:

1) Name of well drilling company that plugged well: Terracon Consultants

2) New Mexico Well Driller License No.: WD-1265 Expiration Date: 1-31-2022

3) Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): Manuel Duenez

4) Date well plugging began: 7-29-2021 Date well plugging concluded: 7-29-2021

5) GPS Well Location: Latitude: 31 deg, 47 min, 37.032 sec
Longitude: -106 deg, 32 min, 0.3834 sec, WGS 84

6) Depth of well confirmed at initiation of plugging as: 14.0 ft below ground level (bgl), by the following manner: weighted measuring tape

7) Static water level measured at initiation of plugging: 4.5 ft bgl

8) Date well plugging plan of operations was approved by the State Engineer: 8-20-2020

9) Were all plugging activities consistent with an approved plugging plan? Yes If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):

10) Log of Plugging Activities - Label vertical scale with depths, and indicate separate plugging intervals with horizontal lines as necessary to illustrate material or methodology changes. Attach additional pages if necessary.

For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
	Portland Cement/Bentonite	10.0	9.5	Tremie	

MULTIPLY		BY		AND OBTAIN
cubic feet	x	7.4805	=	gallons
cubic yards	x	201.97	=	gallons

III. SIGNATURE:

I, Manuel Duenez, say that I am familiar with the rules of the Office of the State Engineer pertaining to the plugging of wells and that each and all of the statements in this Plugging Record and attachments are true to the best of my knowledge and belief.

Manuel Duenez — Signature of Well Driller

8-10-2021 — Date

Version: September 8, 2009
Page 2 of 2

PLUGGING RECORD

NOTE: **A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC**

I. GENERAL / WELL OWNERSHIP:

State Engineer Well Number: LRG-16012-PODS-22

Well owner: Hunstman C/O Scott A Wagman Phone No.: 281-719-3038

Mailing address: 8600 Gosling

City: Woodlands State: Tx Zip code: 77381

II. WELL PLUGGING INFORMATION:

1) Name of well drilling company that plugged well: Terracon Consultants

2) New Mexico Well Driller License No.: WD-1265 Expiration Date: 1-31-2022

3) Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): Manuel Duenez

4) Date well plugging began: 7-29-2021 Date well plugging concluded: 7-29-2021

5) GPS Well Location: Latitude: 31 deg, 47 min, 31.308 sec
Longitude: -106 deg, 31 min, 57.8994 sec, WGS 84

6) Depth of well confirmed at initiation of plugging as: 14.0 ft below ground level (bgl), by the following manner: weighted measuring tape

7) Static water level measured at initiation of plugging: 4.5 ft bgl

8) Date well plugging plan of operations was approved by the State Engineer: 8-20-2020

9) Were all plugging activities consistent with an approved plugging plan? Yes If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):

10) Log of Plugging Activities - Label vertical scale with depths, and indicate separate plugging intervals with horizontal lines as necessary to illustrate material or methodology changes. Attach additional pages if necessary.

For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
	Portland Cement/Bentonite	10.5	9.5	Trmie	

MULTIPLY		BY		AND OBTAIN
cubic feet	x	7.4805	=	gallons
cubic yards	x	201.97	=	gallons

III. SIGNATURE:

I, Manuel Duenez, say that I am familiar with the rules of the Office of the State Engineer pertaining to the plugging of wells and that each and all of the statements in this Plugging Record and attachments are true to the best of my knowledge and belief.

Manuel Duenez — Signature of Well Driller

8-10-2021 — Date

Version: September 8, 2009
Page 2 of 2

Appendix B

Field Data

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-3D			**Date**	03/08/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	55.0 degrees F and Mostly Cloudy. The wind is blowing SW at 3.4 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	8.05	**Total Depth (ft-bmp)**	25	**Water Column(ft)**	16.95	**Gallons in Well**	11.02
MP Elevation		**Pump Intake (ft-bmp)**	10	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	08:50	**Volumes Purged**		**Sample ID**	MW-3D	**Sampled by**	Sergio Celis
Purge Start	08:35	**Gallons Purged**		**Replicate/ Code No.**	DUP-1-030821, FB-1-030821 @0855	**Sample Tye**	Grab
Purge End	08:57						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
08:35	0	0	250	8.10	--	7.52	16.24	0.8	4.79	18.5	248.8	--	--
08:40	5	5	250	8.10	--	7.52	16.25	0.78	4.77	18.5	247.5	--	--
08:45	5	10	250	8.12	--	7.49	16.25	0.65	4.8	18.5	245.9	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	9	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland Park, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-6D			**Date**	03/08/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	57.9 degrees F and Mostly Cloudy. The wind is blowing S/SE at 6.9 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	Stainless Steel
Static Water Level (ft-bmp)	8.90	**Total Depth (ft-bmp)**	25	**Water Column(ft)**	16.1	**Gallons in Well**	10.46
MP Elevation		**Pump Intake (ft-bmp)**	10	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	09:35	**Volumes Purged**	0.14	**Sample ID**	MW-6D	**Sampled by**	Sergio Celis
Purge Start	09:20	**Gallons Purged**	1.50	**Replicate/ Code No.**		**Sample Tye**	Grab
Purge End	09:39						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
09:25	0	0	250	8.93	--	7.55	18.17	0.44	3	20.2	236.7	--	--
09:30	5	5	250	8.93	--	7.54	18.18	0.42	2.93	20.1	236.2	--	--
09:35	5	10	250	8.91	--	7.54	18.16	0.43	2.81	20.2	235.4	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland Park, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-3S			**Date**	03/08/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	52.0 degrees F and Mostly Cloudy. The wind is blowing S/SW at 3.4 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	8.00	**Total Depth (ft-bmp)**	25	**Water Column(ft)**	17	**Gallons in Well**	11.05
MP Elevation		**Pump Intake (ft-bmp)**	10	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	08:20	**Volumes Purged**	0.11	**Sample ID**	MW-3S	**Sampled by**	Sergio Celis
Purge Start	07:50	**Gallons Purged**	1.20	**Replicate/ Code No.**		**Sample Tye**	Grab
Purge End	08:22						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
08:00	0	0	250	8.46	0.66	7.3	8.39	0.58	3.12	17.8	253.8	--	--
08:05	5	5	250	8.45	--	7.24	8.28	0.55	2.84	17.7	255.1	--	--
08:10	5	10	250	8.46	--	7.25	8.42	0.52	2.86	17.9	254.7	--	--
08:15	5	15	250	8.51	--	7.24	8.4	0.51	2.79	17.9	254.6	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland Park, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-17			**Date**	03/08/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	57.9 degrees F and Mostly Cloudy. The wind is blowing S/SE at 6.9 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	9.50	**Total Depth (ft-bmp)**	25	**Water Column(ft)**	15.5	**Gallons in Well**	10.07
MP Elevation		**Pump Intake (ft-bmp)**	11	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	10:20	**Volumes Purged**		**Sample ID**	MW-17	**Sampled by**	Sergio Celis
Purge Start	10:03	**Gallons Purged**		**Replicate/ Code No.**	EB-1-030821	**Sample Tye**	Grab
Purge End	10:24						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
10:06	0	0	250	10.00	--	7.15	9.04	1.06	0.33	21.1	236.8	--	--
10:10	4	4	250	10.00	--	7.15	9.01	1	0.22	21.3	237.2	--	--
10:14	4	8	250	10.00	--	7.15	9.01	0.98	0.21	21.2	236.3	--	--
10:18	4	12	250	10.00	--	7.1	9	0.89	0.22	21.3	236.2	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	6	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-11			**Date**	03/08/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	73.0 degrees F and Mostly Cloudy. The wind is blowing S at 11.4 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	9.43	**Total Depth (ft-bmp)**	25	**Water Column(ft)**	15.57	**Gallons in Well**	10.12
MP Elevation		**Pump Intake (ft-bmp)**	11	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	13:00	**Volumes Purged**	0.18	**Sample ID**	MW-11	**Sampled by**	Sergio Celis
Purge Start	12:36	**Gallons Purged**	1.80	**Replicate/ Code No.**		**Sample Tye**	Grab
Purge End	13:03						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
12:42	0	0	250	9.43	--	7.55	9.01	0.92	0.5	22.6	-21.4	--	--
12:45	3	3	250	9.66	--	7.47	9.01	0.92	0.48	22.7	-66.6	--	--
12:50	5	8	250	10.00	--	7.46	9.01	0.88	0.48	22.7	-88.5	--	--
12:55	5	13	250	10.19	--	7.48	9	0.77	0.46	22.4	-86.4	--	--
13:00	5	18	250	10.19	--	7.45	9	0.79	0.45	22.7	-90.4	Yellow	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland Park, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-8			**Date**	03/08/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	68.0 degrees F and Mostly Cloudy. The wind is blowing S/SE at 5.8 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	7.14	**Total Depth (ft-bmp)**	25	**Water Column(ft)**	17.86	**Gallons in Well**	11.61
MP Elevation		**Pump Intake (ft-bmp)**	10	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	12:10	**Volumes Purged**	0.15	**Sample ID**	MW-8	**Sampled by**	Sergio Celis
Purge Start	11:38	**Gallons Purged**	1.70	**Replicate/ Code No.**	EB-2-030821 @1220, FB-2-030821 @1215, FD-2-030821	**Sample Tye**	Grab
Purge End	12:12						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
11:45	0	0	250	7.56	--	7.3	9.25	0.98	0.9	21.5	-162.4	--	--
11:50	5	5	250	7.68	--	7.3	9.33	1.33	0.38	21.5	177.4	--	--
11:55	5	10	250	7.84	--	7.28	9.19	1.3	0.25	21.6	-180.1	--	--
12:00	5	15	250	7.84	--	7.27	9.17	1.22	0.24	21.6	-185.4	--	--
12:05	5	20	250	7.92	--	7.26	9.15	1.11	0.23	21.7	-188	Yellow	Strong

Constituent Sampled	Container	Number	Preservative
Benzene ,PAHs SW-846 8100	40 mL Glass	21	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location: Sunland Park, NM

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-5			**Date**	03/08/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	62.1 degrees F and Mostly Cloudy. The wind is blowing S/SE at 9.2 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	7.41	**Total Depth (ft-bmp)**	25	**Water Column(ft)**	17.59	**Gallons in Well**	11.43
MP Elevation		**Pump Intake (ft-bmp)**	10	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	11:15	**Volumes Purged**	0.13	**Sample ID**	MW-5	**Sampled by**	Sergio Celis
Purge Start	10:52	**Gallons Purged**	1.50	**Replicate/ Code No.**		**Sample Tye**	Grab
Purge End	11:18						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
10:55	0	0	250	7.60	--	6.85	18.35	8.63	0.42	20.9	-154.6	--	--
11:00	5	5	250	7.84	--	6.75	18.34	7.6	0.23	21.1	-219	--	--
11:05	5	10	250	8.00	--	6.77	18.39	7.6	0.22	21	-220.8	--	--
11:10	5	15	250	8.16	--	6.71	18.4	7.55	0.21	21.2	-225.1	Black	Strong

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments: Sheen present

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland Park, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-10			**Date**	03/08/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	73.9 degrees F and Mostly Cloudy. The wind is blowing S at 10.3 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	10.61	**Total Depth (ft-bmp)**	25	**Water Column(ft)**	14.39	**Gallons in Well**	9.35
MP Elevation		**Pump Intake (ft-bmp)**	12	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	13:45	**Volumes Purged**	0.18	**Sample ID**	MW-10	**Sampled by**	Sergio Celis
Purge Start	13:20	**Gallons Purged**	1.66	**Replicate/ Code No.**		**Sample Tye**	Grab
Purge End	13:46						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
13:22	0	0	250	10.80	--	7.18	9.44	0.92	0.63	23.5	-61.9	--	--
13:27	5	5	250	10.88	--	7.2	9.45	0.87	0.62	23.9	-78.9	--	--
13:32	5	10	250	11.01	--	7.16	9.45	0.78	0.61	23.6	-79.6	--	--
13:37	5	15	250	11.09	--	7.14	9.45	0.88	0.6	23.7	-83.6	Yellow	Medium

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland Park, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Cincinnati, OH +1 513 733 5336
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South Charleston, WV +1 304 356 3168
York, PA +1 717 505 5280

Chain of Custody Form

Page 1 of 2

COC ID: 234074

ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Brickland Refinery 1Q2021	A	8260_LL_W (8260 Benzene (*Unpreserved*)-7 day HT
Work Order		Project Number		B	8270_PAH_LVI (8270 PAHs (LVI))
Company Name	ARCADIS U.S., Inc.	Bill To Company	ARCADIS	C	
Send Report To	Brooke Fontenot	Invoice Attn	Accounts Payable	D	
Address	10352 Plaza Americana Drive	Address	630 Plaza Drive, Suite 600	E	
				F	
City/State/Zip	Baton Rouge, LA 70816	City/State/Zip	Highlands Ranch CO 80129	G	
Phone	(225) 292-1004	Phone	(303) 471-3699	H	
Fax		Fax		I	
e-Mail Address	Brooke.Fontenot@arcadis-us.com	e-Mail Address	Accountspayable.administration@arcadi	J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-35	3/8/21	0820	W	8	3	X										
2	MW-3D Time: 0850	3/8/21	~~0935~~	W	8	3	X										
3	FB-1-030821	3/8/21	0855	W	8	3	X										
4	FD-1-030821	3/8/21	—	W	8	3	X										
5	MW-6D	3/8/21	0935	W	8	3	X										
6	MW-17	3/8/21	1020	W	8	3	X										
7	EB-1-030821	3/8/21	1025	W	8	3	X										
8	MW-5	3/8/21	1115	W	8	3	X										
9	MW-8	3/8/21	1210	W	8	6	X	X									
10	FD-2-030821	3/8/21	—	W	8	3		X									

Sampler(s) Please Print & Sign: Sergio Celis

Shipment Method:

Required Turnaround Time: (Check Box) [X] STD 10 Wk Days [ ] 5 Wk Days [ ] 2 Wk Days [ ] 24 Hour [ ] Other

Results Due Date:

Relinquished by:	Date: 3/8/21	Time: 1700	Received by:	
Relinquished by:	Date:	Time:	Received by (Laboratory):	
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	

Notes: [AGM Brickland NM]

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
- [X] Level II Std QC
- [ ] Level II Std QC/Raw Data
- [ ] Level IV SVM4 8/CLP
- [ ] Other
- [ ] TRRP Checklist
- [ ] TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note:
1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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Chain of Custody Form

Page 2 of 2

COC ID: 234075

ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Brickland Refinery 1Q2021	A	8260_LL_W (8260 Benzene ("Unpreserved")-7 day HT
Work Order		Project Number		B	8270_PAH_LVI (8270 PAHs (LVI))
Company Name	ARCADIS U.S., Inc.	Bill To Company	ARCADIS	C	
Send Report To	Brooke Fontenot	Invoice Attn	Accounts Payable	D	
Address	10352 Plaza Americana Drive	Address	630 Plaza Drive, Suite 600	E	
				F	
City/State/Zip	Baton Rouge, LA 70816	City/State/Zip	Highlands Ranch CO 80129	G	
Phone	(225) 292-1004	Phone	(303) 471-3599	H	
Fax		Fax		I	
e-Mail Address	Brooke.Fontenot@arcadis-us.com	e-Mail Address	Accountspayable.administration@arcadi	J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	EB-2-030821	3/8/21	1220	W	8	6	X	X									
2	FB-2-030821	3/8/21	1215	W	8	6	X	X									
3	MW-11	3/8/21	1300	W	8	3	X										
4	MW-10	3/8/21	1345	W	8	3	X										
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Sergio Collis | Shipment Method | Required Turnaround Time: (Check Box) ☒ STD 10 Wk Days ☐ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☐ Other | Results Due Date:

Relinquished by: Sergio Collis	Date: 3/8/21	Time: 1700	Received by:	Notes: [AGM Brickland NM]	
Relinquished by:	Date:	Time:	Received by (Laboratory):	Cooler ID / Cooler Temp.	QC Package: (Check One Box Below)
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):		☒ Level II Std QC ☐ TRRP Checklist ☐ Level II: Std QC/Raw Data ☐ TRRP Level IV ☐ Level IV SVM6/CLP ☐ Other

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

ARCADIS Design & Consultancy for natural and built assets

Groundwater Gauging Log

Client:	Huntsman
Project Name/Location:	Huntsman Former Brickland / Sunland Park NM
Date(s):	6/1/2021
Sampler(s):	Sergio Celis
Equipment:	oil/water interface probe

Well	Date	Time	Depth to Water (ft)	Well Depth (ft)	Depth to LNAPL (ft)	PID (ppmv)	Remarks
MW-3S	6/1/2021	07:40:00	8.21	16.5	--	--	
MW-3D	6/1/2021	07:45:00	8.29	37.5	--	--	
MW-6D	6/1/2021	07:55:00	9.08	38	--	--	
MW-17	6/1/2021	08:00:00	10.19	24.75	--	--	
MW-5	6/1/2021	08:05:00	7.65	15	--	--	
MW-8	6/1/2021	08:10:00	7.41	14.65	--	--	
MW-11	6/1/2021	08:15:00	9.6	24.75	--	--	
MW-10	6/1/2021	08:17:00	10.8	19.89	--	--	

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-3S			**Date**	06/01/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	66.0 degrees F and Mostly Clear. The wind is blowing E/SE at 9.2 mph.			
Measuring Pt. Description	Top of Outer Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	8.21	**Total Depth (ft-bmp)**	16.5	**Water Column(ft)**	8.29	**Gallons in Well**	5.39
MP Elevation		**Pump Intake (ft-bmp)**	13.5	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	08:50	**Volumes Purged**	0.15	**Sample ID**	MW-3S	**Sampled by**	Sergio Celis
Purge Start	08:33	**Gallons Purged**	0.82	**Replicate/ Code No.**		**Sample Type**	Grab
Purge End	08:53						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
08:38	0	0	200	8.40	--	7.17	9.09	1.24	0.8	20.3	145	--	--
08:43	5	5	200	8.40	--	7.17	9.08	1	0.8	20.5	142	--	--
08:48	5	10	200	8.61	--	7.17	9.07	1.1	0.8	20.5	138.6	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland Park, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-3D			**Date**	06/01/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	66.0 degrees F and Mostly Clear. The wind is blowing E/SE at 9.2 mph.			
Measuring Pt. Description	Top of Outer Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	8.29	**Total Depth (ft-bmp)**	37.5	**Water Column(ft)**	29.21	**Gallons in Well**	18.99
MP Elevation		**Pump Intake (ft-bmp)**	10	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	09:25	**Volumes Purged**	0.04	**Sample ID**	MW-3D	**Sampled by**	Sergio Celis
Purge Start	09:04	**Gallons Purged**	0.79	**Replicate/ Code No.**	DUP1-030821, FB1-030821 @0930	**Sample Type**	Grab
Purge End	09:27						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
09:09	0	0	200	8.31	--	7.34	17.39	0.65	4.4	20.8	137.2	--	--
09:14	5	5	200	8.32	--	7.35	17.4	0.67	4.5	21.1	138.7	--	--
09:18	4	9	200	8.32	--	7.36	17.39	0.56	4.5	21.2	138.8	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	9	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland Park, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-6D			**Date**	06/01/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	69.1 degrees F and Mostly Clear. The wind is blowing E at 10.3 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	Stainless Steel
Static Water Level (ft-bmp)	9.08	**Total Depth (ft-bmp)**	38	**Water Column(ft)**	28.92	**Gallons in Well**	18.8
MP Elevation		**Pump Intake (ft-bmp)**	10	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	10:00	**Volumes Purged**	0.04	**Sample ID**	MW-6D	**Sampled by**	Sergio Celis
Purge Start	09:42	**Gallons Purged**	0.82	**Replicate/ Code No.**		**Sample Type**	Grab
Purge End	10:03						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
09:47	0	0	200	9.12	--	7.42	19.41	0.35	3.2	22.3	144.2	--	--
09:52	5	5	200	9.12	--	7.44	19.42	0.34	3.1	22.2	142.9	--	--
09:57	5	10	200	9.12	--	7.43	19.43	0.44	3.1	22.2	142.1	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland Park, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-17			**Date**	06/01/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	72.0 degrees F and Mostly Clear. The wind is blowing SE at 5.8 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	10.19	**Total Depth (ft-bmp)**	24.75	**Water Column(ft)**	14.56	**Gallons in Well**	9.46
MP Elevation		**Pump Intake (ft-bmp)**	15	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	10:55	**Volumes Purged**	0.11	**Sample ID**	MW-17	**Sampled by**	Sergio Celis
Purge Start	10:30	**Gallons Purged**	1.08	**Replicate/ Code No.**	EB1-030821 @1100	**Sample Type**	Grab
Purge End	11:00						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
10:35	0	0	200	10.19	--	7.09	11.71	0.49	0.9	23.5	-9	--	--
10:40	5	5	200	10.21	--	7.03	11.83	0.44	0.8	23.4	-18	--	--
10:45	5	10	200	10.21	--	7.04	11.85	0.33	0.8	23.4	-16.8	--	--
10:50	5	15	200	10.21	--	7.04	11.86	0.22	0.8	23.5	-16.3	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	6	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-5			**Date**	06/01/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	75.0 degrees F and Mostly Clear. The wind is blowing E at 9.2 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	7.65	**Total Depth (ft-bmp)**	15	**Water Column(ft)**	7.35	**Gallons in Well**	4.78
MP Elevation		**Pump Intake (ft-bmp)**	10	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	11:35	**Volumes Purged**	0.18	**Sample ID**	MW-5	**Sampled by**	Sergio Celis
Purge Start	11:15	**Gallons Purged**	0.85	**Replicate/ Code No.**		**Sample Type**	Grab
Purge End	11:36						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
11:19	0	0	200	7.65	--	6.72	19.53	2.77	0.9	23.4	-210	--	--
11:21	2	2	200	7.99	--	6.67	19.53	2	0.8	23.3	-261.8	--	--
11:25	4	6	200	7.99	--	6.64	19.51	1.98	0.8	23.4	-260	--	--
11:30	5	11	200	7.99	--	6.63	19.51	1.88	0.8	23.3	-270	Black	Strong

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments: Sheen present

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:	Sunland Park, NM	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-8			**Date**	06/01/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	75.0 degrees F and Mostly Clear. The wind is blowing E at 9.2 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	7.41	**Total Depth (ft-bmp)**	14.65	**Water Column(ft)**	7.24	**Gallons in Well**	4.71
MP Elevation		**Pump Intake (ft-bmp)**	11	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	12:10	**Volumes Purged**	0.17	**Sample ID**	MW-8	**Sampled by**	Sergio Celis
Purge Start	11:50	**Gallons Purged**	0.79	**Replicate/ Code No.**	EB-2-030821 @1220, FB2-030821 @1215, FD2-030821	**Sample Type**	Grab
Purge End	12:27						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
11:55	0	0	200	7.55	--	7.17	9.82	1.67	0.8	24.8	-264	--	--
11:58	3	3	200	7.59	--	7.15	9.63	1.11	0.8	24.6	-269.9	--	--
12:01	3	6	200	7.84	--	7.13	9.63	1.09	0.8	24.4	-275.4	--	--
12:04	3	9	200	7.95	--	7.14	9.59	1.02	0.8	24.8	-279.5	Yellow	Strong

Constituent Sampled	Container	Number	Preservative
Benzene ,PAHs SW-846 8100	40 mL Glass	21	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location: Sunland Park, NM

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-11			**Date**	06/01/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	78.1 degrees F and Mostly Clear. The wind is blowing at 4.7 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	9.60	**Total Depth (ft-bmp)**	24.75	**Water Column(ft)**	15.15	**Gallons in Well**	9.85
MP Elevation		**Pump Intake (ft-bmp)**	11	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	13:00	**Volumes Purged**	0.08	**Sample ID**	MW-11	**Sampled by**	Sergio Celis
Purge Start	12:40	**Gallons Purged**	0.82	**Replicate/ Code No.**		**Sample Type**	Grab

Purge End

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
12:44	0	0	200	9.82	--	7.31	9.93	1.97	1.1	25.2	-198.8	--	--
12:47	3	3	200	9.82	--	7.24	9.9	1.11	0.6	25.2	-252.8	--	--
12:50	3	6	200	10.05	--	7.22	9.87	1.05	0.6	25	-258.9	--	--
12:53	3	9	200	10.10	--	7.21	9.84	1.02	0.6	25	-261.9	--	--
12:55	2	11	200	10.25	--	7.19	9.83	1	0.6	25.1	-267.1	Yellow	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location: Sunland Park, NM

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30049071	**Well ID**	MW-10			**Date**	06/01/2021
Project Name/Location	Huntsman / Sunland Park, NM		**Weather(°F)**	78.1 degrees F and Mostly Clear. The wind is blowing at 4.7 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	10.80	**Total Depth (ft-bmp)**	19.89	**Water Column(ft)**	9.09	**Gallons in Well**	5.91
MP Elevation		**Pump Intake (ft-bmp)**	12	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Sample Time	13:35	**Volumes Purged**	0.28	**Sample ID**	MW-10	**Sampled by**	Sergio Celis
Purge Start	13:15	**Gallons Purged**	1.66	**Replicate/ Code No.**		**Sample Type**	Grab
Purge End	13:37						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
13:21	0	0	200	11.20	--	6.99	10.85	1.14	0.7	26.8	-194	--	--
13:25	4	4	200	11.29	--	6.98	10.87	1.14	0.6	26.7	-200.5	--	--
13:29	4	8	200	11.29	--	6.97	10.85	1.32	0.6	26	-202.8	--	--
13:33	4	12	200	11.31	--	6.97	10.86	1.2	0.6	26	-205	Yellow	Medium

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location: Sunland Park, NM

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30091090	**Well ID**	MW-10			**Date**	09/09/2021
Project Name/Location	Huntsman brickyard		**Weather(°F)**	84.2 degrees F and Clear. The wind is blowing S/SE at 6.9 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	9.55	**Total Depth (ft-bmp)**	19.89	**Water Column (ft)**	10.34	**Gallons in Well**	6.72
Purge Start	11:55	**Pump Intake (ft-bmp)**	12	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End		**Volumes Purged**		**Sample ID**	MW-10	**Sampled by**	Charleston Shirley
Sample Time	12:20	**Gallons Purged**		**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
12:00	0	0	200	9.74	--	7.05	12.8	4.3	0.57	26.5	-270.5	--	--
12:05	5	5	200	9.74	--	7.06	12.76	4.4	0.56	26.5	-272	--	--
12:10	5	10	200	9.90	--	7.06	12.75	4	0.54	26.7	-277	--	--
12:15	5	15	200	9.90	--	7.06	12.74	3.9	0.55	26.7	-280	Yellow	Medium

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments: Used 3 amber because clear was out.

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location:
Condition of Well: Good condition
Well Completion: Stick-up
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30091090	**Well ID**	MW-11			**Date**	09/09/2021
Project Name/Location	Huntsman brickyard		**Weather(°F)**	77.0 degrees F and Clear. The wind is blowing undefined at 0.0 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	8.45	**Total Depth (ft-bmp)**	20.29	**Water Column (ft)**	11.84	**Gallons in Well**	7.7
Purge Start	09:35	**Pump Intake (ft-bmp)**	14	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End		**Volumes Purged**		**Sample ID**	MW-11	**Sampled by**	Charleston Shirley
Sample Time	10:05	**Gallons Purged**		**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
09:35	0	0	200	8.45	--	7.3	8.93	1.22	0.44	29	-216.2	--	--
09:40	5	5	200	8.71	--	7.4	8.8	1.32	0.45	29	-213.1	--	--
09:45	5	10	200	8.80	--	7.5	8.8	1.28	0.6	29.4	-204.5	--	--
09:50	5	15	200	8.90	--	7.4	8.82	1.3	0.56	29.7	-200	--	--
09:55	5	20	200	9.00	--	7.4	8.9	1.3	0.56	29	-201.7	--	--
10:00	5	25	200	9.00	--	7.3	8.9	1.4	0.55	29	-201.8	Clear	Mild

Constituent Sampled	Container	Number	Preservative
Other	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location:		Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30091090	**Well ID**	MW-17			**Date**	09/09/2021
Project Name/Location	Huntsman brickyard		**Weather(°F)**	73.0 degrees F and Clear. The wind is blowing undefined at 0.0 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	9.10	**Total Depth (ft-bmp)**	24.75	**Water Column (ft)**	15.65	**Gallons in Well**	10.17
Purge Start	08:30	**Pump Intake (ft-bmp)**	17	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End		**Volumes Purged**		**Sample ID**	MW-17	**Sampled by**	Charleston Shirley
Sample Time	09:00	**Gallons Purged**		**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
08:35	0	0	200	9.10	--	6.86	13.51	8.01	0.44	25.9	65.4	--	--
08:40	5	5	200	9.10	--	6.87	13.53	7.65	0.42	26.1	23.4	--	--
08:45	5	10	200	9.10	--	6.87	13.54	7.65	0.4	26.2	-10.5	--	--
08:50	5	15	200	9.10	--	6.87	13.54	8	0.4	26.4	-12.5	--	--
08:55	5	20	200	9.10	--	6.86	13.56	7.8	0.41	26.2	-12.49	Yellow	None

Constituent Sampled	Container	Number	Preservative
Benzene	50 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location:		Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30091090	**Well ID**	MW-3D			**Date**	09/08/2021
Project Name/Location	Huntsman brickyard		**Weather(°F)**	75.9 degrees F and Mostly Clear. The wind is blowing N at 11.4 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	7.25	**Total Depth (ft-bmp)**	35	**Water Column (ft)**	27.75	**Gallons in Well**	18.04
Purge Start	09:50	**Pump Intake (ft-bmp)**	28	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	10:25	**Volumes Purged**		**Sample ID**	MW-3D	**Sampled by**	Charleston Shirley
Sample Time	10:20	**Gallons Purged**		**Replicate/ Code No.**	FD-090821	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
09:55	0	0	200	7.25	--	7.07	20.42	20.2	0.69	24.2	46.3	--	--
10:00	5	5	200	7.24	--	7	20.62	8.19	1.01	24.2	-9.1	--	--
10:05	5	10	200	7.24	--	7.04	20.78	4.74	0.56	24.3	-36.6	--	--
10:10	5	15	200	7.24	--	7.04	20.83	3.22	0.5	24.5	-44	--	--
10:15	5	20	200	7.24	--	7.05	21.06	3.25	0.5	24.5	-48	--	--
10:20	5	25	200	7.24	--	7.05	21.12	3.24	0.47	24.6	-53.9	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location:	Riverside	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30091090	**Well ID**	MW-3s			**Date**	09/08/2021
Project Name/Location	Huntsman brickyard		**Weather(°F)**	72.0 degrees F and Mostly Clear. The wind is blowing N at 10.3 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	7.20	**Total Depth (ft-bmp)**	15	**Water Column (ft)**	7.8	**Gallons in Well**	5.07
Purge Start	09:00	**Pump Intake (ft-bmp)**	12	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	09:33	**Volumes Purged**	0.16	**Sample ID**	MW-3S	**Sampled by**	Charleston Shirley
Sample Time	09:30	**Gallons Purged**	0.79	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
09:05	0	0	200	7.20	--	6.8	16.43	1.31	1.55	24.3	75.7	--	--
09:10	5	5	200	7.41	--	6.79	16.48	0.69	0.98	24.3	42.6	--	--
09:15	5	10	200	7.48	--	6.78	16.47	0.88	0.73	24.5	18.6	--	--
09:20	5	15	200	7.49	--	6.79	16.47	1.19	0.64	24.6	-6.4	--	--
09:25	5	20	200	7.52	--	6.78	16.45	0.51	0.65	24.9	-6.5	--	--
09:30	5	25	200	7.55	--	6.79	16.47	1.15	0.59	24.7	-8.7	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location:	Riverside	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30091090	**Well ID**	MW-5			**Date**	09/09/2021
Project Name/Location	Huntsman brickyard		**Weather(°F)**	77.0 degrees F and Clear. The wind is blowing undefined at 0.0 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	6.57	**Total Depth (ft-bmp)**	15	**Water Column (ft)**	8.43	**Gallons in Well**	5.48
Purge Start	10:15	**Pump Intake (ft-bmp)**	10	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	10:42	**Volumes Purged**		**Sample ID**	MW-5	**Sampled by**	Charleston Shirley
Sample Time	10:40	**Gallons Purged**		**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
10:19	0	0	200	6.57	--	6.29	20.9	4.88	0.44	27.4	-185.8	--	--
10:25	6	6	200	6.57	--	6.29	20.9	4.7	0.3	28.1	-182.6	--	--
10:30	5	11	200	6.90	--	6.29	20.93	4	0.31	28	-190	--	--
10:35	5	16	200	6.90	--	6.29	20.9	4	0.29	28	-191		Strong

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location:

Condition of Well: Good condition

Well Completion: Stick-up

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30091090	**Well ID**	MW-6D			**Date**	09/08/2021
Project Name/Location	Huntsman brickyard		**Weather(°F)**	86.0 degrees F and Mostly Clear. The wind is blowing N at 10.3 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	8.00	**Total Depth (ft-bmp)**	35	**Water Column (ft)**	27	**Gallons in Well**	17.55
Purge Start	11:31	**Pump Intake (ft-bmp)**	25	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	12:00	**Volumes Purged**	0.05	**Sample ID**	MW-6D	**Sampled by**	Charleston Shirley
Sample Time	12:00	**Gallons Purged**	0.79	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
11:35	0	0	200	8.01	--	7.18	20.33	2.79	0.84	26.4	25.5	--	--
11:40	5	5	200	8.01	--	7.15	20.48	0.82	0.45	26.1	22.5	--	--
11:45	5	10	200	8.01	--	7.22	20.57	0.8	0.34	26.3	23.4	--	--
11:50	5	15	200	8.01	--	7.14	20.62	0.81	0.31	26.4	22.6	--	--
11:55	5	20	200	8.01	--	7.13	20.66	0.79	0.31	26.6	21.1	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location:	Riverside	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30091090	**Well ID**	MW-6S			**Date**	09/08/2021
Project Name/Location	Huntsman brickyard		**Weather(°F)**	81.0 degrees F and Mostly Clear. The wind is blowing N at 8.1 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	8.43	**Total Depth (ft-bmp)**	17.25	**Water Column (ft)**	8.82	**Gallons in Well**	5.73
Purge Start	10:50	**Pump Intake (ft-bmp)**	12	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	11:25	**Volumes Purged**	0.14	**Sample ID**	MW-6S	**Sampled by**	Charleston Shirley
Sample Time	11:20	**Gallons Purged**	0.79	**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
10:54	0	0	200	8.54	--	7.11	12.07	11.7	0.44	27	-107.6	--	--
11:00	6	6	200	8.54	--	7.09	12.01	10.1	0.27	27.2	-114.7	--	--
11:05	5	11	200	8.54	--	7.13	12	8.93	0.24	27.2	-115.7	--	--
11:10	5	16	200	8.54	--	7.13	11.97	10.2	0.22	27.6	-120.7	--	--
11:15	5	21	200	8.54	--	7.12	12	10.2	0.22	27.6	-122	--	--
11:20	5	26	200	8.54	--	7.1	12.01	10.1	0.21	27.4	-123.1	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location:	Riverside	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30091090	**Well ID**	MW-8			**Date**	09/09/2021
Project Name/Location	Huntsman brickyard		**Weather(°F)**	80.1 degrees F and Clear. The wind is blowing S at 4.7 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	6.74	**Total Depth (ft-bmp)**	14.65	**Water Column (ft)**	7.91	**Gallons in Well**	5.14
Purge Start	10:55	**Pump Intake (ft-bmp)**	10	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	11:25	**Volumes Purged**		**Sample ID**	MW-8	**Sampled by**	Charleston Shirley
Sample Time	11:20	**Gallons Purged**		**Replicate/ Code No.**	FD-09092021	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
11:00	0	0	200	6.92	--	6.73	16.42	17.3	0.22	28.1	-286	--	--
11:05	5	5	200	6.92	--	6.7	16.3	17	0.2	28.2	-296	--	--
11:10	5	10	200	6.92	--	6.71	16.2	16.8	0.2	28.6	-296	--	--
11:15	5	15	200	6.92	--	6.7	16.2	16.9	0.19	28	-295	Black tint with solids	Strong

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None
3511/8270 PAH	40 mL Glass	3	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location: _____ Well Locked at Arrival: _____

Condition of Well: _____ Well Locked at Departure: _____

Well Completion: NA Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30091090	**Well ID**	MW-9S			**Date**	09/08/2021
Project Name/Location	Huntsman brickyard		**Weather(°F)**	90.0 degrees F and Mostly Clear. The wind is blowing at 5.8 mph.			
Measuring Pt. Description	Top of Inner Casing	**MP Elevation**		**Casing Diameter (in)**	4	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	9.47	**Total Depth (ft-bmp)**	17.3	**Water Column (ft)**	7.83	**Gallons in Well**	5.09
Purge Start	12:32	**Pump Intake (ft-bmp)**	14	**Purge Method**	Low-Flow	**Purge Equipment**	Peristaltic
Purge End	13:05	**Volumes Purged**		**Sample ID**	MW-9S	**Sampled by**	Charleston Shirley
Sample Time	13:00	**Gallons Purged**		**Replicate/ Code No.**	NA	**Sample Type**	Grab

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
12:35	0	0	200	9.48	--	6.89	15.09	7.03	1.52	29.3	-74.6	--	--
12:40	5	5	200	9.48	--	6.91	15.1	6.37	0.53	29.1	-82.6	--	--
12:45	5	10	200	9.48	--	6.93	15.11	5.99	0.35	29.1	-87.5	--	--
12:50	5	15	200	9.48	--	6.92	15.1	6.21	0.23	28.8	-91.2	--	--
12:55	5	20	200	9.48	--	6.95	15.1	6.27	0.23	28.5	-92.5	--	--
13:00	5	25	200	9.48	--	6.95	15.09	6.62	0.23	28.3	-92.8	Clear	None

Constituent Sampled	Container	Number	Preservative
Benzene	40 mL Glass	3	None

Comments: FB-090821 and EB-090821 (from IP) collected here.

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot

1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location:	Riverside	Well Locked at Arrival:	yes
Condition of Well:	Good condition	Well Locked at Departure:	yes
Well Completion:	Stick-up	Key Number To Well:	NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

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WELL GAUGING LOG

Site Name: Huntsman

Project Number: LA003185.2019

Date & Time: 12/08/2021 0740

water column height = (well depth in feet) - (initial depth to water in feet) reading from Top of Casing

Well Gauging Information

Well ID	Date/Time	PID (ppm)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness	Comments
MW-3S	12/08 0740	.2 PPM		7.52		
MW-3D	0743	.2 PPM		7.60		
MW-5	0806	312 PPM		6.92		
MW-6S	0747	.3 PPM		8.73 36		
MW-6D	0749	.3 PPM		8.73		
MW-8	0810	2.8 PPM		6.61		
MW-9S	0754	.3 PPM		10.03		
MW-10	0815	2.4 PPM		9.96		
MW-11	0812	.3 PPM		8.80		
MW-17	0802	.2 PPM		9.40		

Equipment and Decon Procedures

Gauging Equipment

Decon Procedures

file stamp

ARCADIS Design & Consultancy for natural and built assets

DAILY LOG

Project Name and No. Huntsman Brickland Refinery

Site Location Sunland Park, NM

Prepared by D. Solon

Date/Time	Description of Activities
12/08/2021 0735	Arrive @ site @ 0735
0740-0805	Gauged all wells / PID Readings
0850	Initiated purge + sample MW 35 / sampled @ 0920
0925	Initiated purge + sample MW 30 / Sample @ 0955, FB, FD
1010	Initiated purge + sample MW 65 / Sample @ 1035
1040	Initiated purge + sample MW 6D / Sample @ 1110
1120	Initiated Purge + Sample MW 95 / Sample @ 1150, EB
1300	Cleanup site / Packed & PID / Prep and stored samples in ICE.
12/09/2021 0715	Arrived on site @ 0715
	Initiated purge & sample MW 17 / sampled @ 0750
0755	Initiated purge & sample MW-5 / sampled @ 0830
0840	Initiated purge & Sample MW-8 / sampled @ 0915 FD, EB, FB
0930	Initiated purge & sample MW-11 / sampled @ 1005
1015	Initiated purge & Sample MW-10 / sampled @ 1045
1200	cleanup site, Packed equipment, Prep and shipped samples

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Low-Flow Groundwater Sampling Log

Project: HUNTSMAN BRICKLAND REFINERY

Project Number: 30091090 | Site Location: SUNLAND PARK, NM | Well ID: MW-35

Date: 12/8/21 | Sampled By: DS

Sampling Time: 0920 | Recorded By: DS

Weather: | Coded Replicate No.:

Instrument Identification

Water Quality Meter(s): HORIBA U-52

Casing Material: PVC | Purge Method: LOW FLOW PERISTALTIC

Casing Diameter: 2-INCH/4-INCH

Sounded Depth (ft bmp): 7.53

Depth to Water (ft bmp): | Purge Time | Start 8:50 | Finish 0925

Field Parameter Measurements During Purging

Time	Flow Rate (mL/min)	Volume Purged	Temp (°C)	pH (s.u.)	Conductivity (umhos or mS/cm)	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Depth to Water (ft bmp)
0855	~250	2 gals	19.7	7.18	10.13	168.6	3.26	.66	7.68
0900			19.3	7.14	10.26	163.0	1.56	1.41	7.73
0905			19.9	7.13	10.30	158.5	1.30	.91	7.81
0910			20.1	7.12	10.30	155.6	1.21	1.01	7.86
0915			19.9	7.12	10.31	153.4	1.20	.74	7.89
0920			20.6	7.12	10.32	152.8	1.19	.81	7.90

Collected Sample Condition | Color: clear | Odor: NA | Appearance: clear

Parameter	Container	No.	Preservative
Benzene	40ml/VOA	3	none

PID Reading: .2 ppm

Comments:

ARCADIS

Low-Flow Groundwater Sampling Log

Project: HUNTSMAN BRICKLAND REFINERY

Project Number: 30091090 | Site Location: SUNLAND PARK, NM | Well ID: MW-3D

Date: 12/8/21 | Sampled By: DS

Sampling Time: 0955 | Recorded By: DS

Weather: | Coded Replicate No.:

Instrument Identification

Water Quality Meter(s): HORIBA U-52

Casing Material: PVC | Purge Method: LOW FLOW PERISTALTIC

Casing Diameter: 2-INCH/4-INCH

Sounded Depth (ft bmp): 7.58

Depth to Water (ft bmp): | Purge Time | Start: 0925 | Finish: 1000

Field Parameter Measurements During Purging

Time	Flow Rate (mL/min)	Volume Purged	Temp (°C)	pH (s.u.)	Conductivity (umhos or mS/cm) [1]	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Depth to Water (ft bmp)
0930	~250	2 gals	20.0	7.17	19.15	112.3	.99	1.99	7.61
0935			20.6	7.13	19.37	95.6	.67	2.36	7.61
0940			20.6	7.13	19.50	87.8	.56	1.28	7.61
0945			20.8	7.14	19.72	71.1	.56	1.34	7.61
0950			20.9	7.14	19.82	68.6	.55	1.20	7.61
0955			20.9	7.15	19.87	67.1	.53	1.25	7.61

Collected Sample Condition | Color: clear | Odor: NEA | Appearance:

Parameter	Container	No.	Preservative
Benzene	40 ml / VOA	3	none

PID Reading: .2 ppm

Comments: FD 120821 40ml 3

FB 120821 @ 1000 40ml 3 - Dtkd

ARCADIS

Low-Flow Groundwater Sampling Log

Project: HUNTSMAN BRICKLAND REFINERY

Project Number: 30091090 | Site Location: SUNLAND PARK, NM | Well ID: MW-65

Date: 12/8/21 | Sampled By: DS

Sampling Time: 1035 | Recorded By: DS

Weather: | Coded Replicate No.:

Instrument Identification

Water Quality Meter(s): HORIBA U-52

Casing Material: PVC | Purge Method: LOW FLOW PERISTALTIC

Casing Diameter: 2-INCH (4-INCH)

Sounded Depth (ft bmp): 8.77

Depth to Water (ft bmp): | Purge Time | Start 1018 | Finish 1040

Field Parameter Measurements During Purging

Time	Flow Rate (mL/min)	Volume Purged	Temp (°C)	pH (s.u.)	Conductivity (umhos or mS/cm) [1]	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Depth to Water (ft bmp)
1010	~250	2 gals	21.1	7.07	11.46	-18.9	1.61	8.76	8.83
1015			20.5	7.08	11.43	-32.4	.59	7.69	8.86
1020			20.6	7.07	11.52	-47.0	.44	6.85	8.84
1025			20.9	7.06	11.60	-54.9	.36	5.87	8.86
1030			21.0	7.05	11.76	-61.2	.33	5.70	8.86
1035			21.0	7.06	11.79	-64.4	.32	4.73	8.86

Collected Sample Condition | Color: Clear | Odor: None | Appearance:

Parameter	Container	No.	Preservative
Benzene	40ml/VOA	3	None

PID Reading: .3 ppm

Comments:

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Low-Flow Groundwater Sampling Log

Project: HUNTSMAN BRICKLAND REFINERY

Project Number: 30091090 | Site Location: SUNLAND PARK, NM | Well ID: MW-6D

Date: 12.8.21 | Sampled By: DS

Sampling Time: 1110 | Recorded By: DS

Weather: | Coded Replicate No.:

Instrument Identification

Water Quality Meter(s): HORIBA U-52

Casing Material: PVC | Purge Method: LOW FLOW PERISTALTIC

Casing Diameter: 2-INCH/4-INCH

Sounded Depth (ft bmp): 8.34

Depth to Water (ft bmp): | Purge Time | Start: 1040 | Finish: 1110

Field Parameter Measurements During Purging

Time	Flow Rate (mL/min)	Volume Purged	Temp (°C)	pH (s.u.)	Conductivity (umhos or mS/cm) [1]	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Depth to Water (ft bmp)
1045	~250	2 Lds	21.1	7.44	18.85	91.6	1.36	2.25	8.37
1050			20.9	7.38	18.91	94.8	1.27	1.53	8.36
1055			21.2	7.39	18.90	96.5	1.49	1.06	8.36
1100			20.9	7.40	18.89	99.6	1.28	1.76	8.36
1105			20.9	7.39	18.88	101.4	1.12	1.81	8.36
1110			21.2	7.40	18.87	102.8	1.00	1.99	8.36

Collected Sample Condition | Color: clear | Odor: none | Appearance: clear

Parameter	Container	No.	Preservative
Benzene	40ml / VOA's	3	none

PID Reading: .3 ppm

Comments:

ARCADIS

Low-Flow Groundwater Sampling Log

Project	HUNTSMAN BRICKLAND REFINERY				
Project Number	30091090	Site Location	SUNLAND PARK, NM	Well ID	MW-95
Date	12.8.21	Sampled By	DS		
Sampling Time	1150	Recorded By	DS		
Weather		Coded Replicate No.			

Instrument Identification

Water Quality Meter(s): HORIBA U-52

Casing Material	PVC	Purge Method	LOW FLOW PERISTALTIC
Casing Diameter	2-INCH/4-INCH		
Sounded Depth (ft bmp)	10.04		
Depth to Water (ft bmp)		Purge Time	Start 1120 Finish 1200

Field Parameter Measurements During Purging

Time	Flow Rate (mL/min)	Volume Purged	Temp (°C)	pH (s.u.)	Conductivity (umhos or mS/cm) [1]	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Depth to Water (ft bmp)
1125	~250		22.4	7.17	18.42	109.6	.55	>1000	10.04
1130			21.8	7.18	18.56	90.0	.44	246	10.04
1135			21.7	7.18	18.46	86.6	.43	207	10.04
1140			22.1	7.18	18.51	71.6	1.31	155	10.04
1145			21.7	7.19	18.56	64.9	.47	110	10.04
1150			22.0	7.19	18.50	55.5	.48	69.9	10.04

Collected Sample Condition: slight cloudy Odor: none Appearance: slight cloudy

Parameter	Container	No.	Preservative
Benzene	40ml / VOA	3	none

PID Reading: .3 PPM

Comments: EB120821 @ 1155 3 VOA's

ARCADIS

Low-Flow Groundwater Sampling Log

Project	HUNTSMAN BRICKLAND REFINERY				
Project Number	30091090	Site Location	SUNLAND PARK, NM	Well ID	MW-17
Date	12/9/21	Sampled By	DS		
Sampling Time	0750	Recorded By	DS		
Weather		Coded Replicate No.			

Instrument Identification

Water Quality Meter(s): HORIBA U-52

Casing Material	PVC	Purge Method	LOW FLOW PERISTALTIC
Casing Diameter	2-INCH/4-INCH		
Sounded Depth (ft bmp)	9.39		
Depth to Water (ft bmp)		Purge Time	Start 0720 Finish 0750

Field Parameter Measurements During Purging

Time	Flow Rate (mL/min)	Volume Purged	Temp (°C)	pH (s.u.)	Conductivity (umhos or mS/cm)[1]	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Depth to Water (ft bmp)
0725	~250		20.3	7.05	15.020	100.8	6.51	10.8	9.49
0730			19.8	7.06	15.04	93.3	6.15	5.28	9.45
0735			20.2	7.06	15.00	65.1	5.74	5.36	9.45
0740			20.3	7.06	14.89	57.9	5.24	5.76	9.45
0745			20.4	7.07	14.39	54.7	4.66	2.73	9.45
0750			20.4	7.07	13.92	54.0	4.38	4.06	9.45

Collected Sample Condition

Color: Slight yellow Odor: organic Appearance: slight yellow

Parameter	Container	No.	Preservative
Benzene	40ml/VOA's	3	none

PID Reading: .2ppm

Comments

ARCADIS

Low-Flow Groundwater Sampling Log

Project: HUNTSMAN BRICKLAND REFINERY

Project Number: 30091090 | Site Location: SUNLAND PARK, NM | Well ID: MW-5

Date: 12/9/21 | Sampled By: DS

Sampling Time: 0830 | Recorded By: DS

Weather: | Coded Replicate No.:

Instrument Identification

Water Quality Meter(s): HORIBA U-52

Casing Material: PVC | Purge Method: LOW FLOW PERISTALTIC

Casing Diameter: 2-INCH/4-INCH

Sounded Depth (ft bmp): 6.90

Depth to Water (ft bmp): | Purge Time: Start 0800 Finish 835

Field Parameter Measurements During Purging

Time	Flow Rate (mL/min)	Volume Purged	Temp (°C)	pH (s.u.)	Conductivity (umhos or mS/cm)	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Depth to Water (ft bmp)
805	~250		19.8	6.52	19.94	-281.1	.54	19.5	7.15
810			20.1	6.54	19.98	-274.9	.43	12.6	7.43
815			20.2	6.54	19.89	-286.2	.37	13.7	7.58
820			20.1	6.53	20.07	-291.2	.32	8.55	7.70
825			21.1	6.53	19.87	-296.3	.30	8.86	7.88
830			21.0	6.52	19.88	-298.0	.29	6.42	7.98

Collected Sample Condition: starts Color: Dark Odor: strong Hydrocarbon Appearance: slight Dark

Parameter	Container	No.	Preservative
Benzene	40ml/VOA's	3	none

PID Reading: 312 ppm

Comments:

ARCADIS

Low-Flow Groundwater Sampling Log

Project	HUNTSMAN BRICKLAND REFINERY				
Project Number	30091090	Site Location	SUNLAND PARK, NM	Well ID	MW-8
Date	12/9/21	Sampled By	DS		
Sampling Time	0915	Recorded By	DS		
Weather		Coded Replicate No.			

Instrument Identification

Water Quality Meter(s): HORIBA U-52

Casing Material	PVC	Purge Method	LOW FLOW PERISTALTIC
Casing Diameter	2-INCH/4-INCH		
Sounded Depth (ft bmp)	6.59		
Depth to Water (ft bmp)		Purge Time	Start 845 Finish 0925

Field Parameter Measurements During Purging

Time	Flow Rate (mL/min)	Volume Purged	Temp (°C)	pH (s.u.)	Conductivity (umhos or mS/cm) [1]	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Depth to Water (ft bmp)
0850	~250		21.4	6.99	12.51	-259.7	.41	7.44	6.90
0855			21.3	7.00	12.41	-263.3	.34	3.45	7.09
0900			20.9	7.04	12.12	-263.5	.32	2.63	7.30
0905			21.3	7.13	11.44	-257.4	.28	1.19	7.52
0910			21.2	7.21	11.12	-243.9	.27	.75	7.75
0915			21.2	7.21	11.00	-242.2	.26	.63	7.93

Collected Sample Condition — Color: Pale/yellow — Odor: Slight HC — Appearance: clear/sl yellow

Parameter	Container	No.	Preservative

PID Reading: 2.89 PPM

Comments:
MW-8 (PAH, Benzene)
FD120921 (PAH)
FB120921 (PAH, Benzene) @ 0920
EB120921 (PAH, Benzene) @ 0925

Page 1 of 1

ARCADIS

Low-Flow Groundwater Sampling Log

Project: HUNTSMAN BRICKLAND REFINERY

Project Number: 30091090 | Site Location: SUNLAND PARK, NM | Well ID: MW-11

Date: 12/9/21 | Sampled By: DS

Sampling Time: 1005 | Recorded By: DS

Weather: | Coded Replicate No.:

Instrument Identification

Water Quality Meter(s): HORIBA U-52

Casing Material: PVC | Purge Method: LOW FLOW PERISTALTIC

Casing Diameter: 2-INCH (4-INCH)

Sounded Depth (ft bmp): 8.70

Depth to Water (ft bmp): | Purge Time: Start 935 | Finish 1010

Field Parameter Measurements During Purging

Time	Flow Rate (mL/min)	Volume Purged	Temp (°C)	pH (s.u.)	Conductivity (umhos or mS/cm) [1]	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Depth to Water (ft bmp)
0940	~250		22.7	7.07	11.52	-198.9	.50	<1	9.06
0945			23.0	7.07	11.53	-204.0	.34	<1	9.36
0950			23.1	7.08	11.53	-204.5	.31	<1	9.59
0955			23.1	7.08	11.22	-203.2	.30	<1	9.89
1000			23.7	7.09	11.01	-202.1	.29	<1	10.10
1005			23.6	7.09	10.95	-202.9	.29	<1	10.27

Collected Sample Condition

Color: clear | Odor: — | Appearance: clear

Parameter	Container	No.	Preservative
Benzene	3 - 40ml/vials	3	none

PID Reading: .3 ppm

Comments:

ARCADIS

Low-Flow Groundwater Sampling Log

Project: HUNTSMAN BRICKLAND REFINERY

Project Number: 30091090 | Site Location: SUNLAND PARK, NM | Well ID: MW-10

Date: 12/9/21 | Sampled By: DS

Sampling Time: 1045 | Recorded By: DS

Weather: | Coded Replicate No.:

Instrument Identification

Water Quality Meter(s): HORIBA U-52

Casing Material: PVC | Purge Method: LOW FLOW PERISTALTIC

Casing Diameter: 2-INCH/4-INCH

Sounded Depth (ft bmp): 9.92

Depth to Water (ft bmp): | Purge Time: Start 1015 Finish 1050

Field Parameter Measurements During Purging

Time	Flow Rate (mL/min)	Volume Purged	Temp (°C)	pH (s.u.)	Conductivity (umhos or mS/cm) [1]	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Depth to Water (ft bmp)
1020	~280		23.3	7.13	11.26	-268.7	.38	2.23	10.20
1025			23.5	7.04	11.30	-275.6	.31	2.23	10.33
1030			23.4	7.11	11.31	-278.9	.30	0.05	10.41
1035			23.6	7.11	11.31	-281.0	.27	1.10	10.48
1040			23.5	7.10	11.32	-281.6	.27	.64	10.52
1045			23.6	7.11	11.34	-281.6	.25	1.36	10.55

Collected Sample Condition

Color: Clear | Odor: Slight HC | Appearance: Clear

Parameter	Container	No.	Preservative
Benzene	40ml VOA's	3	none

PID Reading: 2.4 ppm

Comments:

ALS

Cincinnati, OH +1 513 733 5336 | Fort Collins, CO +1 970 490 1511 | Everett, WA +1 425 356 2600 | Holland, MI +1 616 399 6070 | Houston, TX +1 281 530 5656 | Spring City, PA +1 610 948 4903 | South Charleston, WV +1 304 356 3168 | Middletown, PA +1 717 944 5541 | Salt Lake City, UT +1 801 266 7700 | York, PA +1 717 505 5280

Chain of Custody Form

Page ____ of ____

COC ID: 256083

ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order	30049071 Task 250	Project Name	30049071 Brickland Refinery 4Q2021	A	8260_LL_W (8260 Benzene (*Unpreserved*)-7 day HT
Work Order		Project Number	30049071 Task 250	B	8270_PAH_LVI (8270 PAHs (LVI))
Company Name	ARCADIS U.S., Inc.	Bill To Company	ARCADIS	C	
Send Report To	Brooke Fontenot	Invoice Attn	Accounts Payable	D	
Address	10352 Plaza Americana Drive	Address	630 Plaza Drive, Suite 600	E	
				F	
City/State/Zip	Baton Rouge, LA 70816	City/State/Zip	Highlands Ranch CO 80129	G	
Phone	(225) 292-1004	Phone	(303) 471-3699	H	
Fax		Fax		I	
e-Mail Address	Brooke.Fontenot@arcadis-us.com	e-Mail Address	Accountspayable.administration@arcad	J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-3S	12/8/21	0920	W	8	3	X										
2	MW 3D	12/8/21	0955	W	8	3	X										
3	FB120821	12/8/21	1000	W	8	3	X										
4	FD120821	12/8/21	-	W	8	3	X										
5	MW-6S	12/8/21	1035	W	8	3	X										
6	MW-6D	12/8/21	1110	W	8	3	X										
7	MW-9S	12/8/21	1150	W	8	3	X										
8	EB120821	12/8/21	1155	W	8	3	X										
9																	
10																	

Sampler(s) Please Print & Sign: Doug Solan [signature]

Shipment Method: FEDEX

Required Turnaround Time: (Check Box) [X] STD 10 Wk Days [ ] 5 Wk Days [ ] 2 Wk Days [ ] 24 Hour [ ] Other ____

Results Due Date:

Relinquished by:	Date:	Time:	Received by:
[signature]	12/9/21	1401	
Relinquished by:	Date:	Time:	Received by (Laboratory):
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes: [AGM Brickland NM]

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
- [X] Level II Std QC
- [ ] Level III Std QC/Raw Data
- [ ] Level IV SW846/CLP
- [ ] Other
- [ ] TRRP Checklist
- [ ] TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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Houston, TX +1 281 530 5656
Middletown, PA +1 717 944 5541
Spring City, PA +1 610 948 4903
Salt Lake City, UT +1 801 266 7700
South Charleston, WV +1 304 356 3168
York, PA +1 717 505 5280

Chain of Custody Form

Page _____ of _____

COC ID: 256082

ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order	30049071 Task 250	Project Name	30049071 Brickland Refinery 4Q2021	A	8260_LL_W (8260 Benzene (*Unpreserved*)-7 day HT
Work Order		Project Number	30049071 Task 250	B	8270_PAH_LVI (8270 PAHs (LVI))
Company Name	ARCADIS U.S., Inc.	Bill To Company	ARCADIS	C	
Send Report To	Brooke Fontenot	Invoice Attn	Accounts Payable	D	
Address	10352 Plaza Americana Drive	Address	630 Plaza Drive, Suite 600	E	
				F	
City/State/Zip	Baton Rouge, LA 70816	City/State/Zip	Highlands Ranch CO 80129	G	
Phone	(225) 292-1004	Phone	(303) 471-3699	H	
Fax		Fax		I	
e-Mail Address	Brooke.Fontenot@arcadis-us.com	e-Mail Address	Accountspayable.administration@arcadi	J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	~~AW-5~~ MW-17	12/9/21	0750	W	8	3	X										
2	MW-5	12/9/21	0830	W	8	3	X										
3	MW-8	12/9/21	0915	W	8	~~6~~ 3	X	X									
4	FD120921	12/9/21	-	W	8	3		X									
5	FB120921	12/9/21	0920	W	8	6	X	X									
6	EB120921	12/9/21	0925	W	8	6	X	X									
7	MW-11	12/9/21	1005	W	8	3	X										
8	MW-10	12/9/21	1045	W	8	3	X										
9																	
10																	

Sampler(s) Please Print & Sign: Doug Solon Doug Solon

Shipment Method: FEDEX

Required Turnaround Time: (Check Box) [X] STD 10 Wk Days [ ] 5 Wk Days [ ] 2 Wk Days [ ] 24 Hour [ ] Other _____

Results Due Date:

Relinquished by: Doug Solon	Date: 12/9/21	Time: 1400	Received by:	
Relinquished by:	Date:	Time:	Received by (Laboratory):	
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	

Notes: [AGM Brickland NM]

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
[X] Level II Std QC
[ ] Level III Std QC/Raw Data
[ ] Level IV SW846/CLP
[ ] Other _____
[ ] TRRP Checklist
[ ] TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Notes:
1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

Appendix C

Laboratory Analytical Reports

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

March 16, 2021

Brooke Fontenot
ARCADIS U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge, LA 70816

Work Order: **HS21030490**

Laboratory Results for: **Brickland Refinery 1Q2021**

Dear Brooke Fontenot,

ALS Environmental received 14 sample(s) on Mar 09, 2021 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: DAYNA.FISHER
Dane J. Wacasey

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Work Order: HS21030490

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS21030490-01	MW-3S	Water		08-Mar-2021 08:20	09-Mar-2021 10:15	☐
HS21030490-02	MW-3D	Water		08-Mar-2021 08:50	09-Mar-2021 10:15	☐
HS21030490-03	FB-1-030821	Water		08-Mar-2021 08:55	09-Mar-2021 10:15	☐
HS21030490-04	FD-1-030821	Water		08-Mar-2021 00:00	09-Mar-2021 10:15	☐
HS21030490-05	MW-6D	Water		08-Mar-2021 09:35	09-Mar-2021 10:15	☐
HS21030490-06	MW-17	Water		08-Mar-2021 10:20	09-Mar-2021 10:15	☐
HS21030490-07	EB-1-030821	Water		08-Mar-2021 10:25	09-Mar-2021 10:15	☐
HS21030490-08	MW-5	Water		08-Mar-2021 11:15	09-Mar-2021 10:15	☐
HS21030490-09	MW-8	Water		08-Mar-2021 12:10	09-Mar-2021 10:15	☐
HS21030490-10	FD-2-030821	Water		08-Mar-2021 00:00	09-Mar-2021 10:15	☐
HS21030490-11	EB-2-030821	Water		08-Mar-2021 12:20	09-Mar-2021 10:15	☐
HS21030490-12	FB-2-030821	Water		08-Mar-2021 12:15	09-Mar-2021 10:15	☐
HS21030490-13	MW-11	Water		08-Mar-2021 13:00	09-Mar-2021 10:15	☐
HS21030490-14	MW-10	Water		08-Mar-2021 13:45	09-Mar-2021 10:15	☐

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Work Order: HS21030490

CASE NARRATIVE

GCMS Semivolatiles by Method SW8270

Batch ID: 163314

Sample ID: LCSD-163314

- The RPD between the LCS and LCSD was outside of the control limit.

GCMS Volatiles by Method SW8260

Batch ID: R379539

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: MW-3S
Collection Date: 08-Mar-2021 08:20

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-01
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Mar-2021 14:50
Surr: 1,2-Dichloroethane-d4	*105*		*70-126*	*%REC*	*1*	*11-Mar-2021 14:50*
Surr: 4-Bromofluorobenzene	*95.5*		*81-113*	*%REC*	*1*	*11-Mar-2021 14:50*
Surr: Dibromofluoromethane	*101*		*77-123*	*%REC*	*1*	*11-Mar-2021 14:50*
Surr: Toluene-d8	*98.3*		*82-127*	*%REC*	*1*	*11-Mar-2021 14:50*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: MW-3D
Collection Date: 08-Mar-2021 08:50

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-02
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Mar-2021 15:12
Surr: 1,2-Dichloroethane-d4	*107*		*70-126*	*%REC*	*1*	*11-Mar-2021 15:12*
Surr: 4-Bromofluorobenzene	*95.1*		*81-113*	*%REC*	*1*	*11-Mar-2021 15:12*
Surr: Dibromofluoromethane	*102*		*77-123*	*%REC*	*1*	*11-Mar-2021 15:12*
Surr: Toluene-d8	*97.9*		*82-127*	*%REC*	*1*	*11-Mar-2021 15:12*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: FB-1-030821
Collection Date: 08-Mar-2021 08:55

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-03
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Mar-2021 13:19
Surr: 1,2-Dichloroethane-d4	*102*		*70-126*	*%REC*	*1*	*11-Mar-2021 13:19*
Surr: 4-Bromofluorobenzene	*94.2*		*81-113*	*%REC*	*1*	*11-Mar-2021 13:19*
Surr: Dibromofluoromethane	*98.0*		*77-123*	*%REC*	*1*	*11-Mar-2021 13:19*
Surr: Toluene-d8	*96.0*		*82-127*	*%REC*	*1*	*11-Mar-2021 13:19*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: FD-1-030821
Collection Date: 08-Mar-2021 00:00

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-04
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Mar-2021 15:35
Surr: 1,2-Dichloroethane-d4	*107*		*70-126*	*%REC*	*1*	*11-Mar-2021 15:35*
Surr: 4-Bromofluorobenzene	*94.4*		*81-113*	*%REC*	*1*	*11-Mar-2021 15:35*
Surr: Dibromofluoromethane	*99.4*		*77-123*	*%REC*	*1*	*11-Mar-2021 15:35*
Surr: Toluene-d8	*97.9*		*82-127*	*%REC*	*1*	*11-Mar-2021 15:35*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: MW-6D
Collection Date: 08-Mar-2021 09:35

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-05
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Mar-2021 15:57
Surr: 1,2-Dichloroethane-d4	*107*		*70-126*	*%REC*	*1*	*11-Mar-2021 15:57*
Surr: 4-Bromofluorobenzene	*95.3*		*81-113*	*%REC*	*1*	*11-Mar-2021 15:57*
Surr: Dibromofluoromethane	*102*		*77-123*	*%REC*	*1*	*11-Mar-2021 15:57*
Surr: Toluene-d8	*98.3*		*82-127*	*%REC*	*1*	*11-Mar-2021 15:57*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: MW-17
Collection Date: 08-Mar-2021 10:20

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-06
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Mar-2021 20:16
Surr: 1,2-Dichloroethane-d4	*111*		*70-126*	*%REC*	*1*	*11-Mar-2021 20:16*
Surr: 4-Bromofluorobenzene	*95.7*		*81-113*	*%REC*	*1*	*11-Mar-2021 20:16*
Surr: Dibromofluoromethane	*104*		*77-123*	*%REC*	*1*	*11-Mar-2021 20:16*
Surr: Toluene-d8	*99.5*		*82-127*	*%REC*	*1*	*11-Mar-2021 20:16*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: EB-1-030821
Collection Date: 08-Mar-2021 10:25

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-07
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Mar-2021 13:42
Surr: 1,2-Dichloroethane-d4	*102*		*70-126*	*%REC*	*1*	*11-Mar-2021 13:42*
Surr: 4-Bromofluorobenzene	*96.5*		*81-113*	*%REC*	*1*	*11-Mar-2021 13:42*
Surr: Dibromofluoromethane	*99.0*		*77-123*	*%REC*	*1*	*11-Mar-2021 13:42*
Surr: Toluene-d8	*97.1*		*82-127*	*%REC*	*1*	*11-Mar-2021 13:42*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: MW-5
Collection Date: 08-Mar-2021 11:15

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-08
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	**0.37**		**0.050**	**mg/L**	50	11-Mar-2021 17:12
Surr: 1,2-Dichloroethane-d4	*101*		*70-126*	*%REC*	*50*	*11-Mar-2021 17:12*
Surr: 4-Bromofluorobenzene	*96.7*		*81-113*	*%REC*	*50*	*11-Mar-2021 17:12*
Surr: Dibromofluoromethane	*98.5*		*77-123*	*%REC*	*50*	*11-Mar-2021 17:12*
Surr: Toluene-d8	*97.7*		*82-127*	*%REC*	*50*	*11-Mar-2021 17:12*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: MW-8
Collection Date: 08-Mar-2021 12:10

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-09
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	**0.55**		**0.050**	**mg/L**	50	11-Mar-2021 17:37
Surr: 1,2-Dichloroethane-d4	*102*		*70-126*	*%REC*	*50*	*11-Mar-2021 17:37*
Surr: 4-Bromofluorobenzene	*97.0*		*81-113*	*%REC*	*50*	*11-Mar-2021 17:37*
Surr: Dibromofluoromethane	*99.1*		*77-123*	*%REC*	*50*	*11-Mar-2021 17:37*
Surr: Toluene-d8	*98.1*		*82-127*	*%REC*	*50*	*11-Mar-2021 17:37*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 10-Mar-2021		Analyst: ACN
Acenaphthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Acenaphthylene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Anthracene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Benz(a)anthracene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Benzo(a)pyrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Benzo(b)fluoranthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Benzo(g,h,i)perylene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Benzo(k)fluoranthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Chrysene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Dibenz(a,h)anthracene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Fluoranthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Fluorene	**0.000156**		**0.000102**	**mg/L**	1	16-Mar-2021 11:35
Indeno(1,2,3-cd)pyrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Naphthalene	**0.00511**		**0.000102**	**mg/L**	1	16-Mar-2021 11:35
Phenanthrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Pyrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 11:35
Surr: 2-Fluorobiphenyl	*58.7*		*32-130*	*%REC*	*1*	*16-Mar-2021 11:35*
Surr: 4-Terphenyl-d14	*58.0*		*40-135*	*%REC*	*1*	*16-Mar-2021 11:35*
Surr: Nitrobenzene-d5	*75.6*		*45-142*	*%REC*	*1*	*16-Mar-2021 11:35*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: FD-2-030821
Collection Date: 08-Mar-2021 00:00

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-10
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS - 8270D	**Method:SW8270**			Prep:SW3511 / 10-Mar-2021		Analyst: ACN
Acenaphthene	**0.000173**		**0.000102**	**mg/L**	1	16-Mar-2021 12:14
Acenaphthylene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Anthracene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Benz(a)anthracene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Benzo(a)pyrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Benzo(b)fluoranthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Benzo(g,h,i)perylene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Benzo(k)fluoranthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Chrysene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Dibenz(a,h)anthracene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Fluoranthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Fluorene	**0.000260**		**0.000102**	**mg/L**	1	16-Mar-2021 12:14
Indeno(1,2,3-cd)pyrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Naphthalene	**0.00899**		**0.000102**	**mg/L**	1	16-Mar-2021 12:14
Phenanthrene	**0.000109**		**0.000102**	**mg/L**	1	16-Mar-2021 12:14
Pyrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:14
Surr: 2-Fluorobiphenyl	*94.8*		*32-130*	*%REC*	*1*	*16-Mar-2021 12:14*
Surr: 4-Terphenyl-d14	*55.3*		*40-135*	*%REC*	*1*	*16-Mar-2021 12:14*
Surr: Nitrobenzene-d5	*75.2*		*45-142*	*%REC*	*1*	*16-Mar-2021 12:14*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: EB-2-030821
Collection Date: 08-Mar-2021 12:20

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-11
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Mar-2021 14:04
Surr: 1,2-Dichloroethane-d4	*102*		*70-126*	*%REC*	*1*	*11-Mar-2021 14:04*
Surr: 4-Bromofluorobenzene	*96.0*		*81-113*	*%REC*	*1*	*11-Mar-2021 14:04*
Surr: Dibromofluoromethane	*99.2*		*77-123*	*%REC*	*1*	*11-Mar-2021 14:04*
Surr: Toluene-d8	*96.8*		*82-127*	*%REC*	*1*	*11-Mar-2021 14:04*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 10-Mar-2021		Analyst: ACN
Acenaphthene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Acenaphthylene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Anthracene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Benz(a)anthracene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Benzo(a)pyrene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Benzo(b)fluoranthene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Benzo(g,h,i)perylene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Benzo(k)fluoranthene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Chrysene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Dibenz(a,h)anthracene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Fluoranthene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Fluorene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Indeno(1,2,3-cd)pyrene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Naphthalene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Phenanthrene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Pyrene	< 0.000103		0.000103	mg/L	1	16-Mar-2021 12:33
Surr: 2-Fluorobiphenyl	*95.8*		*32-130*	*%REC*	*1*	*16-Mar-2021 12:33*
Surr: 4-Terphenyl-d14	*82.2*		*40-135*	*%REC*	*1*	*16-Mar-2021 12:33*
Surr: Nitrobenzene-d5	*81.5*		*45-142*	*%REC*	*1*	*16-Mar-2021 12:33*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: Brickland Refinery 1Q2021 WorkOrder:HS21030490
Sample ID: FB-2-030821 Lab ID:HS21030490-12
Collection Date: 08-Mar-2021 12:15 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Mar-2021 14:27
Surr: 1,2-Dichloroethane-d4	*103*		*70-126*	*%REC*	*1*	*11-Mar-2021 14:27*
Surr: 4-Bromofluorobenzene	*95.3*		*81-113*	*%REC*	*1*	*11-Mar-2021 14:27*
Surr: Dibromofluoromethane	*99.3*		*77-123*	*%REC*	*1*	*11-Mar-2021 14:27*
Surr: Toluene-d8	*97.1*		*82-127*	*%REC*	*1*	*11-Mar-2021 14:27*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 10-Mar-2021		Analyst: ACN
Acenaphthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Acenaphthylene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Anthracene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Benz(a)anthracene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Benzo(a)pyrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Benzo(b)fluoranthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Benzo(g,h,i)perylene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Benzo(k)fluoranthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Chrysene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Dibenz(a,h)anthracene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Fluoranthene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Fluorene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Indeno(1,2,3-cd)pyrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Naphthalene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Phenanthrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Pyrene	< 0.000102		0.000102	mg/L	1	16-Mar-2021 12:53
Surr: 2-Fluorobiphenyl	*96.4*		*32-130*	*%REC*	*1*	*16-Mar-2021 12:53*
Surr: 4-Terphenyl-d14	*83.7*		*40-135*	*%REC*	*1*	*16-Mar-2021 12:53*
Surr: Nitrobenzene-d5	*84.5*		*45-142*	*%REC*	*1*	*16-Mar-2021 12:53*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: MW-11
Collection Date: 08-Mar-2021 13:00

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-13
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0050		0.0050	mg/L	5	11-Mar-2021 16:22
Surr: 1,2-Dichloroethane-d4	*104*		*70-126*	*%REC*	*5*	*11-Mar-2021 16:22*
Surr: 4-Bromofluorobenzene	*96.4*		*81-113*	*%REC*	*5*	*11-Mar-2021 16:22*
Surr: Dibromofluoromethane	*100*		*77-123*	*%REC*	*5*	*11-Mar-2021 16:22*
Surr: Toluene-d8	*97.7*		*82-127*	*%REC*	*5*	*11-Mar-2021 16:22*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
Sample ID: MW-10
Collection Date: 08-Mar-2021 13:45

ANALYTICAL REPORT
WorkOrder:HS21030490
Lab ID:HS21030490-14
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0050		0.0050	mg/L	5	11-Mar-2021 16:47
Surr: 1,2-Dichloroethane-d4	*106*		*70-126*	*%REC*	*5*	*11-Mar-2021 16:47*
Surr: 4-Bromofluorobenzene	*97.7*		*81-113*	*%REC*	*5*	*11-Mar-2021 16:47*
Surr: Dibromofluoromethane	*101*		*77-123*	*%REC*	*5*	*11-Mar-2021 16:47*
Surr: Toluene-d8	*96.9*		*82-127*	*%REC*	*5*	*11-Mar-2021 16:47*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 16-Mar-21

Weight / Prep Log

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
WorkOrder: HS21030490

Batch ID: 163314 **Start Date:** 10 Mar 2021 09:00 **End Date:** 10 Mar 2021 13:00
Method: SW3511 **Prep Code:** 3511_PAH

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS21030490-09	1	32.2 (mL)	2 (mL)	0.06211	40 mL Amber
HS21030490-10	1	32.35 (mL)	2 (mL)	0.06182	40 mL Amber
HS21030490-11	1	32.17 (mL)	2 (mL)	0.06217	40 mL Amber
HS21030490-12	1	32.42 (mL)	2 (mL)	0.06169	40 mL Amber

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
WorkOrder: HS21030490

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 163314 (0)	**Test Name :** LOW-LEVEL PAHS - 8270D				**Matrix:** Water	
HS21030490-09	MW-8	08 Mar 2021 12:10		10 Mar 2021 09:00	16 Mar 2021 11:35	1
HS21030490-10	FD-2-030821	08 Mar 2021 00:00		10 Mar 2021 09:00	16 Mar 2021 12:14	1
HS21030490-11	EB-2-030821	08 Mar 2021 12:20		10 Mar 2021 09:00	16 Mar 2021 12:33	1
HS21030490-12	FB-2-030821	08 Mar 2021 12:15		10 Mar 2021 09:00	16 Mar 2021 12:53	1
Batch ID: R379539 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Water	
HS21030490-01	MW-3S	08 Mar 2021 08:20			11 Mar 2021 14:50	1
HS21030490-02	MW-3D	08 Mar 2021 08:50			11 Mar 2021 15:12	1
HS21030490-03	FB-1-030821	08 Mar 2021 08:55			11 Mar 2021 13:19	1
HS21030490-04	FD-1-030821	08 Mar 2021 00:00			11 Mar 2021 15:35	1
HS21030490-05	MW-6D	08 Mar 2021 09:35			11 Mar 2021 15:57	1
HS21030490-06	MW-17	08 Mar 2021 10:20			11 Mar 2021 20:16	1
HS21030490-07	EB-1-030821	08 Mar 2021 10:25			11 Mar 2021 13:42	1
HS21030490-08	MW-5	08 Mar 2021 11:15			11 Mar 2021 17:12	50
HS21030490-09	MW-8	08 Mar 2021 12:10			11 Mar 2021 17:37	50
HS21030490-11	EB-2-030821	08 Mar 2021 12:20			11 Mar 2021 14:04	1
HS21030490-12	FB-2-030821	08 Mar 2021 12:15			11 Mar 2021 14:27	1
HS21030490-13	MW-11	08 Mar 2021 13:00			11 Mar 2021 16:22	5
HS21030490-14	MW-10	08 Mar 2021 13:45			11 Mar 2021 16:47	5

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
WorkOrder: HS21030490

QC BATCH REPORT

Batch ID: 163314 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

MBLK Sample ID: **MBLK-163314** Units: **ug/L** Analysis Date: **11-Mar-2021 14:08**
Client ID: Run ID: **SV-6_379454** SeqNo: **5990164** PrepDate: **10-Mar-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	< 0.100	0.100								
Acenaphthylene	< 0.100	0.100								
Anthracene	< 0.100	0.100								
Benz(a)anthracene	< 0.100	0.100								
Benzo(a)pyrene	< 0.100	0.100								
Benzo(b)fluoranthene	< 0.100	0.100								
Benzo(g,h,i)perylene	< 0.100	0.100								
Benzo(k)fluoranthene	< 0.100	0.100								
Chrysene	< 0.100	0.100								
Dibenz(a,h)anthracene	< 0.100	0.100								
Fluoranthene	< 0.100	0.100								
Fluorene	< 0.100	0.100								
Indeno(1,2,3-cd)pyrene	< 0.100	0.100								
Naphthalene	< 0.100	0.100								
Phenanthrene	< 0.100	0.100								
Pyrene	< 0.100	0.100								
Surr: 2-Fluorobiphenyl	*3.005*	*0.100*	*3.03*	*0*	*99.2*	*32 - 130*				
Surr: 4-Terphenyl-d14	*2.543*	*0.100*	*3.03*	*0*	*83.9*	*40 - 135*				
Surr: Nitrobenzene-d5	*3.625*	*0.100*	*3.03*	*0*	*120*	*45 - 142*				

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
WorkOrder: HS21030490

QC BATCH REPORT

Batch ID: 163314 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

LCS Sample ID: **LCS-163314** Units: **ug/L** Analysis Date: **11-Mar-2021 12:27**
Client ID: Run ID: **SV-6_379454** SeqNo: **5990161** PrepDate: **10-Mar-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	3.128	0.100	3.03	0	103	40 - 140				
Acenaphthylene	2.986	0.100	3.03	0	98.5	40 - 140				
Anthracene	2.25	0.100	3.03	0	74.3	40 - 140				
Benz(a)anthracene	2.615	0.100	3.03	0	86.3	40 - 140				
Benzo(a)pyrene	2.56	0.100	3.03	0	84.5	40 - 140				
Benzo(b)fluoranthene	2.859	0.100	3.03	0	94.4	40 - 140				
Benzo(g,h,i)perylene	2.254	0.100	3.03	0	74.4	40 - 140				
Benzo(k)fluoranthene	2.807	0.100	3.03	0	92.6	40 - 140				
Chrysene	2.657	0.100	3.03	0	87.7	40 - 140				
Dibenz(a,h)anthracene	1.887	0.100	3.03	0	62.3	40 - 140				
Fluoranthene	2.291	0.100	3.03	0	75.6	40 - 140				
Fluorene	3.159	0.100	3.03	0	104	40 - 140				
Indeno(1,2,3-cd)pyrene	2.83	0.100	3.03	0	93.4	40 - 140				
Naphthalene	3.623	0.100	3.03	0	120	40 - 140				
Phenanthrene	2.351	0.100	3.03	0	77.6	40 - 140				
Pyrene	2.196	0.100	3.03	0	72.5	40 - 140				
Surr: 2-Fluorobiphenyl	*2.701*	*0.100*	*3.03*	*0*	*89.1*	*32 - 130*				
Surr: 4-Terphenyl-d14	*1.963*	*0.100*	*3.03*	*0*	*64.8*	*40 - 135*				
Surr: Nitrobenzene-d5	*2.3*	*0.100*	*3.03*	*0*	*75.9*	*45 - 142*				

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
WorkOrder: HS21030490

QC BATCH REPORT

Batch ID: 163314 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

LCSD Sample ID: **LCSD-163314** Units: **ug/L** Analysis Date: **11-Mar-2021 12:46**
Client ID: Run ID: **SV-6_379454** SeqNo: **5990162** PrepDate: **10-Mar-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	3.12	0.100	3.03	0	103	40 - 140	3.128	0.246	25	
Acenaphthylene	3.072	0.100	3.03	0	101	40 - 140	2.986	2.85	25	
Anthracene	3.193	0.100	3.03	0	105	40 - 140	2.25	34.6	25	R
Benz(a)anthracene	2.808	0.100	3.03	0	92.7	40 - 140	2.615	7.11	25	
Benzo(a)pyrene	2.861	0.100	3.03	0	94.4	40 - 140	2.56	11.1	25	
Benzo(b)fluoranthene	3.016	0.100	3.03	0	99.5	40 - 140	2.859	5.32	25	
Benzo(g,h,i)perylene	2.604	0.100	3.03	0	85.9	40 - 140	2.254	14.4	25	
Benzo(k)fluoranthene	2.428	0.100	3.03	0	80.1	40 - 140	2.807	14.5	25	
Chrysene	2.934	0.100	3.03	0	96.8	40 - 140	2.657	9.89	25	
Dibenz(a,h)anthracene	2.527	0.100	3.03	0	83.4	40 - 140	1.887	29	25	R
Fluoranthene	2.94	0.100	3.03	0	97.0	40 - 140	2.291	24.8	25	
Fluorene	3.143	0.100	3.03	0	104	40 - 140	3.159	0.506	25	
Indeno(1,2,3-cd)pyrene	3.32	0.100	3.03	0	110	40 - 140	2.83	15.9	25	
Naphthalene	3.287	0.100	3.03	0	108	40 - 140	3.623	9.74	25	
Phenanthrene	2.951	0.100	3.03	0	97.4	40 - 140	2.351	22.6	25	
Pyrene	2.549	0.100	3.03	0	84.1	40 - 140	2.196	14.9	25	
Surr: 2-Fluorobiphenyl	*2.726*	*0.100*	*3.03*	*0*	*90.0*	*32 - 130*	*2.701*	*0.916*	*25*	
Surr: 4-Terphenyl-d14	*2.365*	*0.100*	*3.03*	*0*	*78.1*	*40 - 135*	*1.963*	*18.6*	*25*	
Surr: Nitrobenzene-d5	*2.6*	*0.100*	*3.03*	*0*	*85.8*	*45 - 142*	*2.3*	*12.2*	*25*	

The following samples were analyzed in this batch: HS21030490-09 HS21030490-10 HS21030490-11 HS21030490-12

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
WorkOrder: HS21030490

QC BATCH REPORT

Batch ID: R379539 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-210311** Units: **ug/L** Analysis Date: **11-Mar-2021 12:57**
Client ID: Run ID: **VOA7_379539** SeqNo: **5992153** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 1.0	1.0								
Surr: 1,2-Dichloroethane-d4	*51.94*	*1.0*	*50*	*0*	*104*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*48.02*	*1.0*	*50*	*0*	*96.0*	*82 - 115*				
Surr: Dibromofluoromethane	*49.54*	*1.0*	*50*	*0*	*99.1*	*73 - 126*				
Surr: Toluene-d8	*49.76*	*1.0*	*50*	*0*	*99.5*	*81 - 120*				

LCS Sample ID: **VLCSW-210311** Units: **ug/L** Analysis Date: **11-Mar-2021 12:11**
Client ID: Run ID: **VOA7_379539** SeqNo: **5992152** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	17.64	1.0	20	0	88.2	74 - 120				
Surr: 1,2-Dichloroethane-d4	*50.4*	*1.0*	*50*	*0*	*101*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*50.59*	*1.0*	*50*	*0*	*101*	*82 - 115*				
Surr: Dibromofluoromethane	*47.86*	*1.0*	*50*	*0*	*95.7*	*73 - 126*				
Surr: Toluene-d8	*48.82*	*1.0*	*50*	*0*	*97.6*	*81 - 120*				

MS Sample ID: **HS21030490-01MS** Units: **ug/L** Analysis Date: **11-Mar-2021 18:00**
Client ID: **MW-3S** Run ID: **VOA7_379539** SeqNo: **5992166** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	17.56	1.0	20	0	87.8	70 - 127				
Surr: 1,2-Dichloroethane-d4	*51.43*	*1.0*	*50*	*0*	*103*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*50.69*	*1.0*	*50*	*0*	*101*	*81 - 113*				
Surr: Dibromofluoromethane	*48.67*	*1.0*	*50*	*0*	*97.3*	*77 - 123*				
Surr: Toluene-d8	*50.5*	*1.0*	*50*	*0*	*101*	*82 - 127*				

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
WorkOrder: HS21030490

QC BATCH REPORT

Batch ID: R379539 (0) **Instrument:** VOA7 **Method:** LOW LEVEL VOLATILES BY SW8260C

MSD Sample ID: **HS21030490-01MSD** Units: **ug/L** Analysis Date: **11-Mar-2021 18:23**
Client ID: **MW-3S** Run ID: **VOA7_379539** SeqNo: **5992167** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	17.1	1.0	20	0	85.5	70 - 127	17.56	2.66	20	
Surr: 1,2-Dichloroethane-d4	*50.3*	*1.0*	*50*	*0*	*101*	*70 - 126*	*51.43*	*2.22*	*20*	
Surr: 4-Bromofluorobenzene	*51.01*	*1.0*	*50*	*0*	*102*	*81 - 113*	*50.69*	*0.638*	*20*	
Surr: Dibromofluoromethane	*48.55*	*1.0*	*50*	*0*	*97.1*	*77 - 123*	*48.67*	*0.252*	*20*	
Surr: Toluene-d8	*49.65*	*1.0*	*50*	*0*	*99.3*	*82 - 127*	*50.5*	*1.69*	*20*	

The following samples were analyzed in this batch:

HS21030490-01	HS21030490-02	HS21030490-03	HS21030490-04
HS21030490-05	HS21030490-06	HS21030490-07	HS21030490-08
HS21030490-09	HS21030490-11	HS21030490-12	HS21030490-13
HS21030490-14			

ALS Houston, US Date: 16-Mar-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 1Q2021
WorkOrder: **HS21030490**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/L	Milligrams per Liter

ALS Houston, US Date: 16-Mar-21

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	20-030-0	26-Mar-2021
California	2919, 2020-2021	30-Apr-2021
Dept of Defense	PJLA L20-507-R2	22-Dec-2021
Florida	E87611-30-07/01/2020	30-Jun-2021
Illinois	2000322020-4	09-May-2021
Kansas	E-10352 2020-2021	31-Jul-2021
Kentucky	123043, 2020-2021	30-Apr-2021
Louisiana	03087, 2020-2021	30-Jun-2021
North Carolina	624-2021	31-Dec-2021
North Dakota	R-193 2020-2021	30-Apr-2021
Oklahoma	2020-165	31-Aug-2021
Texas	T104704231-20-26	30-Apr-2021

ALS Houston, US Date: 16-Mar-21

Sample Receipt Checklist

Work Order ID: HS21030490 **Date/Time Received:** 09-Mar-2021 10:15

Client Name: Arcadis-Baton Rouge **Received by:** Jared R. Makan

Completed By:	/S/ Pablo Marinez	09-Mar-2021 18:32	**Reviewed by:**	/S/ Dane J. Wacasey	16-Mar-2021 12:05
	eSignature	Date/Time		eSignature	Date/Time

Matrices: **WATER** Carrier name: **FedEx**

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	2 Page(s)
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	COC IDs:234074/234075
Samplers name present on COC?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	1.3°C UC/C	IR 31	
Cooler(s)/Kit(s):	46941		
Date/Time sample(s) sent to storage:	3/9/21 18:45		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:			

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

Cincinnati, OH +1 513 733 5336
Fort Collins, CO +1 970 490 1511
Everett, WA +1 425 356 2600
Holland, MI +1 616 399 6070

Chain of Custody Form

Page 1 of 2

COC ID: 234074

HS21030490

ARCADIS U.S., Inc.
Brickland Refinery 1Q2021

ALS Project Manager:

Customer Information		Project Information	
Purchase Order		Project Name	Brickland Refinery 1Q2021
Work Order		Project Number	
Company Name	ARCADIS U.S., Inc.	Bill To Company	ARCADIS
Send Report To	Brooke Fontenot	Invoice Attn	Accounts Payable
Address	10352 Plaza Americana Drive	Address	630 Plaza Drive, Suite 600
City/State/Zip	Baton Rouge, LA 70816	City/State/Zip	Highlands Ranch CO 80129
Phone	(225) 292-1004	Phone	(303) 471-3683
Fax		Fax	
e-Mail Address	Brooke.Fontenot@arcadis-us.com	e-Mail Address	Accountspayable.administration@arcadi

	A	B	C	D	E	F	G	H	I	J
A	8260_LL_W (8260 Benzene (*Unpreserved*)-7 day H-T									
B	8270_PAH_LVI (8270 PAHs (LVI))									
C										
D										
E										
F										
G										
H										
I										
J										

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-35	3/8/21	0820	W	8	3	X										
2	MW-30 Time: 0850	3/8/21	~~0935~~	W	8	3	X										
3	FB-1-030821	3/8/21	0855	W	8	3	X										
4	FD-1-030821	3/8/21	—	W	8	3	X										
5	MW-60	3/8/21	0935	W	8	3	X										
6	MW-17	3/8/21	1020	W	8	3	X										
7	EB-1-030821	3/8/21	1025	W	8	3	X										
8	MW-5	3/8/21	1115	W	8	3	X										
9	MW-8	3/8/21	1210	W	8	6	X	X									
10	FD-2-030821	3/8/21	—	W	8	3		X									

Sampler(s) Please Print & Sign: Sergio Celis

Shipment Method:

Required Turnaround Time: (Check Box) ☐ Other ☒ STD 10 Work Days ☐ 5 Work Days ☐ 2 Work Days ☐ 24 Hours

Results Due Date:

Relinquished by: Date: 3/8/21 Time: 1700 Received by:

Relinquished by: Date: 3/9/21 Time: 1015 Received by (Laboratory): J. Mercado

Logged by (Laboratory): Date: Time: Checked by (Laboratory):

Notes: [AGM Brickland NM]

Cooler ID	Cooler Temp.
46941	1.3°C

QC Package: (Check One Box Below)
☒ Level II Std QC
☐ Level III Std QC/Raw Data
☐ Level IV Std QC/Raw Data
☐ TRRP Checklist
☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

1443 CFo

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

Cincinnati, OH +1 513 733 5336
Fort Collins, CO +1 970 490 1511
Everett, WA +1 425 356 2600
Holland, MI +1 616 399 6070

Chain of Custody Form

Page 2 of 2

COC ID: 234075

HS21030490

ARCADIS U.S., Inc.
Brickland Refinery 1Q2021

ALS Project Manager:

Customer Information		Project Information	
Purchase Order		Project Name	Brickland Refinery 1Q2021
Work Order		Project Number	
Company Name	ARCADIS U.S., Inc.	Bill To Company	ARCADIS
Send Report To	Brooke Fontenot	Invoice Attn	Accounts Payable
Address	10352 Plaza Americana Drive	Address	630 Plaza Drive, Suite 600
City/State/Zip	Baton Rouge, LA 70816	City/State/Zip	Highlands Ranch CO 80129
Phone	(225) 292-1004	Phone	(303) 471-3699
Fax		Fax	
e-Mail Address	Brooke.Fontenot@arcadis-us.com	e-Mail Address	Accountspayable.administration@arcadis

A: 8260_LL_W (8260 Benzene) *Unpreserved*)-7 day HT
B: 8270_PAH_LVI (8270 PAHs (LVI))
C
D
E
F
G
H
I
J

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	EB-2-030821	3/8/21	1220	W	8	6	X	X									
2	FB-2-030821	3/8/21	1215	W	8	6	X	X									
3	MW-11	3/8/21	1300	W	8	3	X										
4	MW-10	3/8/21	1345	W	8	3	X										
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Sergio Calis

Shipment Method:

Required Turnaround Time: (Check Box) [X] STD 10 Wk Days [ ] 5 Wk Days [ ] 2 Wk Days [ ] 24 Hour [ ] Other

Results Due Date:

Relinquished by: Date: 3/8/21 Time: 1700 Received by:

Relinquished by: Date: 3/9/21 Time: 10:15 Received by (Laboratory): J. Moreno

Logged by (Laboratory): Date: Time: Checked by (Laboratory):

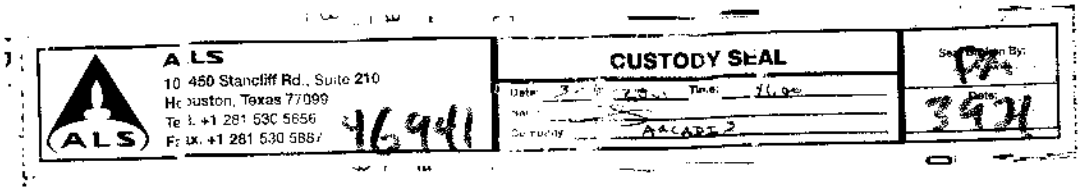
Notes: [AGM Brickland NM]

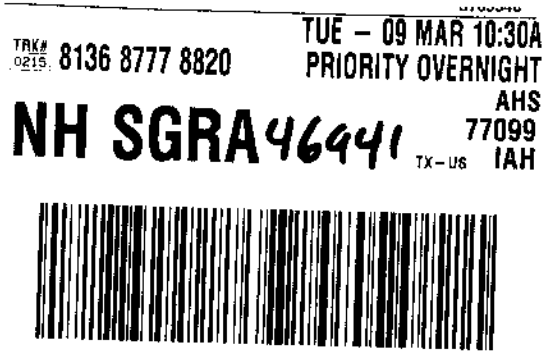
Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
[X] Level II Std. QC
[ ] Level II Std. QC/Raw Data
[ ] NELAC/ELAP
[ ] TRRP Checklist
[ ] TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.





10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

June 07, 2021

Brooke Fontenot
ARCADIS U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge, LA 70816

Work Order: **HS21060128**

Laboratory Results for: **Brickland Refinery 2Q2021**

Dear Brooke Fontenot,

ALS Environmental received 14 sample(s) on Jun 02, 2021 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: DANE.WACASEY
Dane J. Wacasey

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Work Order: HS21060128

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS21060128-01	MW-3S	Water		01-Jun-2021 08:50	02-Jun-2021 14:25	☐
HS21060128-02	MW-3D	Water		01-Jun-2021 09:25	02-Jun-2021 14:25	☐
HS21060128-03	FB1-060121	Water		01-Jun-2021 09:30	02-Jun-2021 14:25	☐
HS21060128-04	FD1-060121	Water		01-Jun-2021 00:00	02-Jun-2021 14:25	☐
HS21060128-05	MW-6D	Water		01-Jun-2021 10:00	02-Jun-2021 14:25	☐
HS21060128-06	MW-17	Water		01-Jun-2021 10:55	02-Jun-2021 14:25	☐
HS21060128-07	EB1-060121	Water		01-Jun-2021 11:00	02-Jun-2021 14:25	☐
HS21060128-08	MW-5	Water		01-Jun-2021 11:35	02-Jun-2021 14:25	☐
HS21060128-09	MW-8	Water		01-Jun-2021 12:10	02-Jun-2021 14:25	☐
HS21060128-10	FD2-060121	Water		01-Jun-2021 00:00	02-Jun-2021 14:25	☐
HS21060128-11	EB2-060121	Water		01-Jun-2021 12:20	02-Jun-2021 14:25	☐
HS21060128-12	FB2-060121	Water		01-Jun-2021 12:15	02-Jun-2021 14:25	☐
HS21060128-13	MW-11	Water		01-Jun-2021 13:00	02-Jun-2021 14:25	☐
HS21060128-14	MW-10	Water		01-Jun-2021 13:35	02-Jun-2021 14:25	☐

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Work Order: HS21060128

CASE NARRATIVE

GCMS Semivolatiles by Method SW8270

Batch ID: 166444

Sample ID: LCSD-166444

- The RPD between the LCS and LCSD was outside of the control limit for select analytes.

GCMS Volatiles by Method SW8260

Batch ID: R385056

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: MW-3S
Collection Date: 01-Jun-2021 08:50

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-01
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 15:55
Surr: 1,2-Dichloroethane-d4	*121*		*70-126*	*%REC*	*1*	*05-Jun-2021 15:55*
Surr: 4-Bromofluorobenzene	*102*		*81-113*	*%REC*	*1*	*05-Jun-2021 15:55*
Surr: Dibromofluoromethane	*109*		*77-123*	*%REC*	*1*	*05-Jun-2021 15:55*
Surr: Toluene-d8	*105*		*82-127*	*%REC*	*1*	*05-Jun-2021 15:55*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: MW-3D
Collection Date: 01-Jun-2021 09:25

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-02
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 17:19
Surr: 1,2-Dichloroethane-d4	*122*		*70-126*	*%REC*	*1*	*05-Jun-2021 17:19*
Surr: 4-Bromofluorobenzene	*103*		*81-113*	*%REC*	*1*	*05-Jun-2021 17:19*
Surr: Dibromofluoromethane	*110*		*77-123*	*%REC*	*1*	*05-Jun-2021 17:19*
Surr: Toluene-d8	*103*		*82-127*	*%REC*	*1*	*05-Jun-2021 17:19*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: FB1-060121
Collection Date: 01-Jun-2021 09:30

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-03
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 14:31
Surr: 1,2-Dichloroethane-d4	*121*		*70-126*	*%REC*	*1*	*05-Jun-2021 14:31*
Surr: 4-Bromofluorobenzene	*103*		*81-113*	*%REC*	*1*	*05-Jun-2021 14:31*
Surr: Dibromofluoromethane	*109*		*77-123*	*%REC*	*1*	*05-Jun-2021 14:31*
Surr: Toluene-d8	*104*		*82-127*	*%REC*	*1*	*05-Jun-2021 14:31*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: FD1-060121
Collection Date: 01-Jun-2021 00:00

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-04
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 17:40
Surr: 1,2-Dichloroethane-d4	*121*		*70-126*	*%REC*	*1*	*05-Jun-2021 17:40*
Surr: 4-Bromofluorobenzene	*103*		*81-113*	*%REC*	*1*	*05-Jun-2021 17:40*
Surr: Dibromofluoromethane	*108*		*77-123*	*%REC*	*1*	*05-Jun-2021 17:40*
Surr: Toluene-d8	*104*		*82-127*	*%REC*	*1*	*05-Jun-2021 17:40*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: MW-6D
Collection Date: 01-Jun-2021 10:00

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-05
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 18:01
Surr: 1,2-Dichloroethane-d4	*122*		*70-126*	*%REC*	*1*	*05-Jun-2021 18:01*
Surr: 4-Bromofluorobenzene	*101*		*81-113*	*%REC*	*1*	*05-Jun-2021 18:01*
Surr: Dibromofluoromethane	*108*		*77-123*	*%REC*	*1*	*05-Jun-2021 18:01*
Surr: Toluene-d8	*105*		*82-127*	*%REC*	*1*	*05-Jun-2021 18:01*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: MW-17
Collection Date: 01-Jun-2021 10:55

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-06
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 18:22
Surr: 1,2-Dichloroethane-d4	*120*		*70-126*	*%REC*	*1*	*05-Jun-2021 18:22*
Surr: 4-Bromofluorobenzene	*105*		*81-113*	*%REC*	*1*	*05-Jun-2021 18:22*
Surr: Dibromofluoromethane	*109*		*77-123*	*%REC*	*1*	*05-Jun-2021 18:22*
Surr: Toluene-d8	*104*		*82-127*	*%REC*	*1*	*05-Jun-2021 18:22*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: EB1-060121
Collection Date: 01-Jun-2021 11:00

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-07
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 14:52
Surr: 1,2-Dichloroethane-d4	*120*		*70-126*	*%REC*	*1*	*05-Jun-2021 14:52*
Surr: 4-Bromofluorobenzene	*102*		*81-113*	*%REC*	*1*	*05-Jun-2021 14:52*
Surr: Dibromofluoromethane	*108*		*77-123*	*%REC*	*1*	*05-Jun-2021 14:52*
Surr: Toluene-d8	*104*		*82-127*	*%REC*	*1*	*05-Jun-2021 14:52*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: MW-5
Collection Date: 01-Jun-2021 11:35

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-08
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	**0.15**		**0.0050**	**mg/L**	5	05-Jun-2021 20:51
Surr: 1,2-Dichloroethane-d4	*120*		*70-126*	*%REC*	*5*	*05-Jun-2021 20:51*
Surr: 4-Bromofluorobenzene	*104*		*81-113*	*%REC*	*5*	*05-Jun-2021 20:51*
Surr: Dibromofluoromethane	*108*		*77-123*	*%REC*	*5*	*05-Jun-2021 20:51*
Surr: Toluene-d8	*105*		*82-127*	*%REC*	*5*	*05-Jun-2021 20:51*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: MW-8
Collection Date: 01-Jun-2021 12:10

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-09
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	**0.22**		**0.010**	**mg/L**	10	05-Jun-2021 21:37
Surr: 1,2-Dichloroethane-d4	*117*		*70-126*	*%REC*	*10*	*05-Jun-2021 21:37*
Surr: 4-Bromofluorobenzene	*105*		*81-113*	*%REC*	*10*	*05-Jun-2021 21:37*
Surr: Dibromofluoromethane	*107*		*77-123*	*%REC*	*10*	*05-Jun-2021 21:37*
Surr: Toluene-d8	*103*		*82-127*	*%REC*	*10*	*05-Jun-2021 21:37*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 02-Jun-2021		Analyst: ACN
Acenaphthene	**0.000201**		**0.000106**	**mg/L**	1	03-Jun-2021 20:54
Acenaphthylene	**0.000106**		**0.000106**	**mg/L**	1	03-Jun-2021 20:54
Anthracene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Benz(a)anthracene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Benzo(a)pyrene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Benzo(b)fluoranthene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Benzo(g,h,i)perylene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Benzo(k)fluoranthene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Chrysene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Dibenz(a,h)anthracene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Fluoranthene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Fluorene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Indeno(1,2,3-cd)pyrene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Naphthalene	**0.000187**		**0.000106**	**mg/L**	1	03-Jun-2021 20:54
Phenanthrene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Pyrene	< 0.000106		0.000106	mg/L	1	03-Jun-2021 20:54
Surr: 2-Fluorobiphenyl	*121*		*32-130*	*%REC*	*1*	*03-Jun-2021 20:54*
Surr: 4-Terphenyl-d14	*92.1*		*40-135*	*%REC*	*1*	*03-Jun-2021 20:54*
Surr: Nitrobenzene-d5	*84.9*		*45-142*	*%REC*	*1*	*03-Jun-2021 20:54*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: FD2-060121
Collection Date: 01-Jun-2021 00:00

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-10
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS - 8270D	**Method:SW8270**			Prep:SW3511 / 02-Jun-2021		Analyst: ACN
Acenaphthene	**0.000149**		**0.000105**	**mg/L**	1	03-Jun-2021 21:13
Acenaphthylene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Anthracene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Benz(a)anthracene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Benzo(a)pyrene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Benzo(b)fluoranthene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Benzo(g,h,i)perylene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Benzo(k)fluoranthene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Chrysene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Dibenz(a,h)anthracene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Fluoranthene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Fluorene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Indeno(1,2,3-cd)pyrene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Naphthalene	**0.000148**		**0.000105**	**mg/L**	1	03-Jun-2021 21:13
Phenanthrene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Pyrene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:13
Surr: 2-Fluorobiphenyl	*82.0*		*32-130*	*%REC*	*1*	*03-Jun-2021 21:13*
Surr: 4-Terphenyl-d14	*83.7*		*40-135*	*%REC*	*1*	*03-Jun-2021 21:13*
Surr: Nitrobenzene-d5	*89.6*		*45-142*	*%REC*	*1*	*03-Jun-2021 21:13*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: EB2-060121
Collection Date: 01-Jun-2021 12:20

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-11
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 15:13
Surr: 1,2-Dichloroethane-d4	*120*		*70-126*	*%REC*	*1*	*05-Jun-2021 15:13*
Surr: 4-Bromofluorobenzene	*102*		*81-113*	*%REC*	*1*	*05-Jun-2021 15:13*
Surr: Dibromofluoromethane	*109*		*77-123*	*%REC*	*1*	*05-Jun-2021 15:13*
Surr: Toluene-d8	*105*		*82-127*	*%REC*	*1*	*05-Jun-2021 15:13*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 02-Jun-2021		Analyst: ACN
Acenaphthene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Acenaphthylene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Anthracene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Benz(a)anthracene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Benzo(a)pyrene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Benzo(b)fluoranthene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Benzo(g,h,i)perylene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Benzo(k)fluoranthene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Chrysene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Dibenz(a,h)anthracene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Fluoranthene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Fluorene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Indeno(1,2,3-cd)pyrene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Naphthalene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Phenanthrene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Pyrene	< 0.000105		0.000105	mg/L	1	03-Jun-2021 21:33
Surr: 2-Fluorobiphenyl	*106*		*32-130*	*%REC*	*1*	*03-Jun-2021 21:33*
Surr: 4-Terphenyl-d14	*106*		*40-135*	*%REC*	*1*	*03-Jun-2021 21:33*
Surr: Nitrobenzene-d5	*117*		*45-142*	*%REC*	*1*	*03-Jun-2021 21:33*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: FB2-060121
Collection Date: 01-Jun-2021 12:15

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-12
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 15:34
Surr: 1,2-Dichloroethane-d4	*119*		*70-126*	*%REC*	*1*	*05-Jun-2021 15:34*
Surr: 4-Bromofluorobenzene	*103*		*81-113*	*%REC*	*1*	*05-Jun-2021 15:34*
Surr: Dibromofluoromethane	*107*		*77-123*	*%REC*	*1*	*05-Jun-2021 15:34*
Surr: Toluene-d8	*105*		*82-127*	*%REC*	*1*	*05-Jun-2021 15:34*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 02-Jun-2021		Analyst: ACN
Acenaphthene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Acenaphthylene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Anthracene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Benz(a)anthracene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Benzo(a)pyrene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Benzo(b)fluoranthene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Benzo(g,h,i)perylene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Benzo(k)fluoranthene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Chrysene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Dibenz(a,h)anthracene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Fluoranthene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Fluorene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Indeno(1,2,3-cd)pyrene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Naphthalene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Phenanthrene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Pyrene	< 0.000104		0.000104	mg/L	1	03-Jun-2021 21:53
Surr: 2-Fluorobiphenyl	*95.1*		*32-130*	*%REC*	*1*	*03-Jun-2021 21:53*
Surr: 4-Terphenyl-d14	*103*		*40-135*	*%REC*	*1*	*03-Jun-2021 21:53*
Surr: Nitrobenzene-d5	*81.7*		*45-142*	*%REC*	*1*	*03-Jun-2021 21:53*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: MW-11
Collection Date: 01-Jun-2021 13:00

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-13
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 18:43
Surr: 1,2-Dichloroethane-d4	*122*		*70-126*	*%REC*	*1*	*05-Jun-2021 18:43*
Surr: 4-Bromofluorobenzene	*105*		*81-113*	*%REC*	*1*	*05-Jun-2021 18:43*
Surr: Dibromofluoromethane	*109*		*77-123*	*%REC*	*1*	*05-Jun-2021 18:43*
Surr: Toluene-d8	*104*		*82-127*	*%REC*	*1*	*05-Jun-2021 18:43*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
Sample ID: MW-10
Collection Date: 01-Jun-2021 13:35

ANALYTICAL REPORT
WorkOrder:HS21060128
Lab ID:HS21060128-14
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	05-Jun-2021 19:04
Surr: 1,2-Dichloroethane-d4	*122*		*70-126*	*%REC*	*1*	*05-Jun-2021 19:04*
Surr: 4-Bromofluorobenzene	*107*		*81-113*	*%REC*	*1*	*05-Jun-2021 19:04*
Surr: Dibromofluoromethane	*110*		*77-123*	*%REC*	*1*	*05-Jun-2021 19:04*
Surr: Toluene-d8	*104*		*82-127*	*%REC*	*1*	*05-Jun-2021 19:04*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 07-Jun-21

Weight / Prep Log

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
WorkOrder: HS21060128

Batch ID: 166444 **Start Date:** 02 Jun 2021 09:00 **End Date:**
Method: SW3511 **Prep Code:** 3511_PAH

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS21060128-09		31.23 (mL)	2 (mL)	0.06404	40 mL Amber
HS21060128-10		31.41 (mL)	2 (mL)	0.06367	40 mL Amber
HS21060128-11		31.55 (mL)	2 (mL)	0.06339	40 mL Amber
HS21060128-12		31.65 (mL)	2 (mL)	0.06319	40 mL Amber

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
WorkOrder: HS21060128

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 166444 (0)	**Test Name :** LOW-LEVEL PAHS - 8270D				**Matrix:** Water	
HS21060128-09	MW-8	01 Jun 2021 12:10		02 Jun 2021 09:00	03 Jun 2021 20:54	1
HS21060128-10	FD2-060121	01 Jun 2021 00:00		02 Jun 2021 09:00	03 Jun 2021 21:13	1
HS21060128-11	EB2-060121	01 Jun 2021 12:20		02 Jun 2021 09:00	03 Jun 2021 21:33	1
HS21060128-12	FB2-060121	01 Jun 2021 12:15		02 Jun 2021 09:00	03 Jun 2021 21:53	1
Batch ID: R385056 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Water	
HS21060128-01	MW-3S	01 Jun 2021 08:50			05 Jun 2021 15:55	1
HS21060128-02	MW-3D	01 Jun 2021 09:25			05 Jun 2021 17:19	1
HS21060128-03	FB1-060121	01 Jun 2021 09:30			05 Jun 2021 14:31	1
HS21060128-04	FD1-060121	01 Jun 2021 00:00			05 Jun 2021 17:40	1
HS21060128-05	MW-6D	01 Jun 2021 10:00			05 Jun 2021 18:01	1
HS21060128-06	MW-17	01 Jun 2021 10:55			05 Jun 2021 18:22	1
HS21060128-07	EB1-060121	01 Jun 2021 11:00			05 Jun 2021 14:52	1
HS21060128-08	MW-5	01 Jun 2021 11:35			05 Jun 2021 20:51	5
HS21060128-09	MW-8	01 Jun 2021 12:10			05 Jun 2021 21:37	10
HS21060128-11	EB2-060121	01 Jun 2021 12:20			05 Jun 2021 15:13	1
HS21060128-12	FB2-060121	01 Jun 2021 12:15			05 Jun 2021 15:34	1
HS21060128-13	MW-11	01 Jun 2021 13:00			05 Jun 2021 18:43	1
HS21060128-14	MW-10	01 Jun 2021 13:35			05 Jun 2021 19:04	1

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
WorkOrder: HS21060128

QC BATCH REPORT

Batch ID: 166444 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

MBLK Sample ID: **MBLK-166444** Units: **ug/L** Analysis Date: **02-Jun-2021 11:50**
Client ID: Run ID: **SV-6_384865** SeqNo: **6120606** PrepDate: **02-Jun-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	< 0.100	0.100								
Acenaphthylene	< 0.100	0.100								
Anthracene	< 0.100	0.100								
Benz(a)anthracene	< 0.100	0.100								
Benzo(a)pyrene	< 0.100	0.100								
Benzo(b)fluoranthene	< 0.100	0.100								
Benzo(g,h,i)perylene	< 0.100	0.100								
Benzo(k)fluoranthene	< 0.100	0.100								
Chrysene	< 0.100	0.100								
Dibenz(a,h)anthracene	< 0.100	0.100								
Fluoranthene	< 0.100	0.100								
Fluorene	< 0.100	0.100								
Indeno(1,2,3-cd)pyrene	< 0.100	0.100								
Naphthalene	< 0.100	0.100								
Phenanthrene	< 0.100	0.100								
Pyrene	< 0.100	0.100								
Surr: 2-Fluorobiphenyl	*2.876*	*0.100*	*3.03*	*0*	*94.9*	*32 - 130*				
Surr: 4-Terphenyl-d14	*2.71*	*0.100*	*3.03*	*0*	*89.4*	*40 - 135*				
Surr: Nitrobenzene-d5	*1.783*	*0.100*	*3.03*	*0*	*58.8*	*45 - 142*				

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
WorkOrder: HS21060128

QC BATCH REPORT

Batch ID: 166444 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

LCS Sample ID: **LCS-166444** Units: **ug/L** Analysis Date: **02-Jun-2021 11:30**
Client ID: Run ID: **SV-6_384865** SeqNo: **6120605** PrepDate: **02-Jun-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	3.297	0.100	3.03	0	109	40 - 140				
Acenaphthylene	3.24	0.100	3.03	0	107	40 - 140				
Anthracene	2.684	0.100	3.03	0	88.6	40 - 140				
Benz(a)anthracene	2.776	0.100	3.03	0	91.6	40 - 140				
Benzo(a)pyrene	2.927	0.100	3.03	0	96.6	40 - 140				
Benzo(b)fluoranthene	2.865	0.100	3.03	0	94.5	40 - 140				
Benzo(g,h,i)perylene	2.877	0.100	3.03	0	94.9	40 - 140				
Benzo(k)fluoranthene	3.051	0.100	3.03	0	101	40 - 140				
Chrysene	3.998	0.100	3.03	0	132	40 - 140				
Dibenz(a,h)anthracene	2.798	0.100	3.03	0	92.4	40 - 140				
Fluoranthene	2.548	0.100	3.03	0	84.1	40 - 140				
Fluorene	2.83	0.100	3.03	0	93.4	40 - 140				
Indeno(1,2,3-cd)pyrene	2.535	0.100	3.03	0	83.7	40 - 140				
Naphthalene	2.475	0.100	3.03	0	81.7	40 - 140				
Phenanthrene	2.626	0.100	3.03	0	86.7	40 - 140				
Pyrene	3.055	0.100	3.03	0	101	40 - 140				
Surr: 2-Fluorobiphenyl	*3.433*	*0.100*	*3.03*	*0*	*113*	*32 - 130*				
Surr: 4-Terphenyl-d14	*2.942*	*0.100*	*3.03*	*0*	*97.1*	*40 - 135*				
Surr: Nitrobenzene-d5	*2.844*	*0.100*	*3.03*	*0*	*93.9*	*45 - 142*				

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
WorkOrder: HS21060128

QC BATCH REPORT

Batch ID: 166444 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

LCSD Sample ID: **LCSD-166444** Units: **ug/L** Analysis Date: **02-Jun-2021 12:10**
Client ID: Run ID: **SV-6_384865** SeqNo: **6120607** PrepDate: **02-Jun-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	3.293	0.100	3.03	0	109	40 - 140	3.297	0.131	25	
Acenaphthylene	3.204	0.100	3.03	0	106	40 - 140	3.24	1.11	25	
Anthracene	2.467	0.100	3.03	0	81.4	40 - 140	2.684	8.44	25	
Benz(a)anthracene	2.436	0.100	3.03	0	80.4	40 - 140	2.776	13	25	
Benzo(a)pyrene	2.22	0.100	3.03	0	73.3	40 - 140	2.927	27.5	25	R
Benzo(b)fluoranthene	2.241	0.100	3.03	0	74.0	40 - 140	2.865	24.4	25	
Benzo(g,h,i)perylene	2.711	0.100	3.03	0	89.5	40 - 140	2.877	5.94	25	
Benzo(k)fluoranthene	2.703	0.100	3.03	0	89.2	40 - 140	3.051	12.1	25	
Chrysene	3.3	0.100	3.03	0	109	40 - 140	3.998	19.1	25	
Dibenz(a,h)anthracene	2.17	0.100	3.03	0	71.6	40 - 140	2.798	25.3	25	R
Fluoranthene	2.271	0.100	3.03	0	74.9	40 - 140	2.548	11.5	25	
Fluorene	2.793	0.100	3.03	0	92.2	40 - 140	2.83	1.29	25	
Indeno(1,2,3-cd)pyrene	2.892	0.100	3.03	0	95.5	40 - 140	2.535	13.2	25	
Naphthalene	2.314	0.100	3.03	0	76.4	40 - 140	2.475	6.73	25	
Phenanthrene	2.404	0.100	3.03	0	79.3	40 - 140	2.626	8.84	25	
Pyrene	2.791	0.100	3.03	0	92.1	40 - 140	3.055	9.03	25	
Surr: 2-Fluorobiphenyl	*3.283*	*0.100*	*3.03*	*0*	*108*	*32 - 130*	*3.433*	*4.47*	*25*	
Surr: 4-Terphenyl-d14	*2.717*	*0.100*	*3.03*	*0*	*89.7*	*40 - 135*	*2.942*	*7.94*	*25*	
Surr: Nitrobenzene-d5	*1.616*	*0.100*	*3.03*	*0*	*53.3*	*45 - 142*	*2.844*	*55.1*	*25*	R

The following samples were analyzed in this batch: HS21060128-09 HS21060128-10 HS21060128-11 HS21060128-12

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
WorkOrder: HS21060128

QC BATCH REPORT

Batch ID: R385056 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-210605** Units: **ug/L** Analysis Date: **05-Jun-2021 14:10**
Client ID: Run ID: **VOA7_385056** SeqNo: **6124705** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 1.0	1.0								
Surr: 1,2-Dichloroethane-d4	*60.03*	*1.0*	*50*	*0*	*120*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*51.42*	*1.0*	*50*	*0*	*103*	*82 - 115*				
Surr: Dibromofluoromethane	*53.95*	*1.0*	*50*	*0*	*108*	*73 - 126*				
Surr: Toluene-d8	*51.35*	*1.0*	*50*	*0*	*103*	*81 - 120*				

LCS Sample ID: **VLCSW-210605** Units: **ug/L** Analysis Date: **05-Jun-2021 13:28**
Client ID: Run ID: **VOA7_385056** SeqNo: **6124704** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	19.24	1.0	20	0	96.2	74 - 120				
Surr: 1,2-Dichloroethane-d4	*60.52*	*1.0*	*50*	*0*	*121*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*53.45*	*1.0*	*50*	*0*	*107*	*82 - 115*				
Surr: Dibromofluoromethane	*53.11*	*1.0*	*50*	*0*	*106*	*73 - 126*				
Surr: Toluene-d8	*52.34*	*1.0*	*50*	*0*	*105*	*81 - 120*				

MS Sample ID: **HS21060128-01MS** Units: **ug/L** Analysis Date: **05-Jun-2021 16:16**
Client ID: **MW-3S** Run ID: **VOA7_385056** SeqNo: **6124711** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	17.34	1.0	20	0	86.7	70 - 127				
Surr: 1,2-Dichloroethane-d4	*58.93*	*1.0*	*50*	*0*	*118*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*53.48*	*1.0*	*50*	*0*	*107*	*81 - 113*				
Surr: Dibromofluoromethane	*52.7*	*1.0*	*50*	*0*	*105*	*77 - 123*				
Surr: Toluene-d8	*52.23*	*1.0*	*50*	*0*	*104*	*82 - 127*				

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
WorkOrder: HS21060128

QC BATCH REPORT

Batch ID: R385056 (0) **Instrument:** VOA7 **Method:** LOW LEVEL VOLATILES BY SW8260C

MSD Sample ID: **HS21060128-01MSD** Units: **ug/L** Analysis Date: **05-Jun-2021 16:37**
Client ID: **MW-3S** Run ID: **VOA7_385056** SeqNo: **6124712** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	16.95	1.0	20	0	84.8	70 - 127	17.34	2.29	20	
Surr: 1,2-Dichloroethane-d4	*59.51*	*1.0*	*50*	*0*	*119*	*70 - 126*	*58.93*	*0.982*	*20*	
Surr: 4-Bromofluorobenzene	*53.31*	*1.0*	*50*	*0*	*107*	*81 - 113*	*53.48*	*0.308*	*20*	
Surr: Dibromofluoromethane	*52.64*	*1.0*	*50*	*0*	*105*	*77 - 123*	*52.7*	*0.121*	*20*	
Surr: Toluene-d8	*51.61*	*1.0*	*50*	*0*	*103*	*82 - 127*	*52.23*	*1.2*	*20*	

The following samples were analyzed in this batch:

HS21060128-01	HS21060128-02	HS21060128-03	HS21060128-04
HS21060128-05	HS21060128-06	HS21060128-07	HS21060128-08
HS21060128-09	HS21060128-11	HS21060128-12	HS21060128-13
HS21060128-14			

ALS Houston, US Date: 07-Jun-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery 2Q2021
WorkOrder: **HS21060128**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/L	Milligrams per Liter

ALS Houston, US Date: 07-Jun-21

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	21-022-0	26-Mar-2022
Dept of Defense	PJLA L20-507-R2	22-Dec-2021
Florida	E87611-30-07/01/2020	30-Jun-2021
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2020-2021	31-Jul-2021
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2020-2021	30-Jun-2021
North Carolina	624-2021	31-Dec-2021
Oklahoma	2020-165	31-Aug-2021
Texas	T104704231-21-27	30-Apr-2022
Utah	TX026932021-10	31-Jul-2021

ALS Houston, US Date: 07-Jun-21

Sample Receipt Checklist

Work Order ID: HS21060128 **Date/Time Received:** 02-Jun-2021 14:25

Client Name: Arcadis-Baton Rouge **Received by:** Jared R. Makan

Completed By:	/S/ Pablo Marinez	02-Jun-2021 19:02	**Reviewed by:**	/S/ Dane J. Wacasey	07-Jun-2021 17:15
	eSignature	Date/Time		eSignature	Date/Time

Matrices: **WATER** Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	2 Page(s)
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	COC IDs:234076/247076
Samplers name present on COC?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	

Temperature(s)/Thermometer(s):	1.8°C UC/C	IR 31
Cooler(s)/Kit(s):	46944	
Date/Time sample(s) sent to storage:	6/2/21 19:15	

Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:			

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

ALS

Cincinnati, OH +1 513 733 5336
Everett, WA +1 425 356 2600
Fort Collins, CO +1 970 490 1511
Holland, MI +1 616 399 6070

Chain of Custody Form

Page ____ of ____

COC ID: 234076

HS21060128

ARCADIS U.S., Inc.

Brickland Refinery 2Q2021

ALS Project Manager:

Customer Information		Project Information	
Purchase Order		Project Name	Brickland Refinery 1Q2021
Work Order		Project Number	
Company Name	ARCADIS U.S., Inc.	Bill To Company	ARCADIS
Send Report To	Brooke Fontenot	Invoice Attn	Accounts Payable
Address	10352 Plaza Americana Drive	Address	630 Plaza Drive, Suite 600
City/State/Zip	Baton Rouge, LA 70816	City/State/Zip	Highlands Ranch CO 80129
Phone	(225) 292-1004	Phone	(303) 471-3399
Fax		Fax	
e-Mail Address	Brooke.Fontenot@arcadis-us.com	e-Mail Address	Accountspayable.administration@arcadi

	Analysis
A	8260_LL_W (8260 Benzene (*Unpreserved*)-7 day H
B	8270_PAH_LVI (8270 PAHs (LVI))
C	
D	
E	
F	
G	
H	
I	
J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-3S	6/01/21	0850	W	8	3	X										
2	MW-3D	6/01/21	0925	W	8	3	X										
3	FB1-060121	6/01/21	0930	W	8	3	X										
4	FD1-060121	6/01/21	—	W	8	3	X										
5	MW-6D	6/01/21	1000	W	8	3	X										
6	MW-17	6/01/21	1055	W	8	3	X										
7	EB1-060121	6/01/21	1100	W	8	3	X										
8	MW-5	6/01/21	1135	W	8	3	X										
9	MW-8	6/01/21	1210	W	8	6	X	X									
10	FD2-060121	6/01/21	—	W	8	3		X									

Sampler(s) Please Print & Sign: Sergio Celis [signature]

Shipment Method:

Required Turnaround Time: (Check Box) ☐ Other ____ ☒ STD 10 Wk Days ☐ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour

Results Due Date:

Relinquished by: [signature] Date: 6/01/21 Time: 1700 Received by:

Relinquished by: Date: 6/2/21 Time: 14:25 Received by (Laboratory): [signature]

Logged by (Laboratory): Date: Time: Checked by (Laboratory):

Notes: [AGM Brickland NM]

Cooler ID	Cooler Temp.
	UC
46944	1.8°C

QC Package: (Check One Box Below)

☒ Level II Std QC
☐ Level III Std QC/Raw Data
☐ Level IV SW846/CLP
☐ Other
☐ TRRP Checklist
☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

1631 CF0

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

ALS

Cincinnati, OH +1 513 733 5336
Fort Collins, CO +1 970 490 1511
Everett, WA +1 425 356 2600
Holland, MI +1 616 399 6070

Chain of Custody Form

Page ____ of ____

COC ID: 247073

HS21060128
ARCADIS U.S., Inc.
Brickland Refinery 2Q2021

ALS Project Manager:

Customer Information		Project Information	
Purchase Order	30049071 Task (250)	Project Name	30049071 Brickland Refinery 2Q2021
Work Order		Project Number	30049071 Task (250)
Company Name	ARCADIS U.S., Inc.	Bill To Company	ARCADIS
Send Report To	Brocke Fontenot	Invoice Attn	Accounts Payable
Address	10352 Plaza Americana Drive	Address	630 Plaza Drive, Suite 600
City/State/Zip	Baton Rouge, LA 70816	City/State/Zip	Highlands Ranch CO 80129
Phone	(225) 292-1004	Phone	(303) 471-3699
Fax		Fax	
e-Mail Address	Brocke.Fontenot@arcadis-us.com	e-Mail Address	Accountspayable.administration@arcadis

A 8260_LL_W (8260 Benzene ("Unpreserved") 7 day HT
B 8270_PAH_LVI (8270 PAHs (LVI))
C
D
E
F
G
H
I
J

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	FB2-060121	6/01/21	1220	W	8	6	X	X									
2	FB2-060121	6/01/21	1215	W	8	6	X	X									
3	MW-11	6/01/21	1300	W	8	3	X										
4	MW-10	6/01/21	1335	W	8	3	X										
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Sergio Celis [signature]

Shipment Method:

Required Turnaround Time: (Check Box) [X] STD 10 Wk Days [ ] 5 Wk Days [ ] 2 Wk Days [ ] 24 Hour [ ] Other ____

Results Due Date:

Relinquished by:	Date:	Time:	Received by:
[signature]	6/01/21	1700	
Relinquished by:	Date: 6/2/21	Time: 14:25	Received by (Laboratory): [signature]
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes: [AGM Brickland NM]

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
[X] Level II Std QC
[ ] Level III Std QC/Raw Data
[ ] Level IV SW846/CLP
[ ] Other
[ ] TRRP Checklist
[ ] TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 770..
Tel. +1 281 530 5656
Fax. +1 281 530 5887

46944

CUSTODY SEAL

Date: 6/1/21 Time: 1100
Name: CHARLESTON 2M33
Company: ARCADIS

Seal Broken By:
Date: 6/2/21

TRK# 0201 7878 1899 4919

WED – 02 JUN 10:30A
PRIORITY OVERNIGHT

XH SGRA 46944

AHS
77099
TX-US IAH

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

September 24, 2021

Brooke Fontenot
ARCADIS U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge, LA 70816

Work Order: **HS21090521**

Laboratory Results for: **Brickland Refinery Huntsman 3Q2021**

Dear Brooke Fontenot,

ALS Environmental received 16 sample(s) on Sep 10, 2021 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL
Dane J. Wacasey

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Work Order: HS21090521

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS21090521-01	MW-3S	Water		08-Sep-2021 09:30	10-Sep-2021 10:00	☐
HS21090521-02	MW-9S	Water		08-Sep-2021 13:00	10-Sep-2021 10:00	☐
HS21090521-03	MW-6S	Water		08-Sep-2021 11:20	10-Sep-2021 10:00	☐
HS21090521-04	MW-6D	Water		08-Sep-2021 12:00	10-Sep-2021 10:00	☐
HS21090521-05	MW-3D	Water		08-Sep-2021 10:20	10-Sep-2021 10:00	☐
HS21090521-06	FB-090821	Water		08-Sep-2021 12:40	10-Sep-2021 10:00	☐
HS21090521-07	FD-090821	Water		08-Sep-2021 10:20	10-Sep-2021 10:00	☐
HS21090521-08	EB-090821	Water		08-Sep-2021 12:50	10-Sep-2021 10:00	☐
HS21090521-09	MW-11	Water		09-Sep-2021 10:05	10-Sep-2021 10:00	☐
HS21090521-10	MW-17	Water		09-Sep-2021 09:00	10-Sep-2021 10:00	☐
HS21090521-11	MW-5	Water		09-Sep-2021 10:40	10-Sep-2021 10:00	☐
HS21090521-12	MW-10	Water		08-Sep-2021 12:20	10-Sep-2021 10:00	☐
HS21090521-13	MW-8	Water		09-Sep-2021 11:20	10-Sep-2021 10:00	☐
HS21090521-14	FB-09092021	Water		09-Sep-2021 11:30	10-Sep-2021 10:00	☐
HS21090521-15	EB-09092021	Water		09-Sep-2021 11:30	10-Sep-2021 10:00	☐
HS21090521-16	FD-2-090921	Water		09-Sep-2021 00:00	10-Sep-2021 10:00	☐

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Work Order: HS21090521

CASE NARRATIVE

GCMS Semivolatiles by Method SW8270

Batch ID: 170211

Sample ID: LCSD-170211

- The RPD between the LCS and LCSD was outside of the control limit.

GCMS Volatiles by Method SW8260

Batch ID: R391199,R391254,R391256

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: MW-3S
Collection Date: 08-Sep-2021 09:30

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-01
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Sep-2021 13:32
Surr: 1,2-Dichloroethane-d4	*113*		*70-126*	*%REC*	*1*	*11-Sep-2021 13:32*
Surr: 4-Bromofluorobenzene	*99.7*		*81-113*	*%REC*	*1*	*11-Sep-2021 13:32*
Surr: Dibromofluoromethane	*103*		*77-123*	*%REC*	*1*	*11-Sep-2021 13:32*
Surr: Toluene-d8	*103*		*82-127*	*%REC*	*1*	*11-Sep-2021 13:32*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: Brickland Refinery Huntsman 3Q2021 WorkOrder:HS21090521
Sample ID: MW-9S Lab ID:HS21090521-02
Collection Date: 08-Sep-2021 13:00 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	13-Sep-2021 13:07
Surr: 1,2-Dichloroethane-d4	*90.5*		*70-126*	*%REC*	*1*	*13-Sep-2021 13:07*
Surr: 4-Bromofluorobenzene	*91.6*		*81-113*	*%REC*	*1*	*13-Sep-2021 13:07*
Surr: Dibromofluoromethane	*92.1*		*77-123*	*%REC*	*1*	*13-Sep-2021 13:07*
Surr: Toluene-d8	*98.5*		*82-127*	*%REC*	*1*	*13-Sep-2021 13:07*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: MW-6S
Collection Date: 08-Sep-2021 11:20

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-03
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	**0.0017**		**0.0010**	**mg/L**	1	11-Sep-2021 15:44
Surr: 1,2-Dichloroethane-d4	*113*		*70-126*	*%REC*	*1*	*11-Sep-2021 15:44*
Surr: 4-Bromofluorobenzene	*107*		*81-113*	*%REC*	*1*	*11-Sep-2021 15:44*
Surr: Dibromofluoromethane	*103*		*77-123*	*%REC*	*1*	*11-Sep-2021 15:44*
Surr: Toluene-d8	*107*		*82-127*	*%REC*	*1*	*11-Sep-2021 15:44*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: MW-6D
Collection Date: 08-Sep-2021 12:00

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-04
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Sep-2021 16:06
Surr: 1,2-Dichloroethane-d4	*116*		*70-126*	*%REC*	*1*	*11-Sep-2021 16:06*
Surr: 4-Bromofluorobenzene	*99.0*		*81-113*	*%REC*	*1*	*11-Sep-2021 16:06*
Surr: Dibromofluoromethane	*105*		*77-123*	*%REC*	*1*	*11-Sep-2021 16:06*
Surr: Toluene-d8	*104*		*82-127*	*%REC*	*1*	*11-Sep-2021 16:06*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: MW-3D
Collection Date: 08-Sep-2021 10:20

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-05
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Sep-2021 16:28
Surr: 1,2-Dichloroethane-d4	*114*		*70-126*	*%REC*	*1*	*11-Sep-2021 16:28*
Surr: 4-Bromofluorobenzene	*99.5*		*81-113*	*%REC*	*1*	*11-Sep-2021 16:28*
Surr: Dibromofluoromethane	*105*		*77-123*	*%REC*	*1*	*11-Sep-2021 16:28*
Surr: Toluene-d8	*103*		*82-127*	*%REC*	*1*	*11-Sep-2021 16:28*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

ANALYTICAL REPORT

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021 WorkOrder:HS21090521
Sample ID: FB-090821 Lab ID:HS21090521-06
Collection Date: 08-Sep-2021 12:40 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	13-Sep-2021 10:48
Surr: 1,2-Dichloroethane-d4	*115*		*70-126*	*%REC*	*1*	*13-Sep-2021 10:48*
Surr: 4-Bromofluorobenzene	*102*		*81-113*	*%REC*	*1*	*13-Sep-2021 10:48*
Surr: Dibromofluoromethane	*107*		*77-123*	*%REC*	*1*	*13-Sep-2021 10:48*
Surr: Toluene-d8	*105*		*82-127*	*%REC*	*1*	*13-Sep-2021 10:48*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: FD-090821
Collection Date: 08-Sep-2021 10:20

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-07
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	13-Sep-2021 13:51
Surr: 1,2-Dichloroethane-d4	*91.1*		*70-126*	*%REC*	*1*	*13-Sep-2021 13:51*
Surr: 4-Bromofluorobenzene	*90.1*		*81-113*	*%REC*	*1*	*13-Sep-2021 13:51*
Surr: Dibromofluoromethane	*91.4*		*77-123*	*%REC*	*1*	*13-Sep-2021 13:51*
Surr: Toluene-d8	*97.9*		*82-127*	*%REC*	*1*	*13-Sep-2021 13:51*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: EB-090821
Collection Date: 08-Sep-2021 12:50

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-08
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	13-Sep-2021 11:10
Surr: 1,2-Dichloroethane-d4	*114*		*70-126*	*%REC*	*1*	*13-Sep-2021 11:10*
Surr: 4-Bromofluorobenzene	*102*		*81-113*	*%REC*	*1*	*13-Sep-2021 11:10*
Surr: Dibromofluoromethane	*109*		*77-123*	*%REC*	*1*	*13-Sep-2021 11:10*
Surr: Toluene-d8	*103*		*82-127*	*%REC*	*1*	*13-Sep-2021 11:10*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: MW-11
Collection Date: 09-Sep-2021 10:05

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-09
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Sep-2021 16:51
Surr: 1,2-Dichloroethane-d4	*116*		*70-126*	*%REC*	*1*	*11-Sep-2021 16:51*
Surr: 4-Bromofluorobenzene	*102*		*81-113*	*%REC*	*1*	*11-Sep-2021 16:51*
Surr: Dibromofluoromethane	*103*		*77-123*	*%REC*	*1*	*11-Sep-2021 16:51*
Surr: Toluene-d8	*102*		*82-127*	*%REC*	*1*	*11-Sep-2021 16:51*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: MW-17
Collection Date: 09-Sep-2021 09:00

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-10
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	**0.0023**		**0.0010**	**mg/L**	1	13-Sep-2021 15:20
Surr: 1,2-Dichloroethane-d4	*87.4*		*70-126*	*%REC*	*1*	*13-Sep-2021 15:20*
Surr: 4-Bromofluorobenzene	*92.9*		*81-113*	*%REC*	*1*	*13-Sep-2021 15:20*
Surr: Dibromofluoromethane	*89.9*		*77-123*	*%REC*	*1*	*13-Sep-2021 15:20*
Surr: Toluene-d8	*97.4*		*82-127*	*%REC*	*1*	*13-Sep-2021 15:20*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: MW-5
Collection Date: 09-Sep-2021 10:40

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-11
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	**0.30**		**0.050**	**mg/L**	50	13-Sep-2021 16:07
Surr: 1,2-Dichloroethane-d4	*84.7*		*70-126*	*%REC*	*50*	*13-Sep-2021 16:07*
Surr: 4-Bromofluorobenzene	*88.3*		*81-113*	*%REC*	*50*	*13-Sep-2021 16:07*
Surr: Dibromofluoromethane	*88.9*		*77-123*	*%REC*	*50*	*13-Sep-2021 16:07*
Surr: Toluene-d8	*98.4*		*82-127*	*%REC*	*50*	*13-Sep-2021 16:07*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: Brickland Refinery Huntsman 3Q2021 WorkOrder:HS21090521
Sample ID: MW-10 Lab ID:HS21090521-12
Collection Date: 08-Sep-2021 12:20 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	11-Sep-2021 17:13
Surr: 1,2-Dichloroethane-d4	*110*		*70-126*	*%REC*	*1*	*11-Sep-2021 17:13*
Surr: 4-Bromofluorobenzene	*102*		*81-113*	*%REC*	*1*	*11-Sep-2021 17:13*
Surr: Dibromofluoromethane	*99.8*		*77-123*	*%REC*	*1*	*11-Sep-2021 17:13*
Surr: Toluene-d8	*101*		*82-127*	*%REC*	*1*	*11-Sep-2021 17:13*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: Brickland Refinery Huntsman 3Q2021 WorkOrder:HS21090521
Sample ID: MW-8 Lab ID:HS21090521-13
Collection Date: 09-Sep-2021 11:20 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	**1.5**		**0.025**	**mg/L**	25	13-Sep-2021 14:59
Surr: 1,2-Dichloroethane-d4	*91.3*		*70-126*	*%REC*	*25*	*13-Sep-2021 14:59*
Surr: 4-Bromofluorobenzene	*90.6*		*81-113*	*%REC*	*25*	*13-Sep-2021 14:59*
Surr: Dibromofluoromethane	*90.8*		*77-123*	*%REC*	*25*	*13-Sep-2021 14:59*
Surr: Toluene-d8	*98.6*		*82-127*	*%REC*	*25*	*13-Sep-2021 14:59*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 16-Sep-2021		Analyst: ACN
Acenaphthene	**0.000203**		**0.000104**	**mg/L**	1	23-Sep-2021 17:57
Acenaphthylene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Anthracene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Benz(a)anthracene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Benzo(a)pyrene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Benzo(b)fluoranthene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Benzo(g,h,i)perylene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Benzo(k)fluoranthene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Chrysene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Dibenz(a,h)anthracene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Fluoranthene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Fluorene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Indeno(1,2,3-cd)pyrene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Naphthalene	**0.00129**		**0.000104**	**mg/L**	1	23-Sep-2021 17:57
Phenanthrene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Pyrene	< 0.000104		0.000104	mg/L	1	23-Sep-2021 17:57
Surr: 2-Fluorobiphenyl	*122*		*32-130*	*%REC*	*1*	*23-Sep-2021 17:57*
Surr: 4-Terphenyl-d14	*111*		*40-135*	*%REC*	*1*	*23-Sep-2021 17:57*
Surr: Nitrobenzene-d5	*83.9*		*45-142*	*%REC*	*1*	*23-Sep-2021 17:57*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: FB-09092021
Collection Date: 09-Sep-2021 11:30

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-14
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	13-Sep-2021 10:19
Surr: 1,2-Dichloroethane-d4	*92.0*		*70-126*	*%REC*	*1*	*13-Sep-2021 10:19*
Surr: 4-Bromofluorobenzene	*95.5*		*81-113*	*%REC*	*1*	*13-Sep-2021 10:19*
Surr: Dibromofluoromethane	*91.3*		*77-123*	*%REC*	*1*	*13-Sep-2021 10:19*
Surr: Toluene-d8	*98.2*		*82-127*	*%REC*	*1*	*13-Sep-2021 10:19*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 16-Sep-2021		Analyst: ACN
Acenaphthene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Acenaphthylene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Anthracene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Benz(a)anthracene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Benzo(a)pyrene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Benzo(b)fluoranthene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Benzo(g,h,i)perylene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Benzo(k)fluoranthene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Chrysene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Dibenz(a,h)anthracene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Fluoranthene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Fluorene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Indeno(1,2,3-cd)pyrene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Naphthalene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Phenanthrene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Pyrene	< 0.000106		0.000106	mg/L	1	23-Sep-2021 18:17
Surr: 2-Fluorobiphenyl	*129*		*32-130*	*%REC*	*1*	*23-Sep-2021 18:17*
Surr: 4-Terphenyl-d14	*127*		*40-135*	*%REC*	*1*	*23-Sep-2021 18:17*
Surr: Nitrobenzene-d5	*106*		*45-142*	*%REC*	*1*	*23-Sep-2021 18:17*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
Sample ID: EB-09092021
Collection Date: 09-Sep-2021 11:30

ANALYTICAL REPORT
WorkOrder:HS21090521
Lab ID:HS21090521-15
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	13-Sep-2021 10:40
Surr: 1,2-Dichloroethane-d4	*93.9*		*70-126*	*%REC*	*1*	*13-Sep-2021 10:40*
Surr: 4-Bromofluorobenzene	*101*		*81-113*	*%REC*	*1*	*13-Sep-2021 10:40*
Surr: Dibromofluoromethane	*93.4*		*77-123*	*%REC*	*1*	*13-Sep-2021 10:40*
Surr: Toluene-d8	*84.8*		*82-127*	*%REC*	*1*	*13-Sep-2021 10:40*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 16-Sep-2021		Analyst: ACN
Acenaphthene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Acenaphthylene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Anthracene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Benz(a)anthracene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Benzo(a)pyrene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Benzo(b)fluoranthene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Benzo(g,h,i)perylene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Benzo(k)fluoranthene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Chrysene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Dibenz(a,h)anthracene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Fluoranthene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Fluorene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Indeno(1,2,3-cd)pyrene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Naphthalene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Phenanthrene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Pyrene	< 0.000102		0.000102	mg/L	1	23-Sep-2021 18:37
Surr: 2-Fluorobiphenyl	*99.2*		*32-130*	*%REC*	*1*	*23-Sep-2021 18:37*
Surr: 4-Terphenyl-d14	*113*		*40-135*	*%REC*	*1*	*23-Sep-2021 18:37*
Surr: Nitrobenzene-d5	*86.5*		*45-142*	*%REC*	*1*	*23-Sep-2021 18:37*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: Brickland Refinery Huntsman 3Q2021 WorkOrder:HS21090521
Sample ID: FD-2-090921 Lab ID:HS21090521-16
Collection Date: 09-Sep-2021 00:00 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS - 8270D	**Method:SW8270**			Prep:SW3511 / 16-Sep-2021		Analyst: ACN
Acenaphthene	**0.000214**		**0.000105**	**mg/L**	1	23-Sep-2021 18:58
Acenaphthylene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Anthracene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Benz(a)anthracene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Benzo(a)pyrene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Benzo(b)fluoranthene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Benzo(g,h,i)perylene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Benzo(k)fluoranthene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Chrysene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Dibenz(a,h)anthracene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Fluoranthene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Fluorene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Indeno(1,2,3-cd)pyrene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Naphthalene	**0.00159**		**0.000105**	**mg/L**	1	23-Sep-2021 18:58
Phenanthrene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Pyrene	< 0.000105		0.000105	mg/L	1	23-Sep-2021 18:58
Surr: 2-Fluorobiphenyl	*117*		*32-130*	*%REC*	*1*	*23-Sep-2021 18:58*
Surr: 4-Terphenyl-d14	*114*		*40-135*	*%REC*	*1*	*23-Sep-2021 18:58*
Surr: Nitrobenzene-d5	*117*		*45-142*	*%REC*	*1*	*23-Sep-2021 18:58*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Weight / Prep Log

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

Batch ID: 170211 **Start Date:** 16 Sep 2021 10:24 **End Date:** 16 Sep 2021 12:00
Method: SW3511 **Prep Code:** 3511_PAH

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS21090521-13	1	31.81 (mL)	2 (mL)	0.06287	40 mL Amber
HS21090521-14	1	31.13 (mL)	2 (mL)	0.06425	40 mL Amber
HS21090521-15	1	32.33 (mL)	2 (mL)	0.06186	40 mL Amber
HS21090521-16	1	31.49 (mL)	2 (mL)	0.06351	40 mL Amber

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 170211 (0)	**Test Name :** LOW-LEVEL PAHS - 8270D				**Matrix:** Water	
HS21090521-13	MW-8	09 Sep 2021 11:20		16 Sep 2021 10:24	23 Sep 2021 17:57	1
HS21090521-14	FB-09092021	09 Sep 2021 11:30		16 Sep 2021 10:24	23 Sep 2021 18:17	1
HS21090521-15	EB-09092021	09 Sep 2021 11:30		16 Sep 2021 10:24	23 Sep 2021 18:37	1
HS21090521-16	FD-2-090921	09 Sep 2021 00:00		16 Sep 2021 10:24	23 Sep 2021 18:58	1
Batch ID: R391199 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Water	
HS21090521-01	MW-3S	08 Sep 2021 09:30			11 Sep 2021 13:32	1
HS21090521-03	MW-6S	08 Sep 2021 11:20			11 Sep 2021 15:44	1
HS21090521-04	MW-6D	08 Sep 2021 12:00			11 Sep 2021 16:06	1
HS21090521-05	MW-3D	08 Sep 2021 10:20			11 Sep 2021 16:28	1
HS21090521-09	MW-11	09 Sep 2021 10:05			11 Sep 2021 16:51	1
HS21090521-12	MW-10	08 Sep 2021 12:20			11 Sep 2021 17:13	1
Batch ID: R391254 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Water	
HS21090521-06	FB-090821	08 Sep 2021 12:40			13 Sep 2021 10:48	1
HS21090521-08	EB-090821	08 Sep 2021 12:50			13 Sep 2021 11:10	1
Batch ID: R391256 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Water	
HS21090521-02	MW-9S	08 Sep 2021 13:00			13 Sep 2021 13:07	1
HS21090521-07	FD-090821	08 Sep 2021 10:20			13 Sep 2021 13:51	1
HS21090521-10	MW-17	09 Sep 2021 09:00			13 Sep 2021 15:20	1
HS21090521-11	MW-5	09 Sep 2021 10:40			13 Sep 2021 16:07	50
HS21090521-13	MW-8	09 Sep 2021 11:20			13 Sep 2021 14:59	25
HS21090521-14	FB-09092021	09 Sep 2021 11:30			13 Sep 2021 10:19	1
HS21090521-15	EB-09092021	09 Sep 2021 11:30			13 Sep 2021 10:40	1

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

QC BATCH REPORT

Batch ID: 170211 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

MBLK Sample ID: **MBLK-170211** Units: **ug/L** Analysis Date: **23-Sep-2021 13:34**
Client ID: Run ID: **SV-6_392027** SeqNo: **6286179** PrepDate: **16-Sep-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	< 0.100	0.100								
Acenaphthylene	< 0.100	0.100								
Anthracene	< 0.100	0.100								
Benz(a)anthracene	< 0.100	0.100								
Benzo(a)pyrene	< 0.100	0.100								
Benzo(b)fluoranthene	< 0.100	0.100								
Benzo(g,h,i)perylene	< 0.100	0.100								
Benzo(k)fluoranthene	< 0.100	0.100								
Chrysene	< 0.100	0.100								
Dibenz(a,h)anthracene	< 0.100	0.100								
Fluoranthene	< 0.100	0.100								
Fluorene	< 0.100	0.100								
Indeno(1,2,3-cd)pyrene	< 0.100	0.100								
Naphthalene	< 0.100	0.100								
Phenanthrene	< 0.100	0.100								
Pyrene	< 0.100	0.100								
Surr: 2-Fluorobiphenyl	*2.265*	*0.100*	*3.03*	*0*	*74.8*	*32 - 130*				
Surr: 4-Terphenyl-d14	*2.269*	*0.100*	*3.03*	*0*	*74.9*	*40 - 135*				
Surr: Nitrobenzene-d5	*1.82*	*0.100*	*3.03*	*0*	*60.1*	*45 - 142*				

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

QC BATCH REPORT

Batch ID: 170211 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

LCS Sample ID: **LCS-170211** Units: **ug/L** Analysis Date: **23-Sep-2021 13:54**
Client ID: Run ID: **SV-6_392027** SeqNo: **6286180** PrepDate: **16-Sep-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	2.579	0.100	3.03	0	85.1	40 - 140				
Acenaphthylene	2.61	0.100	3.03	0	86.1	40 - 140				
Anthracene	2.757	0.100	3.03	0	91.0	40 - 140				
Benz(a)anthracene	1.858	0.100	3.03	0	61.3	40 - 140				
Benzo(a)pyrene	2.689	0.100	3.03	0	88.7	40 - 140				
Benzo(b)fluoranthene	2.108	0.100	3.03	0	69.6	40 - 140				
Benzo(g,h,i)perylene	2.636	0.100	3.03	0	87.0	40 - 140				
Benzo(k)fluoranthene	3.146	0.100	3.03	0	104	40 - 140				
Chrysene	2.548	0.100	3.03	0	84.1	40 - 140				
Dibenz(a,h)anthracene	2.938	0.100	3.03	0	97.0	40 - 140				
Fluoranthene	2.865	0.100	3.03	0	94.6	40 - 140				
Fluorene	3.268	0.100	3.03	0	108	40 - 140				
Indeno(1,2,3-cd)pyrene	3.035	0.100	3.03	0	100	40 - 140				
Naphthalene	3.542	0.100	3.03	0	117	40 - 140				
Phenanthrene	2.218	0.100	3.03	0	73.2	40 - 140				
Pyrene	1.707	0.100	3.03	0	56.3	40 - 140				
Surr: 2-Fluorobiphenyl	*2.565*	*0.100*	*3.03*	*0*	*84.6*	*32 - 130*				
Surr: 4-Terphenyl-d14	*2.02*	*0.100*	*3.03*	*0*	*66.7*	*40 - 135*				
Surr: Nitrobenzene-d5	*1.919*	*0.100*	*3.03*	*0*	*63.3*	*45 - 142*				

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

QC BATCH REPORT

Batch ID: 170211 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

LCSD Sample ID: **LCSD-170211** Units: **ug/L** Analysis Date: **23-Sep-2021 14:14**
Client ID: Run ID: **SV-6_392027** SeqNo: **6286181** PrepDate: **16-Sep-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	2.808	0.100	3.03	0	92.7	40 - 140	2.579	8.51	25	
Acenaphthylene	2.849	0.100	3.03	0	94.0	40 - 140	2.61	8.78	25	
Anthracene	2.645	0.100	3.03	0	87.3	40 - 140	2.757	4.16	25	
Benz(a)anthracene	2.025	0.100	3.03	0	66.8	40 - 140	1.858	8.59	25	
Benzo(a)pyrene	2.382	0.100	3.03	0	78.6	40 - 140	2.689	12.1	25	
Benzo(b)fluoranthene	2.111	0.100	3.03	0	69.7	40 - 140	2.108	0.103	25	
Benzo(g,h,i)perylene	2.58	0.100	3.03	0	85.1	40 - 140	2.636	2.16	25	
Benzo(k)fluoranthene	2.423	0.100	3.03	0	80.0	40 - 140	3.146	26	25	R
Chrysene	2.196	0.100	3.03	0	72.5	40 - 140	2.548	14.8	25	
Dibenz(a,h)anthracene	2.768	0.100	3.03	0	91.3	40 - 140	2.938	5.98	25	
Fluoranthene	3.074	0.100	3.03	0	101	40 - 140	2.865	7.02	25	
Fluorene	3.521	0.100	3.03	0	116	40 - 140	3.268	7.44	25	
Indeno(1,2,3-cd)pyrene	2.83	0.100	3.03	0	93.4	40 - 140	3.035	6.97	25	
Naphthalene	3.718	0.100	3.03	0	123	40 - 140	3.542	4.85	25	
Phenanthrene	2.351	0.100	3.03	0	77.6	40 - 140	2.218	5.82	25	
Pyrene	2.108	0.100	3.03	0	69.6	40 - 140	1.707	21	25	
Surr: 2-Fluorobiphenyl	*2.797*	*0.100*	*3.03*	*0*	*92.3*	*32 - 130*	*2.565*	*8.67*	*25*	
Surr: 4-Terphenyl-d14	*2.361*	*0.100*	*3.03*	*0*	*77.9*	*40 - 135*	*2.02*	*15.5*	*25*	
Surr: Nitrobenzene-d5	*2.211*	*0.100*	*3.03*	*0*	*73.0*	*45 - 142*	*1.919*	*14.1*	*25*	

The following samples were analyzed in this batch: HS21090521-13 HS21090521-14 HS21090521-15 HS21090521-16

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

QC BATCH REPORT

Batch ID: R391199 (0) **Instrument: VOA4** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-210911** Units: **ug/L** Analysis Date: **11-Sep-2021 11:56**
Client ID: Run ID: **VOA4_391199** SeqNo: **6266776** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 1.0	1.0								
Surr: 1,2-Dichloroethane-d4	*56.23*	*1.0*	*50*	*0*	*112*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*49.92*	*1.0*	*50*	*0*	*99.8*	*82 - 115*				
Surr: Dibromofluoromethane	*50.9*	*1.0*	*50*	*0*	*102*	*73 - 126*				
Surr: Toluene-d8	*50.87*	*1.0*	*50*	*0*	*102*	*81 - 120*				

LCS Sample ID: **VLCSW-210911** Units: **ug/L** Analysis Date: **11-Sep-2021 11:12**
Client ID: Run ID: **VOA4_391199** SeqNo: **6266775** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	20.67	1.0	20	0	103	74 - 120				
Surr: 1,2-Dichloroethane-d4	*53.36*	*1.0*	*50*	*0*	*107*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*52.33*	*1.0*	*50*	*0*	*105*	*82 - 115*				
Surr: Dibromofluoromethane	*51.11*	*1.0*	*50*	*0*	*102*	*73 - 126*				
Surr: Toluene-d8	*51.16*	*1.0*	*50*	*0*	*102*	*81 - 120*				

MS Sample ID: **HS21090521-01MS** Units: **ug/L** Analysis Date: **11-Sep-2021 14:16**
Client ID: **MW-3S** Run ID: **VOA4_391199** SeqNo: **6266782** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	18.69	1.0	20	0	93.5	70 - 127				
Surr: 1,2-Dichloroethane-d4	*54.96*	*1.0*	*50*	*0*	*110*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*52.56*	*1.0*	*50*	*0*	*105*	*81 - 113*				
Surr: Dibromofluoromethane	*53.28*	*1.0*	*50*	*0*	*107*	*77 - 123*				
Surr: Toluene-d8	*50.93*	*1.0*	*50*	*0*	*102*	*82 - 127*				

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

QC BATCH REPORT

Batch ID: R391199 (0) **Instrument:** VOA4 **Method:** LOW LEVEL VOLATILES BY SW8260C

MSD Sample ID: **HS21090521-01MSD** Units: **ug/L** Analysis Date: **11-Sep-2021 14:38**
Client ID: **MW-3S** Run ID: **VOA4_391199** SeqNo: **6266783** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	18.86	1.0	20	0	94.3	70 - 127	18.69	0.883	20	
Surr: 1,2-Dichloroethane-d4	*54.28*	*1.0*	*50*	*0*	*109*	*70 - 126*	*54.96*	*1.24*	*20*	
Surr: 4-Bromofluorobenzene	*52.58*	*1.0*	*50*	*0*	*105*	*81 - 113*	*52.56*	*0.0272*	*20*	
Surr: Dibromofluoromethane	*51.28*	*1.0*	*50*	*0*	*103*	*77 - 123*	*53.28*	*3.82*	*20*	
Surr: Toluene-d8	*51.49*	*1.0*	*50*	*0*	*103*	*82 - 127*	*50.93*	*1.1*	*20*	

The following samples were analyzed in this batch: HS21090521-01 HS21090521-03 HS21090521-04 HS21090521-05 HS21090521-09 HS21090521-12

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

QC BATCH REPORT

Batch ID: R391254 (0) **Instrument: VOA4** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-210913** Units: **ug/L** Analysis Date: **13-Sep-2021 10:04**
Client ID: Run ID: **VOA4_391254** SeqNo: **6267928** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 1.0	1.0								
Surr: 1,2-Dichloroethane-d4	*55.07*	*1.0*	*50*	*0*	*110*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*49.72*	*1.0*	*50*	*0*	*99.4*	*82 - 115*				
Surr: Dibromofluoromethane	*52.16*	*1.0*	*50*	*0*	*104*	*73 - 126*				
Surr: Toluene-d8	*52.23*	*1.0*	*50*	*0*	*104*	*81 - 120*				

LCS Sample ID: **VLCSW-210913** Units: **ug/L** Analysis Date: **13-Sep-2021 09:20**
Client ID: Run ID: **VOA4_391254** SeqNo: **6267927** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	22.02	1.0	20	0	110	74 - 120				
Surr: 1,2-Dichloroethane-d4	*57.12*	*1.0*	*50*	*0*	*114*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*51.4*	*1.0*	*50*	*0*	*103*	*82 - 115*				
Surr: Dibromofluoromethane	*52.57*	*1.0*	*50*	*0*	*105*	*73 - 126*				
Surr: Toluene-d8	*53.7*	*1.0*	*50*	*0*	*107*	*81 - 120*				

MS Sample ID: **HS21090228-01MS** Units: **ug/L** Analysis Date: **13-Sep-2021 13:03**
Client ID: Run ID: **VOA4_391254** SeqNo: **6267936** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	21.05	1.0	20	0	105	70 - 127				
Surr: 1,2-Dichloroethane-d4	*55.26*	*1.0*	*50*	*0*	*111*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*54.15*	*1.0*	*50*	*0*	*108*	*81 - 113*				
Surr: Dibromofluoromethane	*53.12*	*1.0*	*50*	*0*	*106*	*77 - 123*				
Surr: Toluene-d8	*52.01*	*1.0*	*50*	*0*	*104*	*82 - 127*				

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

QC BATCH REPORT

Batch ID: R391254 (0) **Instrument: VOA4** **Method: LOW LEVEL VOLATILES BY SW8260C**

MSD Sample ID: **HS21090228-01MSD** Units: **ug/L** Analysis Date: **13-Sep-2021 13:25**
Client ID: Run ID: **VOA4_391254** SeqNo: **6267937** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	19.66	1.0	20	0	98.3	70 - 127	21.05	6.81	20	
Surr: 1,2-Dichloroethane-d4	*55.98*	*1.0*	*50*	*0*	*112*	*70 - 126*	*55.26*	*1.29*	*20*	
Surr: 4-Bromofluorobenzene	*53.78*	*1.0*	*50*	*0*	*108*	*81 - 113*	*54.15*	*0.683*	*20*	
Surr: Dibromofluoromethane	*53.4*	*1.0*	*50*	*0*	*107*	*77 - 123*	*53.12*	*0.517*	*20*	
Surr: Toluene-d8	*51.75*	*1.0*	*50*	*0*	*104*	*82 - 127*	*52.01*	*0.5*	*20*	

The following samples were analyzed in this batch: HS21090521-06 HS21090521-08

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

QC BATCH REPORT

Batch ID: R391256 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-210913** Units: **ug/L** Analysis Date: **13-Sep-2021 09:58**
Client ID: Run ID: **VOA7_391256** SeqNo: **6267961** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 1.0	1.0								
Surr: 1,2-Dichloroethane-d4	*45.41*	*1.0*	*50*	*0*	*90.8*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*51.52*	*1.0*	*50*	*0*	*103*	*82 - 115*				
Surr: Dibromofluoromethane	*46.57*	*1.0*	*50*	*0*	*93.1*	*73 - 126*				
Surr: Toluene-d8	*47.03*	*1.0*	*50*	*0*	*94.1*	*81 - 120*				

LCS Sample ID: **VLCSW-210913** Units: **ug/L** Analysis Date: **13-Sep-2021 09:16**
Client ID: Run ID: **VOA7_391256** SeqNo: **6267960** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	17.52	1.0	20	0	87.6	74 - 120				
Surr: 1,2-Dichloroethane-d4	*44.79*	*1.0*	*50*	*0*	*89.6*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*51.64*	*1.0*	*50*	*0*	*103*	*82 - 115*				
Surr: Dibromofluoromethane	*46.52*	*1.0*	*50*	*0*	*93.0*	*73 - 126*				
Surr: Toluene-d8	*47.06*	*1.0*	*50*	*0*	*94.1*	*81 - 120*				

MS Sample ID: **HS21090101-01MS** Units: **ug/L** Analysis Date: **13-Sep-2021 11:22**
Client ID: Run ID: **VOA7_391256** SeqNo: **6267965** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	16.83	1.0	20	0	84.1	70 - 127				
Surr: 1,2-Dichloroethane-d4	*47.39*	*1.0*	*50*	*0*	*94.8*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*53.93*	*1.0*	*50*	*0*	*108*	*81 - 113*				
Surr: Dibromofluoromethane	*48.49*	*1.0*	*50*	*0*	*97.0*	*77 - 123*				
Surr: Toluene-d8	*46.92*	*1.0*	*50*	*0*	*93.8*	*82 - 127*				

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: HS21090521

QC BATCH REPORT

Batch ID: R391256 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MSD Sample ID: **HS21090101-01MSD** Units: **ug/L** Analysis Date: **13-Sep-2021 11:43**
Client ID: Run ID: **VOA7_391256** SeqNo: **6267966** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	16.07	1.0	20	0	80.3	70 - 127	16.83	4.61	20	
Surr: 1,2-Dichloroethane-d4	*46.52*	*1.0*	*50*	*0*	*93.0*	*70 - 126*	*47.39*	*1.84*	*20*	
Surr: 4-Bromofluorobenzene	*52.47*	*1.0*	*50*	*0*	*105*	*81 - 113*	*53.93*	*2.73*	*20*	
Surr: Dibromofluoromethane	*47.02*	*1.0*	*50*	*0*	*94.0*	*77 - 123*	*48.49*	*3.08*	*20*	
Surr: Toluene-d8	*47.38*	*1.0*	*50*	*0*	*94.8*	*82 - 127*	*46.92*	*0.973*	*20*	

The following samples were analyzed in this batch: HS21090521-02 HS21090521-07 HS21090521-10 HS21090521-11 HS21090521-13 HS21090521-14 HS21090521-15

ALS Houston, US Date: 24-Sep-21

Client: ARCADIS U.S., Inc.
Project: Brickland Refinery Huntsman 3Q2021
WorkOrder: **HS21090521**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	21-022-0	26-Mar-2022
Dept of Defense	PJLA L20-507-R2	22-Dec-2021
Florida	E87611-33	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2021-2022	30-Jun-2022
North Carolina	624-2021	31-Dec-2021
Texas	T104704231-21-28	30-Apr-2022

ALS Houston, US Date: 24-Sep-21

Sample Receipt Checklist

Work Order ID: HS21090521 **Date/Time Received:** 10-Sep-2021 10:00

Client Name: Arcadis-Baton Rouge **Received by:** Pablo Marinez

Completed By:	/S/ Paresh M. Giga	10-Sep-2021 19:50	**Reviewed by:**	/S/ Dane J. Wacasey	24-Sep-2021 17:41
	eSignature	Date/Time		eSignature	Date/Time

Matrices: **Water** Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	2 Page(s)
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	COC IDs:none
Samplers name present on COC?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	0.8C U/C	IR31	
Cooler(s)/Kit(s):	47528		
Date/Time sample(s) sent to storage:	9/10/2021 20:05		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:			

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

ALS Environmental

Chain of Custody Form

Page 1 of 2

COC ID: 123456

☐ Cincinnati, OH +1 513 733 5336 ☐ Holland, MI +1 616 399 6070 ☐ Salt Lake City, UT +1 801 266 7700
☐ Everett, WA +1 425 356 2600 ☑ Houston, TX +1 281 530 5656 ☐ Spring City, PA +1 610 948 4903
☐ Fort Collins, CO +1 970 490 1511 ☐ Middletown, PA +1 717 944 5541 ☐ York, PA +1 717 505 5280

ALS Project Manager:

Work Order #:

Customer Information		Project Information	
Purchase Order	30091090	Project Name	HUNTSMAN BRICKLAND
Work Order		Project Number	30091090
Company Name	ARCADIS	Bill To Company	ARCADIS
Send Report To	DAVID GOMES	Invoice Attn	ACCOUNTS PAYABLE
Address	601 PLAZA DRIVE	Address	601 PLAZA DRIVE
City/State/Zip	HIGHLANDS RANCH, CO 80129	City/State/Zip	HIGHLANDS RANCH, CO 80129
Phone	303-471-3437	Phone	
Fax		Fax	
e-Mail Address	DAVID.GOMES@ARCADIS.COM	e-Mail Address	

Parameter/Method Request for Analysis

A: @260 LL W (8260 Benzene (Unpreserved) 7dy HT)
B: 8270 PAH LVI (8270 PAHs (LVI))
C:
D:
E:
F:
G:
H:
I:
J:

HS21090521
ARCADIS U.S., Inc.
Brickland Refinery Huntsman 3Q2021

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-35	9/8/21	0930	W	8	3	X										
2	MW-9S	9/8/21	1300	W	8	3	X										
3	MW-6S	9/8/21	1120	W	8	3	X										
4	MW-6D	9/8/21	1200	W	8	3	X										
5	MW-3D	9/8/21	1020	W	8	3	X										
6	FB-090821	9/8/21	1240	W	8	3	X										
7	FD-090821	9/8/21	1020	W	8	3	X										
8	EB-090821	9/8/21	1250	W	8	3	X										
9																	
10																	

Sampler(s): Please Print & Sign: Gareth Ferguson / Jesus Placencia

Shipment Method: FEDEX

Required Turnaround Time: ☑ STD 10 Wk Days ☐ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☐ Other

Results Due Date:

Relinquished by:	Date:	Time:	Received by:
	9/9/21	1400	
Relinquished by:	Date:	Time:	Received by (Laboratory):
	9.10.21	10:10	Paula Mancia
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes:

Cooler Temp: 0.2C

QC Package: (Check Box Below)
✓ Level II: Standard QC
Level III: Std QC + Raw Data
Level IV: SW846 CLP-Like
Other:

Preservative Key: 1-HCL 2-HNO3 3-H2SO4 4-NaOH 5-Na2S2O3 6-NaHSO4 7-Other 8-4 degrees C 9-5035

Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

47506 (LVI (LL)

ALS Environmental

Chain of Custody Form

Page 2 of 2

COC ID: 123456

Cincinnati, OH +1 513 733 5336 | Holland, MI +1 616 399 6070 | Salt Lake City, UT +1 801 266 7700
Everett, WA +1 425 356 2600 | Houston, TX +1 281 530 5656 | Spring City, PA +1 610 948 4903
Fort Collins, CO +1 970 490 1511 | Middletown, PA +1 717 944 5541 | York, PA +1 717 505 5280

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order	30091090	Project Name	HUNTSMAN BRICKLAND	A	8260 LL W (8260 Benzene (Unpreserved) 7 day HT
Work Order		Project Number	30091090	B	8270 PAH LVI (8270 PAH's (LVI))
Company Name	ARCADIS	Bill To Company	ARCADIS	C	
Send Report To	DAVID GOMES	Invoice Attn.	ACCOUNTS PAYABLE	D	
Address	601 PLAZA DRIVE	Address	601 PLAZA DRIVE	E	
City/State/Zip	HIGHLANDS RANCH, CO 80129	City/State/Zip	HIGHLANDS RANCH, CO 80129	F	
Phone	303-471-3437	Phone		G	
Fax		Fax		H	
e-Mail Address	DAVID.GOMES@ARCADIS.COM	e-Mail Address		I	
				J	

ALS Project Manager:

Work Order #:

HS21090521
ARCADIS U.S., Inc.
Brickland Refinery Huntsman 3Q2021

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-11	9/9/21	1005	W	8	3	X										
2	MW-17	9/9/21	0900	W	8	3	X										
3	MW-5	9/9/21	1040	W	8	3	X										
4	MW-10	9/9/21	1220	W	8	3	X										
5	MW-8	9/9/21	1120	W	8	6	X	X									
6	FB-09092021	9/9/21	1130	W	8	6	X	X									
7	EB-09092021	9/9/21	1130	W	8	6	X	X									
8	FD-2-090921	9/9/21	—	W	8	3		X									
9	Temp Blank	9/9/21				1											
10																	

Sampler(s): Please Print & Sign: Garett Ferguson / Jesus Placencia

Shipment Method: FEDEX

Required Turnaround Time: ☑ STD 10 Wk Days ☐ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☐ Other

Results Due Date:

	Date:	Time:		
Relinquished by:	9/9/21	1400	Received by:	Notes:
Relinquished by:	9-10-21	10:00	Received by (Laboratory):	Cooler Temp. 0.2C
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	

QC Package: (Check Box Below)
☑ Level II: Standard QC
☐ Level III: Std QC + Raw Data
☐ Level IV: SW846 CLP-Like
☐ Other:

Preservative Key: 1-HCL 2-HNO3 3-H2SO4 4-NaOH 5-Na2S2O3 6-NaHSO4 7-Other 8-4 degrees C 9-5035

Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

47528 IRSI COC

ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

47528

CUSTODY SEAL

Date: 9/9/21 Time: 1400
Name: Joe M Plasencia
Company: Arcadis

Seal Broken By:
Date: 09/10/21

47528

ORIGIN ID:ELPA (915) 747-3902
GARETT FERGUSON
ARCADIS
401 E MAIN DR STE 400

EL PASO, TX 79901
UNITED STATES US

SHIP DATE: 09SEP21
ACTWGT: 34.95 LB
CAD: 6990885/SSF02202
DIMS: 17x15x13 IN

BILL THIRD PARTY

TO CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF RD STE 210

HOUSTON TX 77099

47528

(000) 000-0000 REF:
INV:
PO: DEPT:

FedEx Express

TRK# 0215 8136 8777 9390

FRI - 10 SEP 10:30A
PRIORITY OVERNIGHT

NH SGRA

AHS
77099
TX-US IAH

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

January 03, 2022

Brooke Fontenot
ARCADIS U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge, LA 70816

Work Order: **HS21120608**

Laboratory Results for: **30049071 Brickland Refinery 4Q2021**

Dear Brooke Fontenot,

ALS Environmental received 16 sample(s) on Dec 10, 2021 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL
Dane J. Wacasey

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Work Order: HS21120608

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS21120608-01	MW-3S	Water		08-Dec-2021 09:20	10-Dec-2021 10:10	☐
HS21120608-02	MW-3D	Water		08-Dec-2021 09:55	10-Dec-2021 10:10	☐
HS21120608-03	FB120821	Water		08-Dec-2021 10:00	10-Dec-2021 10:10	☐
HS21120608-04	FD120821	Water		08-Dec-2021 00:00	10-Dec-2021 10:10	☐
HS21120608-05	MW-6S	Water		08-Dec-2021 10:35	10-Dec-2021 10:10	☐
HS21120608-06	MW-6D	Water		08-Dec-2021 11:10	10-Dec-2021 10:10	☐
HS21120608-07	MW-9S	Water		08-Dec-2021 11:50	10-Dec-2021 10:10	☐
HS21120608-08	EB120821	Water		08-Dec-2021 11:55	10-Dec-2021 10:10	☐
HS21120608-09	MW-17	Water		09-Dec-2021 07:50	10-Dec-2021 10:10	☐
HS21120608-10	MW-5	Water		09-Dec-2021 08:30	10-Dec-2021 10:10	☐
HS21120608-11	MW-8	Water		09-Dec-2021 09:15	10-Dec-2021 10:10	☐
HS21120608-12	FD120921	Water		09-Dec-2021 00:00	10-Dec-2021 10:10	☐
HS21120608-13	FB120921	Water		09-Dec-2021 09:20	10-Dec-2021 10:10	☐
HS21120608-14	EB120921	Water		09-Dec-2021 09:25	10-Dec-2021 10:10	☐
HS21120608-15	MW-11	Water		09-Dec-2021 10:05	10-Dec-2021 10:10	☐
HS21120608-16	MW-10	Water		09-Dec-2021 10:45	10-Dec-2021 10:10	☐

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Work Order: HS21120608

CASE NARRATIVE

GCMS Semivolatiles by Method SW8270

Batch ID: 173522

Sample ID: LCSD-173522

- The RPD between the LCS and LCSD was outside of the control limit.

GCMS Volatiles by Method SW8260

Batch ID: R397613,R397616,R397725

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Batch ID: R397537

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Sample ID: MW-3S
Collection Date: 08-Dec-2021 09:20

ANALYTICAL REPORT
WorkOrder:HS21120608
Lab ID:HS21120608-01
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	14-Dec-2021 10:38
Surr: 1,2-Dichloroethane-d4	*103*		*70-126*	*%REC*	*1*	*14-Dec-2021 10:38*
Surr: 4-Bromofluorobenzene	*88.9*		*81-113*	*%REC*	*1*	*14-Dec-2021 10:38*
Surr: Dibromofluoromethane	*98.9*		*77-123*	*%REC*	*1*	*14-Dec-2021 10:38*
Surr: Toluene-d8	*102*		*82-127*	*%REC*	*1*	*14-Dec-2021 10:38*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: 30049071 Brickland Refinery 4Q2021 WorkOrder:HS21120608
Sample ID: MW-3D Lab ID:HS21120608-02
Collection Date: 08-Dec-2021 09:55 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	14-Dec-2021 10:59
Surr: 1,2-Dichloroethane-d4	*103*		*70-126*	*%REC*	*1*	*14-Dec-2021 10:59*
Surr: 4-Bromofluorobenzene	*90.8*		*81-113*	*%REC*	*1*	*14-Dec-2021 10:59*
Surr: Dibromofluoromethane	*97.1*		*77-123*	*%REC*	*1*	*14-Dec-2021 10:59*
Surr: Toluene-d8	*102*		*82-127*	*%REC*	*1*	*14-Dec-2021 10:59*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Sample ID: FB120821
Collection Date: 08-Dec-2021 10:00

ANALYTICAL REPORT
WorkOrder:HS21120608
Lab ID:HS21120608-03
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	13-Dec-2021 22:09
Surr: 1,2-Dichloroethane-d4	*103*		*70-126*	*%REC*	*1*	*13-Dec-2021 22:09*
Surr: 4-Bromofluorobenzene	*90.0*		*81-113*	*%REC*	*1*	*13-Dec-2021 22:09*
Surr: Dibromofluoromethane	*98.2*		*77-123*	*%REC*	*1*	*13-Dec-2021 22:09*
Surr: Toluene-d8	*102*		*82-127*	*%REC*	*1*	*13-Dec-2021 22:09*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Sample ID: FD120821
Collection Date: 08-Dec-2021 00:00

ANALYTICAL REPORT
WorkOrder:HS21120608
Lab ID:HS21120608-04
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	14-Dec-2021 11:20
Surr: 1,2-Dichloroethane-d4	*103*		*70-126*	*%REC*	*1*	*14-Dec-2021 11:20*
Surr: 4-Bromofluorobenzene	*90.3*		*81-113*	*%REC*	*1*	*14-Dec-2021 11:20*
Surr: Dibromofluoromethane	*95.8*		*77-123*	*%REC*	*1*	*14-Dec-2021 11:20*
Surr: Toluene-d8	*102*		*82-127*	*%REC*	*1*	*14-Dec-2021 11:20*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Sample ID: MW-6S
Collection Date: 08-Dec-2021 10:35

ANALYTICAL REPORT
WorkOrder:HS21120608
Lab ID:HS21120608-05
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	14-Dec-2021 21:57
Surr: 1,2-Dichloroethane-d4	*98.1*		*70-126*	*%REC*	*1*	*14-Dec-2021 21:57*
Surr: 4-Bromofluorobenzene	*88.9*		*81-113*	*%REC*	*1*	*14-Dec-2021 21:57*
Surr: Dibromofluoromethane	*94.3*		*77-123*	*%REC*	*1*	*14-Dec-2021 21:57*
Surr: Toluene-d8	*99.3*		*82-127*	*%REC*	*1*	*14-Dec-2021 21:57*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Sample ID: MW-6D
Collection Date: 08-Dec-2021 11:10

ANALYTICAL REPORT
WorkOrder:HS21120608
Lab ID:HS21120608-06
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	14-Dec-2021 23:20
Surr: 1,2-Dichloroethane-d4	*99.9*		*70-126*	*%REC*	*1*	*14-Dec-2021 23:20*
Surr: 4-Bromofluorobenzene	*90.3*		*81-113*	*%REC*	*1*	*14-Dec-2021 23:20*
Surr: Dibromofluoromethane	*94.5*		*77-123*	*%REC*	*1*	*14-Dec-2021 23:20*
Surr: Toluene-d8	*99.7*		*82-127*	*%REC*	*1*	*14-Dec-2021 23:20*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: 30049071 Brickland Refinery 4Q2021 WorkOrder:HS21120608
Sample ID: MW-9S Lab ID:HS21120608-07
Collection Date: 08-Dec-2021 11:50 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	14-Dec-2021 23:41
Surr: 1,2-Dichloroethane-d4	*99.7*		*70-126*	*%REC*	*1*	*14-Dec-2021 23:41*
Surr: 4-Bromofluorobenzene	*88.2*		*81-113*	*%REC*	*1*	*14-Dec-2021 23:41*
Surr: Dibromofluoromethane	*97.1*		*77-123*	*%REC*	*1*	*14-Dec-2021 23:41*
Surr: Toluene-d8	*102*		*82-127*	*%REC*	*1*	*14-Dec-2021 23:41*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Sample ID: EB120821
Collection Date: 08-Dec-2021 11:55

ANALYTICAL REPORT
WorkOrder:HS21120608
Lab ID:HS21120608-08
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	13-Dec-2021 22:30
Surr: 1,2-Dichloroethane-d4	*103*		*70-126*	*%REC*	*1*	*13-Dec-2021 22:30*
Surr: 4-Bromofluorobenzene	*86.8*		*81-113*	*%REC*	*1*	*13-Dec-2021 22:30*
Surr: Dibromofluoromethane	*97.5*		*77-123*	*%REC*	*1*	*13-Dec-2021 22:30*
Surr: Toluene-d8	*102*		*82-127*	*%REC*	*1*	*13-Dec-2021 22:30*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Sample ID: MW-17
Collection Date: 09-Dec-2021 07:50

ANALYTICAL REPORT
WorkOrder:HS21120608
Lab ID:HS21120608-09
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	15-Dec-2021 00:02
Surr: 1,2-Dichloroethane-d4	*98.1*		*70-126*	*%REC*	*1*	*15-Dec-2021 00:02*
Surr: 4-Bromofluorobenzene	*90.6*		*81-113*	*%REC*	*1*	*15-Dec-2021 00:02*
Surr: Dibromofluoromethane	*96.8*		*77-123*	*%REC*	*1*	*15-Dec-2021 00:02*
Surr: Toluene-d8	*100*		*82-127*	*%REC*	*1*	*15-Dec-2021 00:02*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Sample ID: MW-5
Collection Date: 09-Dec-2021 08:30

ANALYTICAL REPORT
WorkOrder:HS21120608
Lab ID:HS21120608-10
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	**0.47**		**0.010**	**mg/L**	10	15-Dec-2021 11:30
Surr: 1,2-Dichloroethane-d4	*93.8*		*70-126*	*%REC*	*10*	*15-Dec-2021 11:30*
Surr: 4-Bromofluorobenzene	*89.6*		*81-113*	*%REC*	*10*	*15-Dec-2021 11:30*
Surr: Dibromofluoromethane	*95.3*		*77-123*	*%REC*	*10*	*15-Dec-2021 11:30*
Surr: Toluene-d8	*99.8*		*82-127*	*%REC*	*10*	*15-Dec-2021 11:30*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: 30049071 Brickland Refinery 4Q2021 WorkOrder:HS21120608
Sample ID: MW-8 Lab ID:HS21120608-11
Collection Date: 09-Dec-2021 09:15 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	**0.041**		**0.0010**	**mg/L**	1	15-Dec-2021 00:44
Surr: 1,2-Dichloroethane-d4	*99.1*		*70-126*	*%REC*	*1*	*15-Dec-2021 00:44*
Surr: 4-Bromofluorobenzene	*91.8*		*81-113*	*%REC*	*1*	*15-Dec-2021 00:44*
Surr: Dibromofluoromethane	*92.1*		*77-123*	*%REC*	*1*	*15-Dec-2021 00:44*
Surr: Toluene-d8	*103*		*82-127*	*%REC*	*1*	*15-Dec-2021 00:44*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 14-Dec-2021		Analyst: GEY
Acenaphthene	**0.000824**		**0.000102**	**mg/L**	1	30-Dec-2021 10:42
Acenaphthylene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Anthracene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Benz(a)anthracene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Benzo(a)pyrene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Benzo(b)fluoranthene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Benzo(g,h,i)perylene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Benzo(k)fluoranthene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Chrysene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Dibenz(a,h)anthracene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Fluoranthene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Fluorene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Indeno(1,2,3-cd)pyrene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Naphthalene	**0.000169**		**0.000102**	**mg/L**	1	30-Dec-2021 10:42
Phenanthrene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Pyrene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 10:42
Surr: 2-Fluorobiphenyl	*55.8*		*32-130*	*%REC*	*1*	*30-Dec-2021 10:42*
Surr: 4-Terphenyl-d14	*67.2*		*40-135*	*%REC*	*1*	*30-Dec-2021 10:42*
Surr: Nitrobenzene-d5	*71.5*		*45-142*	*%REC*	*1*	*30-Dec-2021 10:42*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: 30049071 Brickland Refinery 4Q2021 WorkOrder:HS21120608
Sample ID: FD120921 Lab ID:HS21120608-12
Collection Date: 09-Dec-2021 00:00 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL PAHS - 8270D	**Method:SW8270**			Prep:SW3511 / 14-Dec-2021		Analyst: GEY
Acenaphthene	**0.000836**		**0.000102**	**mg/L**	1	30-Dec-2021 11:02
Acenaphthylene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Anthracene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Benz(a)anthracene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Benzo(a)pyrene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Benzo(b)fluoranthene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Benzo(g,h,i)perylene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Benzo(k)fluoranthene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Chrysene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Dibenz(a,h)anthracene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Fluoranthene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Fluorene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Indeno(1,2,3-cd)pyrene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Naphthalene	**0.000175**		**0.000102**	**mg/L**	1	30-Dec-2021 11:02
Phenanthrene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Pyrene	< 0.000102		0.000102	mg/L	1	30-Dec-2021 11:02
Surr: 2-Fluorobiphenyl	*60.2*		*32-130*	*%REC*	*1*	*30-Dec-2021 11:02*
Surr: 4-Terphenyl-d14	*78.1*		*40-135*	*%REC*	*1*	*30-Dec-2021 11:02*
Surr: Nitrobenzene-d5	*79.2*		*45-142*	*%REC*	*1*	*30-Dec-2021 11:02*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: 30049071 Brickland Refinery 4Q2021 WorkOrder:HS21120608
Sample ID: FB120921 Lab ID:HS21120608-13
Collection Date: 09-Dec-2021 09:20 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	13-Dec-2021 22:51
Surr: 1,2-Dichloroethane-d4	*101*		*70-126*	*%REC*	*1*	*13-Dec-2021 22:51*
Surr: 4-Bromofluorobenzene	*89.6*		*81-113*	*%REC*	*1*	*13-Dec-2021 22:51*
Surr: Dibromofluoromethane	*98.0*		*77-123*	*%REC*	*1*	*13-Dec-2021 22:51*
Surr: Toluene-d8	*103*		*82-127*	*%REC*	*1*	*13-Dec-2021 22:51*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 14-Dec-2021		Analyst: GEY
Acenaphthene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Acenaphthylene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Anthracene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Benz(a)anthracene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Benzo(a)pyrene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Benzo(b)fluoranthene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Benzo(g,h,i)perylene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Benzo(k)fluoranthene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Chrysene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Dibenz(a,h)anthracene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Fluoranthene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Fluorene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Indeno(1,2,3-cd)pyrene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Naphthalene	**0.000157**		**0.000103**	**mg/L**	1	30-Dec-2021 11:22
Phenanthrene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Pyrene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:22
Surr: 2-Fluorobiphenyl	*54.2*		*32-130*	*%REC*	*1*	*30-Dec-2021 11:22*
Surr: 4-Terphenyl-d14	*114*		*40-135*	*%REC*	*1*	*30-Dec-2021 11:22*
Surr: Nitrobenzene-d5	*100*		*45-142*	*%REC*	*1*	*30-Dec-2021 11:22*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
Sample ID: EB120921
Collection Date: 09-Dec-2021 09:25

ANALYTICAL REPORT
WorkOrder:HS21120608
Lab ID:HS21120608-14
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	13-Dec-2021 23:12
Surr: 1,2-Dichloroethane-d4	*101*		*70-126*	*%REC*	*1*	*13-Dec-2021 23:12*
Surr: 4-Bromofluorobenzene	*89.5*		*81-113*	*%REC*	*1*	*13-Dec-2021 23:12*
Surr: Dibromofluoromethane	*101*		*77-123*	*%REC*	*1*	*13-Dec-2021 23:12*
Surr: Toluene-d8	*101*		*82-127*	*%REC*	*1*	*13-Dec-2021 23:12*
LOW-LEVEL PAHS - 8270D		**Method:SW8270**		Prep:SW3511 / 14-Dec-2021		Analyst: GEY
Acenaphthene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Acenaphthylene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Anthracene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Benz(a)anthracene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Benzo(a)pyrene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Benzo(b)fluoranthene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Benzo(g,h,i)perylene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Benzo(k)fluoranthene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Chrysene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Dibenz(a,h)anthracene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Fluoranthene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Fluorene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Indeno(1,2,3-cd)pyrene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Naphthalene	**0.000201**		**0.000103**	**mg/L**	1	30-Dec-2021 11:42
Phenanthrene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Pyrene	< 0.000103		0.000103	mg/L	1	30-Dec-2021 11:42
Surr: 2-Fluorobiphenyl	*63.1*		*32-130*	*%REC*	*1*	*30-Dec-2021 11:42*
Surr: 4-Terphenyl-d14	*65.0*		*40-135*	*%REC*	*1*	*30-Dec-2021 11:42*
Surr: Nitrobenzene-d5	*115*		*45-142*	*%REC*	*1*	*30-Dec-2021 11:42*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: 30049071 Brickland Refinery 4Q2021 WorkOrder:HS21120608
Sample ID: MW-11 Lab ID:HS21120608-15
Collection Date: 09-Dec-2021 10:05 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	15-Dec-2021 01:05
Surr: 1,2-Dichloroethane-d4	*98.0*		*70-126*	*%REC*	*1*	*15-Dec-2021 01:05*
Surr: 4-Bromofluorobenzene	*92.1*		*81-113*	*%REC*	*1*	*15-Dec-2021 01:05*
Surr: Dibromofluoromethane	*94.9*		*77-123*	*%REC*	*1*	*15-Dec-2021 01:05*
Surr: Toluene-d8	*102*		*82-127*	*%REC*	*1*	*15-Dec-2021 01:05*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc. **ANALYTICAL REPORT**
Project: 30049071 Brickland Refinery 4Q2021 WorkOrder:HS21120608
Sample ID: MW-10 Lab ID:HS21120608-16
Collection Date: 09-Dec-2021 10:45 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Benzene	< 0.0010		0.0010	mg/L	1	15-Dec-2021 01:26
Surr: 1,2-Dichloroethane-d4	*97.9*		*70-126*	*%REC*	*1*	*15-Dec-2021 01:26*
Surr: 4-Bromofluorobenzene	*91.6*		*81-113*	*%REC*	*1*	*15-Dec-2021 01:26*
Surr: Dibromofluoromethane	*95.4*		*77-123*	*%REC*	*1*	*15-Dec-2021 01:26*
Surr: Toluene-d8	*101*		*82-127*	*%REC*	*1*	*15-Dec-2021 01:26*

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 03-Jan-22

Weight / Prep Log

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

Batch ID: 173522 **Start Date:** 14 Dec 2021 09:57 **End Date:** 14 Dec 2021 15:00
Method: SW3511 **Prep Code:** 3511_PAH

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS21120608-11	1	32.2 (mL)	2 (mL)	0.06211	40 mL Amber
HS21120608-12	1	32.4 (mL)	2 (mL)	0.06173	40 mL Amber
HS21120608-13	1	31.97 (mL)	2 (mL)	0.06256	40 mL Amber
HS21120608-14	1	31.94 (mL)	2 (mL)	0.06262	40 mL Amber

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 173522 (0)	**Test Name :** LOW-LEVEL PAHS - 8270D				**Matrix:** Water	
HS21120608-11	MW-8	09 Dec 2021 09:15		14 Dec 2021 09:57	30 Dec 2021 10:42	1
HS21120608-12	FD120921	09 Dec 2021 00:00		14 Dec 2021 09:57	30 Dec 2021 11:02	1
HS21120608-13	FB120921	09 Dec 2021 09:20		14 Dec 2021 09:57	30 Dec 2021 11:22	1
HS21120608-14	EB120921	09 Dec 2021 09:25		14 Dec 2021 09:57	30 Dec 2021 11:42	1
Batch ID: R397537 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Water	
HS21120608-03	FB120821	08 Dec 2021 10:00			13 Dec 2021 22:09	1
HS21120608-08	EB120821	08 Dec 2021 11:55			13 Dec 2021 22:30	1
HS21120608-13	FB120921	09 Dec 2021 09:20			13 Dec 2021 22:51	1
HS21120608-14	EB120921	09 Dec 2021 09:25			13 Dec 2021 23:12	1
Batch ID: R397613 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Water	
HS21120608-01	MW-3S	08 Dec 2021 09:20			14 Dec 2021 10:38	1
HS21120608-02	MW-3D	08 Dec 2021 09:55			14 Dec 2021 10:59	1
HS21120608-04	FD120821	08 Dec 2021 00:00			14 Dec 2021 11:20	1
Batch ID: R397616 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Water	
HS21120608-05	MW-6S	08 Dec 2021 10:35			14 Dec 2021 21:57	1
HS21120608-06	MW-6D	08 Dec 2021 11:10			14 Dec 2021 23:20	1
HS21120608-07	MW-9S	08 Dec 2021 11:50			14 Dec 2021 23:41	1
HS21120608-09	MW-17	09 Dec 2021 07:50			15 Dec 2021 00:02	1
HS21120608-11	MW-8	09 Dec 2021 09:15			15 Dec 2021 00:44	1
HS21120608-15	MW-11	09 Dec 2021 10:05			15 Dec 2021 01:05	1
HS21120608-16	MW-10	09 Dec 2021 10:45			15 Dec 2021 01:26	1
Batch ID: R397725 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Water	
HS21120608-10	MW-5	09 Dec 2021 08:30			15 Dec 2021 11:30	10

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: 173522 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

MBLK Sample ID: **MBLK-173522** Units: **ug/L** Analysis Date: **21-Dec-2021 11:19**
Client ID: Run ID: **SV-6_398244** SeqNo: **6438245** PrepDate: **14-Dec-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	< 0.100	0.100								
Acenaphthylene	< 0.100	0.100								
Anthracene	< 0.100	0.100								
Benz(a)anthracene	< 0.100	0.100								
Benzo(a)pyrene	< 0.100	0.100								
Benzo(b)fluoranthene	< 0.100	0.100								
Benzo(g,h,i)perylene	< 0.100	0.100								
Benzo(k)fluoranthene	< 0.100	0.100								
Chrysene	< 0.100	0.100								
Dibenz(a,h)anthracene	< 0.100	0.100								
Fluoranthene	< 0.100	0.100								
Fluorene	< 0.100	0.100								
Indeno(1,2,3-cd)pyrene	< 0.100	0.100								
Naphthalene	< 0.100	0.100								
Phenanthrene	< 0.100	0.100								
Pyrene	< 0.100	0.100								
Surr: 2-Fluorobiphenyl	*1.351*	*0.100*	*3.03*	*0*	*44.6*	*32 - 130*				
Surr: 4-Terphenyl-d14	*3.025*	*0.100*	*3.03*	*0*	*99.8*	*40 - 135*				
Surr: Nitrobenzene-d5	*3.508*	*0.100*	*3.03*	*0*	*116*	*45 - 142*				

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: 173522 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

LCS Sample ID: **LCS-173522** Units: **ug/L** Analysis Date: **23-Dec-2021 19:18**
Client ID: Run ID: **SV-6_398245** SeqNo: **6440302** PrepDate: **14-Dec-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1.261	0.100	3.03	0	41.6	40 - 140				
Acenaphthylene	3.755	0.100	3.03	0	124	40 - 140				
Anthracene	3.663	0.100	3.03	0	121	40 - 140				
Benz(a)anthracene	4.225	0.100	3.03	0	139	40 - 140				
Benzo(a)pyrene	2.723	0.100	3.03	0	89.9	40 - 140				
Benzo(b)fluoranthene	2.612	0.100	3.03	0	86.2	40 - 140				
Benzo(g,h,i)perylene	2.352	0.100	3.03	0	77.6	40 - 140				
Benzo(k)fluoranthene	2.637	0.100	3.03	0	87.0	40 - 140				
Chrysene	3.492	0.100	3.03	0	115	40 - 140				
Dibenz(a,h)anthracene	2.289	0.100	3.03	0	75.6	40 - 140				
Fluoranthene	3.438	0.100	3.03	0	113	40 - 140				
Fluorene	4.015	0.100	3.03	0	133	40 - 140				
Indeno(1,2,3-cd)pyrene	2.066	0.100	3.03	0	68.2	40 - 140				
Naphthalene	4.026	0.100	3.03	0	133	40 - 140				
Phenanthrene	4.168	0.100	3.03	0	138	40 - 140				
Pyrene	3.732	0.100	3.03	0	123	40 - 140				
Surr: 2-Fluorobiphenyl	*2.583*	*0.100*	*3.03*	*0*	*85.3*	*32 - 130*				
Surr: 4-Terphenyl-d14	*2.828*	*0.100*	*3.03*	*0*	*93.3*	*40 - 135*				
Surr: Nitrobenzene-d5	*3.458*	*0.100*	*3.03*	*0*	*114*	*45 - 142*				

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: 173522 (0) **Instrument: SV-6** **Method: LOW-LEVEL PAHS - 8270D**

LCSD Sample ID: **LCSD-173522** Units: **ug/L** Analysis Date: **23-Dec-2021 19:38**
Client ID: Run ID: **SV-6_398245** SeqNo: **6440303** PrepDate: **14-Dec-2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1.867	0.100	3.03	0	61.6	40 - 140	1.261	38.7	25	R
Acenaphthylene	3.33	0.100	3.03	0	110	40 - 140	3.755	12	25	
Anthracene	3.266	0.100	3.03	0	108	40 - 140	3.663	11.5	25	
Benz(a)anthracene	2.279	0.100	3.03	0	75.2	40 - 140	4.225	59.9	25	R
Benzo(a)pyrene	1.812	0.100	3.03	0	59.8	40 - 140	2.723	40.2	25	R
Benzo(b)fluoranthene	1.721	0.100	3.03	0	56.8	40 - 140	2.612	41.1	25	R
Benzo(g,h,i)perylene	1.789	0.100	3.03	0	59.1	40 - 140	2.352	27.2	25	R
Benzo(k)fluoranthene	1.798	0.100	3.03	0	59.4	40 - 140	2.637	37.8	25	R
Chrysene	2.193	0.100	3.03	0	72.4	40 - 140	3.492	45.7	25	R
Dibenz(a,h)anthracene	1.816	0.100	3.03	0	59.9	40 - 140	2.289	23.1	25	
Fluoranthene	3.096	0.100	3.03	0	102	40 - 140	3.438	10.5	25	
Fluorene	3.488	0.100	3.03	0	115	40 - 140	4.015	14.1	25	
Indeno(1,2,3-cd)pyrene	2.013	0.100	3.03	0	66.4	40 - 140	2.066	2.56	25	
Naphthalene	3.462	0.100	3.03	0	114	40 - 140	4.026	15.1	25	
Phenanthrene	3.744	0.100	3.03	0	124	40 - 140	4.168	10.7	25	
Pyrene	2.283	0.100	3.03	0	75.3	40 - 140	3.732	48.2	25	R
Surr: 2-Fluorobiphenyl	*2.636*	*0.100*	*3.03*	*0*	*87.0*	*32 - 130*	*2.583*	*2.01*	*25*	
Surr: 4-Terphenyl-d14	*1.776*	*0.100*	*3.03*	*0*	*58.6*	*40 - 135*	*2.828*	*45.7*	*25*	R
Surr: Nitrobenzene-d5	*3.44*	*0.100*	*3.03*	*0*	*114*	*45 - 142*	*3.458*	*0.527*	*25*	

The following samples were analyzed in this batch: HS21120608-11 HS21120608-12 HS21120608-13 HS21120608-14

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: R397537 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-211213** Units: **ug/L** Analysis Date: **13-Dec-2021 20:45**
Client ID: Run ID: **VOA7_397537** SeqNo: **6419495** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 1.0	1.0								
Surr: 1,2-Dichloroethane-d4	*50.73*	*1.0*	*50*	*0*	*101*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*45.06*	*1.0*	*50*	*0*	*90.1*	*82 - 115*				
Surr: Dibromofluoromethane	*49.26*	*1.0*	*50*	*0*	*98.5*	*73 - 126*				
Surr: Toluene-d8	*50.56*	*1.0*	*50*	*0*	*101*	*81 - 120*				

LCS Sample ID: **VLCSW-211213** Units: **ug/L** Analysis Date: **13-Dec-2021 20:03**
Client ID: Run ID: **VOA7_397537** SeqNo: **6419494** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	18.36	1.0	20	0	91.8	74 - 120				
Surr: 1,2-Dichloroethane-d4	*48.35*	*1.0*	*50*	*0*	*96.7*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*50.08*	*1.0*	*50*	*0*	*100*	*82 - 115*				
Surr: Dibromofluoromethane	*48.87*	*1.0*	*50*	*0*	*97.7*	*73 - 126*				
Surr: Toluene-d8	*49.39*	*1.0*	*50*	*0*	*98.8*	*81 - 120*				

MS Sample ID: **HS21120132-01MS** Units: **ug/L** Analysis Date: **14-Dec-2021 01:46**
Client ID: Run ID: **VOA7_397537** SeqNo: **6419509** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	17.7	1.0	20	0	88.5	70 - 127				
Surr: 1,2-Dichloroethane-d4	*50.69*	*1.0*	*50*	*0*	*101*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*48.87*	*1.0*	*50*	*0*	*97.7*	*81 - 113*				
Surr: Dibromofluoromethane	*49.46*	*1.0*	*50*	*0*	*98.9*	*77 - 123*				
Surr: Toluene-d8	*49.75*	*1.0*	*50*	*0*	*99.5*	*82 - 127*				

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: R397537 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MSD Sample ID: **HS21120132-01MSD** Units: **ug/L** Analysis Date: **14-Dec-2021 02:06**
Client ID: Run ID: **VOA7_397537** SeqNo: **6419510** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	16.59	1.0	20	0	83.0	70 - 127	17.7	6.46	20	
Surr: 1,2-Dichloroethane-d4	*47.21*	*1.0*	*50*	*0*	*94.4*	*70 - 126*	*50.69*	*7.09*	*20*	
Surr: 4-Bromofluorobenzene	*48.33*	*1.0*	*50*	*0*	*96.7*	*81 - 113*	*48.87*	*1.11*	*20*	
Surr: Dibromofluoromethane	*48.87*	*1.0*	*50*	*0*	*97.7*	*77 - 123*	*49.46*	*1.19*	*20*	
Surr: Toluene-d8	*49.84*	*1.0*	*50*	*0*	*99.7*	*82 - 127*	*49.75*	*0.184*	*20*	

The following samples were analyzed in this batch: HS21120608-03 HS21120608-08 HS21120608-13 HS21120608-14

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: R397613 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-211214** Units: **ug/L** Analysis Date: **14-Dec-2021 10:17**
Client ID: Run ID: **VOA7_397613** SeqNo: **6421152** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 1.0	1.0								
Surr: 1,2-Dichloroethane-d4	*48.67*	*1.0*	*50*	*0*	*97.3*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*43.65*	*1.0*	*50*	*0*	*87.3*	*82 - 115*				
Surr: Dibromofluoromethane	*47.07*	*1.0*	*50*	*0*	*94.1*	*73 - 126*				
Surr: Toluene-d8	*50.25*	*1.0*	*50*	*0*	*100*	*81 - 120*				

LCS Sample ID: **VLCSW-211214** Units: **ug/L** Analysis Date: **14-Dec-2021 09:35**
Client ID: Run ID: **VOA7_397613** SeqNo: **6421151** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	17.96	1.0	20	0	89.8	74 - 120				
Surr: 1,2-Dichloroethane-d4	*49.92*	*1.0*	*50*	*0*	*99.8*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*49.12*	*1.0*	*50*	*0*	*98.2*	*82 - 115*				
Surr: Dibromofluoromethane	*48.33*	*1.0*	*50*	*0*	*96.7*	*73 - 126*				
Surr: Toluene-d8	*49.62*	*1.0*	*50*	*0*	*99.2*	*81 - 120*				

MS Sample ID: **HS21120608-02MS** Units: **ug/L** Analysis Date: **14-Dec-2021 16:38**
Client ID: **MW-3D** Run ID: **VOA7_397613** SeqNo: **6421169** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	16.74	1.0	20	0	83.7	70 - 127				
Surr: 1,2-Dichloroethane-d4	*49.41*	*1.0*	*50*	*0*	*98.8*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*48.06*	*1.0*	*50*	*0*	*96.1*	*81 - 113*				
Surr: Dibromofluoromethane	*48.57*	*1.0*	*50*	*0*	*97.1*	*77 - 123*				
Surr: Toluene-d8	*49.96*	*1.0*	*50*	*0*	*99.9*	*82 - 127*				

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: R397613 (0) **Instrument:** VOA7 **Method:** LOW LEVEL VOLATILES BY SW8260C

MSD Sample ID: **HS21120608-02MSD** Units: **ug/L** Analysis Date: **14-Dec-2021 16:58**
Client ID: **MW-3D** Run ID: **VOA7_397613** SeqNo: **6421170** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	16.62	1.0	20	0	83.1	70 - 127	16.74	0.703	20	
Surr: 1,2-Dichloroethane-d4	*49.48*	*1.0*	*50*	*0*	*99.0*	*70 - 126*	*49.41*	*0.14*	*20*	
Surr: 4-Bromofluorobenzene	*49.42*	*1.0*	*50*	*0*	*98.8*	*81 - 113*	*48.06*	*2.8*	*20*	
Surr: Dibromofluoromethane	*48.24*	*1.0*	*50*	*0*	*96.5*	*77 - 123*	*48.57*	*0.69*	*20*	
Surr: Toluene-d8	*49.91*	*1.0*	*50*	*0*	*99.8*	*82 - 127*	*49.96*	*0.0951*	*20*	

The following samples were analyzed in this batch: HS21120608-01 HS21120608-02 HS21120608-04

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: R397616 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-211214** Units: **ug/L** Analysis Date: **14-Dec-2021 21:36**
Client ID: Run ID: **VOA7_397616** SeqNo: **6421233** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 1.0	1.0								
Surr: 1,2-Dichloroethane-d4	*48.79*	*1.0*	*50*	*0*	*97.6*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*43.6*	*1.0*	*50*	*0*	*87.2*	*82 - 115*				
Surr: Dibromofluoromethane	*47.44*	*1.0*	*50*	*0*	*94.9*	*73 - 126*				
Surr: Toluene-d8	*49.72*	*1.0*	*50*	*0*	*99.4*	*81 - 120*				

LCS Sample ID: **VLCSW-211214** Units: **ug/L** Analysis Date: **14-Dec-2021 20:54**
Client ID: Run ID: **VOA7_397616** SeqNo: **6421232** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	17.95	1.0	20	0	89.7	74 - 120				
Surr: 1,2-Dichloroethane-d4	*48.65*	*1.0*	*50*	*0*	*97.3*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*49.82*	*1.0*	*50*	*0*	*99.6*	*82 - 115*				
Surr: Dibromofluoromethane	*47.69*	*1.0*	*50*	*0*	*95.4*	*73 - 126*				
Surr: Toluene-d8	*48.81*	*1.0*	*50*	*0*	*97.6*	*81 - 120*				

MS Sample ID: **HS21120608-05MS** Units: **ug/L** Analysis Date: **14-Dec-2021 22:17**
Client ID: **MW-6S** Run ID: **VOA7_397616** SeqNo: **6421235** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	16.59	1.0	20	0	83.0	70 - 127				
Surr: 1,2-Dichloroethane-d4	*47.94*	*1.0*	*50*	*0*	*95.9*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*49.48*	*1.0*	*50*	*0*	*99.0*	*81 - 113*				
Surr: Dibromofluoromethane	*49.36*	*1.0*	*50*	*0*	*98.7*	*77 - 123*				
Surr: Toluene-d8	*49.22*	*1.0*	*50*	*0*	*98.4*	*82 - 127*				

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: R397616 (0) **Instrument:** VOA7 **Method:** LOW LEVEL VOLATILES BY SW8260C

MSD Sample ID: **HS21120608-05MSD** Units: **ug/L** Analysis Date: **14-Dec-2021 22:38**
Client ID: **MW-6S** Run ID: **VOA7_397616** SeqNo: **6421236** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	15.59	1.0	20	0	77.9	70 - 127	16.59	6.22	20	
Surr: 1,2-Dichloroethane-d4	*48.58*	*1.0*	*50*	*0*	*97.2*	*70 - 126*	*47.94*	*1.32*	*20*	
Surr: 4-Bromofluorobenzene	*49.93*	*1.0*	*50*	*0*	*99.9*	*81 - 113*	*49.48*	*0.905*	*20*	
Surr: Dibromofluoromethane	*47.77*	*1.0*	*50*	*0*	*95.5*	*77 - 123*	*49.36*	*3.27*	*20*	
Surr: Toluene-d8	*48.88*	*1.0*	*50*	*0*	*97.8*	*82 - 127*	*49.22*	*0.69*	*20*	

The following samples were analyzed in this batch: HS21120608-05 HS21120608-06 HS21120608-07 HS21120608-09 HS21120608-11 HS21120608-15 HS21120608-16

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: R397725 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-211215** Units: **ug/L** Analysis Date: **15-Dec-2021 10:03**
Client ID: Run ID: **VOA7_397725** SeqNo: **6423766** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 1.0	1.0								
Surr: 1,2-Dichloroethane-d4	*48.5*	*1.0*	*50*	*0*	*97.0*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*45.48*	*1.0*	*50*	*0*	*91.0*	*82 - 115*				
Surr: Dibromofluoromethane	*47.25*	*1.0*	*50*	*0*	*94.5*	*73 - 126*				
Surr: Toluene-d8	*50.61*	*1.0*	*50*	*0*	*101*	*81 - 120*				

LCS Sample ID: **VLCSW-211215** Units: **ug/L** Analysis Date: **15-Dec-2021 09:21**
Client ID: Run ID: **VOA7_397725** SeqNo: **6423765** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	17.59	1.0	20	0	87.9	74 - 120				
Surr: 1,2-Dichloroethane-d4	*47.61*	*1.0*	*50*	*0*	*95.2*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*51.48*	*1.0*	*50*	*0*	*103*	*82 - 115*				
Surr: Dibromofluoromethane	*47.36*	*1.0*	*50*	*0*	*94.7*	*73 - 126*				
Surr: Toluene-d8	*48.81*	*1.0*	*50*	*0*	*97.6*	*81 - 120*				

MS Sample ID: **HS21120374-07MS** Units: **ug/L** Analysis Date: **15-Dec-2021 15:20**
Client ID: Run ID: **VOA7_397725** SeqNo: **6423781** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	15.89	1.0	20	0	79.4	70 - 127				
Surr: 1,2-Dichloroethane-d4	*45.88*	*1.0*	*50*	*0*	*91.8*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*49.46*	*1.0*	*50*	*0*	*98.9*	*81 - 113*				
Surr: Dibromofluoromethane	*47.15*	*1.0*	*50*	*0*	*94.3*	*77 - 123*				
Surr: Toluene-d8	*48.4*	*1.0*	*50*	*0*	*96.8*	*82 - 127*				

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: HS21120608

QC BATCH REPORT

Batch ID: R397725 (0) **Instrument:** VOA7 **Method:** LOW LEVEL VOLATILES BY SW8260C

MSD Sample ID: **HS21120374-07MSD** Units: **ug/L** Analysis Date: **15-Dec-2021 15:41**
Client ID: Run ID: **VOA7_397725** SeqNo: **6423782** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	15.24	1.0	20	0	76.2	70 - 127	15.89	4.14	20	
Surr: 1,2-Dichloroethane-d4	*46.49*	*1.0*	*50*	*0*	*93.0*	*70 - 126*	*45.88*	*1.32*	*20*	
Surr: 4-Bromofluorobenzene	*48.7*	*1.0*	*50*	*0*	*97.4*	*81 - 113*	*49.46*	*1.54*	*20*	
Surr: Dibromofluoromethane	*46.72*	*1.0*	*50*	*0*	*93.4*	*77 - 123*	*47.15*	*0.917*	*20*	
Surr: Toluene-d8	*48.63*	*1.0*	*50*	*0*	*97.3*	*82 - 127*	*48.4*	*0.485*	*20*	

The following samples were analyzed in this batch: HS21120608-10

ALS Houston, US Date: 03-Jan-22

Client: ARCADIS U.S., Inc.
Project: 30049071 Brickland Refinery 4Q2021
WorkOrder: **HS21120608**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	21-022-0	26-Mar-2022
Florida	E87611-33	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Texas	T104704231-21-28	30-Apr-2022

ALS Houston, US Date: 03-Jan-22

Sample Receipt Checklist

Work Order ID: HS21120608 **Date/Time Received:** 10-Dec-2021 10:10

Client Name: Arcadis-Baton Rouge **Received by:** Pablo Marinez

Completed By:	/S/ Nilesh D. Ranchod	10-Dec-2021 14:45	**Reviewed by:**	/S/ Corey Grandits	27-Dec-2021 14:00
	eSignature	Date/Time		eSignature	Date/Time

Matrices: **Water** Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	2 Page(s)
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	COC IDs:256082/256083
Samplers name present on COC?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	1.0C UC/C		IR #31
Cooler(s)/Kit(s):	43893		
Date/Time sample(s) sent to storage:	12/10/2021 15:00		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:			

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

ALS

Cincinnati, OH +1 513 733 5336
Everett, WA +1 425 356 2600
Fort Collins, CO +1 970 490 1511
Holland, MI +1 616 399 6070

Chain of Custody Form

Page ___ of ___

COC ID: 256083

ALS Project Manager:

HS21120608
ARCADIS U.S., Inc.
30049071 Brickland Refinery 4Q2021

Customer Information		Project Information	
Purchase Order	30049071 Task 250	Project Name	30049071 Brickland Refinery 4Q2021
Work Order		Project Number	30049071 Task 250
Company Name	ARCADIS U.S., Inc	Bill To Company	ARCADIS
Send Report To	Brooke Fontenot	Invoice Attn	Accounts Payable
Address	10352 Plaza Americana Drive	Address	630 Plaza Drive, Suite 600
City/State/Zip	Baton Rouge, LA 70816	City/State/Zip	Highlands Ranch CO 80129
Phone	(225) 292-1004	Phone	(303) 471-3699
Fax		Fax	
e-Mail Address	Brooke.Fontenot@arcadis-us.com	e-Mail Address	Accountspayable.administration@arcadi

A: 8260_LL_W (8260 Benzene, *Unpreserved*)-7 day HT
B: 8270_PAH_LVI (8270 PAHs (LVI))
C:
D:
E:
F:
G:
H:
I:

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-3S	12/8/21	0920	W	8	3	X										
2	MW-3D	12/8/21	0955	W	8	3	X										
3	FB120821	12/8/21	1000	W	8	3	X										
4	FD120821	12/8/21	–	W	8	3	X										
5	MW-6S	12/8/21	1035	W	8	3	X										
6	MW-6D	12/8/21	1110	W	8	3	X										
7	MW-9S	12/8/21	1150	W	8	3	X										
8	EB120821	12/8/21	1155	W	8	3	X										
9																	
10																	

Sampler(s) Please Print & Sign: Doug Solan [signature]
Shipment Method: FEDEX
Required Turnaround Time: (Check Box) [X] STD 10 Wk Days [ ] 5 Wk Days [ ] 2 Wk Days [ ] 24 Hour [ ] Other ____
Results Due Date:

Relinquished by: [signature] Date: 12/9/21 Time: 1401 Received by:
Relinquished by: Date: Time: Received by (Laboratory): [signature]
Logged by (Laboratory): Date: Time: Checked by (Laboratory):

Notes: [AGM Brickland NM]

Cooler ID	Cooler Temp.
43845	1.0C
7073	1.2C

QC Package: (Check One Box Below) [X] Level II Std QC

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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Everett, WA +1 425 356 2600
Fort Collins, CO +1 970 490 1511
Holland, MI +1 616 399 6070

Chain of Custody Form

Page ____ of ____

COC ID: 25608_

HS21120608

ARCADIS U.S., Inc.

30049071 Brickland Refinery 4Q2021

ALS Project Manager:

Customer Information		Project Information			
Purchase Order	30049071 Task 250	Project Name	30049071 Brickland Refinery 4Q2021	A	8260_LL_W (8260 Benzene (*Unpreserved*)-7 day HT
Work Order		Project Number	30049071 Task 250	B	8270_PAH_LVI (8270 PAHs (LVI))
Company Name	ARCADIS U.S., Inc	Bill To Company	ARCADIS	C	
Send Report To	Brooke Fontenot	Invoice Attn	Accounts Payable	D	
Address	10352 Plaza Americana Drive	Address	630 Plaza Drive, Suite 600	E	
				F	
City/State/Zip	Baton Rouge, LA 70816	City/State/Zip	Highlands Ranch CO 80129	G	
Phone	(225) 292-1004	Phone	(303) 471-3699	H	
Fax		Fax		I	
e-Mail Address	Brooke.Fontenot@arcadis-us.com	e-Mail Address	Accountspayable.administration@arcadi		

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	~~MW-5~~ MW-17	12/9/21	0750	W	8	3	X										
2	MW-5	12/9/21	0830	W	8	3	X										
3	MW-8	12/9/21	0915	W	8	6	X	X									
4	FD120921	12/9/21	—	W	8	3		X									
5	FB120921	12/9/21	0920	W	8	6	X	X									
6	EB120921	12/9/21	0925	W	8	6	X	X									
7	MW-11	12/9/21	1005	W	8	3	X										
8	MW-10	12/9/21	1045	W	8	3	X										
9																	
10																	

Sampler(s) Please Print & Sign: Doug Solon [signature]

Shipment Method: FED EX

Required Turnaround Time: (Check Box) [X] STD 10 Wk Days [ ] 5 Wk Days [ ] 2 Wk Days [ ] 24 Hour [ ] Other ____

Results Due Date:

Relinquished by:	Date:	Time:	Received by:
[signature]	12/9/21	1400	
Relinquished by:	Date:	Time:	Received by (Laboratory):
	12-10-21	10:10	[signature]
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes: [AGM Brickland NM]

Cooler ID	Cooler Temp.
13843	1.0C
1R3	6.6C

QC Package: (Check One Box Below)
[X] Level II Std QC
[ ] Level III Std QC/Raw Data
[ ] Level IV SW846/CLP
[ ] Other
[ ] TRRP Checklist
[ ] TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

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3. The Chain of Custody is a legal document. All information must be completed accurately.

CUSTODY SEAL 43893 QEC SM 12/10/21
DATE 12/9/21
SIGNATURE

43893 DEC . 0 2021

CUSTODY SEAL 43893 QEC SM 12/10/21
DATE 12/9/21
SIGNATURE

ORIGIN ID:ELPA (915) 603-1015
ARCADIS
401 E MAIN DR STE 400
EL PASO, TX 79901
UNITED STATES US

SHIP DATE: 09DEC21
ACTWGT: 43.00 LB
CAD: 6990889/SSF02220
DIMS: 24x14x13 IN
BILL THIRD PARTY

TO CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF RD STE 210

43893

HOUSTON TX 77099
(281) 530-5656

FedEx Express

TRK# 0215 8136 8778 0912

FRI - 10 DEC 11:30A
PRIORITY OVERNIGHT
AHS
77099
TX-US IAH

NH SGRA

Arcadis U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge
Louisiana 70816
Phone: 225 292 1004
Fax: 225 218 9677
www.arcadis.com

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 94773

CONDITIONS

Operator:	OGRID:
Huntsman Advanced Materials LLC 10003 Woodloch Forest Drive The Woodlands, TX 77380	330766
	Action Number: 94773
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
michael.buchanan	Review of the 2021 Former Brickland Refinery Groundwater Monitoring Report: Content Satisfactory 1. Continue LNAPL removal as appropriate by bailing or pumping at quarterly intervals 2. Continue to conduct groundwater monitoring at the site for benzene 3. continue monitoring for PAHs in MW-8 to evaluate trends and report findings to OCD 4. Continue ongoing evaluations for the site as planned in report. 5. Submit the 2022 and 2023 Groundwater reports unless they've already been submitted. 6. Submit the 2024 Annual Groundwater Monitoring Report by April 1, 2025 7. Well plugging reports accepted for the record.	6/6/2024