

Texas Commission on Environmental Quality
Remediation Division Correspondence Identification Form

SITE & PROGRAM AREA IDENTIFICATION			
SITE LOCATION		REMEDIATION DIVISION PROGRAM AND FACILITY IDENTIFICATION	
Site Name:		Is This Site Being Managed Under A State Lead Contract? Yes No	
Address 1:		Program Area:	
Address 2:		Mail Code:	
City:	State: Texas	Is This A New Site To This Program Area? Yes No	
Zip Code:		County:	Additional Information:
TCEQ Region:		Additional Information:	

DOCUMENT(S) IDENTIFICATION	
PHASE OF REMEDIATION	DOCUMENT NAME
1.	
2.	
3.	
4.	
5.	

CONTACT INFORMATION			
I attest that all work has been done in accordance with TCEQ rules	I certify that I am aware misrepresentation of any claim is a violation.		
RESPONSIBLE PARTY/APPLICANT/CUSTOMER INFORMATION (IF APPLICABLE)			
ENVIRONMENTAL CONSULTANT/REPORT PREPARER/AGENT			
SIGNATURES			

DATABASE CODES			
Document No.	TCEQ Database Term	Document No.	TCEQ Database Term
1.		4.	
2.		5.	
3.			



December 21, 2020

Project No. 19119232

Ms. Maureen Hatfield

Texas Commission on Environmental Quality
VCP-CA Section, Team 1, Remediation Division, MC-127
P.O. Box 13087
Austin, Texas 78711-3087

**UPDATED SOIL VAPOR INTRUSION ASSESSMENT REPORT
UNION PACIFIC RAILROAD HOUSTON WOOD PRESERVING WORKS FACILITY
4910 LIBERTY ROAD, HOUSTON, TEXAS
POST-CLOSURE CARE PERMIT NO. HW-50343; INDUSTRIAL SWR NO. 31547**

Dear Ms. Hatfield,

Golder Associates, Inc. (Golder) is pleased to provide, on behalf of Union Pacific Railroad (UPRR), this updated Soil Vapor Intrusion Assessment Interim Report summarizing the vapor intrusion (VI) evaluation conducted at the UPRR Houston Wood Preserving Works (HWPW) site (the Site). This letter details the VI evaluation background, overview of potential vapor migration processes, field procedures, soil and soil gas sample collection, quality control/quality assurance, and data evaluation, as discussed below. This letter report serves as an update to the Soil Vapor Intrusion Assessment Interim Report dated August 4, 2020. The information that was provided in the August 4, 2020 report is also provided in this letter report to aid in the review of the overall VI assessment. Below is a summary of the vapor intrusion assessment chronology.

Date	Description/Activity
April 2019	Texas Commission on Environmental Quality (TCEQ) issued the 4 th Technical Notice of Deficiency (TNOD) dated April 11, 2019 requesting that UPRR conduct a supplemental groundwater evaluation for potential VI from the A-Transmissive Zone (A-TZ) in the residential area north of the Site near monitoring well MW-68B (detailed in TCEQ Deficiency ID T59).
May 2019	UPRR completed the agreed upon groundwater evaluation.
July 2019	UPRR submitted the results of the groundwater evaluation in a letter dated July 3, 2019 that was included in Appendix 3 of the Conceptual Response Action Plan – Revision No. 4 dated July 9, 2019. The results of the groundwater evaluation documented that concentrations of chemicals of concern (COC) in the groundwater sample from the May 2019 sampling event at A-TZ monitoring well MW-68A (installed next to MW-68B) were below the conservative screening values estimated by U.S.

Date	Description/Activity
	Environmental Protection Agency's (EPA's) VI Screening Level (VISL) calculator (EPA, 2019) and indicated the VI pathway was incomplete.
September 2019	TCEQ acknowledged the July 3, 2019 letter and requested further evaluation of the VI pathway in a letter dated September 6, 2019. UPRR, Golder and TCEQ met on September 23, 2019 at the TCEQ Austin Office to discuss options to further evaluate the VI pathway.
October 2019	Golder, on behalf of UPRR, submitted a response letter dated October 23, 2019 to the TCEQ comment letter dated September 6, 2019 detailing the proposed VI assessment through a soil gas evaluation north of the Site based on discussions with TCEQ at the September 23, 2019 meeting.
December 2019	The TCEQ issued a letter dated December 13, 2019 requesting a meeting to discuss the proposed VI field activities. The proposed VI assessment field activities were discussed during the meeting on December 19, 2019 between UPRR, Golder, and TCEQ. Based on that meeting, Golder, on behalf of UPRR, submitted the Proposed Vapor Intrusion Assessment Work Plan (Work Plan) dated December 20, 2019 to the TCEQ for review. The TCEQ issued a comment letter on the Work Plan dated December 23, 2019.
January 2020	A revised Work Plan was submitted to the TCEQ on January 2, 2020 and was approved by the TCEQ in a letter dated January 3, 2020 and field activities were initiated on January 29, 2020. A change in soil gas probe installation procedures was needed due to field conditions, and an updated Work Plan dated January 31, 2020 was submitted following a conference call with the TCEQ on January 30, 2020 to document the modified installation procedures. The updated plan was approved via e-mail from the TCEQ on January 31, 2020 with the request that soil gas probes be allowed to equilibrate for 10 days after installation prior to soil gas sample collection. UPRR began installation of soil gas probes in January 2020.
February 2020	UPRR finished installing 22 soil gas probes. Nine of the 22 locations were not sampled for soil gas due to the presence of water in the probes.
March 2020	Golder, on behalf of UPRR, submitted to the TCEQ the Soil Vapor Intrusion Assessment Interim Report dated March 31, 2020 summarizing the preliminary assessment.
April 2020	The TCEQ issued an Approval with Comments letter dated April 23, 2020, requesting installation of alternate soil gas probe sampling locations in the general vicinity of the existing probes that contained water.

Date	Description/Activity
May 2020	Golder, on behalf of UPRR, proposed alternate soil gas probe locations in the City of Houston ROW and on private property in a response letter dated May 1, 2020. The TCEQ issued an Approval with Comments letter dated May 19, 2020.
June 2020	UPRR obtained an access agreement with the private property owner and six additional soil gas probes were installed and soil gas sample collection was attempted in June 2020. Four of the six additional soil gas probes were not sampled for soil gas due to the presence of water in the probes.
July 2020	Golder, UPRR, and the TCEQ discussed the June 2020 soil gas sampling event during a conference call on July 30, 2020. Golder, on behalf of UPRR, collected water samples from the soil gas probes containing water that prevented collection of a soil gas sample.
August 2020	Golder, on behalf of UPRR, submitted to the TCEQ the Updated Soil Vapor Intrusion Assessment Interim Report dated August 4, 2020 summarizing the assessment of the June 2020 sampling event. A letter proposing six additional soil gas probe locations, four on the Greater Mount Nebo Baptist Church (GMNBC) property and two on property owned by 2013 Cottage, LLC, was submitted to the TCEQ dated August 4, 2020 with an updated version dated August 25, 2020 submitted to the TCEQ. TCEQ issued an approval letter dated August 31, 2020 for the proposed additional activities.
October 2020	Golder, on behalf of UPRR, submitted the Soil Gas Probe Water Source Evaluation letter report dated October 23, 2020 to the TCEQ summarizing sampling activities and data evaluation of the water collected from soil gas probes that contained water.
November 2020	<p>Golder made multiple attempts from August 2020 through November 2020 to request an access agreement with 2013 Cottage, LLC (landowner of property on west side of Lavender Street). The TCEQ contacted representatives with 2013 Cottage, LLC in November to facilitate the access agreement; however, representatives with 2013 Cottage, LLC have not followed up with the TCEQ on the request. UPRR has not been able to obtain an access agreement with the 2013 Cottage, LLC property owner.</p> <p>Four soil gas probes were installed on the GMNBC property on November 10, 2020 by hand auger and sampled November 11, 2020 in accordance with the Work Plan dated January 2, 2020.</p>

Overview of Potential Vapor Migration Processes

Vapor intrusion describes the migration of volatile organic vapors from a subsurface source, such as impacted soil or groundwater, into an overlying building. This migration may occur through subsurface soils and then through foundations and basements, or through preferential pathways such as utility conduits or other openings in the buildings. As outlined in the EPA's guidance document, *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air*, VI is considered a

potential human exposure pathway, with the pathway only considered complete when all of the following conditions are met (EPA, 2015a):

- A source of vapors is present underneath or near the buildings;
- Vapor migration from the source to the building (receptor) can occur;
- The vapors can enter the building;
- Chemicals associated with the vapor source are found in the building; and
- The buildings are occupied when the chemicals associated with the vapor source are present.

If all of these conditions are met, then the VI pathway may be complete and there may be an opportunity for human exposure, which indicates additional analysis may be required to determine if an exposure condition exists. If one or more of these conditions are not present and are not reasonably expected to be present in the future, EPA considers the VI pathway as “incomplete”. An example of a condition that would render the pathway incomplete is if vapor migration is impeded by the geology, hydrogeology, or biochemical (biodegradation) conditions present at a site. A determination that the VI pathway is incomplete should be supported by site-specific information that shows the nature and extent of the vapor source in the subsurface is well understood, and that the vapor sources, vadose zone conditions, and surrounding infrastructure would not allow for the unattenuated or enhanced migration of vapors. If the VI pathway is shown to be incomplete, additional VI investigation and mitigation is typically not necessary (EPA, 2015b).

In addition to the general guidance for addressing vapor intrusion, EPA has developed a companion guide to address VI specifically associated with petroleum hydrocarbons (*Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites*). This guidance recognizes the difference between petroleum hydrocarbon vapor intrusion (PVI) and VI associated with other volatile chemicals. While the PVI guidance is primarily intended to address releases associated with underground storage tank (UST) releases, the guidance is also appropriate for evaluating non-UST sites that may have similar characteristics (i.e., size, chemicals of concern) (EPA, 2015a). PVI is a sub-category of VI that occurs when volatile petroleum hydrocarbons released as vapors from various subsurface sources (free product, soil, groundwater) migrate into buildings through the vadose zone. The migration of petroleum hydrocarbon vapors can be highly limited by biodegradation occurring in the vadose zone. The amount of biodegradation is dependent on the strength of the vapor source, the distance the vapors travel through the soil of the vadose zone, and availability of oxygen (O₂) in the vadose zone (ITRC, 2014).

Field Procedures

Golder installed 22 shallow, single-depth, soil gas probes off-site within the City of Houston ROW in January and February 2020, 6 additional probes on private property and in the City of Houston ROW in June 2020, and 4 additional soil gas probes on private property in November 2020 to evaluate the VI pathway at the Site (Figure 1). Prior to the start of activities, Golder obtained required permits from the City of Houston, conducted the necessary utility notifications (i.e., 811 One Call and reviewed City of Houston utility maps), and used a private utility locator using ground penetrating radar (GPR) to scan each proposed location. UPRR obtained an access agreement with a private landowner (Greater Mount Nebo Baptist Church) to install 5 soil gas probes on the private property located at 5005 Liberty Road in June 2020 and an additional 4 soil gas probes in November

2020. Boreholes and soil gas point installation were completed by Cascade Environmental, a Texas-licensed drilling firm subcontracted by Golder.

On January 29, 2020, soil gas points were advanced using a hand-auger. During installation of the second soil gas probe, the field crew encountered material at a depth of around 5.5 feet below ground surface that was suspected to potentially be a buried utility pipe. Upon further investigation, the material encountered was identified as buried brick and concrete debris within general fill material and not associated with an underground utility. The depth of the debris (approximately 3 to 4 feet below ground surface (bgs)) and other environmental variables, such as soil moisture, prevented GPR from locating anomalies deeper than 2 feet with confidence. Therefore, in consideration of this encounter and given the high potential for the presence of underground utilities in the area that could not be located using GPR or identified on city utility maps (i.e., private sanitary sewer service lines), Golder proposed modifying the soil gas probe installation procedures to use hydrovac excavation methods (i.e., excavation using a high-pressure water probe and vacuum) to advance the remaining boreholes. This modification to the Work Plan was approved by the TCEQ via e-mail on January 31, 2020. The remaining 21 soil gas probes were installed in February 2020 and six additional soil gas probes were installed in June 2020 in accordance with the methods outlined in the modified approved Work Plan (using hydrovac excavation) with the following exception: three soil gas probes (SG-25, SG-26, and SG-27) located on private property were advanced using a hand-auger due to the low potential for underground utilities in the area.

On November 10, 2020, an additional four soil gas probes (SG-28, SG-29, SG-30, and SG-31) located on private property were advanced using a hand-auger due to the low potential for underground utilities in the area. Due to the semi-confined nature of the A-Zone, TCEQ recommended, in an email sent on August 18, 2020, that UPRR gauge the groundwater elevation of MW-68A prior to installing SG-31. Golder personnel measured the depth to groundwater in well MW-68A at 5.96 feet from the top of casing on November 10, 2020, indicating that the A-TZ is confined in this area. The soil from 5 to 6 feet bgs at SG-31 did not appear to be saturated based on the field observations, and the soil gas probe at SG-31 was installed.

The general lithology of the soil gas borings consisted of brown sandy clay from the surface to a depth of approximately 4 feet bgs with a light grey clay with sand present from approximately 4 to 6 feet bgs. Except at locations SG-21 through SG-27, historical debris such as brick, concrete, and glass were found in the boreholes at a depth interval from approximately 2 to 3.5 feet bgs.

Soil gas points were constructed in accordance with the approved Work Plan procedures (Figure 2). First, the boreholes for the soil gas points were backfilled from the bottom of the hole (6 feet bgs) to 5.5 feet bgs with a filter pack of industrial silica sand. Next, a 6-inch long by 0.5-inch in diameter soil vapor implant, composed of a stainless-steel mesh screen with a 0.15 mm pore size, was connected to ¼-inch outer diameter Teflon tubing with a Swagelok compression fitting and placed into the borehole. Filter pack material was backfilled around the soil vapor implant to a depth of 5 feet bgs. The borehole was then backfilled with bentonite by hydrating bentonite granules from 5 feet bgs to 1 foot bgs. The upper foot of the borehole was sealed with cement and the tubing housed in a 5-inch diameter flush-mount vault centered in a concrete pad (SG-06, SG-14, SG-20, SG-21, SG-22, SG-25, SG-26, SG-27, SG-28, SG-29, SG-30, and SG-31) or concrete/asphalt road/sidewalk. The sample tubing extending from the sample point was sealed and coiled inside the vault.

The approximate location of each soil gas point was surveyed in the field using a Trimble handheld GPS unit.

Soil Sample Collection

During the installation of the soil gas points, advancement of the borings was halted to collect an undisturbed soil sample from the 0.5 to 1 feet interval and the 5.5 to 6 feet interval at each location according to Method 5035A. The undisturbed soil sample was collected using a 1-inch diameter soil probe with a 12-inch-long plastic liner within the collection chamber. The samples were field screened with a MiniRAE Photoionization Detector (PID) for the presence of VOCs. Prior to sampling, the PID was calibrated using 100 parts per million by volume (ppmV) isobutylene standard. The soil probe was decontaminated after each sample collection and a new plastic sleeve replaced the used one.

Soil samples were placed in laboratory-supplied containers, stored on ice in an insulated cooler, and delivered to ALS Environmental in Houston, Texas for analysis of benzene, ethylbenzene, and xylenes by EPA Method 8260 and naphthalene by EPA Method 8270. A completed chain-of-custody accompanied the samples through receipt at the analytical laboratory. Copies of the laboratory reports and data usability summaries for the soil sample data prepared pursuant to Texas Risk Reduction Program (TRRP)-13 Guidance are included in Attachment 1. A summary of the soil analytical results and PID readings is provided in Table 1.

Soil Gas Sample Collection

Soil gas samples SG-01 through SG-27 were collected a minimum of 10 days after the installation of the sample points per the request of the TCEQ and soil gas samples SG-28 through SG-31 were collected a minimum of 24 hours after the installation of the sample points, using the procedures described in the approved Work Plan. A leak check was performed at each sample point using helium gas as a tracer. The leak check was conducted by introducing helium gas into a shroud over the sample point and measuring the concentration of helium in the shroud, around 20% to 50% during this check, and then measuring the concentration of helium in vapor from the sampling point. An MGD-2002 helium detector was used to measure the initial tracer gas concentration in the shroud and in the soil gas point. Helium was not detected in any of the soil gas points during the leak check, indicating that the sample points were adequately sealed from ambient air.

Prior to sample collection, each sample point was purged of approximately 90 milliliters (ml) of air. Soil gas samples were collected using laboratory certified-clean 1-L summa canisters. The vacuum on each canister was verified prior to sample collection and the sample train was checked for leaks using a shut-in/vacuum test prior to sampling. The canister was connected to a sampling train consisting of a "T" fitting and two valves. A shut-in/vacuum test was performed on the sampling train to check for leaks. To collect the sample, the sample tubing was connected to the sampling train with compression fittings, which were then connected to the summa canister. The sample was collected by opening the valve on the summa canister and monitoring the vacuum as the sample was collected. Samples SG-01 through SG-27 were collected at a flow rate of 200 ml/minute using flow regulators set and provided by the laboratory. Based on the vacuum readings observed during sample collection, the sample collection rate was consistent with a flow rate of 200 ml/minute. Samples SG-28 through SG-31 were collected with 100ml/minute regulators provided by the lab. To collect the field duplicate sample, a "T" fitting was added to the sample train and the parent and duplicate sample collected concurrently.

Soil gas sample collection began on February 19, 2020 at the locations installed in January-February 2020. During this sampling event, it was observed that water had infiltrated sample points SG-03, SG-09, and SG-13. Another sampling event was scheduled for February 27, 2020 to meet the minimum 10 days after installation requirement for the remaining locations that were installed in mid-February 2020. On February 25, 2020, the

remaining soil gas sample points were checked for water by connecting a peristaltic pump to the installation tubing. If water was discovered, the soil gas points were purged until dry. Water had infiltrated 9 of the 22 soil gas points (SG-01 through SG-07, SG-09, and SG-13) and they were purged dry, except for SG-03. Water recharged in SG-03 at a rate equal to the pump rate. On February 27, 2020, Golder representatives were on-site to collect the remaining soil gas samples with oversight from TCEQ representatives. Water had re-infiltrated the soil gas points (SG-01 through SG-07, SG-09, and SG-13) that had been purged dry two days prior and were not able to be sampled. Neither the TCEQ nor EPA have established corrective measures to be implemented when soil gas points become saturated with water and, as confirmed by the analytical laboratory, a soil gas sample would be compromised if water were to enter the summa canister during sampling, and the water would likely cause damage to the summa canister. As such, soil gas samples could not be collected from these locations.

Another sampling event was conducted on June 30, 2020 to collect soil gas samples from the six additional soil gas probe locations that were installed on June 18 and 19, 2020. Water had infiltrated four of the six soil gas points, including three of the five installed on the GMNBC Property (SG-23, SG-24, and SG-26) and the replacement location for SG-13 (SG-13R). Soil gas samples were collected at SG-25 and SG-27 in June 2020. The initial soil gas points that contained water in February 2020 were checked, and those points continued to contain water. Even though three of the five additional soil gas probes installed on the GMNBC property had water in them, soil gas samples were collected from three locations (SG-08 (in February), SG-25, and SG-27) on the property between Lavender Street and Clementine Street.

On November 11, 2020, a sampling event was conducted to collect soil gas samples from four soil gas probe locations that were installed on November 10, 2020. Soil gas samples were collected from soil gas probes SG-28, SG-29, SG-30, and SG-31 located on the GMNBC Property (Figure 1).

Following collection, soil gas samples were shipped to Pace Analytical in Minneapolis, Minnesota for analysis of benzene, ethylbenzene, naphthalene, and xylenes by EPA Method TO-15. A completed chain-of-custody accompanied the samples through receipt at the analytical laboratory. Copies of the laboratory reports and data usability summaries for the soil gas sample data prepared pursuant to TRRP-13 Guidance are included in Attachment 2. A summary of the soil gas analytical results is provided in Table 2.

Quality Assurance/Quality Control

Sampling activities were conducted as specified in the approved Work Plan. Samples were handled under appropriate chain-of-custody documentation. To confirm the accuracy and reproducibility of the laboratory analytical results, the analytical laboratory implements a program that includes laboratory replicate samples, method blanks and control standards. The laboratory QA/QC data generated during the sample analysis are included in the laboratory analytical report provided to Golder (provided as Attachments 1 (soil samples) and 2 (soil gas samples) to this letter report). Field QA/QC protocols included field duplicate samples and ambient air control samples AA-1 (2/19/2020), AA-2 (2/27/2020), AA-3 (6/30/20), and AA-4 (11/11/20) that were collected during sampling events to assess background conditions. The ambient air control samples were collected within the vicinity of the soil gas points in 6-liter summa canisters with a 200 ml/minute flow regulator with the exception of AA-4 which was collected with a 100 ml/minute flow regulator. A sample of the helium used for the leak test procedure, HE-1, was also collected by providing a constant flow of helium gas to the summa canister inlet. Duplicate soil gas samples were collected during each soil gas sampling event following the procedures outlined above. Analytical results of the control samples are summarized in Table 2.

The analytical data were validated pursuant to TRRP-13 Guidance. Data usability summaries are included in Attachments 1 and 2.

Data Evaluation

Pursuant to TRRP procedures, analytical data for the soil samples collected from each soil gas boring were compared to the lesser value between the TRRP Residential (30 acre) $T^{ot}Soil_{Comb}$ Protective Concentration Level (PCL) and the $^{GW}Soil_{Ing}$ PCL for surface soils, which is the Residential Assessment Level (RAL). Benzene, ethylbenzene, xylene, and naphthalene concentrations in the soil samples collected during the soil gas probe installation were generally not detected and in all cases were below applicable RALs (Table 1). These data support a conclusion that the vertical separation distance consisting of unimpacted soil between potential receptors at the ground surface, and the potential source of contamination (groundwater), is greater than 6 feet (the base depth of the deeper soil samples collected for this evaluation).

Consistent with the approved Work Plan, soil gas analytical results were compared to the target soil gas assessment levels which are calculated by dividing the TRRP Residential Risk-Based Exposure Limits (RBELs) for inhalation ($^{Air}RBEL_{Inh}$) by an attenuation factor of 0.03 (US EPA, 2015b) for soil gas. The inhalation RBELs apply to sites under TRRP and are considered protective concentrations for a COC in air at the point of exposure (POE) for human inhalation. The RBEL is adjusted using the specified attenuation factor to account for the following: (1) the soil gas sample does not represent an indoor air concentration (i.e., in a POE sample) and (2) that COC attenuation through multiple processes (e.g., dispersion, biodegradation, etc.) occurs when vapors migrate from the vadose zone to an indoor air receptor. As shown in Table 2, benzene, ethylbenzene, naphthalene, and xylene concentrations in all of the soil gas samples were at least an order of magnitude less than their respective target soil gas assessment levels, and thus demonstrating the VI pathway to be incomplete.

Other Lines of Evidence

As discussed in the Background section of this letter report, the analytical results of the A-TZ groundwater from MW-68A were below the conservative screening values estimated by EPA's VISL calculator (EPA, 2019) and indicated the VI pathway was incomplete. To further evaluate the groundwater as a potential source for the VI pathway, the A-TZ groundwater analytical data from the July 2019 and January-March 2020 sampling events from the off-site monitoring wells presented in the Interim Groundwater Monitoring Report (2019-2020) dated April 30, 2020 were compared to VISL calculator values (EPA, 2015, EPA, 2019). The VISL calculator (EPA, 2019) provides a screening level based on several basic inputs, including a residential or commercial exposure scenario, target hazard quotient, target carcinogenic risk, and groundwater temperature. For this evaluation, the selected inputs were residential scenario, hazard quotient of 0.1, carcinogenic risk of 10^{-5} (consistent with the TRRP criteria), and groundwater temperature of 25°C. A summary of the VISL values relative to the maximum detected COC concentrations from the two recent sampling events are provided in the following table.

COC	VISL Screening Level for Elimination from Further Consideration (mg/L) *	Maximum Detected COC Concentrations in Off-Site A-TZ Wells July 2019 & January-March 2020 Samples (mg/L)
Benzene	0.014	0.00036J (MW-26A-July 2019)
Chlorobenzene	0.041	<0.0003
Ethylbenzene	0.035	<0.0003
Methylene Chloride	0.471	<0.001
Toluene	1.92	<0.0002
Xylenes	0.0385	<0.0003
Benzo(a)anthracene	0.344	0.00012 (MW-25A-Jan 2020)
Naphthalene	0.0174	0.0026 (MW-27A – July 2019)
Nitrobenzene	0.715	<0.000025

* - VISL calculator values (EPA, 2015, EPA, 2019).

Groundwater COC concentrations from the July 2019 and January-March 2020 off-site A-TZ wells were below the conservative EPA VISL-calculated screening levels by orders of magnitude, providing an additional line of evidence that the VI pathway from the shallow groundwater is incomplete (Golder, 2020).

Conclusion

Based on benzene, ethylbenzene, xylenes, and naphthalene concentrations in soil gas samples collected for this evaluation being at least an order of magnitude less than their respective target soil gas assessment levels, the vertical separation distance, groundwater COC concentrations in the off-site A-TZ wells, and the lateral distribution of the soil gas sample locations, multiple lines of evidence support that the VI pathway off-site is incomplete.

Multiple unsuccessful attempts were made to obtain an access agreement with 2013 Cottage, LLC to install the two additional soil gas probe locations proposed in the August 25, 2020 letter to TCEQ. With the installation and sampling of the four additional soil gas probes on the GMNBC property, the soil gas samples that have been collected for the vapor intrusion assessment span from Cushing Street to Lavender Street. Concentrations in all soil gas samples collected were less than the target soil gas assessment levels. Given the large area that the existing soil gas probes cover, including in areas where dense non-aqueous phase liquid (DNAPL) has been observed in the B-Cohesive Zone/ B-Transmissive Zone (B-CZ/B-TZ) (e.g. SG-31 near MW-68B), the two

additional proposed locations do not appear necessary to demonstrate that the VI pathway is incomplete in this area. Given the extensive coverage of the existing soil gas probes despite the 2013 Cottage, LLC property owner not providing access, UPRR requests TCEQ concurrence that a VI risk is not indicated in the study area and the vapor intrusion assessment is complete.

If you have any questions or comments, please feel free to give Mr. Kevin Peterburs of UPRR (414-267-4164) or us a call.

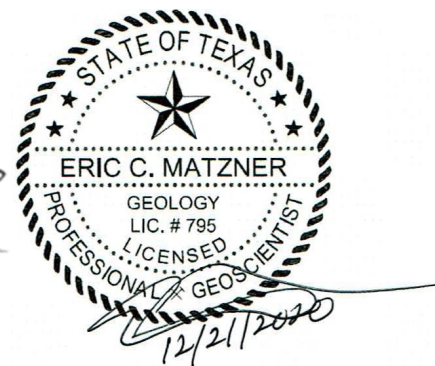
Sincerely,
Golder Associates Inc.



Tim Nickels
Senior Consultant



Eric Matzner, P.G.
Principal Hydrogeologist



CC: TCEQ Region 12, Houston Texas

Attachments: Table 1 – Summary of Soil Analytical Results
Table 2 – Summary of Soil Gas Analytical Results
Figure 1 – Soil Gas & Surface Soil Sampling Locations
Figure 2 – Soil Gas Probe Construction Diagram
Attachment 1 – Soil Samples – Data Usability Summary and Laboratory Analytical Reports
Attachment 2 – Soil Gas Samples – Data Usability Summary and Laboratory Analytical Reports

References

- United States Environmental Protection Agency (EPA), 2015a. *Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites* (EPA 510-R-15-001), June.
- EPA, 2015b. *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (OSWER Publication 9200.2-154), June.
- EPA, 2019. Vapor Intrusion Screening Level (VISL) calculator, <https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator>. Accessed April 2019.
- Golder Associates Inc (Golder), 2020, *Interim Groundwater Monitoring Report (2019-2020)*, Union Pacific Railroad Houston Wood Preserving Works Facility, Houston, Texas, Dated April 30.
- Interstate Technology & Regulatory Council (ITRC), 2014. *Petroleum Vapor Intrusion: Fundamentals of Screening, Investigation, and Management*.

TABLES

Table 1

**Summary of Soil Analytical Results
UPRR Houston Wood Preserving Works**

Sample Location	Sample Depth (ft BGS)	Field PID	Sample Date	Benzene	Ethylbenzene	Xylenes	Naphthalene
TRRP Tier 1 Residential Assessment Level (mg/kg)				0.013	3.8	61	16
SG-01	0.5-1	0	2/11/2020	<0.00059	<0.00082	<0.0012	<0.00070
SG-01	5.5-6	0	2/11/2020	<0.00082	<0.0011	<0.0016	<0.00073
SG-02	0.5-1	0	2/10/2020	<0.00053	<0.00075	<0.0011	0.0024 J
SG-02	5.5-6	0	2/10/2020	<0.00037	<0.00051	<0.00073	<0.00079
SG-03	0.5-1	0.3	2/5/2020	<0.00037	<0.00052	0.0066	0.0018 J
SG-03	5.5-6	0.1	2/5/2020	<0.00071	<0.0010	<0.0014	0.0017 J
SG-04	0.5-1	0	2/10/2020	<0.00044	<0.00061	<0.00087	<0.00071
SG-04	5.5-6	0.1	2/10/2020	<0.00068	<0.00096	<0.0014	<0.00072
SG-05	0.5-1	0.5	2/10/2020	<0.00037	<0.00051	<0.00073	0.0049
SG-05	5.5-6	0	2/10/2020	<0.00078	<0.0011	<0.0016	<0.00074
SG-06	0.5-1	0.1	2/17/2020	<0.00065	<0.00091	<0.0013	<0.0067
SG-06	5.5-6	0	2/17/2020	<0.00042	<0.00059	<0.00084	<0.00071
SG-07	0.5-1	0	2/17/2020	<0.00058	<0.00082	<0.0012	0.0071 J
SG-07	5.5-6	0	2/17/2020	<0.00036	<0.00050	<0.00072	<0.00072
SG-08	0.5-1	0.8	2/7/2020	<0.00062	<0.00087	<0.0012	0.0034 J
SG-08	5.5-6	1.8	2/7/2020	<0.00038	<0.00053	<0.00075	0.0014 J
SG-09	0.5-1	--	2/3/2020	<0.00052	<0.00074	<0.0010	0.0042
SG-09	5.5-6	0.5	2/3/2020	<0.00082	<0.0012	<0.0016	<0.00072
SG-10	0.5-1	0.3	2/7/2020	<0.00052	<0.00072	<0.0010	0.0056
SG-10	5.5-6	1.1	2/7/2020	<0.00039	<0.00054	<0.00077	<0.00072
SG-11	0.5-1	0.4	2/6/2020	<0.00070	<0.00098	<0.0014	0.0084 J
SG-11	5.5-6	0.5	2/6/2020	<0.00032	<0.00045	<0.00064	0.0011 J
SG-12	0.5-1	0	2/17/2020	<0.00062	<0.00087	<0.0012	0.0039
SG-12	5.5-6	0	2/17/2020	<0.00060	<0.00084	<0.0012	<0.00071
SG-13	0.5-1	--	2/3/2020	<0.00076	<0.0011	<0.0015	<0.00075
SG-13	5.5-6	--	2/3/2020	<0.00049	<0.00068	<0.00097	<0.00071
SG-14	0.5-1	0	2/17/2020	<0.00030	<0.00042	<0.00061	0.0027 J
SG-14	5.5-6	0	2/17/2020	<0.00037	<0.00051	<0.00073	<0.00077
SG-15	0.5-1	0.2	2/13/2020	<0.00050	<0.00070	<0.0010	0.014
SG-15	5.5-6	0.1	2/13/2020	<0.00032	<0.00045	<0.00065	<0.00071
SG-16	0.5-1	0.1	2/13/2020	<0.00066	<0.00093	<0.0013	0.0099
SG-16	5.5-6	0	2/13/2020	<0.00068	<0.00095	<0.0014	<0.00071
SG-17	0.5-1	0	2/12/2020	<0.00071	<0.0010	<0.0014	0.0095
SG-17	5.5-6	0	2/12/2020	<0.00079	<0.0011	<0.0016	0.0015 J
SG-18	0.5-1	--	2/3/2020	0.0034 J	0.0034 J	0.0056	<0.00069
SG-18	5.5-6	--	2/3/2020	<0.00054	<0.00076	<0.0011	0.0041
SG-19	0.5-1	0	2/12/2020	<0.00059	<0.00082	<0.0012	<0.00069
SG-19 (DUP)	0.5-1	0	2/12/2020	<0.00060	<0.00083	<0.0012	0.0053
SG-19	5.5-6	0	2/12/2020	<0.00062	<0.00087	<0.0012	<0.00071
SG-20	0.5-1	0	2/11/2020	<0.00080	<0.0011	<0.0016	<0.00069
SG-20	5.5-6	0	2/11/2020	<0.00072	<0.0010	<0.0014	<0.00071
SG-21	0.5-1	0	1/29/2020	<0.00088	<0.0012	<0.0018	0.022
SG-21	5.5-6	0	1/29/2020	<0.00053	<0.00074	<0.0011	0.01
SG-22	0.5-1	0	1/29/2020	<0.00061	<0.00085	<0.0012	0.14
SG-22	5.5-6	0	1/29/2020	<0.00056	<0.00079	<0.0011	<0.00072

Table 1

Summary of Soil Analytical Results
UPRR Houston Wood Preserving Works

Sample Location	Sample Depth (ft BGS)	Field PID	Sample Date	Benzene	Ethylbenzene	Xylenes	Naphthalene
TRRP Tier 1 Residential Assessment Level (mg/kg)				0.013	3.8	61	16
SG-13R	0.5-1	0	6/18/2020	<0.00053	<0.00075	<0.0011	<0.00074
SG-13R	5.5-6	0	6/18/2020	<0.00044	<0.00062	<0.00089	<0.00073
SG-23	0.5-1	0.1	6/18/2020	<0.00031	<0.00044	<0.00062	0.00071 J
SG-23	5.5-6	0	6/18/2020	<0.00032	<0.00044	<0.00064	<0.00071
SG-24	0.5-1	0	6/18/2020	<0.00038	<0.00053	<0.00076	0.001 J
SG-24	5.5-6	0	6/18/2020	<0.00030	<0.00043	<0.00061	<0.00069
SG-25	0.5-1	0.1	6/18/2020	<0.00068	<0.00095	<0.0014	0.0046
SG-25	5.5-6	0	6/18/2020	<0.00030	<0.00042	<0.00059	<0.00070
SG-26	0.5-1	0	6/19/2020	<0.00046	<0.00064	<0.00092	0.0039
SG-26	5.5-6	0	6/19/2020	<0.00039	<0.00054	<0.00077	<0.00069
SG-27	0.5-1	0	6/19/2020	<0.00039	<0.00054	<0.00077	0.0018 J
SG-27	5.5-6	0	6/19/2020	<0.00069	<0.00097	<0.0014	0.0022 J
SG-28	0.5-1	0.1	11/10/2020	<0.00056	0.0022 J	0.019	<0.00067
SG-28	5.5-6	0.2	11/10/2020	<0.00051	<0.00072	<0.0010	<0.00070
SG-29	0.5-1	0.4	11/10/2020	<0.00045	<0.00063	<0.00090	<0.00067
SG-29	5.5-6	0.3	11/10/2020	<0.00050	<0.00070	<0.0010	<0.00069
SG-30	0.5-1	1.5	11/10/2020	<0.00052	<0.00072	<0.0010	0.0016 J
SG-30	5.5-6	0.5	11/10/2020	<0.00040	<0.00056	<0.00080	<0.00069
SG-31	0.5-1	43	11/10/2020	<0.00042	<0.00058	<0.00083	<0.00065
SG-31	5.5-6	0	11/10/2020	<0.00054	<0.00075	<0.0011	<0.00070

Notes:

1. TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Assessment level (RAL) based on lowest of Soil PCLs $^{GW}Soil_{Inq}$ or $^{Tot}Soil_{Comb}$ (assuming 30 acre source area).
2. Bolded concentrations are greater than the sample detection limit (SDL).
3. J = Result is estimated due to a detected concentration that is less than the MQL but greater than or equal to the SDL.
4. -- = Not Applicable / Not Analyzed.
5. Concentrations in milligrams per kilogram (mg/kg).

Table 2

**Summary of Soil Gas Analytical Results
UPRR Houston Wood Preserving Works**

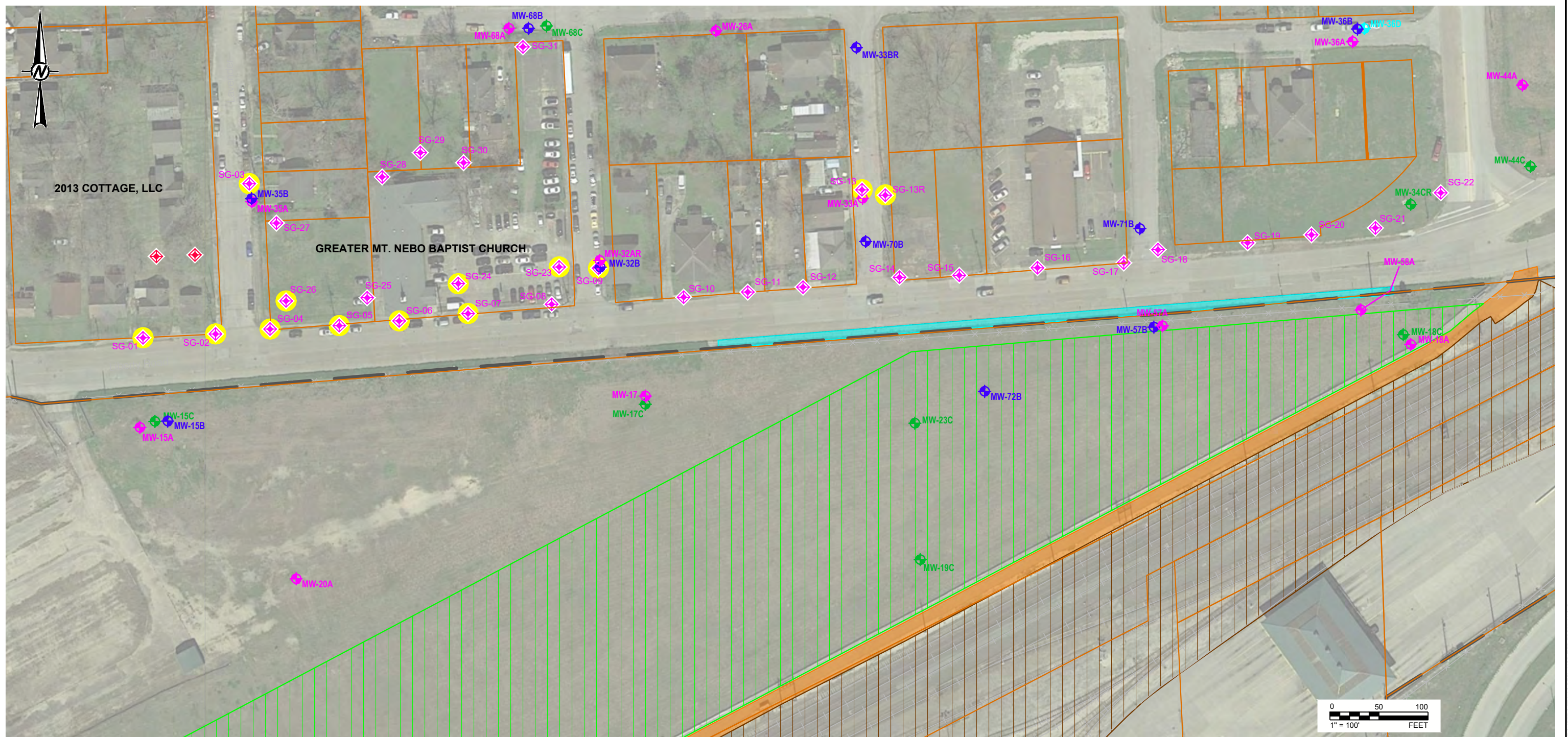
Sample Location	Sample Date	Benzene	Ethylbenzene	m&p-Xylene	o-Xylene	Naphthalene
	^{Air} RBEL _{inh} (ug/m ³)	11	2000	640	640	3.1
	Target Soil Gas Assessment Level** (ug/m ³)	367	66,667	21,333	21,333	103
<i>Soil Gas Samples</i>						
SG-08	2/19/2020	0.31 J	0.63 J	2.4 J	0.81 J	<2.3
SG-10	2/19/2020	<0.26	0.54 J	2.1 J	0.69 J	<2.2
SG-11	2/19/2020	0.87	5.1	13.1	7.6	3.8 J
SG-12	2/27/2020	0.28 J	<0.54	1.3 J	<0.61	<3.1
SG-14	2/27/2020	<0.27	<0.54	<1.2	<0.61	<2.3
SG-15	2/27/2020	<0.26	<0.51	<1.2	<0.58	<3.4
SG-16	2/27/2020	<0.26	13.4	46.9	20.9	<3.1
SG-16 (DUP)	2/27/2020	0.58	14	50.6	21.5	<3.2
SG-17	2/27/2020	0.25 J	<0.48	1.1 J	<0.54	<3.0
SG-18	2/19/2020	1	3.9	8	3.7	<2.2
SG-19	2/27/2020	0.46 J	<0.51	1.6 J	0.91 J	<3.5
SG-20	2/27/2020	0.27 J	<0.53	1.7 J	<0.60	<3.1
SG-21	2/19/2020	<0.26	<0.51	<1.2	<0.58	<2.2
SG-21 (DUP)	2/19/2020	<0.26	<0.51	<1.2	<0.58	<2.2
SG-22	2/19/2020	<0.26	0.82 J	2.5 J	0.81 J	<2.2
SG-25	6/30/2020	<0.25	<0.32	<0.74	<0.34	<2.4
SG-27	6/30/2020	12.4 J	7.9 J	21.2 J	6.2 J	<2.3
SG-27 (DUP)	6/30/2020	1.5 J	2.2 J	7.7 J	3.1 J	<2.3
SG-28	11/11/2020	1.1	35.2	222	56	10.9
SG-29	11/11/2020	0.88	88.3	456	136	11.4
SG-29 (DUP)	11/11/2020	0.82	83.9	441	130	9.5
SG-30	11/11/2020	0.77	103	768	154	13.2
SG-31	11/11/2020	1.9	382	2,730	615	13.5
<i>Control Samples</i>						
AA-1	2/19/2020	0.73	<0.38	<0.88	<0.43	<1.7
AA-2	2/27/2020	1.1	<0.37	0.99 J	<0.42	<1.6
HE-1	2/19/2020	5.6	3.8	22	21.2	<1.3
AA-3	6/30/2020	<0.18	<0.23	<0.53	<0.24	<1.7
AA-1	11/11/2020	0.48 J	0.31 J	0.89 J	<0.35	2.6 J

Notes:

- Bolded concentrations are greater than the method detection limit (MDL).
- ** Target soil gas assessment levels calculated by dividing the ^{Air}RBEL_{inh} (Table 9 TRRP PCL Tables last revised November 8, 2019) by the soil gas attenuation factor of 0.03 (EPA, 2015b)
- J = Result is estimated due to a detected concentration that is less than the MQL but greater than or equal to the SDL or as indicated in data usability summaries.
- One method blank yielded a low level detection for naphthalene in lab report 10510405. Associated sample results with similar detections to the method blank were qualified as non-detect (see Data Usability Summary in Attachment 2 for details).
- Concentrations in micrograms per cubic meter (ug/m³).

FIGURES

Path: \\uswest\arcad\at\Projects - Round Rock\2019\19119232 - HWPP\2020\7 July 1 - Soil Gas Sampling Locations.dwg | File Name: FIG 1 - Soil Gas Sampling Locations.dwg | Last Edited By: malfanz | Date: 2020-11-18 | Time: 4:53:44 PM | Printed By: RScholar | Date: 2020-12-14 | Time: 3:44:52 PM



LEGEND

- UPRR PROPERTY BOUNDARY
- FENCE
- RAILROAD
- A-TZ MONITORING WELL LOCATION
- B-CZ/B-TZ MONITORING WELL LOCATION
- C-TZ MONITORING WELL LOCATION
- D-TZ MONITORING WELL LOCATION
- SOIL CAP AREA (20016)
- ASPHALT CAP AREA
- CONCRETE SIDEWALK CAP AREA
- RAILROAD CAP AREA
- SOIL GAS AND SURFACE SOIL SAMPLE LOCATION
- SOIL GAS SAMPLE POINT SATURATED WITH WATER (NO SOIL GAS SAMPLE COLLECTED)
- PROPOSED SOIL GAS AND SURFACE SOIL SAMPLE LOCATION (ACCESS NOT GRANTED)

REFERENCE(S)

BASE MAP TAKEN FROM ERM-SOUTHWEST, INC APAR ADDENDUM, FIG 3-1, DATED JUNE 2004.
 AERIAL: GOOGLE EARTH, IMAGERY DATED 2/23/19.

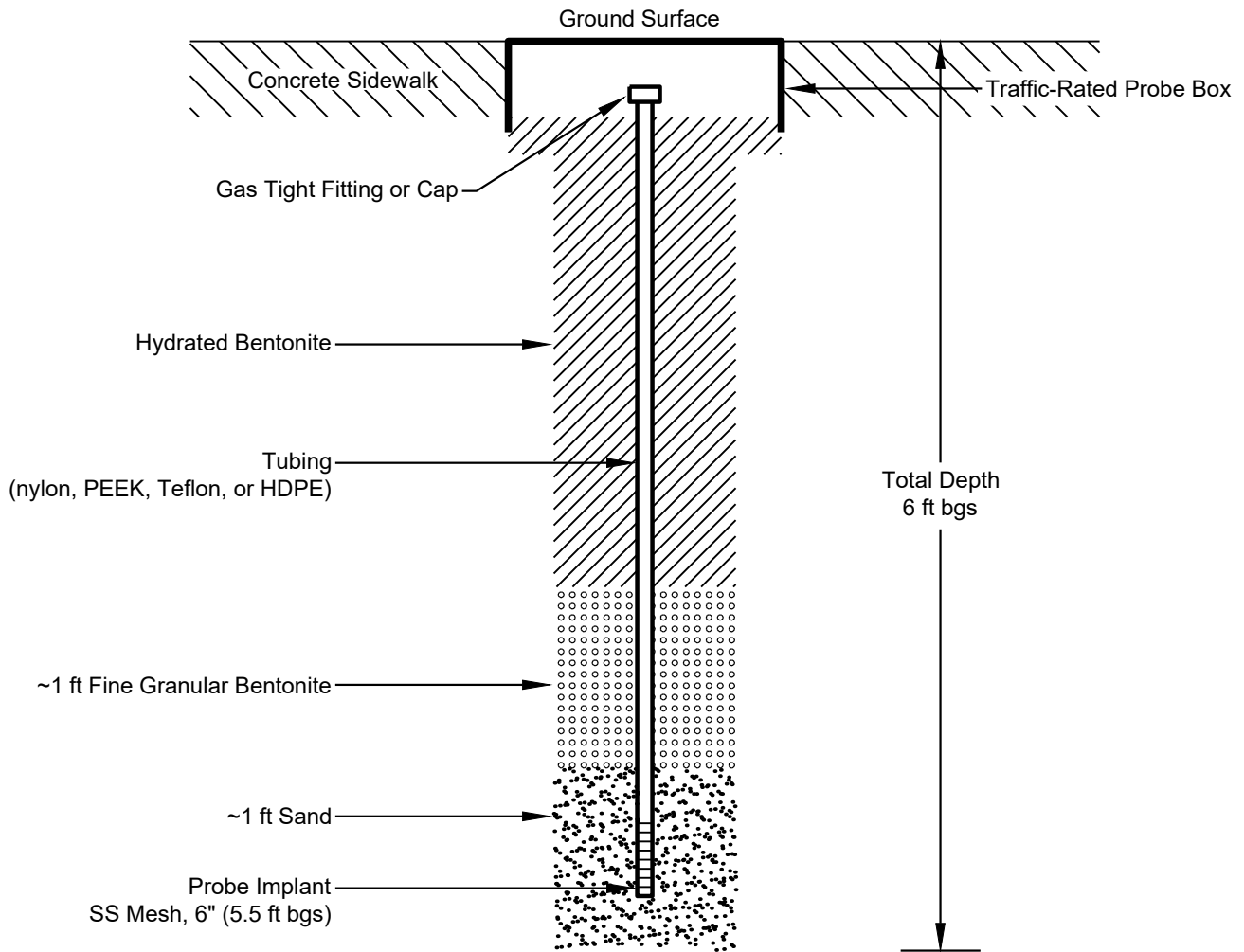
CLIENT
 UNION PACIFIC RAILROAD CO.

PROJECT
 HOUSTON WOOD PRESERVING WORKS

TITLE
SOIL GAS & SURFACE SOIL SAMPLING LOCATIONS

CONSULTANT	YYYY-MM-DD	2020-12-14
DESIGNED	AJD	
PREPARED	AJD	
REVIEWED	MH	
APPROVED	ECM	

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B



Total Depth
6 ft bgs

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

TITLE
SOIL GAS PROBE CONSTRUCTION DIAGRAM

CONSULTANT	YYYY-MM-DD	2019-12-20
	DESIGNED	AJD
	PREPARED	AJD
	REVIEWED	ECM
	APPROVED	ECM

PROJECT NO.
19119232

REV.
0

FIGURE
2

ATTACHMENT 1

**Soil Samples - Data Usability
Summary and Laboratory Analytical
Reports**



Memorandum

December 21, 2020

To: Eric Matzner Ref. No.: 11183954-1620

From: ^{CK} Chris G. Knight/eew/841-NF Tel: 512-506-8803

cc: Jesse Orth, Jon Lang; Julie Lidstone

**Subject: Data Usability Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
November 2020**

1. Scope of Data Usability Study

This document details a Data Usability Summary (DUS) of analytical results for soil samples collected in support of the Soil Gas Probes at the Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works site during November 2020. Samples were submitted to ALS Environmental (ALS), located in Houston, Texas and are reported in data package HS20110548. The intended use of the data is to support the Soil Gas Probes at the site by providing current concentration of chemicals of concern.

Data were reviewed and validated by Chris G. Knight of GHD, in accordance with Title 30 of the Texas Administrative Code Section 350.54 (30 TAC 350.54) as described in the Texas Commission on Environmental Quality (TCEQ) Regulatory Guidance document entitled "Review and Reporting of COC Concentration Data under TRRP", (RG-366/TRRP-13), revised May 2010, herein referred to as "TRRP-13 Guidance". Evaluation of the data was based on information obtained from the chain of custody forms, the finished report forms, method blank data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spikes (MS), the laboratory review checklists (LRC), and the laboratory exception report (ER).

A sample collection and analysis summary is presented in Table 1. This summary provides a cross-reference of field sample identification numbers and location identification. Each sample is assigned a unique field identification number.

The validated sample results are presented in Table 2. A summary of the analytical methodology is presented in Table 3.

2. Laboratory Qualifications

The Laboratory's quality assurance program is consistent with the quality standards outlined in the National Environmental Laboratory Accreditation Program (NELAP). This laboratory was accredited under Texas



Certification number # TX104704231 at the time the analysis was performed and the certificate is included in Attachment A.

3. Project Objectives

3.1 Sampling/Analytical QA/QC Objectives

The QA/QC program was designed to identify contamination resulting from the sampling, sample transport and analytical process through the analysis of method blanks. The QA/QC program was designed to evaluate the quality of the resulting data with respect to bias and precision through analysis of LCS and MS analyses.

4. Data Review/Validation Results

4.1 Sample Holding Time and Preservation

Samples were shipped with a chain of custody and the paper work was filled out properly. All samples were delivered on ice and stored by the laboratory at the required temperature (0-6°C).

The sample chain of custody documents and the analytical report were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

4.2 Sample Containers

Sample containers used were certified pre-cleaned glass containers provided by the laboratory. These containers meet or exceed analyte specifications established in the United States Environmental Protection Agency (USEPA) *Specifications and Guidance for Contaminant-free Sample Containers*.

4.3 Calibrations

According to the LRC, initial calibration and continuing calibration data met the criteria for the selected method.

4.4 Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures. As these were not discrete samples handled in the field, these blanks are not listed on the sample identification cross-reference list found in the data package.

For this study, laboratory method blanks were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch and results are reported in the laboratory data package.

The method blank results were non-detect or below the method quantitation limit (MQL), indicating that laboratory contamination was not a factor for this investigation.



4.5 Internal Standard and Surrogate Spike Recoveries

Recoveries of internal standards are addressed in the LRC of the data package. All internal standard recoveries associated with the compounds of interest were acceptable per the LRC.

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for volatile organic compounds (VOCs) and naphthalene are spiked with surrogate compounds prior to sample analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices. The recovery ranges established by the laboratory are adopted as the acceptance criteria for the project. Each individual surrogate compound is expected to meet the laboratory control limits. According to the TRRP-13 Guidelines, one outlying surrogate is acceptable for methods with multiple surrogate spike compounds as long as the recovery is at least ten percent.

Surrogate recoveries were assessed against laboratory control limits and/or the guidance in TRRP-13. Samples analyzed at elevated sample dilutions (five times or greater) were not assessed. All surrogate recoveries met the above criteria.

4.6 Laboratory Control Sample Analysis

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The recovery ranges established by the laboratory are adopted as the acceptance criteria for the project.

For this study, LCS were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch.

The LCS contained all compounds specified in the methods. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

4.7 Matrix Spike Analysis

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with known concentrations of the analytes of interest and analyzed as MS/matrix spike duplicate (MSD) samples. The relative percent difference (RPD) between the MS and MSD is used to assess analytical precision.

The laboratory performed MS/MSD analyses on non-site samples. These cannot be used to assess accuracy and precision for the site samples.

4.8 Field Procedures

Golder Associates, Inc. collected soil samples in accordance with their Standard Operating Procedures (SOP) for sample collection.

4.9 Analyte Reporting

The laboratory reported detected results for each analyte down to the sample detection limit (SDL), which is defined as the method detection limit (MDL) with sample-specific adjustments for dilutions, aliquot size,



volumes, etc. Positive analyte detections less than the MQL but greater than the SDL were qualified as estimated (J) in Table 2.

- i) The sample extract for SO-1622-SG31(0.5-1) 20201110 was analyzed at an elevated sample dilution for naphthalene due to a high level of matrix interference. No further action was required.

The detectability check standard (DCS) results supported the laboratory MDLs.

All soil results were reported on a dry weight basis.

5. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are usable for the purpose of supporting the Soil Gas Probes at the site by providing current concentration of chemicals of concern in soil samples without qualification.

Table 1

Sample Collection and Analysis Summary
Soil Gas Probes
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
November 2020

Sample Identification	Location	Matrix	Initial Sample Depth (ft bgs)	Final Sample Depth (ft bgs)	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters	
							VOCs	Naphthalene
SO-1622-SG31(0.5-1) 20201110	SG-31	Soil	0.5	1	11/10/2020	09:00	X	X
SO-1622-SG31(5.5-6) 20201110	SG-31	Soil	5.5	6	11/10/2020	09:20	X	X
SO-1622-SG30(0.5-1) 20201110	SG-30	Soil	0.5	1	11/10/2020	11:29	X	X
SO-1622-SG29(0.5-1) 20201110	SG-29	Soil	0.5	1	11/10/2020	11:40	X	X
SO-1622-SG30(5.5-6) 20201110	SG-30	Soil	5.5	6	11/10/2020	12:00	X	X
SO-1622-SG29(5.5-6) 20201110	SG-29	Soil	5.5	6	11/10/2020	12:10	X	X
SO-1622-SG28(0.5-1) 20201110	SG-28	Soil	0.5	1	11/10/2020	12:40	X	X
SO-1622-SG28(5.5-6) 20201110	SG-28	Soil	5.5	6	11/10/2020	13:10	X	X

Notes:

- ft bgs - Feet Below Ground Surface
VOCs - Volatile Organic Compounds

Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
November 2020

Location ID:	SG-28	SG-28	SG-29	SG-29
Sample Name:	SO-1622-SG28(0.5-1) 20201110	SO-1622-SG28(5.5-6) 20201110	SO-1622-SG29(0.5-1) 20201110	SO-1622-SG29(5.5-6) 20201110
Sample Date:	11/10/2020	11/10/2020	11/10/2020	11/10/2020
Depth:	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs

Parameters	Unit				
Volatile Organic Compounds					
Benzene	mg/kg	<0.00056	<0.00051	<0.00045	<0.00050
Ethylbenzene	mg/kg	0.0022 J	<0.00072	<0.00063	<0.00070
Xylenes (total)	mg/kg	0.019	<0.0010	<0.00090	<0.0010
Semi-volatile Organic Compounds					
Naphthalene	mg/kg	<0.00067	<0.00070	<0.0067	<0.00069

Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
November 2020

Location ID:	SG-30	SG-30	SG-31	SG-31
Sample Name:	SO-1622-SG30(0.5-1) 20201110	SO-1622-SG30(5.5-6) 20201110	SO-1622-SG31(0.5-1) 20201110	SO-1622-SG31(5.5-6) 20201110
Sample Date:	11/10/2020	11/10/2020	11/10/2020	11/10/2020
Depth:	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs

Parameters	Unit				
Volatile Organic Compounds					
Benzene	mg/kg	<0.00052	<0.00040	<0.00042	<0.00054
Ethylbenzene	mg/kg	<0.00072	<0.00056	<0.00058	<0.00075
Xylenes (total)	mg/kg	<0.0010	<0.00080	<0.00083	<0.0011
Semi-volatile Organic Compounds					
Naphthalene	mg/kg	0.0016 J	<0.00069	<0.0065	<0.00070

Notes:

- ft bgs - Feet below ground surface
- < - Not detected at the associated reporting limit
- J - Estimated concentration

Table 3

Analytical Methods
Soil Gas Probes
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
November 2020

Parameter	Method	Matrix	Holding Time	
			Collection to Extraction (Days)	Extraction to Analysis (Days)
VOCs	SW-846 8260C	Soil	-	14
Naphthalene	SW-846 8270D	Soil	14	40

Notes:

VOCs - Volatile Organic Compounds

"-" - Not Applicable

Method References:

SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions

Attachment A

Laboratory NELAP Certificate



Texas Commission on Environmental Quality

NELAP-Recognized Laboratory Accreditation is hereby awarded to



ALS Laboratory Group, Environmental Services Division (Houston, Texas)

10450 Stancliff Road, Suite 210
Houston, TX 77099-4338

in accordance with Texas Water Code Chapter 5, Subchapter R, Title 30 Texas Administrative Code Chapter 25, and the National Environmental Laboratory Accreditation Program.

The laboratory's scope of accreditation includes the fields of accreditation that accompany this certificate. Continued accreditation depends upon successful ongoing participation in the program. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current location(s) and accreditation status for particular methods and analyses (www.tceq.texas.gov/goto/lab). Accreditation does not imply that a product, process, system or person is approved by the Texas Commission on Environmental Quality.

A handwritten signature in black ink, appearing to read "T. G. Baker".

Certificate Number: T104704231-20-26
Effective Date: 5/1/2020
Expiration Date: 4/30/2021

**Executive Director Texas Commission on
Environmental Quality**



Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation



ALS Laboratory Group, Environmental Services Division (Houston, Texas)

10450 Stancliff Road, Suite 210
Houston, TX 77099-4338

Certificate: T104704231-20-26
Expiration Date: 4/30/2021

Issue Date: 5/1/2020

These fields of accreditation supercede all previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Drinking Water*

Method EPA 1613

Analyte	AB	Analyte ID	Method ID
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10120408

Method EPA 200.8

Analyte	AB	Analyte ID	Method ID
Copper	TX	1055	10014605
Lead	TX	1075	10014605



Texas Commission on Environmental Quality



NELAP - Recognized Laboratory Fields of Accreditation

ALS Laboratory Group, Environmental Services Division (Houston, Texas)

10450 Stancliff Road, Suite 210
Houston, TX 77099-4338

Certificate: T104704231-20-26
Expiration Date: 4/30/2021
Issue Date: 5/1/2020

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Matrix: Non-Potable Water

Method	Analyte	AB	Analyte ID	Method ID
Method EPA 1010	Ignitability	TX	1780	10116606
Method EPA 120.1	Conductivity	TX	1610	10006403
Method EPA 1311	TCLP	TX	849	10118806
Method EPA 1312	SPLP	TX	850	10119003
Method EPA 160.4	Residue-volatile	TX	1970	10010409
Method EPA 1613	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TX	9516	10120408
	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TX	9519	10120408
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	TX	9420	10120408
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD)	TX	9426	10120408
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	TX	9423	10120408
	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	TX	9471	10120408
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCDD)	TX	9453	10120408
	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCDF)	TX	9474	10120408
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,6,7,8-HxCDD)	TX	9456	10120408
	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCDF)	TX	9477	10120408
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCDD)	TX	9459	10120408
	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-PeCDF)	TX	9543	10120408
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	TX	9540	10120408
	2,3,4,6,7,8-Hexachlorodibenzofuran (2,3,4,6,7,8-HxCDF)	TX	9480	10120408



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Matrix: Non-Potable Water

2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	TX	9549	10120408
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	TX	9612	10120408
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10120408
Total Heptachlorodibenzofuran (Total HpCDF)	TX	9444	10120408
Total Heptachlorodibenzo-p-dioxin (Total HpCDD)	TX	9438	10120408
Total Hexachlorodibenzofuran (Total HxCDF)	TX	9483	10120408
Total Hexachlorodibenzo-p-dioxin (Total HxCDD)	TX	9468	10120408
Total Pentachlorodibenzofuran (Total PeCDF)	TX	9552	10120408
Total Pentachlorodibenzo-p-dioxin (Total PeCDD)	TX	9555	10120408
Total Tetrachlorodibenzofuran (Total TCDF)	TX	9615	10120408
Total Tetrachlorodibenzo-p-dioxin (Total TCDD)	TX	9609	10120408
Method EPA 1664			
Analyte	AB	Analyte ID	Method ID
n-Hexane Extractable Material (HEM) (O&G)	TX	1803	10127807
Method EPA 180.1			
Analyte	AB	Analyte ID	Method ID
Turbidity	TX	2055	10011606
Method EPA 200.8			
Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10014605
Antimony	TX	1005	10014605
Arsenic	TX	1010	10014605
Barium	TX	1015	10014605
Beryllium	TX	1020	10014605
Boron	TX	1025	10014605
Cadmium	TX	1030	10014605
Calcium	TX	1035	10014605
Chromium	TX	1040	10014605
Cobalt	TX	1050	10014605
Copper	TX	1055	10014605
Iron	TX	1070	10014605



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Matrix: Non-Potable Water

Lead	TX	1075	10014605
Magnesium	TX	1085	10014605
Manganese	TX	1090	10014605
Molybdenum	TX	1100	10014605
Nickel	TX	1105	10014605
Potassium	TX	1125	10014605
Selenium	TX	1140	10014605
Silver	TX	1150	10014605
Sodium	TX	1155	10014605
Strontium	TX	1160	10014605
Thallium	TX	1165	10014605
Tin	TX	1175	10014605
Titanium	TX	1180	10014605
Uranium	TX	3035	10014605
Vanadium	TX	1185	10014605
Zinc	TX	1190	10014605

Method EPA 245.1

Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10036609

Method EPA 300.0

Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10053200
Chloride	TX	1575	10053200
Fluoride	TX	1730	10053200
Nitrate as N	TX	1810	10053200
Nitrate-nitrite	TX	1820	10053200
Nitrite as N	TX	1840	10053200
Orthophosphate as P	TX	1870	10053200
Sulfate	TX	2000	10053200

Method EPA 325.1

Analyte	AB	Analyte ID	Method ID
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Matrix: Non-Potable Water

Chloride	TX	1575	10056801
Method EPA 335.1			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	10060001
Method EPA 335.2			
Analyte	AB	Analyte ID	Method ID
Total cyanide	TX	1645	10278203
Method EPA 335.4			
Analyte	AB	Analyte ID	Method ID
Total cyanide	TX	1645	10061402
Method EPA 350.3			
Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	10064401
Method EPA 365.3			
Analyte	AB	Analyte ID	Method ID
Orthophosphate as P	TX	1870	10070801
Phosphorus	TX	1910	10070801
Method EPA 375.4			
Analyte	AB	Analyte ID	Method ID
Sulfate	TX	2000	10073800
Method EPA 376.1			
Analyte	AB	Analyte ID	Method ID
Sulfide	TX	2005	10074201
Method EPA 410.4			
Analyte	AB	Analyte ID	Method ID
Chemical oxygen demand (COD)	TX	1565	10077404
Method EPA 415.1			
Analyte	AB	Analyte ID	Method ID
Total Organic Carbon (TOC)	TX	2040	10078407
Method EPA 420.1			
Analyte	AB	Analyte ID	Method ID
Total phenolics	TX	1905	10079400



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Matrix: Non-Potable Water

Method EPA 420.4

Analyte	AB	Analyte ID	Method ID
Total phenolics	TX	1905	10080203

Method EPA 6020

Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10156419
Antimony	TX	1005	10156419
Arsenic	TX	1010	10156419
Barium	TX	1015	10156419
Beryllium	TX	1020	10156419
Boron	TX	1025	10156419
Cadmium	TX	1030	10156419
Calcium	TX	1035	10156419
Chromium	TX	1040	10156419
Cobalt	TX	1050	10156419
Copper	TX	1055	10156419
Iron	TX	1070	10156419
Lead	TX	1075	10156419
Lithium	TX	1080	10156419
Magnesium	TX	1085	10156419
Manganese	TX	1090	10156419
Molybdenum	TX	1100	10156419
Nickel	TX	1105	10156419
Potassium	TX	1125	10156419
Selenium	TX	1140	10156419
Silver	TX	1150	10156419
Sodium	TX	1155	10156419
Strontium	TX	1160	10156419
Thallium	TX	1165	10156419
Tin	TX	1175	10156419
Titanium	TX	1180	10156419



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Matrix: Non-Potable Water

Vanadium	TX	1185	10156419
Zinc	TX	1190	10156419
Method EPA 608			
Analyte	AB	Analyte ID	Method ID
4,4'-DDD	TX	7355	10103603
4,4'-DDE	TX	7360	10103603
4,4'-DDT	TX	7365	10103603
Aldrin	TX	7025	10103603
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10103603
alpha-Chlordane	TX	7240	10103603
Aroclor-1016 (PCB-1016)	TX	8880	10103603
Aroclor-1221 (PCB-1221)	TX	8885	10103603
Aroclor-1232 (PCB-1232)	TX	8890	10103603
Aroclor-1242 (PCB-1242)	TX	8895	10103603
Aroclor-1248 (PCB-1248)	TX	8900	10103603
Aroclor-1254 (PCB-1254)	TX	8905	10103603
Aroclor-1260 (PCB-1260)	TX	8910	10103603
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10103603
Chlordane (tech.)	TX	7250	10103603
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10103603
Dieldrin	TX	7470	10103603
Endosulfan I	TX	7510	10103603
Endosulfan II	TX	7515	10103603
Endosulfan sulfate	TX	7520	10103603
Endrin	TX	7540	10103603
Endrin aldehyde	TX	7530	10103603
Endrin ketone	TX	7535	10103603
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10103603
gamma-Chlordane	TX	7245	10103603
Heptachlor	TX	7685	10103603



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Matrix: Non-Potable Water

Heptachlor epoxide	TX	7690	10103603
Methoxychlor	TX	7810	10103603
Toxaphene (Chlorinated camphene)	TX	8250	10103603

Method EPA 624

Analyte	AB	Analyte ID	Method ID
1,1,1-Trichloroethane	TX	5160	10107207
1,1,2,2-Tetrachloroethane	TX	5110	10107207
1,1,2-Trichloroethane	TX	5165	10107207
1,1-Dichloroethane	TX	4630	10107207
1,1-Dichloroethylene	TX	4640	10107207
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10107207
1,2-Dichlorobenzene	TX	4610	10107207
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10107207
1,2-Dichloropropane	TX	4655	10107207
1,3-Dichlorobenzene	TX	4615	10107207
1,4-Dichlorobenzene	TX	4620	10107207
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10107207
2-Chloroethyl vinyl ether	TX	4500	10107207
Acetone (2-Propanone)	TX	4315	10107207
Acrolein (Propenal)	TX	4325	10107207
Acrylonitrile	TX	4340	10107207
Benzene	TX	4375	10107207
Bromodichloromethane	TX	4395	10107207
Bromoform	TX	4400	10107207
Carbon tetrachloride	TX	4455	10107207
Chlorobenzene	TX	4475	10107207
Chlorodibromomethane	TX	4575	10107207
Chloroethane (Ethyl chloride)	TX	4485	10107207
Chloroform	TX	4505	10107207
cis-1,2-Dichloroethylene	TX	4645	10107207



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Matrix: Non-Potable Water

cis-1,3-Dichloropropene	TX	4680	10107207
Ethylbenzene	TX	4765	10107207
m+p-xylene	TX	5240	10107207
Methyl bromide (Bromomethane)	TX	4950	10107207
Methyl chloride (Chloromethane)	TX	4960	10107207
Methyl tert-butyl ether (MTBE)	TX	5000	10107207
Methylene chloride (Dichloromethane)	TX	4975	10107207
Naphthalene	TX	5005	10107207
o-Xylene	TX	5250	10107207
Tetrachloroethylene (Perchloroethylene)	TX	5115	10107207
Toluene	TX	5140	10107207
trans-1,2-Dichloroethylene	TX	4700	10107207
trans-1,3-Dichloropropylene	TX	4685	10107207
Trichloroethene (Trichloroethylene)	TX	5170	10107207
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10107207
Vinyl chloride	TX	5235	10107207
Xylene (total)	TX	5260	10107207

Method EPA 625

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10107401
1,2,4-Trichlorobenzene	TX	5155	10107401
1,2-Dichlorobenzene	TX	4610	10107401
1,2-Diphenylhydrazine	TX	6220	10107401
1,3-Dichlorobenzene	TX	4615	10107401
1,4-Dichlorobenzene	TX	4620	10107401
2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl)ether)	TX	4659	10107401
2,4,5-Trichlorophenol	TX	6835	10107401
2,4,6-Trichlorophenol	TX	6840	10107401
2,4-Dichlorophenol	TX	6000	10107401
2,4-Dimethylphenol	TX	6130	10107401



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Matrix: Non-Potable Water

2,4-Dinitrophenol	TX	6175	10107401
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10107401
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10107401
2-Chloronaphthalene	TX	5795	10107401
2-Chlorophenol	TX	5800	10107401
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10107401
2-Methylphenol (o-Cresol)	TX	6400	10107401
2-Nitrophenol	TX	6490	10107401
3,3'-Dichlorobenzidine	TX	5945	10107401
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10107401
4-Chloro-3-methylphenol	TX	5700	10107401
4-Chlorophenyl phenylether	TX	5825	10107401
4-Methylphenol (p-Cresol)	TX	6410	10107401
4-Nitrophenol	TX	6500	10107401
Acenaphthene	TX	5500	10107401
Acenaphthylene	TX	5505	10107401
Anthracene	TX	5555	10107401
Benzidine	TX	5595	10107401
Benzo(a)anthracene	TX	5575	10107401
Benzo(a)pyrene	TX	5580	10107401
Benzo(b)fluoranthene	TX	5585	10107401
Benzo(g,h,i)perylene	TX	5590	10107401
Benzo(k)fluoranthene	TX	5600	10107401
bis(2-Chloroethoxy)methane	TX	5760	10107401
bis(2-Chloroethyl) ether	TX	5765	10107401
bis(2-Ethylhexyl) phthalate (Di(2-Ethylhexyl) phthalate, DEHP)	TX	6065	10107401
Butyl benzyl phthalate	TX	5670	10107401
Chrysene	TX	5855	10107401
Dibenz(a,h) anthracene	TX	5895	10107401
Diethyl phthalate	TX	6070	10107401



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Matrix: Non-Potable Water

Dimethyl phthalate	TX	6135	10107401
Di-n-butyl phthalate	TX	5925	10107401
Di-n-octyl phthalate	TX	6200	10107401
Fluoranthene	TX	6265	10107401
Fluorene	TX	6270	10107401
Hexachlorobenzene	TX	6275	10107401
Hexachlorobutadiene	TX	4835	10107401
Hexachlorocyclopentadiene	TX	6285	10107401
Hexachloroethane	TX	4840	10107401
Indeno(1,2,3-cd) pyrene	TX	6315	10107401
Isophorone	TX	6320	10107401
Naphthalene	TX	5005	10107401
Nitrobenzene	TX	5015	10107401
n-Nitrosodiethylamine	TX	6525	10107401
n-Nitrosodimethylamine	TX	6530	10107401
n-Nitrosodi-n-butylamine	TX	5025	10107401
n-Nitrosodi-n-propylamine	TX	6545	10107401
n-Nitrosodiphenylamine	TX	6535	10107401
Pentachlorobenzene	TX	6590	10107401
Pentachlorophenol	TX	6605	10107401
Phenanthrene	TX	6615	10107401
Phenol	TX	6625	10107401
Pyrene	TX	6665	10107401
Pyridine	TX	5095	10107401
Method EPA 7196			
Analyte	AB	Analyte ID	Method ID
Chromium (VI)	TX	1045	10162206
Method EPA 7470			
Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10165603



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Matrix: Non-Potable Water

Method EPA 8011

Analyte	AB	Analyte ID	Method ID
1,2,3-Trichloropropane	TX	5180	10173009
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10173009
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10173009

Method EPA 8015

Analyte	AB	Analyte ID	Method ID
Diesel range organics (DRO)	TX	9369	10173203
Ethanol	TX	4750	10173203
Ethylene glycol	TX	4785	10173203
Gasoline range organics (GRO)	TX	9408	10173203
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10173203
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10173203
Methanol	TX	4930	10173203
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10173203
n-Propanol (1-Propanol)	TX	5055	10173203
Propylene Glycol	TX	6657	10173203
tert-Butyl alcohol	TX	4420	10173203

Method EPA 8081

Analyte	AB	Analyte ID	Method ID
4,4'-DDD	TX	7355	10178402
4,4'-DDE	TX	7360	10178402
4,4'-DDT	TX	7365	10178402
Aldrin	TX	7025	10178402
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10178402
alpha-Chlordane	TX	7240	10178402
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10178402
Chlordane (tech.)	TX	7250	10178402
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10178402
Dieldrin	TX	7470	10178402
Endosulfan I	TX	7510	10178402



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Matrix: Non-Potable Water

Endosulfan II	TX	7515	10178402
Endosulfan sulfate	TX	7520	10178402
Endrin	TX	7540	10178402
Endrin aldehyde	TX	7530	10178402
Endrin ketone	TX	7535	10178402
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10178402
gamma-Chlordane	TX	7245	10178402
Heptachlor	TX	7685	10178402
Heptachlor epoxide	TX	7690	10178402
Hexachlorobenzene	TX	6275	10178402
Methoxychlor	TX	7810	10178402
Mirex	TX	7870	10178402
Toxaphene (Chlorinated camphene)	TX	8250	10178402

Method EPA 8082

Analyte	AB	Analyte ID	Method ID
Aroclor-1016 (PCB-1016)	TX	8880	10179201
Aroclor-1221 (PCB-1221)	TX	8885	10179201
Aroclor-1232 (PCB-1232)	TX	8890	10179201
Aroclor-1242 (PCB-1242)	TX	8895	10179201
Aroclor-1248 (PCB-1248)	TX	8900	10179201
Aroclor-1254 (PCB-1254)	TX	8905	10179201
Aroclor-1260 (PCB-1260)	TX	8910	10179201
PCBs (total)	TX	8870	10179201

Method EPA 8151

Analyte	AB	Analyte ID	Method ID
2,4,5-T	TX	8655	10183003
2,4-D	TX	8545	10183003
2,4-DB	TX	8560	10183003
Dalapon	TX	8555	10183003
Dicamba	TX	8595	10183003
Dichloroprop (Dichloroprop, Weedone)	TX	8605	10183003



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10450 Stancliff Road, Suite 210
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Expiration Date: 4/30/2021
Issue Date: 5/1/2020

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Matrix: Non-Potable Water

Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10183003
MCPA	TX	7775	10183003
MCPP	TX	7780	10183003
Silvex (2,4,5-TP)	TX	8650	10183003

Method EPA 8260

Analyte	AB	Analyte ID	Method ID
1,1,1,2-Tetrachloroethane	TX	5105	10184404
1,1,1-Trichloroethane	TX	5160	10184404
1,1,2,2-Tetrachloroethane	TX	5110	10184404
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	TX	5195	10184404
1,1,2-Trichloroethane	TX	5165	10184404
1,1-Dichloroethane	TX	4630	10184404
1,1-Dichloroethylene	TX	4640	10184404
1,1-Dichloropropene	TX	4670	10184404
1,2,3-Trichlorobenzene	TX	5150	10184404
1,2,3-Trichloropropane	TX	5180	10184404
1,2,4-Trichlorobenzene	TX	5155	10184404
1,2,4-Trimethylbenzene	TX	5210	10184404
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10184404
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10184404
1,2-Dichlorobenzene	TX	4610	10184404
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10184404
1,2-Dichloropropane	TX	4655	10184404
1,3,5-Trimethylbenzene	TX	5215	10184404
1,3-Dichlorobenzene	TX	4615	10184404
1,3-Dichloropropane	TX	4660	10184404
1,4-Dichlorobenzene	TX	4620	10184404
1,4-Dioxane (1,4-Diethyleneoxide)	TX	4735	10184404
1-Chlorohexane	TX	4510	10184404
1-Propanol	TX	5060	10184404



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Matrix: Non-Potable Water

2,2-Dichloropropane	TX	4665	10184404
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10184404
2-Chloroethyl vinyl ether	TX	4500	10184404
2-Chlorotoluene	TX	4535	10184404
2-Hexanone (MBK)	TX	4860	10184404
2-Pentanone	TX	5045	10184404
4-Chlorotoluene	TX	4540	10184404
4-Isopropyltoluene (p-Cymene)	TX	4915	10184404
4-Methyl-2-pentanone (MIBK)	TX	4995	10184404
Acetone (2-Propanone)	TX	4315	10184404
Acetonitrile	TX	4320	10184404
Acrolein (Propenal)	TX	4325	10184404
Acrylonitrile	TX	4340	10184404
Allyl alcohol	TX	4350	10184404
Allyl chloride (3-Chloropropene)	TX	4355	10184404
Benzene	TX	4375	10184404
Benzyl chloride	TX	5635	10184404
Bromobenzene	TX	4385	10184404
Bromochloromethane	TX	4390	10184404
Bromodichloromethane	TX	4395	10184404
Bromoform	TX	4400	10184404
Carbon disulfide	TX	4450	10184404
Carbon tetrachloride	TX	4455	10184404
Chlorobenzene	TX	4475	10184404
Chlorodibromomethane	TX	4575	10184404
Chloroethane (Ethyl chloride)	TX	4485	10184404
Chloroform	TX	4505	10184404
Chloroprene (2-Chloro-1,3-butadiene)	TX	4525	10184404
cis-1,2-Dichloroethylene	TX	4645	10184404
cis-1,3-Dichloropropene	TX	4680	10184404



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Matrix: Non-Potable Water

Dibromofluoromethane	TX	4590	10184404
Dibromomethane (Methylene bromide)	TX	4595	10184404
Dichlorodifluoromethane (Freon-12)	TX	4625	10184404
Diethyl ether	TX	4725	10184404
Di-isopropylether (DIPE)	TX	9375	10184404
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	TX	4745	10184404
Ethanol	TX	4750	10184404
Ethyl acetate	TX	4755	10184404
Ethyl methacrylate	TX	4810	10184404
Ethylbenzene	TX	4765	10184404
Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)	TX	4770	10184404
Hexachlorobutadiene	TX	4835	10184404
Iodomethane (Methyl iodide)	TX	4870	10184404
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10184404
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10184404
Isopropylbenzene (Cumene)	TX	4900	10184404
m+p-xylene	TX	5240	10184404
Methacrylonitrile	TX	4925	10184404
Methyl acetate	TX	4940	10184404
Methyl acrylate	TX	4945	10184404
Methyl bromide (Bromomethane)	TX	4950	10184404
Methyl chloride (Chloromethane)	TX	4960	10184404
Methyl methacrylate	TX	4990	10184404
Methyl tert-butyl ether (MTBE)	TX	5000	10184404
Methylcyclohexane	TX	4965	10184404
Methylene chloride (Dichloromethane)	TX	4975	10184404
Naphthalene	TX	5005	10184404
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10184404
n-Butylbenzene	TX	4435	10184404
n-Propylbenzene	TX	5090	10184404



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Matrix: Non-Potable Water

o-Xylene	TX	5250	10184404
Propionitrile (Ethyl cyanide)	TX	5080	10184404
Pyridine	TX	5095	10184404
sec-Butylbenzene	TX	4440	10184404
Styrene	TX	5100	10184404
T-amylmethylether (TAME)	TX	4370	10184404
tert-Butyl alcohol	TX	4420	10184404
tert-Butylbenzene	TX	4445	10184404
Tetrachloroethylene (Perchloroethylene)	TX	5115	10184404
Toluene	TX	5140	10184404
trans-1,2-Dichloroethylene	TX	4700	10184404
trans-1,3-Dichloropropylene	TX	4685	10184404
trans-1,4-Dichloro-2-butene	TX	4605	10184404
Trichloroethene (Trichloroethylene)	TX	5170	10184404
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10184404
Vinyl acetate	TX	5225	10184404
Vinyl chloride	TX	5235	10184404
Xylene (total)	TX	5260	10184404

Method EPA 8270

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10185203
1,2,4-Trichlorobenzene	TX	5155	10185203
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10185203
1,2-Dichlorobenzene	TX	4610	10185203
1,2-Dinitrobenzene	TX	6155	10185203
1,2-Diphenylhydrazine	TX	6220	10185203
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10185203
1,3-Dichlorobenzene	TX	4615	10185203
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10185203
1,4-Dichlorobenzene	TX	4620	10185203



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Matrix: Non-Potable Water

1,4-Dinitrobenzene	TX	6165	10185203
1,4-Naphthoquinone	TX	6420	10185203
1,4-Phenylenediamine	TX	6630	10185203
1-Chloronaphthalene	TX	5790	10185203
1-Naphthylamine	TX	6425	10185203
2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl)ether)	TX	4659	10185203
2,3,4,6-Tetrachlorophenol	TX	6735	10185203
2,4,5-Trichlorophenol	TX	6835	10185203
2,4,5-Trimethylaniline	TX	6880	10185203
2,4,6-Trichlorophenol	TX	6840	10185203
2,4-Diaminotoluene	TX	5880	10185203
2,4-Dichlorophenol	TX	6000	10185203
2,4-Dimethylphenol	TX	6130	10185203
2,4-Dinitrophenol	TX	6175	10185203
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10185203
2,6-Dichlorophenol	TX	6005	10185203
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10185203
2-Acetylamino fluorene	TX	5515	10185203
2-Chloronaphthalene	TX	5795	10185203
2-Chlorophenol	TX	5800	10185203
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10185203
2-Methylaniline (o-Toluidine)	TX	5145	10185203
2-Methylnaphthalene	TX	6385	10185203
2-Methylphenol (o-Cresol)	TX	6400	10185203
2-Naphthylamine	TX	6430	10185203
2-Nitroaniline	TX	6460	10185203
2-Nitrophenol	TX	6490	10185203
2-Picoline (2-Methylpyridine)	TX	5050	10185203
3,3'-Dichlorobenzidine	TX	5945	10185203
3,3'-Dimethylbenzidine	TX	6120	10185203



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Matrix: Non-Potable Water

3-Methylcholanthrene	TX	6355	10185203
3-Methylphenol (m-Cresol)	TX	6405	10185203
3-Nitroaniline	TX	6465	10185203
4-Aminobiphenyl	TX	5540	10185203
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10185203
4-Chloro-3-methylphenol	TX	5700	10185203
4-Chloroaniline	TX	5745	10185203
4-Chlorophenyl phenylether	TX	5825	10185203
4-Dimethyl aminoazobenzene	TX	6105	10185203
4-Methylphenol (p-Cresol)	TX	6410	10185203
4-Nitroaniline	TX	6470	10185203
4-Nitrobiphenyl	TX	6480	10185203
4-Nitrophenol	TX	6500	10185203
4-Nitroquinoline-1-oxide	TX	6510	10185203
5-Chloro-2-methylaniline	TX	5695	10185203
5-Nitro-o-toluidine	TX	6570	10185203
7,12-Dimethylbenz(a) anthracene	TX	6115	10185203
a-a-Dimethylphenethylamine	TX	6125	10185203
Acenaphthene	TX	5500	10185203
Acenaphthylene	TX	5505	10185203
Acetophenone	TX	5510	10185203
Aniline	TX	5545	10185203
Anthracene	TX	5555	10185203
Aramite	TX	5560	10185203
Atrazine	TX	7065	10185203
Azinphos-methyl (Guthion)	TX	7075	10185203
Azobenzene	TX	5562	10185203
Benzenethiol (Thiophenol)	TX	6750	10185203
Benzidine	TX	5595	10185203
Benzo(a)anthracene	TX	5575	10185203



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Matrix: Non-Potable Water

Benzo(a)pyrene	TX	5580	10185203
Benzo(b)fluoranthene	TX	5585	10185203
Benzo(e)pyrene	TX	5605	10185203
Benzo(g,h,i)perylene	TX	5590	10185203
Benzo(k)fluoranthene	TX	5600	10185203
Benzoic acid	TX	5610	10185203
Benzyl alcohol	TX	5630	10185203
Biphenyl	TX	5640	10185203
bis(2-Chloroethoxy)methane	TX	5760	10185203
bis(2-Chloroethyl) ether	TX	5765	10185203
bis(2-Ethylhexyl) phthalate (Di(2-Ethylhexyl) phthalate, DEHP)	TX	6065	10185203
Butyl benzyl phthalate	TX	5670	10185203
Caprolactam	TX	7180	10185203
Captan	TX	7190	10185203
Carbaryl (Sevin)	TX	7195	10185203
Carbazole	TX	5680	10185203
Carbophenothion	TX	7220	10185203
Chlorobenzilate	TX	7260	10185203
Chrysene	TX	5855	10185203
Coumaphos	TX	7315	10185203
Demeton	TX	7390	10185203
Demeton	TX	7390	10185203
Demeton-o	TX	7395	10185203
Demeton-s	TX	7385	10185203
Diallate	TX	7405	10185203
Dibenz(a,h) anthracene	TX	5895	10185203
Dibenz(a,j) acridine	TX	5900	10185203
Dibenzofuran	TX	5905	10185203
Dichlorovos (DDVP, Dichlorvos)	TX	8610	10185203
Diethyl phthalate	TX	6070	10185203



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Matrix: Non-Potable Water

Dimethoate	TX	7475	10185203
Dimethoate	TX	7475	10185203
Dimethyl phthalate	TX	6135	10185203
Di-n-butyl phthalate	TX	5925	10185203
Di-n-octyl phthalate	TX	6200	10185203
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10185203
Dioxathion	TX	7495	10185203
Diphenylamine	TX	6205	10185203
Disulfoton	TX	8625	10185203
Ethion	TX	7565	10185203
Ethyl methanesulfonate	TX	6260	10185203
Famphur	TX	7580	10185203
Fluoranthene	TX	6265	10185203
Fluorene	TX	6270	10185203
Hexachlorobenzene	TX	6275	10185203
Hexachlorobutadiene	TX	4835	10185203
Hexachlorocyclopentadiene	TX	6285	10185203
Hexachloroethane	TX	4840	10185203
Hexachlorophene	TX	6290	10185203
Hexachloropropene	TX	6295	10185203
Indeno(1,2,3-cd) pyrene	TX	6315	10185203
Isodrin	TX	7725	10185203
Isophorone	TX	6320	10185203
Isosafrole	TX	6325	10185203
Kepone	TX	7740	10185203
Maleic anhydride	TX	6335	10185203
Methapyrilene	TX	6345	10185203
Methyl methanesulfonate	TX	6375	10185203
Methyl parathion (Parathion, methyl)	TX	7825	10185203
Mevinphos	TX	7850	10185203



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Matrix: Non-Potable Water

Naled	TX	7905	10185203
Naphthalene	TX	5005	10185203
Nitrobenzene	TX	5015	10185203
n-Nitrosodiethylamine	TX	6525	10185203
n-Nitrosodimethylamine	TX	6530	10185203
n-Nitrosodi-n-butylamine	TX	5025	10185203
n-Nitrosodi-n-propylamine	TX	6545	10185203
n-Nitrosodiphenylamine	TX	6535	10185203
n-Nitrosomethylethylamine	TX	6550	10185203
n-Nitrosomorpholine	TX	6555	10185203
n-Nitrosopiperidine	TX	6560	10185203
n-Nitrosopyrrolidine	TX	6565	10185203
o,o,o-Triethyl phosphorothioate	TX	8290	10185203
o-Anisidine	TX	5550	10185203
Parathion, ethyl	TX	7955	10185203
p-Cresidine	TX	5860	10185203
Pentachlorobenzene	TX	6590	10185203
Pentachloronitrobenzene (PCNB)	TX	6600	10185203
Pentachlorophenol	TX	6605	10185203
Phenacetin	TX	6610	10185203
Phenanthrene	TX	6615	10185203
Phenol	TX	6625	10185203
Phorate	TX	7985	10185203
Phosmet (Imidan)	TX	8000	10185203
Phthalic anhydride	TX	6640	10185203
Pronamide (Kerb)	TX	6650	10185203
Pyrene	TX	6665	10185203
Pyridine	TX	5095	10185203
Quinoline	TX	6670	10185203
Resorcinol	TX	6680	10185203



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Matrix: Non-Potable Water

Safrole	TX	6685	10185203
Sulfotepp	TX	8155	10185203
Terbufos	TX	8185	10185203
Tetrachlorvinphos (Stirophos, Gardona)	TX	8197	10185203
Thionazin (Zinophos)	TX	8235	10185203
Toluene diisocyanate	TX	6775	10185203
Trifluralin (Treflan)	TX	8295	10185203

Method EPA 8290

Analyte	AB	Analyte ID	Method ID
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TX	9516	10187209
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TX	9519	10187209
1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	TX	9420	10187209
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD)	TX	9426	10187209
1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	TX	9423	10187209
1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	TX	9471	10187209
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCDD)	TX	9453	10187209
1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCDF)	TX	9474	10187209
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,6,7,8-HxCDD)	TX	9456	10187209
1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCDF)	TX	9477	10187209
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCDD)	TX	9459	10187209
1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-PeCDF)	TX	9543	10187209
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	TX	9540	10187209
2,3,4,6,7,8-Hexachlorodibenzofuran (2,3,4,6,7,8-HxCDF)	TX	9480	10187209
2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	TX	9549	10187209
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	TX	9612	10187209
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10187209
Total Heptachlorodibenzofuran (Total HpCDF)	TX	9444	10187209
Total Heptachlorodibenzo-p-dioxin (Total HpCDD)	TX	9438	10187209
Total Hexachlorodibenzofuran (Total HxCDF)	TX	9483	10187209
Total Hexachlorodibenzo-p-dioxin (Total HxCDD)	TX	9468	10187209



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Matrix: *Non-Potable Water*

Total Pentachlorodibenzofuran (Total PeCDF)	TX	9552	10187209
Total Pentachlorodibenzo-p-dioxin (Total PeCDD)	TX	9555	10187209
Total Tetrachlorodibenzofuran (Total TCDF)	TX	9615	10187209
Total Tetrachlorodibenzo-p-dioxin (Total TCDD)	TX	9609	10187209
Method EPA 8316			
Analyte	AB	Analyte ID	Method ID
Acrylamide	TX	4330	10188202
Method EPA 8330			
Analyte	AB	Analyte ID	Method ID
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10189807
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10189807
2,4,6-Trinitrotoluene (2,4,6-TNT)	TX	9651	10189807
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10189807
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10189807
2-Amino-4,6-dinitrotoluene (2-am-dnt)	TX	9303	10189807
2-Nitrotoluene	TX	9507	10189807
3-Nitrotoluene	TX	9510	10189807
4-Amino-2,6-dinitrotoluene (4-am-dnt)	TX	9306	10189807
4-Nitrotoluene	TX	9513	10189807
Methyl-2,4,6-trinitrophenylnitramine (tetryl)	TX	6415	10189807
Nitrobenzene	TX	5015	10189807
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	TX	9522	10189807
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	TX	9432	10189807
Method EPA 9014			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	10193803
Total cyanide	TX	1645	10193803
Method EPA 9038			
Analyte	AB	Analyte ID	Method ID
Sulfate	TX	2000	10196608



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Expiration Date: 4/30/2021

Issue Date: 5/1/2020

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Matrix: Non-Potable Water

Method	Analyte	AB	Analyte ID	Method ID
EPA 9040	pH	TX	1900	10196802
EPA 9050	Conductivity	TX	1610	10198604
EPA 9056	Bromide	TX	1540	10199209
	Chloride	TX	1575	10199209
	Fluoride	TX	1730	10199209
	Nitrate as N	TX	1810	10199209
	Nitrate-nitrite	TX	1820	10199209
	Nitrite as N	TX	1840	10199209
	Orthophosphate as P	TX	1870	10199209
	Sulfate	TX	2000	10199209
EPA 9060	Total Organic Carbon (TOC)	TX	2040	10200201
EPA 9065	Total phenolics	TX	1905	10200405
EPA 9066	Total phenolics	TX	1905	10200609
EPA 9250	Chloride	TX	1575	10207202
EPA RSK 175	2-methylpropane (Isobutane)	TX	4942	10212905



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Matrix: Non-Potable Water

Ethane	TX	4747	10212905
Ethene	TX	4752	10212905
Methane	TX	4926	10212905
n-Butane	TX	5007	10212905
n-Propane	TX	5029	10212905
Method HACH 8000			
Analyte	AB	Analyte ID	Method ID
Chemical oxygen demand (COD)	TX	1565	60003001
Method SM 2120 B			
Analyte	AB	Analyte ID	Method ID
Color	TX	1605	20223807
Method SM 2310 B (4a)			
Analyte	AB	Analyte ID	Method ID
Acidity, as CaCO ₃	TX	1500	20002806
Method SM 2320 B			
Analyte	AB	Analyte ID	Method ID
Alkalinity as CaCO ₃	TX	1505	20045005
Method SM 2340 B			
Analyte	AB	Analyte ID	Method ID
Total hardness as CaCO ₃	TX	1755	20046008
Method SM 2510 B			
Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	20048004
Method SM 2540 B			
Analyte	AB	Analyte ID	Method ID
Residue-total (total solids)	TX	1950	20004608
Method SM 2540 C			
Analyte	AB	Analyte ID	Method ID
Residue-filterable (TDS)	TX	1955	20049803
Method SM 2540 D			
Analyte	AB	Analyte ID	Method ID



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Matrix: Non-Potable Water

Residue-nonfilterable (TSS)	TX	1960	20004802
Method SM 3500-Cr B			
Analyte	AB	Analyte ID	Method ID
Chromium (VI)	TX	1045	20065809
Method SM 4500-Cl F			
Analyte	AB	Analyte ID	Method ID
Total residual chlorine	TX	1940	20080482
Method SM 4500-Cl ⁻ E			
Analyte	AB	Analyte ID	Method ID
Chloride	TX	1575	20019209
Method SM 4500-CN ⁻ C			
Analyte	AB	Analyte ID	Method ID
Total cyanide	TX	1645	20020808
Method SM 4500-CN ⁻ E			
Analyte	AB	Analyte ID	Method ID
Total cyanide	TX	1645	20021209
Method SM 4500-CN ⁻ G			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	20021607
Method SM 4500-H+ B			
Analyte	AB	Analyte ID	Method ID
pH	TX	1900	20104603
Method SM 4500-NH3 D			
Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	20108809
Kjeldahl Nitrogen (Total Kjeldahl Nitrogen-TKN)	TX	1790	20108809
Method SM 4500-NH3 F			
Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	20023001
Method SM 4500-O G			
Analyte	AB	Analyte ID	Method ID
Oxygen, dissolved	TX	1880	20025405



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Matrix: Non-Potable Water

Method	Analyte	AB	Analyte ID	Method ID
Method SM 4500-P E				
	Orthophosphate as P	TX	1870	20025803
	Phosphorus	TX	1910	20025803
Method SM 4500-S2 ⁻ D				
	Sulfide	TX	2005	20125400
Method SM 4500-S2 ⁻ F				
	Sulfide	TX	2005	20126209
Method SM 4500-SiO2 D				
	Silica as SiO2	TX	1990	20127202
Method SM 4500-SO3 ⁻ B				
	Sulfite	TX	2015	20026806
Method SM 5210 B				
	Biochemical oxygen demand (BOD)	TX	1530	20027401
	Carbonaceous BOD, CBOD	TX	1555	20027401
Method SM 5310 B				
	Total Organic Carbon (TOC)	TX	2040	20137206
Method SM 5310 C				
	Total Organic Carbon (TOC)	TX	2040	20138209
Method SM 5540 C				
	Surfactants - MBAS	TX	2025	20144405
Method TCEQ 1005				
	Total Petroleum Hydrocarbons (TPH)	TX	2050	90019208



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Matrix: Solid & Chemical Materials

Method ASTM D2216

Analyte	AB	Analyte ID	Method ID
Moisture	TX	10337	ASTM D2216-05

Method EPA 1010

Analyte	AB	Analyte ID	Method ID
Ignitability	TX	1780	10116606

Method EPA 1030

Analyte	AB	Analyte ID	Method ID
Ignitability	TX	1780	10117201

Method EPA 1311

Analyte	AB	Analyte ID	Method ID
TCLP	TX	849	10118806

Method EPA 1312

Analyte	AB	Analyte ID	Method ID
SPLP	TX	850	10119003

Method EPA 200.8

Analyte	AB	Analyte ID	Method ID
Uranium	TX	3035	10014605

Method EPA 300.0

Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10053200
Chloride	TX	1575	10053200
Fluoride	TX	1730	10053200
Nitrate as N	TX	1810	10053200
Nitrate-nitrite	TX	1820	10053200
Nitrite as N	TX	1840	10053200
Orthophosphate as P	TX	1870	10053200
Sulfate	TX	2000	10053200

Method EPA 310.1

Analyte	AB	Analyte ID	Method ID
Alkalinity as CaCO3	TX	1505	10054805



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Matrix: Solid & Chemical Materials

Method EPA 350.3

Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	10064401

Method EPA 365.3

Analyte	AB	Analyte ID	Method ID
Orthophosphate as P	TX	1870	10070801
Phosphorus	TX	1910	10070801

Method EPA 6020

Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10156204
Antimony	TX	1005	10156204
Arsenic	TX	1010	10156204
Barium	TX	1015	10156204
Beryllium	TX	1020	10156204
Boron	TX	1025	10156204
Cadmium	TX	1030	10156204
Calcium	TX	1035	10156204
Chromium	TX	1040	10156204
Cobalt	TX	1050	10156204
Copper	TX	1055	10156204
Iron	TX	1070	10156204
Lead	TX	1075	10156204
Lithium	TX	1080	10156204
Magnesium	TX	1085	10156204
Manganese	TX	1090	10156204
Molybdenum	TX	1100	10156204
Nickel	TX	1105	10156204
Potassium	TX	1125	10156204
Selenium	TX	1140	10156204
Silver	TX	1150	10156204
Sodium	TX	1155	10156204



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Matrix: Solid & Chemical Materials

Strontium	TX	1160	10156204
Thallium	TX	1165	10156204
Tin	TX	1175	10156204
Titanium	TX	1180	10156204
Vanadium	TX	1185	10156204
Zinc	TX	1190	10156204
Method EPA 7196			
Analyte	AB	Analyte ID	Method ID
Chromium (VI)	TX	1045	10162206
Method EPA 7470			
Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10165603
Method EPA 7471			
Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10166004
Method EPA 8015			
Analyte	AB	Analyte ID	Method ID
Diesel range organics (DRO)	TX	9369	10173203
Ethanol	TX	4750	10173203
Ethylene glycol	TX	4785	10173203
Gasoline range organics (GRO)	TX	9408	10173203
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10173203
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10173203
Methanol	TX	4930	10173203
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10173203
n-Propanol (1-Propanol)	TX	5055	10173203
Propylene Glycol	TX	6657	10173203
tert-Butyl alcohol	TX	4420	10173203
Method EPA 8081			
Analyte	AB	Analyte ID	Method ID
4,4'-DDD	TX	7355	10178402



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Matrix: Solid & Chemical Materials

4,4'-DDE	TX	7360	10178402
4,4'-DDT	TX	7365	10178402
Aldrin	TX	7025	10178402
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10178402
alpha-Chlordane	TX	7240	10178402
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10178402
Chlordane (tech.)	TX	7250	10178402
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10178402
Dieldrin	TX	7470	10178402
Endosulfan I	TX	7510	10178402
Endosulfan II	TX	7515	10178402
Endosulfan sulfate	TX	7520	10178402
Endrin	TX	7540	10178402
Endrin aldehyde	TX	7530	10178402
Endrin ketone	TX	7535	10178402
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10178402
gamma-Chlordane	TX	7245	10178402
Heptachlor	TX	7685	10178402
Heptachlor epoxide	TX	7690	10178402
Methoxychlor	TX	7810	10178402
Mirex	TX	7870	10178402
Toxaphene (Chlorinated camphene)	TX	8250	10178402

Method EPA 8082

Analyte	AB	Analyte ID	Method ID
Aroclor-1016 (PCB-1016)	TX	8880	10179201
Aroclor-1221 (PCB-1221)	TX	8885	10179201
Aroclor-1232 (PCB-1232)	TX	8890	10179201
Aroclor-1242 (PCB-1242)	TX	8895	10179201
Aroclor-1248 (PCB-1248)	TX	8900	10179201
Aroclor-1254 (PCB-1254)	TX	8905	10179201



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Matrix: Solid & Chemical Materials

Aroclor-1260 (PCB-1260)	TX	8910	10179201
PCBs (total)	TX	8870	10179201
Method EPA 8260			
Analyte	AB	Analyte ID	Method ID
1,1,1,2-Tetrachloroethane	TX	5105	10184404
1,1,1-Trichloroethane	TX	5160	10184404
1,1,2,2-Tetrachloroethane	TX	5110	10184404
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	TX	5195	10184404
1,1,2-Trichloroethane	TX	5165	10184404
1,1-Dichloroethane	TX	4630	10184404
1,1-Dichloroethylene	TX	4640	10184404
1,1-Dichloropropene	TX	4670	10184404
1,2,3-Trichlorobenzene	TX	5150	10184404
1,2,3-Trichloropropane	TX	5180	10184404
1,2,4-Trichlorobenzene	TX	5155	10184404
1,2,4-Trimethylbenzene	TX	5210	10184404
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10184404
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10184404
1,2-Dichlorobenzene	TX	4610	10184404
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10184404
1,2-Dichloropropane	TX	4655	10184404
1,3,5-Trimethylbenzene	TX	5215	10184404
1,3-Dichlorobenzene	TX	4615	10184404
1,3-Dichloropropane	TX	4660	10184404
1,4-Dichlorobenzene	TX	4620	10184404
1,4-Dioxane (1,4-Diethyleneoxide)	TX	4735	10184404
1-Chlorohexane	TX	4510	10184404
1-Propanol	TX	5060	10184404
2,2-Dichloropropane	TX	4665	10184404
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10184404



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Matrix: Solid & Chemical Materials

2-Chloroethyl vinyl ether	TX	4500	10184404
2-Chlorotoluene	TX	4535	10184404
2-Hexanone (MBK)	TX	4860	10184404
4-Chlorotoluene	TX	4540	10184404
4-Isopropyltoluene (p-Cymene)	TX	4915	10184404
4-Methyl-2-pentanone (MIBK)	TX	4995	10184404
Acetone (2-Propanone)	TX	4315	10184404
Acetonitrile	TX	4320	10184404
Acrolein (Propenal)	TX	4325	10184404
Acrylonitrile	TX	4340	10184404
Allyl chloride (3-Chloropropene)	TX	4355	10184404
Benzene	TX	4375	10184404
Benzyl chloride	TX	5635	10184404
Bromobenzene	TX	4385	10184404
Bromochloromethane	TX	4390	10184404
Bromodichloromethane	TX	4395	10184404
Bromoform	TX	4400	10184404
Carbon disulfide	TX	4450	10184404
Carbon tetrachloride	TX	4455	10184404
Chlorobenzene	TX	4475	10184404
Chlorodibromomethane	TX	4575	10184404
Chloroethane (Ethyl chloride)	TX	4485	10184404
Chloroform	TX	4505	10184404
Chloroprene (2-Chloro-1,3-butadiene)	TX	4525	10184404
cis-1,2-Dichloroethylene	TX	4645	10184404
cis-1,3-Dichloropropene	TX	4680	10184404
Dibromofluoromethane	TX	4590	10184404
Dibromomethane (Methylene bromide)	TX	4595	10184404
Dichlorodifluoromethane (Freon-12)	TX	4625	10184404
Diethyl ether	TX	4725	10184404



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Matrix: Solid & Chemical Materials

Epichlorohydrin (1-Chloro-2,3-epoxypropane)	TX	4745	10184404
Ethanol	TX	4750	10184404
Ethyl acetate	TX	4755	10184404
Ethyl methacrylate	TX	4810	10184404
Ethylbenzene	TX	4765	10184404
Ethylene oxide	TX	4795	10184404
Hexachlorobutadiene	TX	4835	10184404
Iodomethane (Methyl iodide)	TX	4870	10184404
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10184404
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10184404
Isopropylbenzene (Cumene)	TX	4900	10184404
m+p-xylene	TX	5240	10184404
Methacrylonitrile	TX	4925	10184404
Methyl acetate	TX	4940	10184404
Methyl acrylate	TX	4945	10184404
Methyl bromide (Bromomethane)	TX	4950	10184404
Methyl chloride (Chloromethane)	TX	4960	10184404
Methyl methacrylate	TX	4990	10184404
Methyl tert-butyl ether (MTBE)	TX	5000	10184404
Methylcyclohexane	TX	4965	10184404
Methylene chloride (Dichloromethane)	TX	4975	10184404
Naphthalene	TX	5005	10184404
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10184404
n-Butylbenzene	TX	4435	10184404
n-Propylbenzene	TX	5090	10184404
o-Xylene	TX	5250	10184404
Pentachloroethane	TX	5035	10184404
Propionitrile (Ethyl cyanide)	TX	5080	10184404
Pyridine	TX	5095	10184404
sec-Butylbenzene	TX	4440	10184404



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Matrix: Solid & Chemical Materials

Styrene	TX	5100	10184404
tert-Butyl alcohol	TX	4420	10184404
tert-Butylbenzene	TX	4445	10184404
Tetrachloroethylene (Perchloroethylene)	TX	5115	10184404
Toluene	TX	5140	10184404
trans-1,2-Dichloroethylene	TX	4700	10184404
trans-1,3-Dichloropropylene	TX	4685	10184404
trans-1,4-Dichloro-2-butene	TX	4605	10184404
Trichloroethene (Trichloroethylene)	TX	5170	10184404
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10184404
Vinyl acetate	TX	5225	10184404
Vinyl chloride	TX	5235	10184404
Xylene (total)	TX	5260	10184404

Method EPA 8270

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10185203
1,2,4-Trichlorobenzene	TX	5155	10185203
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10185203
1,2-Dichlorobenzene	TX	4610	10185203
1,2-Dinitrobenzene	TX	6155	10185203
1,2-Diphenylhydrazine	TX	6220	10185203
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10185203
1,3-Dichlorobenzene	TX	4615	10185203
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10185203
1,4-Dichlorobenzene	TX	4620	10185203
1,4-Dinitrobenzene	TX	6165	10185203
1,4-Naphthoquinone	TX	6420	10185203
1,4-Phenylenediamine	TX	6630	10185203
1-Chloronaphthalene	TX	5790	10185203
1-Naphthylamine	TX	6425	10185203



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Matrix: Solid & Chemical Materials

2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl)ether)	TX	4659	10185203
2,3,4,6-Tetrachlorophenol	TX	6735	10185203
2,4,5-Trichlorophenol	TX	6835	10185203
2,4,5-Trimethylaniline	TX	6880	10185203
2,4,6-Trichlorophenol	TX	6840	10185203
2,4-Diaminotoluene	TX	5880	10185203
2,4-Dichlorophenol	TX	6000	10185203
2,4-Dimethylphenol	TX	6130	10185203
2,4-Dinitrophenol	TX	6175	10185203
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10185203
2,6-Dichlorophenol	TX	6005	10185203
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10185203
2-Acetylamino fluorene	TX	5515	10185203
2-Chloronaphthalene	TX	5795	10185203
2-Chlorophenol	TX	5800	10185203
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10185203
2-Methylaniline (o-Toluidine)	TX	5145	10185203
2-Methylnaphthalene	TX	6385	10185203
2-Methylphenol (o-Cresol)	TX	6400	10185203
2-Naphthylamine	TX	6430	10185203
2-Nitroaniline	TX	6460	10185203
2-Nitrophenol	TX	6490	10185203
2-Picoline (2-Methylpyridine)	TX	5050	10185203
3,3'-Dichlorobenzidine	TX	5945	10185203
3,3'-Dimethylbenzidine	TX	6120	10185203
3-Methylcholanthrene	TX	6355	10185203
3-Methylphenol (m-Cresol)	TX	6405	10185203
3-Nitroaniline	TX	6465	10185203
4-Aminobiphenyl	TX	5540	10185203
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10185203



Texas Commission on Environmental Quality



NELAP - Recognized Laboratory Fields of Accreditation

ALS Laboratory Group, Environmental Services Division (Houston, Texas)

10450 Stancliff Road, Suite 210
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Certificate: T104704231-20-26
Expiration Date: 4/30/2021
Issue Date: 5/1/2020

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Matrix: Solid & Chemical Materials

4-Chloro-3-methylphenol	TX	5700	10185203
4-Chloroaniline	TX	5745	10185203
4-Chlorophenyl phenylether	TX	5825	10185203
4-Methylphenol (p-Cresol)	TX	6410	10185203
4-Nitroaniline	TX	6470	10185203
4-Nitrophenol	TX	6500	10185203
4-Nitroquinoline-1-oxide	TX	6510	10185203
5-Nitro-o-toluidine	TX	6570	10185203
7,12-Dimethylbenz(a) anthracene	TX	6115	10185203
a-a-Dimethylphenethylamine	TX	6125	10185203
Acenaphthene	TX	5500	10185203
Acenaphthylene	TX	5505	10185203
Acetophenone	TX	5510	10185203
Aniline	TX	5545	10185203
Anthracene	TX	5555	10185203
Aramite	TX	5560	10185203
Atrazine	TX	7065	10185203
Azinphos-methyl (Guthion)	TX	7075	10185203
Azobenzene	TX	5562	10185203
Benzenethiol (Thiophenol)	TX	6750	10185203
Benzidine	TX	5595	10185203
Benzo(a)anthracene	TX	5575	10185203
Benzo(a)pyrene	TX	5580	10185203
Benzo(b)fluoranthene	TX	5585	10185203
Benzo(e)pyrene	TX	5605	10185203
Benzo(g,h,i)perylene	TX	5590	10185203
Benzo(k)fluoranthene	TX	5600	10185203
Benzoic acid	TX	5610	10185203
Benzyl alcohol	TX	5630	10185203
Biphenyl	TX	5640	10185203



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Matrix: Solid & Chemical Materials

bis(2-Chloroethoxy)methane	TX	5760	10185203
bis(2-Chloroethyl) ether	TX	5765	10185203
bis(2-Ethylhexyl) phthalate (Di(2-Ethylhexyl) phthalate, DEHP)	TX	6065	10185203
Butyl benzyl phthalate	TX	5670	10185203
Caprolactam	TX	7180	10185203
Carbaryl (Sevin)	TX	7195	10185203
Carbazole	TX	5680	10185203
Carbophenothion	TX	7220	10185203
Chlorobenzilate	TX	7260	10185203
Chrysene	TX	5855	10185203
Demeton	TX	7390	10185203
Demeton-o	TX	7395	10185203
Demeton-s	TX	7385	10185203
Diallate	TX	7405	10185203
Dibenz(a,h) anthracene	TX	5895	10185203
Dibenz(a,j) acridine	TX	5900	10185203
Dibenzo(a,e) pyrene	TX	5890	10185203
Dibenzofuran	TX	5905	10185203
Dichlorvos (DDVP, Dichlorvos)	TX	8610	10185203
Diethyl phthalate	TX	6070	10185203
Dimethoate	TX	7475	10185203
Dimethyl phthalate	TX	6135	10185203
Di-n-butyl phthalate	TX	5925	10185203
Di-n-octyl phthalate	TX	6200	10185203
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10185203
Diphenylamine	TX	6205	10185203
Disulfoton	TX	8625	10185203
Ethyl methanesulfonate	TX	6260	10185203
Fluoranthene	TX	6265	10185203
Fluorene	TX	6270	10185203



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Matrix: Solid & Chemical Materials

Hexachlorobenzene	TX	6275	10185203
Hexachlorobutadiene	TX	4835	10185203
Hexachlorocyclopentadiene	TX	6285	10185203
Hexachloroethane	TX	4840	10185203
Hexachlorophene	TX	6290	10185203
Hexachloropropene	TX	6295	10185203
Indeno(1,2,3-cd) pyrene	TX	6315	10185203
Isodrin	TX	7725	10185203
Isophorone	TX	6320	10185203
Isosafrole	TX	6325	10185203
Kepone	TX	7740	10185203
Malathion	TX	7770	10185203
Methapyrilene	TX	6345	10185203
Methyl methanesulfonate	TX	6375	10185203
Methyl parathion (Parathion, methyl)	TX	7825	10185203
Mevinphos	TX	7850	10185203
Naphthalene	TX	5005	10185203
Nitrobenzene	TX	5015	10185203
n-Nitrosodiethylamine	TX	6525	10185203
n-Nitrosodimethylamine	TX	6530	10185203
n-Nitrosodi-n-butylamine	TX	5025	10185203
n-Nitrosodi-n-propylamine	TX	6545	10185203
n-Nitrosodiphenylamine	TX	6535	10185203
n-Nitrosomethylethylamine	TX	6550	10185203
n-Nitrosomorpholine	TX	6555	10185203
n-Nitrosopiperidine	TX	6560	10185203
n-Nitrosopyrrolidine	TX	6565	10185203
o,o,o-Triethyl phosphorothioate	TX	8290	10185203
o-Anisidine	TX	5550	10185203
Parathion, ethyl	TX	7955	10185203



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Matrix: Solid & Chemical Materials

p-Cresidine	TX	5860	10185203
Pentachlorobenzene	TX	6590	10185203
Pentachloronitrobenzene (PCNB)	TX	6600	10185203
Pentachlorophenol	TX	6605	10185203
Phenacetin	TX	6610	10185203
Phenanthrene	TX	6615	10185203
Phenol	TX	6625	10185203
Phorate	TX	7985	10185203
Pronamide (Kerb)	TX	6650	10185203
Pyrene	TX	6665	10185203
Pyridine	TX	5095	10185203
Quinoline	TX	6670	10185203
Safrole	TX	6685	10185203
Sulfotepp	TX	8155	10185203
Terbufos	TX	8185	10185203
Tetrachlorvinphos (Stirophos, Gardona)	TX	8197	10185203
Thionazin (Zinophos)	TX	8235	10185203
Toluene diisocyanate	TX	6775	10185203

Method EPA 8290

Analyte	AB	Analyte ID	Method ID
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TX	9516	10187209
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TX	9519	10187209
1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	TX	9420	10187209
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD)	TX	9426	10187209
1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	TX	9423	10187209
1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	TX	9471	10187209
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCDD)	TX	9453	10187209
1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCDF)	TX	9474	10187209
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-HxCDD)	TX	9456	10187209
1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCDF)	TX	9477	10187209



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1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCDD)	TX	9459	10187209
1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-PeCDF)	TX	9543	10187209
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	TX	9540	10187209
2,3,4,6,7,8-Hexachlorodibenzofuran (2,3,4,6,7,8-HxCDF)	TX	9480	10187209
2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	TX	9549	10187209
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	TX	9612	10187209
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10187209
Total Heptachlorodibenzofuran (Total HpCDF)	TX	9444	10187209
Total Heptachlorodibenzo-p-dioxin (Total HpCDD)	TX	9438	10187209
Total Hexachlorodibenzofuran (Total HxCDF)	TX	9483	10187209
Total Hexachlorodibenzo-p-dioxin (Total HxCDD)	TX	9468	10187209
Total Pentachlorodibenzofuran (Total PeCDF)	TX	9552	10187209
Total Pentachlorodibenzo-p-dioxin (Total PeCDD)	TX	9555	10187209
Total Tetrachlorodibenzofuran (Total TCDF)	TX	9615	10187209
Total Tetrachlorodibenzo-p-dioxin (Total TCDD)	TX	9609	10187209

Method EPA 8316

Analyte	AB	Analyte ID	Method ID
Acrylamide	TX	4330	10188202

Method EPA 8330

Analyte	AB	Analyte ID	Method ID
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10189807
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10189807
2,4,6-Trinitrotoluene (2,4,6-TNT)	TX	9651	10189807
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10189807
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10189807
2-Amino-4,6-dinitrotoluene (2-am-dnt)	TX	9303	10189807
2-Nitrotoluene	TX	9507	10189807
3-Nitrotoluene	TX	9510	10189807
4-Amino-2,6-dinitrotoluene (4-am-dnt)	TX	9306	10189807
4-Nitrotoluene	TX	9513	10189807
Methyl-2,4,6-trinitrophenylnitramine (tetryl)	TX	6415	10189807



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Nitrobenzene	TX	5015	10189807
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	TX	9522	10189807
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	TX	9432	10189807
Method EPA 9014			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	10193803
Total cyanide	TX	1645	10193803
Method EPA 9038			
Analyte	AB	Analyte ID	Method ID
Sulfate	TX	2000	10196608
Method EPA 9040			
Analyte	AB	Analyte ID	Method ID
Corrosivity	TX	1615	10197203
pH	TX	1900	10196802
Method EPA 9045			
Analyte	AB	Analyte ID	Method ID
Corrosivity	TX	1615	10197805
pH	TX	1900	10197805
Method EPA 9050			
Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	10198604
Method EPA 9056			
Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10199209
Chloride	TX	1575	10199209
Fluoride	TX	1730	10199209
Nitrate as N	TX	1810	10199209
Nitrate-nitrite	TX	1820	10199209
Nitrite as N	TX	1840	10199209
Orthophosphate as P	TX	1870	10199209
Sulfate	TX	2000	10199209



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Matrix: Solid & Chemical Materials

Method EPA 9060			
Analyte Total Organic Carbon (TOC)	AB TX	Analyte ID 2040	Method ID 10200201
Method EPA 9065			
Analyte Total phenolics	AB TX	Analyte ID 1905	Method ID 10200405
Method EPA 9071			
Analyte n-Hexane Extractable Material (HEM) (O&G)	AB TX	Analyte ID 1803	Method ID 10201204
Method EPA 9095			
Analyte Paint Filter Liquids Test	AB TX	Analyte ID 10312	Method ID 10204009
Method EPA 9250			
Analyte Chloride	AB TX	Analyte ID 1575	Method ID 10207202
Method SM 2320 B			
Analyte Alkalinity as CaCO ₃	AB TX	Analyte ID 1505	Method ID 20045005
Method SM 2510 B			
Analyte Conductivity	AB TX	Analyte ID 1610	Method ID 20048004
Method SM 2540 G			
Analyte Residue-total (total solids)	AB TX	Analyte ID 1950	Method ID 20005203
Method SSA/ASA Part 3:34			
Analyte Carbon, organic (Walkley-Black)	AB TX	Analyte ID 10340	Method ID SSA/ASA Pt 3:34
Method TCEQ 1005			
Analyte Total Petroleum Hydrocarbons (TPH)	AB TX	Analyte ID 2050	Method ID 90019208



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November 23, 2020

Eric Matzner
Golder Associates Inc.
2201 Double Creek Drive
Suite 4004
Round Rock, TX 78664

Work Order: **HS20110548**

Laboratory Results for: **Houston TX-Wood Preserving Works**

Dear Eric Matzner,

ALS Environmental received 8 sample(s) on Nov 11, 2020 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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
- R10 Other problems or anomalies.
The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.



Dane J. Wacasey

Laboratory Review Checklist: Reportable Data

Laboratory Name: ALS Laboratory Group		LRC Date 11/23/2020					
Project Name: Houston TX-Wood Preserving Works		Laboratory Job Number: HS20110548					
Reviewer Name: Dane Wacasey		Prep Batch Number: 159620,159628,R373024,R373142,R373157					
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?	X				
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
		Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference affects on the sample results?	X				1
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Supporting Data							
Laboratory Name: ALS Laboratory Group			LRC Date 11/23/2020				
Project Name: Houston TX-Wood Preserving Works			Laboratory Job Number: HS20110548				
Reviewer Name: Dane Wacasey			Prep Batch Number: 159620,159628,R373024,R373142,R373157				
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section)					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);

NA = Not Applicable;

NR = Not Reviewed;

R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ALS Laboratory Group	LRC Date 11/23/2020
Project Name: Houston TX-Wood Preserving Works	Laboratory Job Number: HS20110548
Reviewer Name: Dane Wacasey	Prep Batch Number: 159620,159628,R373024,R373142,R373157

ER# ⁵	Description
1	Batch 159620, Semivolatile Organics Method SW8270, sample SO-1622-SG31(0.5-1) 20201110, the GCMS semi-volatile extract of this sample was run at a dilution due to a high level of matrix interference.

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
 O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);
 NA = Not Applicable;
 NR = Not Reviewed;
 R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20110548

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20110548-01	SO-1622-SG31(0.5-1) 20201110	Soil		10-Nov-2020 09:00	11-Nov-2020 14:10	<input type="checkbox"/>
HS20110548-02	SO-1622-SG31(5.5-6) 20201110	Soil		10-Nov-2020 09:20	11-Nov-2020 14:10	<input type="checkbox"/>
HS20110548-03	SO-1622-SG30(0.5-1) 20201110	Soil		10-Nov-2020 11:29	11-Nov-2020 14:10	<input type="checkbox"/>
HS20110548-04	SO-1622-SG30(5.5-6) 20201110	Soil		10-Nov-2020 12:00	11-Nov-2020 14:10	<input type="checkbox"/>
HS20110548-05	SO-1622-SG29(0.5-1) 20201110	Soil		10-Nov-2020 11:40	11-Nov-2020 14:10	<input type="checkbox"/>
HS20110548-06	SO-1622-SG29(5.5-6) 20201110	Soil		10-Nov-2020 12:10	11-Nov-2020 14:10	<input type="checkbox"/>
HS20110548-07	SO-1622-SG28(0.5-1) 20201110	Soil		10-Nov-2020 12:40	11-Nov-2020 14:10	<input type="checkbox"/>
HS20110548-08	SO-1622-SG28(5.5-6) 20201110	Soil		10-Nov-2020 13:10	11-Nov-2020 14:10	<input type="checkbox"/>

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1622-SG31(0.5-1) 20201110
 Collection Date: 10-Nov-2020 09:00

ANALYTICAL REPORT

WorkOrder:HS20110548
 Lab ID:HS20110548-01
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	< 0.00042		0.00042	0.0042	mg/Kg-dry	1	19-Nov-2020 16:36
Ethylbenzene	< 0.00058		0.00058	0.0042	mg/Kg-dry	1	19-Nov-2020 16:36
Xylenes, Total	< 0.00083		0.00083	0.0042	mg/Kg-dry	1	19-Nov-2020 16:36
Surr: 1,2-Dichloroethane-d4	87.2			70-126	%REC	1	19-Nov-2020 16:36
Surr: 4-Bromofluorobenzene	94.1			70-130	%REC	1	19-Nov-2020 16:36
Surr: Dibromofluoromethane	90.0			70-130	%REC	1	19-Nov-2020 16:36
Surr: Toluene-d8	97.7			70-130	%REC	1	19-Nov-2020 16:36
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 13-Nov-2020		Analyst: GEY
Naphthalene	< 0.0065		0.0065	0.036	mg/Kg-dry	10	21-Nov-2020 19:37
Surr: 2-Fluorobiphenyl	79.1			43-125	%REC	10	21-Nov-2020 19:37
Surr: 4-Terphenyl-d14	87.2			32-125	%REC	10	21-Nov-2020 19:37
Surr: Nitrobenzene-d5	76.7			37-125	%REC	10	21-Nov-2020 19:37
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: JAC		
Percent Moisture	8.72		0.0100	0.0100	wt%	1	21-Nov-2020 08:07

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1622-SG31(5.5-6) 20201110
 Collection Date: 10-Nov-2020 09:20

ANALYTICAL REPORT

WorkOrder:HS20110548
 Lab ID:HS20110548-02
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	< 0.00054		0.00054	0.0054	mg/Kg-dry	1	19-Nov-2020 17:00
Ethylbenzene	< 0.00075		0.00075	0.0054	mg/Kg-dry	1	19-Nov-2020 17:00
Xylenes, Total	< 0.0011		0.0011	0.0054	mg/Kg-dry	1	19-Nov-2020 17:00
Surr: 1,2-Dichloroethane-d4	82.3			70-126	%REC	1	19-Nov-2020 17:00
Surr: 4-Bromofluorobenzene	92.2			70-130	%REC	1	19-Nov-2020 17:00
Surr: Dibromofluoromethane	86.9			70-130	%REC	1	19-Nov-2020 17:00
Surr: Toluene-d8	95.5			70-130	%REC	1	19-Nov-2020 17:00
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 13-Nov-2020		Analyst: GEY
Naphthalene	< 0.00070		0.00070	0.0039	mg/Kg-dry	1	20-Nov-2020 20:27
Surr: 2-Fluorobiphenyl	78.7			43-125	%REC	1	20-Nov-2020 20:27
Surr: 4-Terphenyl-d14	77.2			32-125	%REC	1	20-Nov-2020 20:27
Surr: Nitrobenzene-d5	84.7			37-125	%REC	1	20-Nov-2020 20:27
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: JAC		
Percent Moisture	14.6		0.0100	0.0100	wt%	1	21-Nov-2020 08:07

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1622-SG30(0.5-1) 20201110
 Collection Date: 10-Nov-2020 11:29

ANALYTICAL REPORT

WorkOrder:HS20110548
 Lab ID:HS20110548-03
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	SQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	< 0.00052		0.00052	0.0052	mg/Kg-dry	1	22-Nov-2020 23:05
Ethylbenzene	< 0.00072		0.00072	0.0052	mg/Kg-dry	1	22-Nov-2020 23:05
Xylenes, Total	< 0.0010		0.0010	0.0052	mg/Kg-dry	1	22-Nov-2020 23:05
Surr: 1,2-Dichloroethane-d4	97.7			70-126	%REC	1	22-Nov-2020 23:05
Surr: 4-Bromofluorobenzene	98.7			70-130	%REC	1	22-Nov-2020 23:05
Surr: Dibromofluoromethane	101			70-130	%REC	1	22-Nov-2020 23:05
Surr: Toluene-d8	101			70-130	%REC	1	22-Nov-2020 23:05
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 13-Nov-2020		Analyst: GEY
Naphthalene	0.0016	J	0.00066	0.0036	mg/Kg-dry	1	21-Nov-2020 19:18
Surr: 2-Fluorobiphenyl	67.2			43-125	%REC	1	21-Nov-2020 19:18
Surr: 4-Terphenyl-d14	77.4			32-125	%REC	1	21-Nov-2020 19:18
Surr: Nitrobenzene-d5	76.1			37-125	%REC	1	21-Nov-2020 19:18
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: JAC		
Percent Moisture	9.04		0.0100	0.0100	wt%	1	21-Nov-2020 08:07

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1622-SG30(5.5-6) 20201110
 Collection Date: 10-Nov-2020 12:00

ANALYTICAL REPORT
 WorkOrder:HS20110548
 Lab ID:HS20110548-04
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	< 0.00040		0.00040	0.0040	mg/Kg-dry	1	22-Nov-2020 23:28
Ethylbenzene	< 0.00056		0.00056	0.0040	mg/Kg-dry	1	22-Nov-2020 23:28
Xylenes, Total	< 0.00080		0.00080	0.0040	mg/Kg-dry	1	22-Nov-2020 23:28
Surr: 1,2-Dichloroethane-d4	98.1			70-126	%REC	1	22-Nov-2020 23:28
Surr: 4-Bromofluorobenzene	99.6			70-130	%REC	1	22-Nov-2020 23:28
Surr: Dibromofluoromethane	101			70-130	%REC	1	22-Nov-2020 23:28
Surr: Toluene-d8	103			70-130	%REC	1	22-Nov-2020 23:28
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Nov-2020		Analyst: GEY	
Naphthalene	< 0.00069		0.00069	0.0038	mg/Kg-dry	1	20-Nov-2020 20:47
Surr: 2-Fluorobiphenyl	86.4			43-125	%REC	1	20-Nov-2020 20:47
Surr: 4-Terphenyl-d14	79.8			32-125	%REC	1	20-Nov-2020 20:47
Surr: Nitrobenzene-d5	111			37-125	%REC	1	20-Nov-2020 20:47
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: JAC			
Percent Moisture	12.8		0.0100	0.0100	wt%	1	21-Nov-2020 08:07

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1622-SG29(0.5-1) 20201110
 Collection Date: 10-Nov-2020 11:40

ANALYTICAL REPORT

WorkOrder:HS20110548
 Lab ID:HS20110548-05
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	< 0.00045		0.00045	0.0045	mg/Kg-dry	1	22-Nov-2020 23:51
Ethylbenzene	< 0.00063		0.00063	0.0045	mg/Kg-dry	1	22-Nov-2020 23:51
Xylenes, Total	< 0.00090		0.00090	0.0045	mg/Kg-dry	1	22-Nov-2020 23:51
Surr: 1,2-Dichloroethane-d4	95.6			70-126	%REC	1	22-Nov-2020 23:51
Surr: 4-Bromofluorobenzene	96.4			70-130	%REC	1	22-Nov-2020 23:51
Surr: Dibromofluoromethane	98.7			70-130	%REC	1	22-Nov-2020 23:51
Surr: Toluene-d8	99.6			70-130	%REC	1	22-Nov-2020 23:51
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 13-Nov-2020		Analyst: GEY
Naphthalene	< 0.0067		0.0067	0.037	mg/Kg-dry	10	21-Nov-2020 19:57
Surr: 2-Fluorobiphenyl	78.3			43-125	%REC	10	21-Nov-2020 19:57
Surr: 4-Terphenyl-d14	77.1			32-125	%REC	10	21-Nov-2020 19:57
Surr: Nitrobenzene-d5	93.0			37-125	%REC	10	21-Nov-2020 19:57
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: JAC		
Percent Moisture	11.6		0.0100	0.0100	wt%	1	21-Nov-2020 08:07

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1622-SG29(5.5-6) 20201110
 Collection Date: 10-Nov-2020 12:10

ANALYTICAL REPORT
 WorkOrder:HS20110548
 Lab ID:HS20110548-06
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	< 0.00050		0.00050	0.0050	mg/Kg-dry	1	23-Nov-2020 00:14
Ethylbenzene	< 0.00070		0.00070	0.0050	mg/Kg-dry	1	23-Nov-2020 00:14
Xylenes, Total	< 0.0010		0.0010	0.0050	mg/Kg-dry	1	23-Nov-2020 00:14
Surr: 1,2-Dichloroethane-d4	92.0			70-126	%REC	1	23-Nov-2020 00:14
Surr: 4-Bromofluorobenzene	99.2			70-130	%REC	1	23-Nov-2020 00:14
Surr: Dibromofluoromethane	96.0			70-130	%REC	1	23-Nov-2020 00:14
Surr: Toluene-d8	100			70-130	%REC	1	23-Nov-2020 00:14
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 13-Nov-2020		Analyst: GEY
Naphthalene	< 0.00069		0.00069	0.0038	mg/Kg-dry	1	20-Nov-2020 21:07
Surr: 2-Fluorobiphenyl	90.4			43-125	%REC	1	20-Nov-2020 21:07
Surr: 4-Terphenyl-d14	87.0			32-125	%REC	1	20-Nov-2020 21:07
Surr: Nitrobenzene-d5	106			37-125	%REC	1	20-Nov-2020 21:07
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: JAC		
Percent Moisture	13.7		0.0100	0.0100	wt%	1	21-Nov-2020 08:07

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1622-SG28(0.5-1) 20201110
 Collection Date: 10-Nov-2020 12:40

ANALYTICAL REPORT
 WorkOrder:HS20110548
 Lab ID:HS20110548-07
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	< 0.00056		0.00056	0.0056	mg/Kg-dry	1	23-Nov-2020 00:36
Ethylbenzene	0.0022	J	0.00078	0.0056	mg/Kg-dry	1	23-Nov-2020 00:36
Xylenes, Total	0.019		0.0011	0.0056	mg/Kg-dry	1	23-Nov-2020 00:36
<i>Surr: 1,2-Dichloroethane-d4</i>	96.8			70-126	%REC	1	23-Nov-2020 00:36
<i>Surr: 4-Bromofluorobenzene</i>	93.3			70-130	%REC	1	23-Nov-2020 00:36
<i>Surr: Dibromofluoromethane</i>	100			70-130	%REC	1	23-Nov-2020 00:36
<i>Surr: Toluene-d8</i>	108			70-130	%REC	1	23-Nov-2020 00:36
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Nov-2020		Analyst: GEY	
Naphthalene	< 0.00067		0.00067	0.0037	mg/Kg-dry	1	21-Nov-2020 18:58
<i>Surr: 2-Fluorobiphenyl</i>	75.0			43-125	%REC	1	21-Nov-2020 18:58
<i>Surr: 4-Terphenyl-d14</i>	76.4			32-125	%REC	1	21-Nov-2020 18:58
<i>Surr: Nitrobenzene-d5</i>	84.2			37-125	%REC	1	21-Nov-2020 18:58
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: JAC			
Percent Moisture	10.8		0.0100	0.0100	wt%	1	21-Nov-2020 08:07

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1622-SG28(5.5-6) 20201110
 Collection Date: 10-Nov-2020 13:10

ANALYTICAL REPORT
 WorkOrder:HS20110548
 Lab ID:HS20110548-08
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	< 0.00051		0.00051	0.0051	mg/Kg-dry	1	23-Nov-2020 00:59
Ethylbenzene	< 0.00072		0.00072	0.0051	mg/Kg-dry	1	23-Nov-2020 00:59
Xylenes, Total	< 0.0010		0.0010	0.0051	mg/Kg-dry	1	23-Nov-2020 00:59
Surr: 1,2-Dichloroethane-d4	95.2			70-126	%REC	1	23-Nov-2020 00:59
Surr: 4-Bromofluorobenzene	100			70-130	%REC	1	23-Nov-2020 00:59
Surr: Dibromofluoromethane	99.7			70-130	%REC	1	23-Nov-2020 00:59
Surr: Toluene-d8	100			70-130	%REC	1	23-Nov-2020 00:59
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 13-Nov-2020		Analyst: GEY
Naphthalene	< 0.00070		0.00070	0.0038	mg/Kg-dry	1	20-Nov-2020 21:26
Surr: 2-Fluorobiphenyl	84.4			43-125	%REC	1	20-Nov-2020 21:26
Surr: 4-Terphenyl-d14	83.1			32-125	%REC	1	20-Nov-2020 21:26
Surr: Nitrobenzene-d5	97.6			37-125	%REC	1	20-Nov-2020 21:26
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: JAC		
Percent Moisture	14.9		0.0100	0.0100	wt%	1	21-Nov-2020 08:07

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

Weight / Prep Log

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

Batch ID: 4019	Start Date: 18 Nov 2020 08:20	End Date: 18 Nov 2020 08:20
Method: VOLATILES BY SW8260C		

Sample ID	Container	Sample Wt/Vol	Final Volume	Weight Factor	Container Type
HS20110548-01	1	6.591 (g)	5 (mL)	0.76	TerraCore (5035A)
HS20110548-02	1	5.437 (g)	5 (mL)	0.92	TerraCore (5035A)
HS20110548-03	1	5.337 (g)	5 (mL)	0.94	TerraCore (5035A)
HS20110548-04	1	7.16 (g)	5 (mL)	0.7	TerraCore (5035A)
HS20110548-05	1	6.278 (g)	5 (mL)	0.8	TerraCore (5035A)
HS20110548-06	1	5.789 (g)	5 (mL)	0.86	TerraCore (5035A)
HS20110548-07	1	4.976 (g)	5 (mL)	1	TerraCore (5035A)
HS20110548-08	1	5.718 (g)	5 (mL)	0.87	TerraCore (5035A)

Batch ID: 159620	Start Date: 13 Nov 2020 12:00	End Date: 13 Nov 2020 15:00
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541	Prep Code: 3541_B_LOW	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20110548-01		30.2 (g)	1 (mL)	0.03311
HS20110548-02		30.02 (g)	1 (mL)	0.03331
HS20110548-03		30.08 (g)	1 (mL)	0.03324
HS20110548-04		30.03 (g)	1 (mL)	0.0333

Batch ID: 159628	Start Date: 13 Nov 2020 14:00	End Date: 13 Nov 2020 17:00
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541	Prep Code: 3541_B_LOW	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20110548-05		30.23 (g)	1 (mL)	0.03308
HS20110548-06		30.07 (g)	1 (mL)	0.03326
HS20110548-07		30.11 (g)	1 (mL)	0.03321
HS20110548-08		30.42 (g)	1 (mL)	0.03287

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 159620 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20110548-01	SO-1622-SG31(0.5-1) 20201110	10 Nov 2020 09:00		13 Nov 2020 12:00	21 Nov 2020 19:37	10
HS20110548-02	SO-1622-SG31(5.5-6) 20201110	10 Nov 2020 09:20		13 Nov 2020 12:00	20 Nov 2020 20:27	1
HS20110548-03	SO-1622-SG30(0.5-1) 20201110	10 Nov 2020 11:29		13 Nov 2020 12:00	21 Nov 2020 19:18	1
HS20110548-04	SO-1622-SG30(5.5-6) 20201110	10 Nov 2020 12:00		13 Nov 2020 12:00	20 Nov 2020 20:47	1
Batch ID: 159628 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20110548-05	SO-1622-SG29(0.5-1) 20201110	10 Nov 2020 11:40		13 Nov 2020 14:00	21 Nov 2020 19:57	10
HS20110548-06	SO-1622-SG29(5.5-6) 20201110	10 Nov 2020 12:10		13 Nov 2020 14:00	20 Nov 2020 21:07	1
HS20110548-07	SO-1622-SG28(0.5-1) 20201110	10 Nov 2020 12:40		13 Nov 2020 14:00	21 Nov 2020 18:58	1
HS20110548-08	SO-1622-SG28(5.5-6) 20201110	10 Nov 2020 13:10		13 Nov 2020 14:00	20 Nov 2020 21:26	1
Batch ID: R373024 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20110548-01	SO-1622-SG31(0.5-1) 20201110	10 Nov 2020 09:00			19 Nov 2020 16:36	1
HS20110548-02	SO-1622-SG31(5.5-6) 20201110	10 Nov 2020 09:20			19 Nov 2020 17:00	1
Batch ID: R373142 (0)		Test Name : MOISTURE - ASTM D2216			Matrix: Soil	
HS20110548-01	SO-1622-SG31(0.5-1) 20201110	10 Nov 2020 09:00			21 Nov 2020 08:07	1
HS20110548-02	SO-1622-SG31(5.5-6) 20201110	10 Nov 2020 09:20			21 Nov 2020 08:07	1
HS20110548-03	SO-1622-SG30(0.5-1) 20201110	10 Nov 2020 11:29			21 Nov 2020 08:07	1
HS20110548-04	SO-1622-SG30(5.5-6) 20201110	10 Nov 2020 12:00			21 Nov 2020 08:07	1
HS20110548-05	SO-1622-SG29(0.5-1) 20201110	10 Nov 2020 11:40			21 Nov 2020 08:07	1
HS20110548-06	SO-1622-SG29(5.5-6) 20201110	10 Nov 2020 12:10			21 Nov 2020 08:07	1
HS20110548-07	SO-1622-SG28(0.5-1) 20201110	10 Nov 2020 12:40			21 Nov 2020 08:07	1
HS20110548-08	SO-1622-SG28(5.5-6) 20201110	10 Nov 2020 13:10			21 Nov 2020 08:07	1
Batch ID: R373157 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20110548-03	SO-1622-SG30(0.5-1) 20201110	10 Nov 2020 11:29			22 Nov 2020 23:05	1
HS20110548-04	SO-1622-SG30(5.5-6) 20201110	10 Nov 2020 12:00			22 Nov 2020 23:28	1
HS20110548-05	SO-1622-SG29(0.5-1) 20201110	10 Nov 2020 11:40			22 Nov 2020 23:51	1
HS20110548-06	SO-1622-SG29(5.5-6) 20201110	10 Nov 2020 12:10			23 Nov 2020 00:14	1
HS20110548-07	SO-1622-SG28(0.5-1) 20201110	10 Nov 2020 12:40			23 Nov 2020 00:36	1
HS20110548-08	SO-1622-SG28(5.5-6) 20201110	10 Nov 2020 13:10			23 Nov 2020 00:59	1

WorkOrder: HS20110548
 InstrumentID: SV-7
 Test Code: 8270_LOW_S
 Test Number: SW8270
 Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0017	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20110548
 InstrumentID: VOA5
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0011	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.00098	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0025	0.0052	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

WorkOrder: HS20110548
 InstrumentID: VOA8
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0013	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0013	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0015	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

QC BATCH REPORT

Batch ID: 159620 (0) **Instrument:** SV-7 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

MBLK		Sample ID: MBLK-159620		Units: ug/Kg		Analysis Date: 17-Nov-2020 12:08			
Client ID:		Run ID: SV-7_372782		SeqNo: 5836474		PrepDate: 13-Nov-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	< 0.60	3.3							
Surr: 2-Fluorobiphenyl	167.2	0	167	0	100	43 - 125			
Surr: 4-Terphenyl-d14	180.3	0	167	0	108	32 - 125			
Surr: Nitrobenzene-d5	164.7	0	167	0	98.7	37 - 125			

LCS		Sample ID: LCS-159620		Units: ug/Kg		Analysis Date: 17-Nov-2020 12:27			
Client ID:		Run ID: SV-7_372782		SeqNo: 5836475		PrepDate: 13-Nov-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	134.4	3.3	167	0	80.5	50 - 125			
Surr: 2-Fluorobiphenyl	154.2	0	167	0	92.3	43 - 125			
Surr: 4-Terphenyl-d14	173.7	0	167	0	104	32 - 125			
Surr: Nitrobenzene-d5	161.9	0	167	0	96.9	37 - 125			

MS		Sample ID: HS20110464-09MS		Units: ug/Kg		Analysis Date: 17-Nov-2020 16:54			
Client ID:		Run ID: SV-7_372782		SeqNo: 5836851		PrepDate: 13-Nov-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	135.8	3.3	166.8	0	81.4	50 - 125			
Surr: 2-Fluorobiphenyl	140.7	0	166.8	0	84.3	43 - 125			
Surr: 4-Terphenyl-d14	148.5	0	166.8	0	89.0	32 - 125			
Surr: Nitrobenzene-d5	153.1	0	166.8	0	91.8	37 - 125			

MSD		Sample ID: HS20110464-09MSD		Units: ug/Kg		Analysis Date: 17-Nov-2020 17:13			
Client ID:		Run ID: SV-7_372782		SeqNo: 5836852		PrepDate: 13-Nov-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	116.4	3.3	166.9	0	69.7	50 - 125	135.8	15.4	30
Surr: 2-Fluorobiphenyl	158.3	0	166.9	0	94.8	43 - 125	140.7	11.8	30
Surr: 4-Terphenyl-d14	135.1	0	166.9	0	80.9	32 - 125	148.5	9.47	30
Surr: Nitrobenzene-d5	120.8	0	166.9	0	72.3	37 - 125	153.1	23.6	30

The following samples were analyzed in this batch: HS20110548-01 HS20110548-02 HS20110548-03 HS20110548-04

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

QC BATCH REPORT

Batch ID: 159628 (0) **Instrument:** SV-7 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

MBLK		Sample ID: MBLK-159628		Units: ug/Kg		Analysis Date: 19-Nov-2020 11:43			
Client ID:		Run ID: SV-7_372963		SeqNo: 5841394		PrepDate: 13-Nov-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	< 0.60	3.3							
Surr: 2-Fluorobiphenyl	159.1	0	167	0	95.3	43 - 125			
Surr: 4-Terphenyl-d14	163.1	0	167	0	97.6	32 - 125			
Surr: Nitrobenzene-d5	195.4	0	167	0	117	37 - 125			

LCS		Sample ID: LCS-159628		Units: ug/Kg		Analysis Date: 19-Nov-2020 12:03			
Client ID:		Run ID: SV-7_372963		SeqNo: 5841395		PrepDate: 13-Nov-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	114.9	3.3	167	0	68.8	50 - 125			
Surr: 2-Fluorobiphenyl	129.8	0	167	0	77.7	43 - 125			
Surr: 4-Terphenyl-d14	137	0	167	0	82.1	32 - 125			
Surr: Nitrobenzene-d5	150.6	0	167	0	90.2	37 - 125			

MS		Sample ID: HS20110476-15MS		Units: ug/Kg		Analysis Date: 19-Nov-2020 14:42			
Client ID:		Run ID: SV-7_372963		SeqNo: 5841410		PrepDate: 13-Nov-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	132.5	3.3	165.6	0	80.0	50 - 125			
Surr: 2-Fluorobiphenyl	141	0	165.6	0	85.1	43 - 125			
Surr: 4-Terphenyl-d14	141.7	0	165.6	0	85.6	32 - 125			
Surr: Nitrobenzene-d5	172.9	0	165.6	0	104	37 - 125			

MSD		Sample ID: HS20110476-15MSD		Units: ug/Kg		Analysis Date: 19-Nov-2020 15:02			
Client ID:		Run ID: SV-7_372963		SeqNo: 5841411		PrepDate: 13-Nov-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	117.6	3.3	166.1	0	70.8	50 - 125	132.5	11.9	30
Surr: 2-Fluorobiphenyl	123.6	0	166.1	0	74.5	43 - 125	141	13.1	30
Surr: 4-Terphenyl-d14	129.4	0	166.1	0	77.9	32 - 125	141.7	9.08	30
Surr: Nitrobenzene-d5	145	0	166.1	0	87.3	37 - 125	172.9	17.5	30

The following samples were analyzed in this batch: HS20110548-05 HS20110548-06 HS20110548-07 HS20110548-08

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

QC BATCH REPORT

Batch ID: R373024 (0)	Instrument: VOA5	Method: VOLATILES BY SW8260C
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MBLK	Sample ID: VBLKS1-111920	Units: ug/Kg	Analysis Date: 19-Nov-2020 11:50							
Client ID:	Run ID: VOA5_373024	SeqNo: 5842016	PrepDate: DF: 1							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 0.50	5.0								
Ethylbenzene	< 0.70	5.0								
Xylenes, Total	< 1.0	5.0								
<i>Surr: 1,2-Dichloroethane-d4</i>	44.44	0	50	0	88.9	76 - 125				
<i>Surr: 4-Bromofluorobenzene</i>	47.9	0	50	0	95.8	80 - 120				
<i>Surr: Dibromofluoromethane</i>	45.36	0	50	0	90.7	80 - 119				
<i>Surr: Toluene-d8</i>	49.38	0	50	0	98.8	81 - 118				

LCS	Sample ID: VLCSS1-111920	Units: ug/Kg	Analysis Date: 19-Nov-2020 11:02							
Client ID:	Run ID: VOA5_373024	SeqNo: 5842015	PrepDate: DF: 1							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	49.18	5.0	50	0	98.4	75 - 124				
Ethylbenzene	52.48	5.0	50	0	105	70 - 123				
Xylenes, Total	153.5	5.0	150	0	102	77 - 128				
<i>Surr: 1,2-Dichloroethane-d4</i>	48.74	0	50	0	97.5	76 - 125				
<i>Surr: 4-Bromofluorobenzene</i>	50.03	0	50	0	100	80 - 120				
<i>Surr: Dibromofluoromethane</i>	48.84	0	50	0	97.7	80 - 119				
<i>Surr: Toluene-d8</i>	49.33	0	50	0	98.7	81 - 118				

MS	Sample ID: HS20110725-01MS	Units: ug/Kg	Analysis Date: 19-Nov-2020 14:13							
Client ID:	Run ID: VOA5_373024	SeqNo: 5842021	PrepDate: DF: 1							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	47.27	5.0	49.5	0	95.5	70 - 130				
Ethylbenzene	48.13	5.0	49.5	0	97.2	70 - 130				
Xylenes, Total	141.2	5.0	148.5	0	95.1	70 - 130				
<i>Surr: 1,2-Dichloroethane-d4</i>	46.37	0	49.5	0	93.7	70 - 126				
<i>Surr: 4-Bromofluorobenzene</i>	48	0	49.5	0	97.0	70 - 130				
<i>Surr: Dibromofluoromethane</i>	45.31	0	49.5	0	91.5	70 - 130				
<i>Surr: Toluene-d8</i>	47.56	0	49.5	0	96.1	70 - 130				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

QC BATCH REPORT

Batch ID: R373024 (0) **Instrument:** VOA5 **Method:** VOLATILES BY SW8260C

MSD		Sample ID: HS20110725-01MSD			Units: ug/Kg		Analysis Date: 19-Nov-2020 14:37			
Client ID:		Run ID: VOA5_373024			SeqNo: 5842022		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	46.01	5.0	49.5	0	92.9	70 - 130	47.27	2.69	30	
Ethylbenzene	45.87	5.0	49.5	0	92.7	70 - 130	48.13	4.82	30	
Xylenes, Total	134.3	5.0	148.5	0	90.4	70 - 130	141.2	5.01	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>47.39</i>	<i>0</i>	<i>49.5</i>	<i>0</i>	<i>95.7</i>	<i>70 - 126</i>	<i>46.37</i>	<i>2.16</i>	<i>30</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>47.7</i>	<i>0</i>	<i>49.5</i>	<i>0</i>	<i>96.4</i>	<i>70 - 130</i>	<i>48</i>	<i>0.621</i>	<i>30</i>	
<i>Surr: Dibromofluoromethane</i>	<i>46.26</i>	<i>0</i>	<i>49.5</i>	<i>0</i>	<i>93.5</i>	<i>70 - 130</i>	<i>45.31</i>	<i>2.08</i>	<i>30</i>	
<i>Surr: Toluene-d8</i>	<i>47.3</i>	<i>0</i>	<i>49.5</i>	<i>0</i>	<i>95.6</i>	<i>70 - 130</i>	<i>47.56</i>	<i>0.549</i>	<i>30</i>	

The following samples were analyzed in this batch: HS20110548-01 HS20110548-02

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

QC BATCH REPORT

Batch ID: R373157 (0)	Instrument: VOA8	Method: VOLATILES BY SW8260C
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MBLK	Sample ID: VBLKS2-112220	Units: ug/Kg	Analysis Date: 22-Nov-2020 21:11							
Client ID:	Run ID: VOA8_373157	SeqNo: 5845514	PrepDate: DF: 1							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	< 0.50	5.0								
Ethylbenzene	< 0.70	5.0								
Xylenes, Total	< 1.0	5.0								
<i>Surr: 1,2-Dichloroethane-d4</i>	48.36	0	50	0	96.7	76 - 125				
<i>Surr: 4-Bromofluorobenzene</i>	49.1	0	50	0	98.2	80 - 120				
<i>Surr: Dibromofluoromethane</i>	51.34	0	50	0	103	80 - 119				
<i>Surr: Toluene-d8</i>	50.18	0	50	0	100	81 - 118				

LCS	Sample ID: VLCSS2-112220	Units: ug/Kg	Analysis Date: 22-Nov-2020 20:25							
Client ID:	Run ID: VOA8_373157	SeqNo: 5845513	PrepDate: DF: 1							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	47.16	5.0	50	0	94.3	75 - 124				
Ethylbenzene	47.47	5.0	50	0	94.9	70 - 123				
Xylenes, Total	142.6	5.0	150	0	95.1	77 - 128				
<i>Surr: 1,2-Dichloroethane-d4</i>	50.94	0	50	0	102	76 - 125				
<i>Surr: 4-Bromofluorobenzene</i>	51	0	50	0	102	80 - 120				
<i>Surr: Dibromofluoromethane</i>	52.48	0	50	0	105	80 - 119				
<i>Surr: Toluene-d8</i>	49.18	0	50	0	98.4	81 - 118				

MS	Sample ID: HS20110868-08MS	Units: ug/Kg	Analysis Date: 22-Nov-2020 22:19							
Client ID:	Run ID: VOA8_373157	SeqNo: 5845517	PrepDate: DF: 1							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	47.25	5.0	49.5	1.667	92.1	70 - 130				
Ethylbenzene	47.8	5.0	49.5	0	96.6	70 - 130				
Xylenes, Total	141.8	5.0	148.5	0	95.5	70 - 130				
<i>Surr: 1,2-Dichloroethane-d4</i>	49.94	0	49.5	0	101	70 - 126				
<i>Surr: 4-Bromofluorobenzene</i>	49.91	0	49.5	0	101	70 - 130				
<i>Surr: Dibromofluoromethane</i>	52.11	0	49.5	0	105	70 - 130				
<i>Surr: Toluene-d8</i>	49.5	0	49.5	0	100.0	70 - 130				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

QC BATCH REPORT

Batch ID: R373157 (0)		Instrument: VOA8		Method: VOLATILES BY SW8260C						
MSD	Sample ID: HS20110868-08MSD	Units: ug/Kg			Analysis Date: 22-Nov-2020 22:42					
Client ID:	Run ID: VOA8_373157	SeqNo: 5845518		PrepDate:		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	49.78	5.0	49.5	1.667	97.2	70 - 130	47.25	5.21	30	
Ethylbenzene	47.96	5.0	49.5	0	96.9	70 - 130	47.8	0.335	30	
Xylenes, Total	143.7	5.0	148.5	0	96.7	70 - 130	141.8	1.31	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>50.45</i>	<i>0</i>	<i>49.5</i>	<i>0</i>	<i>102</i>	<i>70 - 126</i>	<i>49.94</i>	<i>1.01</i>	<i>30</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>50.36</i>	<i>0</i>	<i>49.5</i>	<i>0</i>	<i>102</i>	<i>70 - 130</i>	<i>49.91</i>	<i>0.893</i>	<i>30</i>	
<i>Surr: Dibromofluoromethane</i>	<i>53.23</i>	<i>0</i>	<i>49.5</i>	<i>0</i>	<i>108</i>	<i>70 - 130</i>	<i>52.11</i>	<i>2.13</i>	<i>30</i>	
<i>Surr: Toluene-d8</i>	<i>49.68</i>	<i>0</i>	<i>49.5</i>	<i>0</i>	<i>100</i>	<i>70 - 130</i>	<i>49.5</i>	<i>0.361</i>	<i>30</i>	

The following samples were analyzed in this batch:

HS20110548-03	HS20110548-04	HS20110548-05	HS20110548-06
HS20110548-07	HS20110548-08		

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

QC BATCH REPORT

Batch ID: R373142 (0) **Instrument:** Balance1 **Method:** MOISTURE - ASTM D2216

DUP Sample ID: **HS20110517-57DUP** Units: **wt%** Analysis Date: **21-Nov-2020 08:07**
Client ID: Run ID: **Balance1_373142** SeqNo: **5844867** PrepDate: DF: **1**
Analyte Result MQL SPK Val SPK Ref Control RPD Ref RPD
Value %REC Limit Value %RPD Limit Qual

Percent Moisture 17.5 0.0100 18 2.82 20

The following samples were analyzed in this batch: HS20110548-01 HS20110548-02 HS20110548-03 HS20110548-04
HS20110548-05 HS20110548-06 HS20110548-07 HS20110548-08

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20110548

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg-dry	Milligrams per Kilogram- Dry weight corrected

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	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	624-2020	31-Dec-2020
North Dakota	R-193 2020-2021	30-Apr-2021
Texas	T104704231-20-26	30-Apr-2021

Sample Receipt Checklist

Work Order ID: HS20110548

Date/Time Received: 11-Nov-2020 14:10

Client Name: PBW

Received by: Donald Gilmore

Completed By: /S/ Pablo Martinez	11-Nov-2020 18:07	Reviewed by: /S/ Dane J. Wacasey	13-Nov-2020 18:25
eSignature	Date/Time	eSignature	Date/Time

Matrices: SOIL

Carrier name: ALS.HS

- 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 1 Page(s)
- Chain of custody signed when relinquished and received? Yes No COC IDs:231274
- 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):	3.1°C UC/C	IR 31
Cooler(s)/Kit(s):	46745	
Date/Time sample(s) sent to storage:	11/11/20 18:15	

- 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:



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 1 of 1

COC ID: 231274

HS20110548

WV

Golder Associates Inc.
Houston TX-Wood Preserving Works



ALS Project Manager:

Customer Information		Project Information	
Purchase Order	UPRR/Ke/in Peterburs 1620-22	Project Name	Houston TX-Wood Preserving Works
Work Order		Project Number	1620-22-Rev1 SR 92688
Company Name	Golder Associates Inc.	Bill To Company	Union Pacific Railroad- A/P
Send Report To	Eric Matzner	Invoice Attn	Accounts Payable
Address	2201 Double Creek Drive Suite 4004	Address	1400 Douglas Street Stop 0750
City/State/Zip	Round Rock, TX 78664	City/State/Zip	Omaha NE 681790750
Phone	(512) 671-3434	Phone	
Fax	(512) 671-3446	Fax	
e-Mail Address	Eric_Matzner@golder.com	e-Mail Address	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	SO-1622-SG 31 (0.5-1) 20201110	11-10-20	0900	Soil	8.9	5	X	X	X								
2	SG 30 (5.5-6)		0920														
3	SG 30 (0.5-1)		1129														
4	SG 30 (5.5-6)		1200														
5	SG 29 (0.5-1)		1140														
6	SG 29 (5.5-6)		1210														
7	SG 28 (0.5-1)		1240														
8	SG 24 (5.5-6)		1310														
9																	
10																	

Sampler(s) Please Print & Sign <i>Anthony Reich</i>		Shipment Method		Required Turnaround Time: (Check Box)			Results Due Date:	
<i>Anthony Reich</i>				<input checked="" type="checkbox"/> STD 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour				
Relinquished by:	Date: 11-11-20	Time: 1310	Received by:	Notes: UPRR HWPW 1620-22				
<i>D.S.</i>	Date: 11-11-20	Time: 1410	Received by (Laboratory):	Cooler ID	Cooler Temp.	QC Package: (Check One Box Below)		
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	46745	3.1	<input type="checkbox"/> Level II Std QC	<input checked="" type="checkbox"/> RFP Checklist	
						<input type="checkbox"/> Level III Std QC/Raw Data	<input type="checkbox"/> RFP Level IV	
						<input type="checkbox"/> Level IV Sw846/CLP		

Preservative Key: 1-HCl 2-HNO₃ 3-H₂SO₄ 4-NaOH 5-Na₂S₂O₃ 6-NaHSO₄ 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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Memorandum

March 5, 2020

Revision: March 31, 2020

To: Eric Matzner Ref. No.: 11183954-1620

From: ^{CK} Chris G. Knight/eew/554-NF Tel: 512-506-8803

cc: Jesse Orth, Jon Lang; Julie Lidstone

**Subject: Data Usability Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020**

1. Scope of Data Usability Study

This document details a Data Usability Summary (DUS) of analytical results for soil samples collected in support of the Soil Gas Probes at the Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works site during January-February 2020. Samples were submitted to ALS Environmental (ALS), located in Houston, Texas and are reported in data packages HS20011451, HS20020120, HS20020243, HS20020308, HS20020445, HS20020506, HS20020571, and HS20020741. The intended use of the data is to support the Soil Gas Probes at the site by providing current concentration of chemicals of concern.

Data were reviewed and validated by Chris G. Knight of GHD, in accordance with Title 30 of the Texas Administrative Code Section 350.54 (30 TAC 350.54) as described in the Texas Commission on Environmental Quality (TCEQ) Regulatory Guidance document entitled "Review and Reporting of COC Concentration Data under TRRP", (RG-366/TRRP-13), revised May 2010, herein referred to as "TRRP-13 Guidance". Evaluation of the data was based on information obtained from the chain of custody forms, the finished report forms, method blank data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spikes (MS), field quality assurance/quality control samples (QA/QC), the laboratory review checklists (LRC), and the laboratory exception reports (ER).

A sample collection and analysis summary is presented in Table 1. This summary provides a cross-reference of field sample identification numbers and location identification. Each sample is assigned a unique field identification number.

The validated sample results are presented in Table 2. A summary of the analytical methodology is presented in Table 3.



2. Laboratory Qualifications

The Laboratory's quality assurance program is consistent with the quality standards outlined in the National Environmental Laboratory Accreditation Program (NELAP). This laboratory was accredited under Texas Certification number # TX104704231 at the time the analysis was performed and the certificate is included in Attachment A.

3. Project Objectives

3.1 Sampling/Analytical QA/QC Objectives

The QA/QC program was designed to identify contamination resulting from the sampling, sample transport and analytical process through the analysis of field duplicate sample sets and method blanks. The QA/QC program was designed to evaluate the quality of the resulting data with respect to bias and precision through analysis of LCS and MS analyses.

4. Data Review/Validation Results

4.1 Sample Holding Time and Preservation

Samples were shipped with a chain of custody and the paper work was filled out properly with the following exceptions:

- i) HS20011451 - Sample container count differs. The chain of custody states 5 sample containers were submitted, but the laboratory only received 4 sample containers. All 2 oz. amber bottles were received empty. No further action was required.
- ii) HS20020120 - Sample container count differs. The chain of custody states 5 sample containers were submitted, but the laboratory only received 4 sample containers. All 2 oz. amber bottles were received empty. No further action was required. Per M. Hermiston, SG-3 samples were placed on hold; and will be re-collected.
- iii) HS20020243 - Sample container count differs. The chain of custody states 5 sample containers were submitted, but the laboratory only received 4 sample containers. All 2 oz. amber bottles were received empty. No further action was required.
- iv) HS20020445 - Sample container count differs. The chain of custody states 5 sample containers were submitted, but the laboratory only received 4 sample containers. All 2 oz. amber bottles were received empty. No further action was required.
- v) HS20020506 - This report was revised. The sample collection date for the field duplicate sample was changed from 2/11/2020 to 2/12/2020. No further action was required.
- vi) HS20020741 - Sample container count differs. The chain of custody states 5 sample containers were submitted, but the laboratory only received 4 sample containers. All 2 oz. amber bottles were received empty. No further action was required.



All samples were delivered on ice and stored by the laboratory at the required temperature (0-6°C).

The sample chain of custody documents and the analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

4.2 Sample Containers

Sample containers used were certified pre-cleaned glass containers provided by the laboratory. These containers meet or exceed analyte specifications established in the United States Environmental Protection Agency (USEPA) *Specifications and Guidance for Contaminant-free Sample Containers*.

4.3 Calibrations

According to the LRC, initial calibration and continuing calibration data met the criteria for the selected method.

4.4 Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures. As these were not discrete samples handled in the field, these blanks are not listed on the sample identification cross-reference list found in the data packages.

For this study, laboratory method blanks were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch and results are reported in the laboratory data packages.

The method blank results were non-detect or below the method quantitation limit (MQL), indicating that laboratory contamination was not a factor for this investigation.

4.5 Internal Standard and Surrogate Spike Recoveries

Recoveries of internal standards are addressed in the LRC of the data packages. All internal standard recoveries associated with the compounds of interest were acceptable per the LRC with the following exceptions:

- i) SO-1620-SG10(0.5-1)20200207 was reported with one or more of the semi-volatile organic compounds (SVOCs) internal standards were recovered at less than fifty percent. The target compound naphthalene was not associated with the failing internal standards. No further action was required.
- ii) SO-1620-SG02(0.5-1) 20200210 and SO-1620-FD01-20200212 were reported with the internal standard Perylene-d12 shifted due to possible matrix effect. The target compound naphthalene was not associated with the failing internal standards. No further action was required.

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for volatile organic compounds (VOCs) and naphthalene are spiked with surrogate compounds prior to sample analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample



matrices. The recovery ranges established by the laboratory are adopted as the acceptance criteria for the project. Each individual surrogate compound is expected to meet the laboratory control limits. According to the TRRP-13 Guidelines, one outlying surrogate is acceptable for methods with multiple surrogate spike compounds as long as the recovery is at least ten percent. Sample analyzed at elevated sample dilutions (five times or greater) were not assessed.

Surrogate recoveries were assessed against laboratory control limits and/or the guidance in TRRP-13. All surrogate recoveries met the above criteria.

4.6 Laboratory Control Sample Analysis

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The recovery ranges established by the laboratory are adopted as the acceptance criteria for the project.

For this study, LCS were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch.

The LCS contained all compounds specified in the methods. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

4.7 Matrix Spike Analysis

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with known concentrations of the analytes of interest and analyzed as MS/matrix spike duplicate (MSD) samples. The RPD between the MS and MSD is used to assess analytical precision.

An MS/MSD analysis was performed as specified in Table 1. The recovery ranges established by the laboratory is adopted as the acceptance criteria for the project.

The MS/MSD samples were spiked with all compounds specified in the methods. All percent recoveries and the RPD value were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

The laboratory also performed additional MS/MSD on non-site samples. These cannot be used to assess accuracy and precision for the site samples.

4.8 Field QA/QC Samples

The field QA/QC consisted of two field duplicate sample sets.

To assess the analytical and sampling protocol precision, two field duplicate sample sets were collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than fifty percent for soil samples. The RPDs are only used when sample concentrations are above the estimated regions of detection.



Field duplicate summary data are presented in Table 2. All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision. SO-1620-DUP1-2020203 was not assessed; the parent sample was not analyzed. No further action was required.

4.9 Field Procedures

Golder Associates, Inc. collected soil samples in accordance with their Standard Operating Procedures (SOP) for sample collection.

4.10 Analyte Reporting

The laboratory reported detected results for each analyte down to the sample detection limit (SDL), which is defined as the method detection limit (MDL) with sample-specific adjustments for dilutions, aliquot size, volumes, etc. Positive analyte detections less than the MQL but greater than the SDL were qualified as estimated (J) in Table 2.

- i) The following sample extracts were analyzed at an elevated sample dilution for naphthalene due to a high level of matrix interference: SO-1620-SG11(0.5-1) 20200206, SO-1620-SG07(0.5-1)20200217 and SO-1620-SG06(0.5-1)20200217. No further action was required.

The detectability check standard (DCS) results supported the laboratory MDLs.

All soil results were reported on a dry weight basis.

5. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are usable for the purpose of supporting the Soil Gas Probes at the site by providing current concentration of chemicals of concern in soil samples without qualification.

Table 1

Sample Collection and Analysis Summary
Soil Gas Probes
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
January-February 2020

Work Order	Sample Identification	Location	Matrix	Initial Sample Depth (ft bgs)	Final Sample Depth (ft bgs)	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters		Comments
								VOCs	Naphthalene	
HS20011451	SO-1620-SG22 (0.5-1) 20200129	SG22	Soil	0.5	1	01/29/2020	09:45	X	X	
	SO-1620-SG22 (5.5-6) 20200129	SG22	Soil	5.5	6	01/29/2020	10:30	X	X	
	SO-1620-SG21 (0.5-1) 20200129	SG21	Soil	0.5	1	01/29/2020	11:30	X	X	
	SO-1620-SG21 (5.5-6) 20200129	SG21	Soil	5.5	6	01/29/2020	14:15	X	X	
HS20020120	SO-1620-SG-18(0.5-1)-2020203	SG18	Soil	0.5	1	02/03/2020	09:45	X	X	
	SO-1620-SG-18(5.5-6)-2020203	SG18	Soil	5.5	6	02/03/2020	10:00	X	X	
	SO-1620-SG-9(0.5-1)-2020203	SG09	Soil	0.5	1	02/03/2020	11:00	X	X	
	SO-1620-SG-9(5.5-6)-2020203	SG09	Soil	5.5	6	02/03/2020	11:35	X	X	
	SO-1620-SG-13(0.5-1)-2020203	SG13	Soil	0.5	1	02/03/2020	14:15	X	X	
	SO-1620-SG-13(5.5-6)-2020203	SG13	Soil	5.5	6	02/03/2020	14:45	X	X	
	SO-1620-DUP1-2020203	SG03	Soil	5.5	6	02/03/2020	12:40	X	X	
HS20020243	SO-1620-SG03(0.5-1) 20200205	SG03	Soil	0.5	1	02/05/2020	10:30	X	X	
	SO-1620-SG03(5.5-6) 20200205	SG03	Soil	5.5	6	02/05/2020	10:45	X	X	
	SO-1620-SG11(0.5-1) 20200206	SG11	Soil	0.5	1	02/06/2020	13:40	X	X	
	SO-1620-SG11(5.5-6) 20200206	SG11	Soil	5.5	6	02/06/2020	14:00	X	X	MS/MSD-P
HS20020308	SO-1620-SG10(0.5-1)20200207	SG10	Soil	0.5	1	02/07/2020	11:10	X	X	
	SO-1620-SG10(5.5-6)20200207	SG10	Soil	5.5	6	02/07/2020	11:30	X	X	
	SO-1620-SG08(0.5-1)20200207	SG08	Soil	0.5	1	02/07/2020	14:00	X	X	
	SO-1620-SG08(5.5-6)20200207	SG08	Soil	5.5	6	02/07/2020	14:20	X	X	

Table 1

Sample Collection and Analysis Summary
Soil Gas Probes
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
January-February 2020

Work Order	Sample Identification	Location	Matrix	Initial Sample Depth (ft bgs)	Final Sample Depth (ft bgs)	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters		Comments
								VOCs	Naphthalene	
HS20020445	SO-1620-SG05(0.5-1) 20200210	SG05	Soil	0.5	1	02/10/2020	09:50	X	X	
	SO-1620-SG05(5.5-6) 20200210	SG05	Soil	5.5	6	02/10/2020	10:10	X	X	
	SO-1620-SG04(0.5-1) 20200210	SG04	Soil	0.5	1	02/10/2020	13:20	X	X	
	SO-1620-SG04(5.5-6) 20200210	SG04	Soil	5.5	6	02/10/2020	13:30	X	X	
	SO-1620-SG02(0.5-1) 20200210	SG02	Soil	0.5	1	02/10/2020	15:50	X	X	
	SO-1620-SG02(5.5-6) 20200210	SG02	Soil	5.5	6	02/10/2020	16:00	X	X	
HS20020506	SO-1620-SG01(0.5-1)-20200211	SG01	Soil	0.5	1	02/11/2020	11:50	X	X	
	SO-1620-SG01(5.5-6)-20200211	SG01	Soil	5.5	6	02/11/2020	12:10	X	X	
	SO-1620-SG20(0.5-1)-20200211	SG20	Soil	0.5	1	02/11/2020	15:00	X	X	
	SO-1620-SG20(5.5-6)-20200211	SG20	Soil	5.5	6	02/11/2020	15:20	X	X	
	SO-1620-SG19(0.5-1)-20200212	SG19	Soil	0.5	1	02/12/2020	11:20	X	X	
	SO-1620-FD01-20200212	SG19	Soil	5.5	6	02/12/2020	11:20	X	X	Field duplicate of SG19 (0.5-1)
	SO-1620-SG19(5.5-6)-20200212	SG19	Soil	5.5	6	02/12/2020	11:35	X	X	
HS20020571	SO-1620-SG17(0.5-1)20200212	SG17	Soil	0.5	1	02/12/2020	15:40	X	X	
	SO-1620-SG17(5.5-6)20200212	SG17	Soil	5.5	6	02/12/2020	15:50	X	X	
	SO-1620-SG16(0.5-1)20200213	SG16	Soil	0.5	1	02/13/2020	12:15	X	X	
	SO-1620-SG16(5.5-6)20200213	SG16	Soil	5.5	6	02/13/2020	12:30	X	X	
	SO-1620-SG15(0.5-1)20200213	SG15	Soil	0.5	1	02/13/2020	14:30	X	X	
	SO-1620-SG15(5.5-6)20200213	SG15	Soil	5.5	6	02/13/2020	14:40	X	X	

Table 1

Sample Collection and Analysis Summary
Soil Gas Probes
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
January-February 2020

Work Order	Sample Identification	Location	Matrix	Initial Sample Depth (ft bgs)	Final Sample Depth (ft bgs)	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters		Comments
								VOCs	Naphthalene	
HS20020741	SO-1620-SG12(0.5-1)20200217	SG12	Soil	0.5	1	02/17/2020	09:11	X	X	
	SO-1620-SG12(5.5-6)20200217	SG12	Soil	5.5	6	02/17/2020	09:30	X	X	
	SO-1620-SG07(0.5-1)20200217	SG07	Soil	0.5	1	02/17/2020	10:50	X	X	
	SO-1620-SG07(5.5-6)20200217	SG07	Soil	5.5	6	02/17/2020	11:10	X	X	
	SO-1620-SG06(0.5-1)20200217	SG06	Soil	0.5	1	02/17/2020	14:00	X	X	
	SO-1620-SG06(5.5-6)20200217	SG06	Soil	5.5	6	02/17/2020	14:15	X	X	
	SO-1620-SG14(0.5-1)20200217	SG14	Soil	0.5	1	02/17/2020	16:15	X	X	
	SO-1620-SG14(5.5-6)20200217	SG14	Soil	5.5	6	02/17/2020	16:30	X	X	

Notes:

- ft bgs - Feet Below Ground Surface
VOCs - Volatile Organic Compounds
MS/MSD-P - Matrix Spike/ Matrix Spike Duplicate (partial parameters)

Table 2

**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020**

		SG01	SG01	SG02	SG02	SG03
Location ID:		SG01	SG01	SG02	SG02	SG03
Sample Name:		SO-1620-SG01(0.5-1)-20200211	SO-1620-SG01(5.5-6)-20200211	SO-1620-SG02(0.5-1) 20200210	SO-1620-SG02(5.5-6) 20200210	SO-1620-DUP1-2020203
Sample Date:		02/11/2020	02/11/2020	02/10/2020	02/10/2020	02/03/2020
Depth:		0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs	5.5-6 ft bgs
Parameters	Unit					
Volatile Organic Compounds						
Benzene	mg/kg	<0.00059	<0.00082	<0.00053	<0.00037	<0.00040
Ethylbenzene	mg/kg	<0.00082	<0.0011	<0.00075	<0.00051	<0.00056
Xylenes (total)	mg/kg	<0.0012	<0.0016	<0.0011	<0.00073	<0.00080
Semivolatile Organic Compounds						
Naphthalene	mg/kg	<0.00070	<0.00073	0.0024 J	<0.00079	<0.00069

Table 2
Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020

		SG03	SG03	SG04	SG04
Location ID:		SG03	SG03	SG04	SG04
Sample Name:		SO-1620-SG03(0.5-1) 20200205	SO-1620-SG03(5.5-6) 20200205	SO-1620-SG04(0.5-1) 20200210	SO-1620-SG04(5.5-6) 20200210
Sample Date:		02/05/2020	02/05/2020	02/10/2020	02/10/2020
Depth:		0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs
Parameters	Unit				
Volatile Organic Compounds					
Benzene	mg/kg	<0.00037	<0.00071	<0.00044	<0.00068
Ethylbenzene	mg/kg	<0.00052	<0.0010	<0.00061	<0.00096
Xylenes (total)	mg/kg	0.0066	<0.0014	<0.00087	<0.0014
Semivolatile Organic Compounds					
Naphthalene	mg/kg	0.0018 J	0.0017 J	<0.00071	<0.00072

Table 2

**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020**

		SG05	SG05	SG06	SG06	SG07
Location ID:		SG05	SG05	SG06	SG06	SG07
Sample Name:		SO-1620-SG05(0.5-1) 20200210	SO-1620-SG05(5.5-6) 20200210	SO-1620-SG06(0.5-1)20200217	SO-1620-SG06(5.5-6)20200217	SO-1620-SG07(0.5-1)20200217
Sample Date:		02/10/2020	02/10/2020	02/17/2020	02/17/2020	02/17/2020
Depth:		0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs
Parameters	Unit					
Volatile Organic Compounds						
Benzene	mg/kg	<0.00037	<0.00078	<0.00065	<0.00042	<0.00058
Ethylbenzene	mg/kg	<0.00051	<0.0011	<0.00091	<0.00059	<0.00082
Xylenes (total)	mg/kg	<0.00073	<0.0016	<0.0013	<0.00084	<0.0012
Semivolatile Organic Compounds						
Naphthalene	mg/kg	0.0049	<0.00074	<0.0067	<0.00071	0.0071 J

Table 2

**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020**

	Location ID:	SG07	SG08	SG08	SG09
	Sample Name:	SO-1620-SG07(5.5-6)20200217	SO-1620-SG08(0.5-1)20200207	SO-1620-SG08(5.5-6)20200207	SO-1620-SG-9(0.5-1)-2020203
	Sample Date:	02/17/2020	02/07/2020	02/07/2020	02/03/2020
	Depth:	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs
Parameters	Unit				
Volatile Organic Compounds					
Benzene	mg/kg	<0.00036	<0.00062	<0.00038	<0.00052
Ethylbenzene	mg/kg	<0.00050	<0.00087	<0.00053	<0.00074
Xylenes (total)	mg/kg	<0.00072	<0.0012	<0.00075	<0.0010
Semivolatile Organic Compounds					
Naphthalene	mg/kg	<0.00072	0.0034 J	0.0014 J	0.0042

Table 2

**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020**

	Location ID:	SG09	SG10	SG10	SG11
	Sample Name:	SO-1620-SG-9(5.5-6)-2020203	SO-1620-SG10(0.5-1)20200207	SO-1620-SG10(5.5-6)20200207	SO-1620-SG11(0.5-1) 20200206
	Sample Date:	02/03/2020	02/07/2020	02/07/2020	02/06/2020
	Depth:	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs
Parameters	Unit				
Volatile Organic Compounds					
Benzene	mg/kg	<0.00082	<0.00052	<0.00039	<0.00070
Ethylbenzene	mg/kg	<0.0012	<0.00072	<0.00054	<0.00098
Xylenes (total)	mg/kg	<0.0016	<0.0010	<0.00077	<0.0014
Semivolatile Organic Compounds					
Naphthalene	mg/kg	<0.00072	0.0056	<0.00072	0.0084 J

Notes:

ft bgs - Feet below ground surface

< - Not detected at the associated reporting limit

J - Estimated concentration

Table 2

**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020**

	Location ID:	SG11	SG12	SG12	SG13
	Sample Name:	SO-1620-SG11(5.5-6) 20200206	SO-1620-SG12(0.5-1)20200217	SO-1620-SG12(5.5-6)20200217	SO-1620-SG-13(0.5-1)-2020203
	Sample Date:	02/06/2020	02/17/2020	02/17/2020	02/03/2020
	Depth:	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs
Parameters	Unit				
Volatile Organic Compounds					
Benzene	mg/kg	<0.00032	<0.00062	<0.00060	<0.00076
Ethylbenzene	mg/kg	<0.00045	<0.00087	<0.00084	<0.0011
Xylenes (total)	mg/kg	<0.00064	<0.0012	<0.0012	<0.0015
Semivolatile Organic Compounds					
Naphthalene	mg/kg	0.0011 J	0.0039	<0.00071	<0.00075

Table 2

**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020**

	Location ID:	SG13	SG14	SG14	SG15	SG15
	Sample Name:	SO-1620-SG-13(5.5-6)-2020203	SO-1620-SG14(0.5-1)20200217	SO-1620-SG14(5.5-6)20200217	SO-1620-SG15(0.5-1)20200213	SO-1620-SG15(5.5-6)20200213
	Sample Date:	02/03/2020	02/17/2020	02/17/2020	02/13/2020	02/13/2020
	Depth:	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs
Parameters	Unit					
Volatile Organic Compounds						
Benzene	mg/kg	<0.00049	<0.00030	<0.00037	<0.00050	<0.00032
Ethylbenzene	mg/kg	<0.00068	<0.00042	<0.00051	<0.00070	<0.00045
Xylenes (total)	mg/kg	<0.00097	<0.00061	<0.00073	<0.0010	<0.00065
Semivolatile Organic Compounds						
Naphthalene	mg/kg	<0.00071	0.0027 J	<0.00077	0.014	<0.00071

Table 2

**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020**

		SG16	SG16	SG17	SG17	SG18
Location ID:		SG16	SG16	SG17	SG17	SG18
Sample Name:		SO-1620-SG16(0.5-1)20200213	SO-1620-SG16(5.5-6)20200213	SO-1620-SG17(0.5-1)20200212	SO-1620-SG17(5.5-6)20200212	SO-1620-SG-18(0.5-1)-2020203
Sample Date:		02/13/2020	02/13/2020	02/12/2020	02/12/2020	02/03/2020
Depth:		0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs
Parameters	Unit					
Volatile Organic Compounds						
Benzene	mg/kg	<0.00066	<0.00068	<0.00071	<0.00079	0.0034 J
Ethylbenzene	mg/kg	<0.00093	<0.00095	<0.0010	<0.0011	0.0034 J
Xylenes (total)	mg/kg	<0.0013	<0.0014	<0.0014	<0.0016	0.0056
Semivolatile Organic Compounds						
Naphthalene	mg/kg	0.0099	<0.00071	0.0095	0.0015 J	<0.00069

Table 2

**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020**

	Location ID:	SG18	SG19	SG19	SG19	SG20
	Sample Name:	SO-1620-SG-18(5.5-6)-2020203	SO-1620-SG19(0.5-1)-20200212	SO-1620-FD01-20200212	SO-1620-SG19(5.5-6)-20200212	SO-1620-SG20(0.5-1)-20200211
	Sample Date:	02/03/2020	02/12/2020	02/12/2020	02/12/2020	02/11/2020
	Depth:	5.5-6 ft bgs	0.5-1 ft bgs	0.5-1 ft bgs Duplicate	5.5-6 ft bgs	0.5-1 ft bgs
Parameters	Unit					
Volatile Organic Compounds						
Benzene	mg/kg	<0.00054	<0.00059	<0.00060	<0.00062	<0.00080
Ethylbenzene	mg/kg	<0.00076	<0.00082	<0.00083	<0.00087	<0.0011
Xylenes (total)	mg/kg	<0.0011	<0.0012	<0.0012	<0.0012	<0.0016
Semivolatile Organic Compounds						
Naphthalene	mg/kg	0.0041	<0.00069	0.0053	<0.00071	<0.00069

Table 2

**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
January-February 2020**

	Location ID:	SG20	SG21	SG21	SG22	SG22
Sample Name:		SO-1620-SG20(5.5-6)-20200211	SO-1620-SG21 (0.5-1) 20200129	SO-1620-SG21 (5.5-6) 20200129	SO-1620-SG22 (0.5-1) 20200129	SO-1620-SG22 (5.5-6) 20200129
Sample Date:		02/11/2020	01/29/2020	01/29/2020	01/29/2020	01/29/2020
Depth:		5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs
Parameters	Unit					
Volatile Organic Compounds						
Benzene	mg/kg	<0.00072	<0.00088	<0.00053	<0.00061	<0.00056
Ethylbenzene	mg/kg	<0.0010	<0.0012	<0.00074	<0.00085	<0.00079
Xylenes (total)	mg/kg	<0.0014	<0.0018	<0.0011	<0.0012	<0.0011
Semivolatile Organic Compounds						
Naphthalene	mg/kg	<0.00071	0.022	0.010	0.14	<0.00072

Notes:

- ft bgs - Feet below ground surface
- < - Not detected at the associated reporting limit
- J - Estimated concentration

Table 3

**Analytical Methods
Soil Gas Probes
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
January-February 2020**

Parameter	Method	Matrix	Holding Time	
			Collection to Extraction (Days)	Extraction to Analysis (Days)
VOCs	SW-846 8260C	Soil	-	14
Naphthalene	SW-846 8270D	Soil	14	40

Notes:

VOCs - Volatile Organic Compounds

"-" - Not Applicable

Method References:

SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions

Attachment A

Laboratory NELAP Certificate



Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation



ALS Laboratory Group, Environmental Services Division (Houston, Texas)

10450 Stancliff Road, Suite 210
Houston, TX 77099-4338

Certificate: T104704231-19-23
Expiration Date: 4/30/2020
Issue Date: 5/1/2019

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Matrix: *Drinking Water*

Method EPA 1613

Analyte	AB	Analyte ID	Method ID
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10120408

Method EPA 200.8

Analyte	AB	Analyte ID	Method ID
Copper	TX	1055	10014605
Lead	TX	1075	10014605



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Matrix: Non-Potable Water

Method	AB	Analyte ID	Method ID
Method EPA 1010			
Analyte Ignitability	TX	1780	10116606
Method EPA 120.1			
Analyte Conductivity	TX	1610	10006403
Method EPA 1311			
Analyte TCLP	TX	849	10118806
Method EPA 1312			
Analyte SPLP	TX	850	10119003
Method EPA 160.4			
Analyte Residue-volatile	TX	1970	10010409
Method EPA 1613			
Analyte 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TX	9516	10120408
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TX	9519	10120408
1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	TX	9420	10120408
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD)	TX	9426	10120408
1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	TX	9423	10120408
1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	TX	9471	10120408
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCDD)	TX	9453	10120408
1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCDF)	TX	9474	10120408
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,6,7,8-HxCDD)	TX	9456	10120408
1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCDF)	TX	9477	10120408
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCDD)	TX	9459	10120408
1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-PeCDF)	TX	9543	10120408
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	TX	9540	10120408
2,3,4,6,7,8-Hexachlorodibenzofuran (2,3,4,6,7,8-HxCDF)	TX	9480	10120408



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Matrix: Non-Potable Water

2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	TX	9549	10120408
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	TX	9612	10120408
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10120408
Total Heptachlorodibenzofuran (Total HpCDF)	TX	9444	10120408
Total Heptachlorodibenzo-p-dioxin (Total HpCDD)	TX	9438	10120408
Total Hexachlorodibenzofuran (Total HxCDF)	TX	9483	10120408
Total Hexachlorodibenzo-p-dioxin (Total HxCDD)	TX	9468	10120408
Total Pentachlorodibenzofuran (Total PeCDF)	TX	9552	10120408
Total Pentachlorodibenzo-p-dioxin (Total PeCDD)	TX	9555	10120408
Total Tetrachlorodibenzofuran (Total TCDF)	TX	9615	10120408
Total Tetrachlorodibenzo-p-dioxin (Total TCDD)	TX	9609	10120408
Method EPA 1664			
Analyte	AB	Analyte ID	Method ID
n-Hexane Extractable Material (HEM) (O&G)	TX	1803	10127807
Method EPA 180.1			
Analyte	AB	Analyte ID	Method ID
Turbidity	TX	2055	10011606
Method EPA 200.8			
Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10014605
Antimony	TX	1005	10014605
Arsenic	TX	1010	10014605
Barium	TX	1015	10014605
Beryllium	TX	1020	10014605
Boron	TX	1025	10014605
Cadmium	TX	1030	10014605
Calcium	TX	1035	10014605
Chromium	TX	1040	10014605
Cobalt	TX	1050	10014605
Copper	TX	1055	10014605
Iron	TX	1070	10014605



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Matrix: Non-Potable Water

Lead	TX	1075	10014605
Magnesium	TX	1085	10014605
Manganese	TX	1090	10014605
Molybdenum	TX	1100	10014605
Nickel	TX	1105	10014605
Potassium	TX	1125	10014605
Selenium	TX	1140	10014605
Silver	TX	1150	10014605
Sodium	TX	1155	10014605
Strontium	TX	1160	10014605
Thallium	TX	1165	10014605
Tin	TX	1175	10014605
Titanium	TX	1180	10014605
Uranium	TX	3035	10014605
Vanadium	TX	1185	10014605
Zinc	TX	1190	10014605

Method EPA 245.1

Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10036609

Method EPA 300.0

Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10053200
Chloride	TX	1575	10053200
Fluoride	TX	1730	10053200
Nitrate as N	TX	1810	10053200
Nitrate-nitrite	TX	1820	10053200
Nitrite as N	TX	1840	10053200
Orthophosphate as P	TX	1870	10053200
Sulfate	TX	2000	10053200

Method EPA 325.1

Analyte	AB	Analyte ID	Method ID
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Matrix: Non-Potable Water

Chloride	TX	1575	10056801
Method EPA 335.1			
Analyte Amenable cyanide	AB TX	Analyte ID 1510	Method ID 10060001
Method EPA 335.2			
Analyte Total cyanide	AB TX	Analyte ID 1645	Method ID 10278203
Method EPA 335.4			
Analyte Total cyanide	AB TX	Analyte ID 1645	Method ID 10061402
Method EPA 350.3			
Analyte Ammonia as N	AB TX	Analyte ID 1515	Method ID 10064401
Method EPA 365.3			
Analyte Orthophosphate as P	AB TX	Analyte ID 1870	Method ID 10070801
Phosphorus	TX	1910	10070801
Method EPA 375.4			
Analyte Sulfate	AB TX	Analyte ID 2000	Method ID 10073800
Method EPA 376.1			
Analyte Sulfide	AB TX	Analyte ID 2005	Method ID 10074201
Method EPA 410.4			
Analyte Chemical oxygen demand (COD)	AB TX	Analyte ID 1565	Method ID 10077404
Method EPA 415.1			
Analyte Total Organic Carbon (TOC)	AB TX	Analyte ID 2040	Method ID 10078407
Method EPA 420.1			
Analyte Total phenolics	AB TX	Analyte ID 1905	Method ID 10079400



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Matrix: Non-Potable Water

Method EPA 420.4

Analyte	AB	Analyte ID	Method ID
Total phenolics	TX	1905	10080203

Method EPA 6020

Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10156419
Antimony	TX	1005	10156419
Arsenic	TX	1010	10156419
Barium	TX	1015	10156419
Beryllium	TX	1020	10156419
Boron	TX	1025	10156419
Cadmium	TX	1030	10156419
Calcium	TX	1035	10156419
Chromium	TX	1040	10156419
Cobalt	TX	1050	10156419
Copper	TX	1055	10156419
Iron	TX	1070	10156419
Lead	TX	1075	10156419
Lithium	TX	1080	10156419
Magnesium	TX	1085	10156419
Manganese	TX	1090	10156419
Molybdenum	TX	1100	10156419
Nickel	TX	1105	10156419
Potassium	TX	1125	10156419
Selenium	TX	1140	10156419
Silver	TX	1150	10156419
Sodium	TX	1155	10156419
Strontium	TX	1160	10156419
Thallium	TX	1165	10156419
Tin	TX	1175	10156419
Titanium	TX	1180	10156419



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Matrix: Non-Potable Water

Vanadium	TX	1185	10156419
Zinc	TX	1190	10156419
Method EPA 608			
Analyte	AB	Analyte ID	Method ID
4,4'-DDD	TX	7355	10103603
4,4'-DDE	TX	7360	10103603
4,4'-DDT	TX	7365	10103603
Aldrin	TX	7025	10103603
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10103603
alpha-Chlordane	TX	7240	10103603
Aroclor-1016 (PCB-1016)	TX	8880	10103603
Aroclor-1221 (PCB-1221)	TX	8885	10103603
Aroclor-1232 (PCB-1232)	TX	8890	10103603
Aroclor-1242 (PCB-1242)	TX	8895	10103603
Aroclor-1248 (PCB-1248)	TX	8900	10103603
Aroclor-1254 (PCB-1254)	TX	8905	10103603
Aroclor-1260 (PCB-1260)	TX	8910	10103603
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10103603
Chlordane (tech.)	TX	7250	10103603
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10103603
Dieldrin	TX	7470	10103603
Endosulfan I	TX	7510	10103603
Endosulfan II	TX	7515	10103603
Endosulfan sulfate	TX	7520	10103603
Endrin	TX	7540	10103603
Endrin aldehyde	TX	7530	10103603
Endrin ketone	TX	7535	10103603
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10103603
gamma-Chlordane	TX	7245	10103603
Heptachlor	TX	7685	10103603



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Matrix: Non-Potable Water

Heptachlor epoxide	TX	7690	10103603
Methoxychlor	TX	7810	10103603
Toxaphene (Chlorinated camphene)	TX	8250	10103603

Method EPA 624

Analyte	AB	Analyte ID	Method ID
1,1,1-Trichloroethane	TX	5160	10107207
1,1,2,2-Tetrachloroethane	TX	5110	10107207
1,1,2-Trichloroethane	TX	5165	10107207
1,1-Dichloroethane	TX	4630	10107207
1,1-Dichloroethylene	TX	4640	10107207
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10107207
1,2-Dichlorobenzene	TX	4610	10107207
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10107207
1,2-Dichloropropane	TX	4655	10107207
1,3-Dichlorobenzene	TX	4615	10107207
1,4-Dichlorobenzene	TX	4620	10107207
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10107207
2-Chloroethyl vinyl ether	TX	4500	10107207
Acetone (2-Propanone)	TX	4315	10107207
Acrolein (Propenal)	TX	4325	10107207
Acrylonitrile	TX	4340	10107207
Benzene	TX	4375	10107207
Bromodichloromethane	TX	4395	10107207
Bromoform	TX	4400	10107207
Carbon tetrachloride	TX	4455	10107207
Chlorobenzene	TX	4475	10107207
Chlorodibromomethane	TX	4575	10107207
Chloroethane (Ethyl chloride)	TX	4485	10107207
Chloroform	TX	4505	10107207
cis-1,2-Dichloroethylene	TX	4645	10107207



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Matrix: Non-Potable Water

cis-1,3-Dichloropropene	TX	4680	10107207
Ethylbenzene	TX	4765	10107207
m+p-xylene	TX	5240	10107207
Methyl bromide (Bromomethane)	TX	4950	10107207
Methyl chloride (Chloromethane)	TX	4960	10107207
Methyl tert-butyl ether (MTBE)	TX	5000	10107207
Methylene chloride (Dichloromethane)	TX	4975	10107207
Naphthalene	TX	5005	10107207
o-Xylene	TX	5250	10107207
Tetrachloroethylene (Perchloroethylene)	TX	5115	10107207
Toluene	TX	5140	10107207
trans-1,2-Dichloroethylene	TX	4700	10107207
trans-1,3-Dichloropropylene	TX	4685	10107207
Trichloroethene (Trichloroethylene)	TX	5170	10107207
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10107207
Vinyl chloride	TX	5235	10107207
Xylene (total)	TX	5260	10107207

Method EPA 625

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10107401
1,2,4-Trichlorobenzene	TX	5155	10107401
1,2-Dichlorobenzene	TX	4610	10107401
1,2-Diphenylhydrazine	TX	6220	10107401
1,3-Dichlorobenzene	TX	4615	10107401
1,4-Dichlorobenzene	TX	4620	10107401
2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl)ether)	TX	4659	10107401
2,4,5-Trichlorophenol	TX	6835	10107401
2,4,6-Trichlorophenol	TX	6840	10107401
2,4-Dichlorophenol	TX	6000	10107401
2,4-Dimethylphenol	TX	6130	10107401



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Expiration Date: 4/30/2020
Issue Date: 5/1/2019

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Matrix: Non-Potable Water

2,4-Dinitrophenol	TX	6175	10107401
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10107401
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10107401
2-Chloronaphthalene	TX	5795	10107401
2-Chlorophenol	TX	5800	10107401
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10107401
2-Methylphenol (o-Cresol)	TX	6400	10107401
2-Nitrophenol	TX	6490	10107401
3,3'-Dichlorobenzidine	TX	5945	10107401
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10107401
4-Chloro-3-methylphenol	TX	5700	10107401
4-Chlorophenyl phenylether	TX	5825	10107401
4-Methylphenol (p-Cresol)	TX	6410	10107401
4-Nitrophenol	TX	6500	10107401
Acenaphthene	TX	5500	10107401
Acenaphthylene	TX	5505	10107401
Anthracene	TX	5555	10107401
Benzidine	TX	5595	10107401
Benzo(a)anthracene	TX	5575	10107401
Benzo(a)pyrene	TX	5580	10107401
Benzo(b)fluoranthene	TX	5585	10107401
Benzo(g,h,i)perylene	TX	5590	10107401
Benzo(k)fluoranthene	TX	5600	10107401
bis(2-Chloroethoxy)methane	TX	5760	10107401
bis(2-Chloroethyl) ether	TX	5765	10107401
bis(2-Ethylhexyl) phthalate (Di(2-Ethylhexyl) phthalate, DEHP)	TX	6065	10107401
Butyl benzyl phthalate	TX	5670	10107401
Chrysene	TX	5855	10107401
Dibenz(a,h) anthracene	TX	5895	10107401
Diethyl phthalate	TX	6070	10107401



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Matrix: Non-Potable Water

Dimethyl phthalate	TX	6135	10107401
Di-n-butyl phthalate	TX	5925	10107401
Di-n-octyl phthalate	TX	6200	10107401
Fluoranthene	TX	6265	10107401
Fluorene	TX	6270	10107401
Hexachlorobenzene	TX	6275	10107401
Hexachlorobutadiene	TX	4835	10107401
Hexachlorocyclopentadiene	TX	6285	10107401
Hexachloroethane	TX	4840	10107401
Indeno(1,2,3-cd) pyrene	TX	6315	10107401
Isophorone	TX	6320	10107401
Naphthalene	TX	5005	10107401
Nitrobenzene	TX	5015	10107401
n-Nitrosodiethylamine	TX	6525	10107401
n-Nitrosodimethylamine	TX	6530	10107401
n-Nitrosodi-n-butylamine	TX	5025	10107401
n-Nitrosodi-n-propylamine	TX	6545	10107401
n-Nitrosodiphenylamine	TX	6535	10107401
Pentachlorobenzene	TX	6590	10107401
Pentachlorophenol	TX	6605	10107401
Phenanthrene	TX	6615	10107401
Phenol	TX	6625	10107401
Pyrene	TX	6665	10107401
Pyridine	TX	5095	10107401
Method EPA 7196			
Analyte	AB	Analyte ID	Method ID
Chromium (VI)	TX	1045	10162206
Method EPA 7470			
Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10165603



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Matrix: Non-Potable Water

Method EPA 8011

Analyte	AB	Analyte ID	Method ID
1,2,3-Trichloropropane	TX	5180	10173009
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10173009
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10173009

Method EPA 8015

Analyte	AB	Analyte ID	Method ID
Diesel range organics (DRO)	TX	9369	10173203
Ethanol	TX	4750	10173203
Ethylene glycol	TX	4785	10173203
Gasoline range organics (GRO)	TX	9408	10173203
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10173203
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10173203
Methanol	TX	4930	10173203
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10173203
n-Propanol (1-Propanol)	TX	5055	10173203
Propylene Glycol	TX	6657	10173203
tert-Butyl alcohol	TX	4420	10173203

Method EPA 8021

Analyte	AB	Analyte ID	Method ID
Benzene	TX	4375	10174400
Ethylbenzene	TX	4765	10174400
m+p-xylene	TX	5240	10174400
Methyl tert-butyl ether (MTBE)	TX	5000	10174400
o-Xylene	TX	5250	10174400
Toluene	TX	5140	10174400
Xylene (total)	TX	5260	10174400

Method EPA 8081

Analyte	AB	Analyte ID	Method ID
4,4'-DDD	TX	7355	10178402
4,4'-DDE	TX	7360	10178402



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Matrix: Non-Potable Water

4,4'-DDT	TX	7365	10178402
Aldrin	TX	7025	10178402
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10178402
alpha-Chlordane	TX	7240	10178402
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10178402
Chlordane (tech.)	TX	7250	10178402
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10178402
Dieldrin	TX	7470	10178402
Endosulfan I	TX	7510	10178402
Endosulfan II	TX	7515	10178402
Endosulfan sulfate	TX	7520	10178402
Endrin	TX	7540	10178402
Endrin aldehyde	TX	7530	10178402
Endrin ketone	TX	7535	10178402
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10178402
gamma-Chlordane	TX	7245	10178402
Heptachlor	TX	7685	10178402
Heptachlor epoxide	TX	7690	10178402
Hexachlorobenzene	TX	6275	10178402
Methoxychlor	TX	7810	10178402
Mirex	TX	7870	10178402
Toxaphene (Chlorinated camphene)	TX	8250	10178402

Method EPA 8082

Analyte	AB	Analyte ID	Method ID
Aroclor-1016 (PCB-1016)	TX	8880	10179201
Aroclor-1221 (PCB-1221)	TX	8885	10179201
Aroclor-1232 (PCB-1232)	TX	8890	10179201
Aroclor-1242 (PCB-1242)	TX	8895	10179201
Aroclor-1248 (PCB-1248)	TX	8900	10179201
Aroclor-1254 (PCB-1254)	TX	8905	10179201



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Matrix: Non-Potable Water

Aroclor-1260 (PCB-1260)	TX	8910	10179201
PCBs (total)	TX	8870	10179201

Method EPA 8151

Analyte	AB	Analyte ID	Method ID
2,4,5-T	TX	8655	10183003
2,4-D	TX	8545	10183003
2,4-DB	TX	8560	10183003
Dalapon	TX	8555	10183003
Dicamba	TX	8595	10183003
Dichloroprop (Dichloroprop, Weedone)	TX	8605	10183003
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10183003
MCPA	TX	7775	10183003
MCPP	TX	7780	10183003
Silvex (2,4,5-TP)	TX	8650	10183003

Method EPA 8260

Analyte	AB	Analyte ID	Method ID
1,1,1,2-Tetrachloroethane	TX	5105	10184404
1,1,1-Trichloroethane	TX	5160	10184404
1,1,2,2-Tetrachloroethane	TX	5110	10184404
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	TX	5195	10184404
1,1,2-Trichloroethane	TX	5165	10184404
1,1-Dichloroethane	TX	4630	10184404
1,1-Dichloroethylene	TX	4640	10184404
1,1-Dichloropropene	TX	4670	10184404
1,2,3-Trichlorobenzene	TX	5150	10184404
1,2,3-Trichloropropane	TX	5180	10184404
1,2,4-Trichlorobenzene	TX	5155	10184404
1,2,4-Trimethylbenzene	TX	5210	10184404
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10184404
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10184404
1,2-Dichlorobenzene	TX	4610	10184404



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Matrix: Non-Potable Water

1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10184404
1,2-Dichloropropane	TX	4655	10184404
1,3,5-Trimethylbenzene	TX	5215	10184404
1,3-Dichlorobenzene	TX	4615	10184404
1,3-Dichloropropane	TX	4660	10184404
1,4-Dichlorobenzene	TX	4620	10184404
1,4-Dioxane (1,4-Diethyleneoxide)	TX	4735	10184404
1-Chlorohexane	TX	4510	10184404
1-Propanol	TX	5060	10184404
2,2-Dichloropropane	TX	4665	10184404
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10184404
2-Chloroethyl vinyl ether	TX	4500	10184404
2-Chlorotoluene	TX	4535	10184404
2-Hexanone (MBK)	TX	4860	10184404
2-Pentanone	TX	5045	10184404
4-Chlorotoluene	TX	4540	10184404
4-Isopropyltoluene (p-Cymene)	TX	4915	10184404
4-Methyl-2-pentanone (MIBK)	TX	4995	10184404
Acetone (2-Propanone)	TX	4315	10184404
Acetonitrile	TX	4320	10184404
Acrolein (Propenal)	TX	4325	10184404
Acrylonitrile	TX	4340	10184404
Allyl alcohol	TX	4350	10184404
Allyl chloride (3-Chloropropene)	TX	4355	10184404
Benzene	TX	4375	10184404
Benzyl chloride	TX	5635	10184404
Bromobenzene	TX	4385	10184404
Bromochloromethane	TX	4390	10184404
Bromodichloromethane	TX	4395	10184404
Bromoform	TX	4400	10184404



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Matrix: Non-Potable Water

Carbon disulfide	TX	4450	10184404
Carbon tetrachloride	TX	4455	10184404
Chlorobenzene	TX	4475	10184404
Chlorodibromomethane	TX	4575	10184404
Chloroethane (Ethyl chloride)	TX	4485	10184404
Chloroform	TX	4505	10184404
Chloroprene (2-Chloro-1,3-butadiene)	TX	4525	10184404
cis-1,2-Dichloroethylene	TX	4645	10184404
cis-1,3-Dichloropropene	TX	4680	10184404
Dibromofluoromethane	TX	4590	10184404
Dibromomethane (Methylene bromide)	TX	4595	10184404
Dichlorodifluoromethane (Freon-12)	TX	4625	10184404
Diethyl ether	TX	4725	10184404
Di-isopropylether (DIPE)	TX	9375	10184404
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	TX	4745	10184404
Ethanol	TX	4750	10184404
Ethyl acetate	TX	4755	10184404
Ethyl methacrylate	TX	4810	10184404
Ethylbenzene	TX	4765	10184404
Ethylene oxide	TX	4795	10184404
Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)	TX	4770	10184404
Hexachlorobutadiene	TX	4835	10184404
Iodomethane (Methyl iodide)	TX	4870	10184404
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10184404
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10184404
Isopropylbenzene (Cumene)	TX	4900	10184404
m+p-xylene	TX	5240	10184404
Methacrylonitrile	TX	4925	10184404
Methyl acetate	TX	4940	10184404
Methyl acrylate	TX	4945	10184404



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Matrix: Non-Potable Water

Methyl bromide (Bromomethane)	TX	4950	10184404
Methyl chloride (Chloromethane)	TX	4960	10184404
Methyl methacrylate	TX	4990	10184404
Methyl tert-butyl ether (MTBE)	TX	5000	10184404
Methylcyclohexane	TX	4965	10184404
Methylene chloride (Dichloromethane)	TX	4975	10184404
Naphthalene	TX	5005	10184404
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10184404
n-Butylbenzene	TX	4435	10184404
n-Propylbenzene	TX	5090	10184404
o-Xylene	TX	5250	10184404
Pentachloroethane	TX	5035	10184404
Propionitrile (Ethyl cyanide)	TX	5080	10184404
Pyridine	TX	5095	10184404
sec-Butylbenzene	TX	4440	10184404
Styrene	TX	5100	10184404
T-amylmethylether (TAME)	TX	4370	10184404
tert-Butyl alcohol	TX	4420	10184404
tert-Butylbenzene	TX	4445	10184404
Tetrachloroethylene (Perchloroethylene)	TX	5115	10184404
Toluene	TX	5140	10184404
trans-1,2-Dichloroethylene	TX	4700	10184404
trans-1,3-Dichloropropylene	TX	4685	10184404
trans-1,4-Dichloro-2-butene	TX	4605	10184404
Trichloroethene (Trichloroethylene)	TX	5170	10184404
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10184404
Vinyl acetate	TX	5225	10184404
Vinyl chloride	TX	5235	10184404
Xylene (total)	TX	5260	10184404



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Matrix: Non-Potable Water

Method EPA 8270

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10185203
1,2,4-Trichlorobenzene	TX	5155	10185203
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10185203
1,2-Dichlorobenzene	TX	4610	10185203
1,2-Dinitrobenzene	TX	6155	10185203
1,2-Diphenylhydrazine	TX	6220	10185203
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10185203
1,3-Dichlorobenzene	TX	4615	10185203
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10185203
1,4-Dichlorobenzene	TX	4620	10185203
1,4-Dinitrobenzene	TX	6165	10185203
1,4-Naphthoquinone	TX	6420	10185203
1,4-Phenylenediamine	TX	6630	10185203
1-Chloronaphthalene	TX	5790	10185203
1-Naphthylamine	TX	6425	10185203
2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl)ether)	TX	4659	10185203
2,3,4,6-Tetrachlorophenol	TX	6735	10185203
2,4,5-Trichlorophenol	TX	6835	10185203
2,4,5-Trimethylaniline	TX	6880	10185203
2,4,6-Trichlorophenol	TX	6840	10185203
2,4-Diaminotoluene	TX	5880	10185203
2,4-Dichlorophenol	TX	6000	10185203
2,4-Dimethylphenol	TX	6130	10185203
2,4-Dinitrophenol	TX	6175	10185203
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10185203
2,6-Dichlorophenol	TX	6005	10185203
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10185203
2-Acetylaminofluorene	TX	5515	10185203



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Matrix: Non-Potable Water

2-Chloronaphthalene	TX	5795	10185203
2-Chlorophenol	TX	5800	10185203
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10185203
2-Methylaniline (o-Toluidine)	TX	5145	10185203
2-Methylnaphthalene	TX	6385	10185203
2-Methylphenol (o-Cresol)	TX	6400	10185203
2-Naphthylamine	TX	6430	10185203
2-Nitroaniline	TX	6460	10185203
2-Nitrophenol	TX	6490	10185203
2-Picoline (2-Methylpyridine)	TX	5050	10185203
3,3'-Dichlorobenzidine	TX	5945	10185203
3,3'-Dimethylbenzidine	TX	6120	10185203
3-Methylcholanthrene	TX	6355	10185203
3-Methylphenol (m-Cresol)	TX	6405	10185203
3-Nitroaniline	TX	6465	10185203
4-Aminobiphenyl	TX	5540	10185203
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10185203
4-Chloro-3-methylphenol	TX	5700	10185203
4-Chloroaniline	TX	5745	10185203
4-Chlorophenyl phenylether	TX	5825	10185203
4-Dimethyl aminoazobenzene	TX	6105	10185203
4-Methylphenol (p-Cresol)	TX	6410	10185203
4-Nitroaniline	TX	6470	10185203
4-Nitrobiphenyl	TX	6480	10185203
4-Nitrophenol	TX	6500	10185203
4-Nitroquinoline-1-oxide	TX	6510	10185203
5-Chloro-2-methylaniline	TX	5695	10185203
5-Nitro-o-toluidine	TX	6570	10185203
7,12-Dimethylbenz(a) anthracene	TX	6115	10185203
a-a-Dimethylphenethylamine	TX	6125	10185203



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Matrix: Non-Potable Water

Acenaphthene	TX	5500	10185203
Acenaphthylene	TX	5505	10185203
Acetophenone	TX	5510	10185203
Aniline	TX	5545	10185203
Anthracene	TX	5555	10185203
Aramite	TX	5560	10185203
Atrazine	TX	7065	10185203
Azinphos-methyl (Guthion)	TX	7075	10185203
Azobenzene	TX	5562	10185203
Benzenethiol (Thiophenol)	TX	6750	10185203
Benzidine	TX	5595	10185203
Benzo(a)anthracene	TX	5575	10185203
Benzo(a)pyrene	TX	5580	10185203
Benzo(b)fluoranthene	TX	5585	10185203
Benzo(e)pyrene	TX	5605	10185203
Benzo(g,h,i)perylene	TX	5590	10185203
Benzo(k)fluoranthene	TX	5600	10185203
Benzoic acid	TX	5610	10185203
Benzyl alcohol	TX	5630	10185203
Biphenyl	TX	5640	10185203
bis(2-Chloroethoxy)methane	TX	5760	10185203
bis(2-Chloroethyl) ether	TX	5765	10185203
bis(2-Ethylhexyl) phthalate (Di(2-Ethylhexyl) phthalate, DEHP)	TX	6065	10185203
Butyl benzyl phthalate	TX	5670	10185203
Caprolactam	TX	7180	10185203
Captan	TX	7190	10185203
Carbaryl (Sevin)	TX	7195	10185203
Carbazole	TX	5680	10185203
Carbophenothion	TX	7220	10185203
Chlorobenzilate	TX	7260	10185203



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Issue Date: 5/1/2019

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Matrix: Non-Potable Water

Chrysene	TX	5855	10185203
Coumaphos	TX	7315	10185203
Demeton	TX	7390	10185203
Demeton	TX	7390	10185203
Demeton-o	TX	7395	10185203
Demeton-s	TX	7385	10185203
Diallate	TX	7405	10185203
Dibenz(a,h) anthracene	TX	5895	10185203
Dibenz(a,j) acridine	TX	5900	10185203
Dibenzofuran	TX	5905	10185203
Dichlorovos (DDVP, Dichlorvos)	TX	8610	10185203
Diethyl phthalate	TX	6070	10185203
Dimethoate	TX	7475	10185203
Dimethoate	TX	7475	10185203
Dimethyl phthalate	TX	6135	10185203
Di-n-butyl phthalate	TX	5925	10185203
Di-n-octyl phthalate	TX	6200	10185203
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10185203
Dioxathion	TX	7495	10185203
Diphenylamine	TX	6205	10185203
Disulfoton	TX	8625	10185203
Ethion	TX	7565	10185203
Ethyl methanesulfonate	TX	6260	10185203
Famphur	TX	7580	10185203
Fluoranthene	TX	6265	10185203
Fluorene	TX	6270	10185203
Hexachlorobenzene	TX	6275	10185203
Hexachlorobutadiene	TX	4835	10185203
Hexachlorocyclopentadiene	TX	6285	10185203
Hexachloroethane	TX	4840	10185203



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Matrix: Non-Potable Water

Hexachlorophene	TX	6290	10185203
Hexachloropropene	TX	6295	10185203
Indeno(1,2,3-cd) pyrene	TX	6315	10185203
Isodrin	TX	7725	10185203
Isophorone	TX	6320	10185203
Isosafrole	TX	6325	10185203
Kepone	TX	7740	10185203
Maleic anhydride	TX	6335	10185203
Methapyrilene	TX	6345	10185203
Methyl methanesulfonate	TX	6375	10185203
Methyl parathion (Parathion, methyl)	TX	7825	10185203
Mevinphos	TX	7850	10185203
Naled	TX	7905	10185203
Naphthalene	TX	5005	10185203
Nitrobenzene	TX	5015	10185203
n-Nitrosodiethylamine	TX	6525	10185203
n-Nitrosodimethylamine	TX	6530	10185203
n-Nitrosodi-n-butylamine	TX	5025	10185203
n-Nitrosodi-n-propylamine	TX	6545	10185203
n-Nitrosodiphenylamine	TX	6535	10185203
n-Nitrosomethylethylamine	TX	6550	10185203
n-Nitrosomorpholine	TX	6555	10185203
n-Nitrosopiperidine	TX	6560	10185203
n-Nitrosopyrrolidine	TX	6565	10185203
o,o,o-Triethyl phosphorothioate	TX	8290	10185203
o-Anisidine	TX	5550	10185203
Parathion, ethyl	TX	7955	10185203
p-Cresidine	TX	5860	10185203
Pentachlorobenzene	TX	6590	10185203
Pentachloronitrobenzene (PCNB)	TX	6600	10185203



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Matrix: Non-Potable Water

Pentachlorophenol	TX	6605	10185203
Phenacetin	TX	6610	10185203
Phenanthrene	TX	6615	10185203
Phenol	TX	6625	10185203
Phorate	TX	7985	10185203
Phosmet (Imidan)	TX	8000	10185203
Phthalic anhydride	TX	6640	10185203
Pronamide (Kerb)	TX	6650	10185203
Pyrene	TX	6665	10185203
Pyridine	TX	5095	10185203
Quinoline	TX	6670	10185203
Resorcinol	TX	6680	10185203
Safrole	TX	6685	10185203
Sulfotepp	TX	8155	10185203
Terbufos	TX	8185	10185203
Tetrachlorvinphos (Stirophos, Gardona)	TX	8197	10185203
Thionazin (Zinophos)	TX	8235	10185203
Toluene diisocyanate	TX	6775	10185203
Trifluralin (Treflan)	TX	8295	10185203

Method EPA 8290

Analyte	AB	Analyte ID	Method ID
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TX	9516	10187209
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TX	9519	10187209
1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	TX	9420	10187209
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD)	TX	9426	10187209
1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	TX	9423	10187209
1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	TX	9471	10187209
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCDD)	TX	9453	10187209
1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCDF)	TX	9474	10187209
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-HxCDD)	TX	9456	10187209



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Matrix: Non-Potable Water

1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCDF)	TX	9477	10187209
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCDD)	TX	9459	10187209
1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-PeCDF)	TX	9543	10187209
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	TX	9540	10187209
2,3,4,6,7,8-Hexachlorodibenzofuran (2,3,4,6,7,8-HxCDF)	TX	9480	10187209
2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	TX	9549	10187209
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	TX	9612	10187209
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10187209
Total Heptachlorodibenzofuran (Total HpCDF)	TX	9444	10187209
Total Heptachlorodibenzo-p-dioxin (Total HpCDD)	TX	9438	10187209
Total Hexachlorodibenzofuran (Total HxCDF)	TX	9483	10187209
Total Hexachlorodibenzo-p-dioxin (Total HxCDD)	TX	9468	10187209
Total Pentachlorodibenzofuran (Total PeCDF)	TX	9552	10187209
Total Pentachlorodibenzo-p-dioxin (Total PeCDD)	TX	9555	10187209
Total Tetrachlorodibenzofuran (Total TCDF)	TX	9615	10187209
Total Tetrachlorodibenzo-p-dioxin (Total TCDD)	TX	9609	10187209

Method EPA 8316

Analyte	AB	Analyte ID	Method ID
Acrylamide	TX	4330	10188202

Method EPA 8330

Analyte	AB	Analyte ID	Method ID
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10189807
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10189807
2,4,6-Trinitrotoluene (2,4,6-TNT)	TX	9651	10189807
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10189807
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10189807
2-Amino-4,6-dinitrotoluene (2-am-dnt)	TX	9303	10189807
2-Nitrotoluene	TX	9507	10189807
3-Nitrotoluene	TX	9510	10189807
4-Amino-2,6-dinitrotoluene (4-am-dnt)	TX	9306	10189807
4-Nitrotoluene	TX	9513	10189807



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Matrix: Non-Potable Water

Methyl-2,4,6-trinitrophenylamine (tetryl)	TX	6415	10189807
Nitrobenzene	TX	5015	10189807
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	TX	9522	10189807
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	TX	9432	10189807
Method EPA 9014			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	10193803
Total cyanide	TX	1645	10193803
Method EPA 9038			
Analyte	AB	Analyte ID	Method ID
Sulfate	TX	2000	10196608
Method EPA 9040			
Analyte	AB	Analyte ID	Method ID
pH	TX	1900	10196802
Method EPA 9050			
Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	10198604
Method EPA 9056			
Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10199209
Chloride	TX	1575	10199209
Fluoride	TX	1730	10199209
Nitrate as N	TX	1810	10199209
Nitrate-nitrite	TX	1820	10199209
Nitrite as N	TX	1840	10199209
Orthophosphate as P	TX	1870	10199209
Sulfate	TX	2000	10199209
Method EPA 9060			
Analyte	AB	Analyte ID	Method ID
Total Organic Carbon (TOC)	TX	2040	10200201



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Matrix: Non-Potable Water

Method	Analyte	AB	Analyte ID	Method ID
Method EPA 9065				
	Total phenolics	TX	1905	10200405
Method EPA 9066				
	Total phenolics	TX	1905	10200609
Method EPA 9250				
	Chloride	TX	1575	10207202
Method EPA RSK 175				
	2-methylpropane (Isobutane)	TX	4942	10212905
	Ethane	TX	4747	10212905
	Ethene	TX	4752	10212905
	Methane	TX	4926	10212905
	n-Butane	TX	5007	10212905
	n-Propane	TX	5029	10212905
Method HACH 8000				
	Chemical oxygen demand (COD)	TX	1565	60003001
Method SM 2120 B				
	Color	TX	1605	20223807
Method SM 2310 B (4a)				
	Acidity, as CaCO ₃	TX	1500	20002806
Method SM 2320 B				
	Alkalinity as CaCO ₃	TX	1505	20045005
Method SM 2340 B				
	Analyte	AB	Analyte ID	Method ID



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Matrix: Non-Potable Water

Total hardness as CaCO ₃	TX	1755	20046008
Method SM 2510 B			
Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	20048004
Method SM 2540 B			
Analyte	AB	Analyte ID	Method ID
Residue-total (total solids)	TX	1950	20004608
Method SM 2540 C			
Analyte	AB	Analyte ID	Method ID
Residue-filterable (TDS)	TX	1955	20049803
Method SM 2540 D			
Analyte	AB	Analyte ID	Method ID
Residue-nonfilterable (TSS)	TX	1960	20004802
Method SM 3500-Cr B			
Analyte	AB	Analyte ID	Method ID
Chromium (VI)	TX	1045	20065809
Method SM 4500-Cl F			
Analyte	AB	Analyte ID	Method ID
Total residual chlorine	TX	1940	20080482
Method SM 4500-Cl ⁻ E			
Analyte	AB	Analyte ID	Method ID
Chloride	TX	1575	20019209
Method SM 4500-CN ⁻ C			
Analyte	AB	Analyte ID	Method ID
Total cyanide	TX	1645	20020808
Method SM 4500-CN ⁻ E			
Analyte	AB	Analyte ID	Method ID
Total cyanide	TX	1645	20021209
Method SM 4500-CN ⁻ G			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	20021607



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Matrix: Non-Potable Water

Method	AB	Analyte ID	Method ID
Method SM 4500-H+ B			
Analyte	AB	Analyte ID	Method ID
pH	TX	1900	20104603
Method SM 4500-NH3 D			
Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	20108809
Kjeldahl Nitrogen (Total Kjeldahl Nitrogen-TKN)	TX	1790	20108809
Method SM 4500-NH3 F			
Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	20023001
Method SM 4500-O G			
Analyte	AB	Analyte ID	Method ID
Oxygen, dissolved	TX	1880	20025405
Method SM 4500-P E			
Analyte	AB	Analyte ID	Method ID
Orthophosphate as P	TX	1870	20025803
Phosphorus	TX	1910	20025803
Method SM 4500-S2 ⁻ F			
Analyte	AB	Analyte ID	Method ID
Sulfide	TX	2005	20126209
Method SM 4500-SiO2 D			
Analyte	AB	Analyte ID	Method ID
Silica as SiO2	TX	1990	20127202
Method SM 4500-SO3 ⁻ B			
Analyte	AB	Analyte ID	Method ID
Sulfite	TX	2015	20026806
Method SM 5210 B			
Analyte	AB	Analyte ID	Method ID
Biochemical oxygen demand (BOD)	TX	1530	20027401
Carbonaceous BOD, CBOD	TX	1555	20027401
Method SM 5310 B			
Analyte	AB	Analyte ID	Method ID



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Matrix: Non-Potable Water

Total Organic Carbon (TOC)	TX	2040	20137206
Method SM 5310 C			
Analyte	AB	Analyte ID	Method ID
Total Organic Carbon (TOC)	TX	2040	20138209
Method SM 5540 C			
Analyte	AB	Analyte ID	Method ID
Surfactants - MBAS	TX	2025	20144405
Method TCEQ 1005			
Analyte	AB	Analyte ID	Method ID
Total Petroleum Hydrocarbons (TPH)	TX	2050	90019208



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Matrix: Solid & Chemical Materials

Method	AB	Analyte ID	Method ID
Method ASTM D2216			
Analyte Moisture	TX	10337	ASTM D2216-05
Method EPA 1010			
Analyte Ignitability	TX	1780	10116606
Method EPA 1030			
Analyte Ignitability	TX	1780	10117201
Method EPA 1311			
Analyte TCLP	TX	849	10118806
Method EPA 1312			
Analyte SPLP	TX	850	10119003
Method EPA 1668			
Analyte Decachlorobiphenyls	TX	10332	10262007
Dichlorobiphenyls	TX	464	10262007
Heptachlorobiphenyls	TX	486	10262007
Hexachlorobiphenyls	TX	487	10262007
Monochlorobiphenyls	TX	501	10262007
Nonachlorobiphenyls	TX	507	10262007
Octachlorobiphenyls	TX	508	10262007
Pentachlorobiphenyls	TX	515	10262007
Tetrachlorobiphenyls	TX	528	10262007
Trichlorobiphenyls	TX	541	10262007
Method EPA 200.8			
Analyte Uranium	TX	3035	10014605



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Matrix: **Solid & Chemical Materials**

Method EPA 300.0

Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10053200
Chloride	TX	1575	10053200
Fluoride	TX	1730	10053200
Nitrate as N	TX	1810	10053200
Nitrate-nitrite	TX	1820	10053200
Nitrite as N	TX	1840	10053200
Orthophosphate as P	TX	1870	10053200
Sulfate	TX	2000	10053200

Method EPA 310.1

Analyte	AB	Analyte ID	Method ID
Alkalinity as CaCO3	TX	1505	10054805

Method EPA 350.3

Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	10064401

Method EPA 365.3

Analyte	AB	Analyte ID	Method ID
Orthophosphate as P	TX	1870	10070801
Phosphorus	TX	1910	10070801

Method EPA 6020

Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10156204
Antimony	TX	1005	10156204
Arsenic	TX	1010	10156204
Barium	TX	1015	10156204
Beryllium	TX	1020	10156204
Boron	TX	1025	10156204
Cadmium	TX	1030	10156204
Calcium	TX	1035	10156204
Chromium	TX	1040	10156204



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Matrix: Solid & Chemical Materials

Cobalt	TX	1050	10156204
Copper	TX	1055	10156204
Iron	TX	1070	10156204
Lead	TX	1075	10156204
Lithium	TX	1080	10156204
Magnesium	TX	1085	10156204
Manganese	TX	1090	10156204
Molybdenum	TX	1100	10156204
Nickel	TX	1105	10156204
Potassium	TX	1125	10156204
Selenium	TX	1140	10156204
Silver	TX	1150	10156204
Sodium	TX	1155	10156204
Strontium	TX	1160	10156204
Thallium	TX	1165	10156204
Tin	TX	1175	10156204
Titanium	TX	1180	10156204
Vanadium	TX	1185	10156204
Zinc	TX	1190	10156204
Method EPA 7196			
Analyte	AB	Analyte ID	Method ID
Chromium (VI)	TX	1045	10162206
Method EPA 7470			
Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10165603
Method EPA 7471			
Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10166004
Method EPA 8015			
Analyte	AB	Analyte ID	Method ID
Diesel range organics (DRO)	TX	9369	10173203



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Matrix: Solid & Chemical Materials

Ethanol	TX	4750	10173203
Ethylene glycol	TX	4785	10173203
Gasoline range organics (GRO)	TX	9408	10173203
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10173203
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10173203
Methanol	TX	4930	10173203
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10173203
n-Propanol (1-Propanol)	TX	5055	10173203
Propylene Glycol	TX	6657	10173203
tert-Butyl alcohol	TX	4420	10173203

Method EPA 8021

Analyte	AB	Analyte ID	Method ID
Benzene	TX	4375	10174400
Ethylbenzene	TX	4765	10174400
m+p-xylene	TX	5240	10174400
Methyl tert-butyl ether (MTBE)	TX	5000	10174400
o-Xylene	TX	5250	10174400
Toluene	TX	5140	10174400
Xylene (total)	TX	5260	10174400

Method EPA 8081

Analyte	AB	Analyte ID	Method ID
4,4'-DDD	TX	7355	10178402
4,4'-DDE	TX	7360	10178402
4,4'-DDT	TX	7365	10178402
Aldrin	TX	7025	10178402
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10178402
alpha-Chlordane	TX	7240	10178402
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10178402
Chlordane (tech.)	TX	7250	10178402
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10178402
Dieldrin	TX	7470	10178402



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Matrix: Solid & Chemical Materials

Endosulfan I	TX	7510	10178402
Endosulfan II	TX	7515	10178402
Endosulfan sulfate	TX	7520	10178402
Endrin	TX	7540	10178402
Endrin aldehyde	TX	7530	10178402
Endrin ketone	TX	7535	10178402
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10178402
gamma-Chlordane	TX	7245	10178402
Heptachlor	TX	7685	10178402
Heptachlor epoxide	TX	7690	10178402
Methoxychlor	TX	7810	10178402
Mirex	TX	7870	10178402
Toxaphene (Chlorinated camphene)	TX	8250	10178402

Method EPA 8082

Analyte	AB	Analyte ID	Method ID
Aroclor-1016 (PCB-1016)	TX	8880	10179201
Aroclor-1221 (PCB-1221)	TX	8885	10179201
Aroclor-1232 (PCB-1232)	TX	8890	10179201
Aroclor-1242 (PCB-1242)	TX	8895	10179201
Aroclor-1248 (PCB-1248)	TX	8900	10179201
Aroclor-1254 (PCB-1254)	TX	8905	10179201
Aroclor-1260 (PCB-1260)	TX	8910	10179201
PCBs (total)	TX	8870	10179201

Method EPA 8260

Analyte	AB	Analyte ID	Method ID
1,1,1,2-Tetrachloroethane	TX	5105	10184404
1,1,1-Trichloroethane	TX	5160	10184404
1,1,2,2-Tetrachloroethane	TX	5110	10184404
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	TX	5195	10184404
1,1,2-Trichloroethane	TX	5165	10184404
1,1-Dichloroethane	TX	4630	10184404



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Issue Date: 5/1/2019

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Matrix: Solid & Chemical Materials

1,1-Dichloroethylene	TX	4640	10184404
1,1-Dichloropropene	TX	4670	10184404
1,2,3-Trichlorobenzene	TX	5150	10184404
1,2,3-Trichloropropane	TX	5180	10184404
1,2,4-Trichlorobenzene	TX	5155	10184404
1,2,4-Trimethylbenzene	TX	5210	10184404
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10184404
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10184404
1,2-Dichlorobenzene	TX	4610	10184404
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10184404
1,2-Dichloropropane	TX	4655	10184404
1,3,5-Trimethylbenzene	TX	5215	10184404
1,3-Dichlorobenzene	TX	4615	10184404
1,3-Dichloropropane	TX	4660	10184404
1,4-Dichlorobenzene	TX	4620	10184404
1,4-Dioxane (1,4-Diethyleneoxide)	TX	4735	10184404
1-Chlorohexane	TX	4510	10184404
1-Propanol	TX	5060	10184404
2,2-Dichloropropane	TX	4665	10184404
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10184404
2-Chloroethyl vinyl ether	TX	4500	10184404
2-Chlorotoluene	TX	4535	10184404
2-Hexanone (MBK)	TX	4860	10184404
4-Chlorotoluene	TX	4540	10184404
4-Isopropyltoluene (p-Cymene)	TX	4915	10184404
4-Methyl-2-pentanone (MIBK)	TX	4995	10184404
Acetone (2-Propanone)	TX	4315	10184404
Acetonitrile	TX	4320	10184404
Acrolein (Propenal)	TX	4325	10184404
Acrylonitrile	TX	4340	10184404



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Matrix: Solid & Chemical Materials

Allyl chloride (3-Chloropropene)	TX	4355	10184404
Benzene	TX	4375	10184404
Benzyl chloride	TX	5635	10184404
Bromobenzene	TX	4385	10184404
Bromochloromethane	TX	4390	10184404
Bromodichloromethane	TX	4395	10184404
Bromoform	TX	4400	10184404
Carbon disulfide	TX	4450	10184404
Carbon tetrachloride	TX	4455	10184404
Chlorobenzene	TX	4475	10184404
Chlorodibromomethane	TX	4575	10184404
Chloroethane (Ethyl chloride)	TX	4485	10184404
Chloroform	TX	4505	10184404
Chloroprene (2-Chloro-1,3-butadiene)	TX	4525	10184404
cis-1,2-Dichloroethylene	TX	4645	10184404
cis-1,3-Dichloropropene	TX	4680	10184404
Dibromofluoromethane	TX	4590	10184404
Dibromomethane (Methylene bromide)	TX	4595	10184404
Dichlorodifluoromethane (Freon-12)	TX	4625	10184404
Diethyl ether	TX	4725	10184404
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	TX	4745	10184404
Ethanol	TX	4750	10184404
Ethyl acetate	TX	4755	10184404
Ethyl methacrylate	TX	4810	10184404
Ethylbenzene	TX	4765	10184404
Ethylene oxide	TX	4795	10184404
Hexachlorobutadiene	TX	4835	10184404
Iodomethane (Methyl iodide)	TX	4870	10184404
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10184404
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10184404



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Matrix: Solid & Chemical Materials

Isopropylbenzene (Cumene)	TX	4900	10184404
m+p-xylene	TX	5240	10184404
Methacrylonitrile	TX	4925	10184404
Methyl acetate	TX	4940	10184404
Methyl acrylate	TX	4945	10184404
Methyl bromide (Bromomethane)	TX	4950	10184404
Methyl chloride (Chloromethane)	TX	4960	10184404
Methyl methacrylate	TX	4990	10184404
Methyl tert-butyl ether (MTBE)	TX	5000	10184404
Methylcyclohexane	TX	4965	10184404
Methylene chloride (Dichloromethane)	TX	4975	10184404
Naphthalene	TX	5005	10184404
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10184404
n-Butylbenzene	TX	4435	10184404
n-Propylbenzene	TX	5090	10184404
o-Xylene	TX	5250	10184404
Pentachloroethane	TX	5035	10184404
Propionitrile (Ethyl cyanide)	TX	5080	10184404
Pyridine	TX	5095	10184404
sec-Butylbenzene	TX	4440	10184404
Styrene	TX	5100	10184404
tert-Butyl alcohol	TX	4420	10184404
tert-Butylbenzene	TX	4445	10184404
Tetrachloroethylene (Perchloroethylene)	TX	5115	10184404
Toluene	TX	5140	10184404
trans-1,2-Dichloroethylene	TX	4700	10184404
trans-1,3-Dichloropropylene	TX	4685	10184404
trans-1,4-Dichloro-2-butene	TX	4605	10184404
Trichloroethene (Trichloroethylene)	TX	5170	10184404
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10184404



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Matrix: Solid & Chemical Materials

Vinyl acetate	TX	5225	10184404
Vinyl chloride	TX	5235	10184404
Xylene (total)	TX	5260	10184404
Method EPA 8270			
Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10185203
1,2,4-Trichlorobenzene	TX	5155	10185203
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10185203
1,2-Dichlorobenzene	TX	4610	10185203
1,2-Dinitrobenzene	TX	6155	10185203
1,2-Diphenylhydrazine	TX	6220	10185203
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10185203
1,3-Dichlorobenzene	TX	4615	10185203
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10185203
1,4-Dichlorobenzene	TX	4620	10185203
1,4-Dinitrobenzene	TX	6165	10185203
1,4-Naphthoquinone	TX	6420	10185203
1,4-Phenylenediamine	TX	6630	10185203
1-Chloronaphthalene	TX	5790	10185203
1-Naphthylamine	TX	6425	10185203
2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl)ether)	TX	4659	10185203
2,3,4,6-Tetrachlorophenol	TX	6735	10185203
2,4,5-Trichlorophenol	TX	6835	10185203
2,4,5-Trimethylaniline	TX	6880	10185203
2,4,6-Trichlorophenol	TX	6840	10185203
2,4-Diaminotoluene	TX	5880	10185203
2,4-Dichlorophenol	TX	6000	10185203
2,4-Dimethylphenol	TX	6130	10185203
2,4-Dinitrophenol	TX	6175	10185203
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10185203



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Matrix: Solid & Chemical Materials

2,6-Dichlorophenol	TX	6005	10185203
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10185203
2-Acetylaminofluorene	TX	5515	10185203
2-Chloronaphthalene	TX	5795	10185203
2-Chlorophenol	TX	5800	10185203
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10185203
2-Methylaniline (o-Toluidine)	TX	5145	10185203
2-Methylnaphthalene	TX	6385	10185203
2-Methylphenol (o-Cresol)	TX	6400	10185203
2-Naphthylamine	TX	6430	10185203
2-Nitroaniline	TX	6460	10185203
2-Nitrophenol	TX	6490	10185203
2-Picoline (2-Methylpyridine)	TX	5050	10185203
3,3'-Dichlorobenzidine	TX	5945	10185203
3,3'-Dimethylbenzidine	TX	6120	10185203
3-Methylcholanthrene	TX	6355	10185203
3-Methylphenol (m-Cresol)	TX	6405	10185203
3-Nitroaniline	TX	6465	10185203
4-Aminobiphenyl	TX	5540	10185203
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10185203
4-Chloro-3-methylphenol	TX	5700	10185203
4-Chloroaniline	TX	5745	10185203
4-Chlorophenyl phenylether	TX	5825	10185203
4-Methylphenol (p-Cresol)	TX	6410	10185203
4-Nitroaniline	TX	6470	10185203
4-Nitrophenol	TX	6500	10185203
4-Nitroquinoline-1-oxide	TX	6510	10185203
5-Nitro-o-toluidine	TX	6570	10185203
7,12-Dimethylbenz(a) anthracene	TX	6115	10185203
a-a-Dimethylphenethylamine	TX	6125	10185203



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Matrix: Solid & Chemical Materials

Acenaphthene	TX	5500	10185203
Acenaphthylene	TX	5505	10185203
Acetophenone	TX	5510	10185203
Aniline	TX	5545	10185203
Anthracene	TX	5555	10185203
Aramite	TX	5560	10185203
Atrazine	TX	7065	10185203
Azinphos-methyl (Guthion)	TX	7075	10185203
Azobenzene	TX	5562	10185203
Benzenethiol (Thiophenol)	TX	6750	10185203
Benzidine	TX	5595	10185203
Benzo(a)anthracene	TX	5575	10185203
Benzo(a)pyrene	TX	5580	10185203
Benzo(b)fluoranthene	TX	5585	10185203
Benzo(e)pyrene	TX	5605	10185203
Benzo(g,h,i)perylene	TX	5590	10185203
Benzo(k)fluoranthene	TX	5600	10185203
Benzoic acid	TX	5610	10185203
Benzyl alcohol	TX	5630	10185203
Biphenyl	TX	5640	10185203
bis(2-Chloroethoxy)methane	TX	5760	10185203
bis(2-Chloroethyl) ether	TX	5765	10185203
bis(2-Ethylhexyl) phthalate (Di(2-Ethylhexyl) phthalate, DEHP)	TX	6065	10185203
Butyl benzyl phthalate	TX	5670	10185203
Caprolactam	TX	7180	10185203
Carbaryl (Sevin)	TX	7195	10185203
Carbazole	TX	5680	10185203
Carbophenothion	TX	7220	10185203
Chlorobenzilate	TX	7260	10185203
Chrysene	TX	5855	10185203



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Matrix: Solid & Chemical Materials

Demeton	TX	7390	10185203
Demeton-o	TX	7395	10185203
Demeton-s	TX	7385	10185203
Diallate	TX	7405	10185203
Dibenz(a,h) anthracene	TX	5895	10185203
Dibenz(a,j) acridine	TX	5900	10185203
Dibenzo(a,e) pyrene	TX	5890	10185203
Dibenzofuran	TX	5905	10185203
Dichlorovos (DDVP, Dichlorvos)	TX	8610	10185203
Diethyl phthalate	TX	6070	10185203
Dimethoate	TX	7475	10185203
Dimethyl phthalate	TX	6135	10185203
Di-n-butyl phthalate	TX	5925	10185203
Di-n-octyl phthalate	TX	6200	10185203
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10185203
Diphenylamine	TX	6205	10185203
Disulfoton	TX	8625	10185203
Ethyl methanesulfonate	TX	6260	10185203
Fluoranthene	TX	6265	10185203
Fluorene	TX	6270	10185203
Hexachlorobenzene	TX	6275	10185203
Hexachlorobutadiene	TX	4835	10185203
Hexachlorocyclopentadiene	TX	6285	10185203
Hexachloroethane	TX	4840	10185203
Hexachlorophene	TX	6290	10185203
Hexachloropropene	TX	6295	10185203
Indeno(1,2,3-cd) pyrene	TX	6315	10185203
Isodrin	TX	7725	10185203
Isophorone	TX	6320	10185203
Isosafrole	TX	6325	10185203



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Matrix: Solid & Chemical Materials

Kepona	TX	7740	10185203
Malathion	TX	7770	10185203
Methapyrilene	TX	6345	10185203
Methyl methanesulfonate	TX	6375	10185203
Methyl parathion (Parathion, methyl)	TX	7825	10185203
Mevinphos	TX	7850	10185203
Naphthalene	TX	5005	10185203
Nitrobenzene	TX	5015	10185203
n-Nitrosodiethylamine	TX	6525	10185203
n-Nitrosodimethylamine	TX	6530	10185203
n-Nitrosodi-n-butylamine	TX	5025	10185203
n-Nitrosodi-n-propylamine	TX	6545	10185203
n-Nitrosodiphenylamine	TX	6535	10185203
n-Nitrosomethylethylamine	TX	6550	10185203
n-Nitrosomorpholine	TX	6555	10185203
n-Nitrosopiperidine	TX	6560	10185203
n-Nitrosopyrrolidine	TX	6565	10185203
o,o,o-Triethyl phosphorothioate	TX	8290	10185203
o-Anisidine	TX	5550	10185203
Parathion, ethyl	TX	7955	10185203
p-Cresidine	TX	5860	10185203
Pentachlorobenzene	TX	6590	10185203
Pentachloronitrobenzene (PCNB)	TX	6600	10185203
Pentachlorophenol	TX	6605	10185203
Phenacetin	TX	6610	10185203
Phenanthrene	TX	6615	10185203
Phenol	TX	6625	10185203
Phorate	TX	7985	10185203
Pronamide (Kerb)	TX	6650	10185203
Pyrene	TX	6665	10185203



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Matrix: Solid & Chemical Materials

Pyridine	TX	5095	10185203
Quinoline	TX	6670	10185203
Safrole	TX	6685	10185203
Sulfotepp	TX	8155	10185203
Terbufos	TX	8185	10185203
Tetrachlorvinphos (Stirophos, Gardona)	TX	8197	10185203
Thionazin (Zinophos)	TX	8235	10185203
Toluene diisocyanate	TX	6775	10185203

Method EPA 8290

Analyte	AB	Analyte ID	Method ID
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TX	9516	10187209
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TX	9519	10187209
1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	TX	9420	10187209
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD)	TX	9426	10187209
1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	TX	9423	10187209
1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	TX	9471	10187209
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCDD)	TX	9453	10187209
1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCDF)	TX	9474	10187209
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-HxCDD)	TX	9456	10187209
1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCDF)	TX	9477	10187209
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCDD)	TX	9459	10187209
1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-PeCDF)	TX	9543	10187209
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	TX	9540	10187209
2,3,4,6,7,8-Hexachlorodibenzofuran (2,3,4,6,7,8-HxCDF)	TX	9480	10187209
2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	TX	9549	10187209
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	TX	9612	10187209
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10187209
Total Heptachlorodibenzofuran (Total HpCDF)	TX	9444	10187209
Total Heptachlorodibenzo-p-dioxin (Total HpCDD)	TX	9438	10187209
Total Hexachlorodibenzofuran (Total HxCDF)	TX	9483	10187209



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Matrix: Solid & Chemical Materials

Total Hexachlorodibenzo-p-dioxin (Total HxCDD)	TX	9468	10187209
Total Pentachlorodibenzofuran (Total PeCDF)	TX	9552	10187209
Total Pentachlorodibenzo-p-dioxin (Total PeCDD)	TX	9555	10187209
Total Tetrachlorodibenzofuran (Total TCDF)	TX	9615	10187209
Total Tetrachlorodibenzo-p-dioxin (Total TCDD)	TX	9609	10187209
Method EPA 8316			
Analyte	AB	Analyte ID	Method ID
Acrylamide	TX	4330	10188202
Method EPA 8330			
Analyte	AB	Analyte ID	Method ID
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10189807
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10189807
2,4,6-Trinitrotoluene (2,4,6-TNT)	TX	9651	10189807
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10189807
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10189807
2-Amino-4,6-dinitrotoluene (2-am-dnt)	TX	9303	10189807
2-Nitrotoluene	TX	9507	10189807
3-Nitrotoluene	TX	9510	10189807
4-Amino-2,6-dinitrotoluene (4-am-dnt)	TX	9306	10189807
4-Nitrotoluene	TX	9513	10189807
Methyl-2,4,6-trinitrophenylnitramine (tetryl)	TX	6415	10189807
Nitrobenzene	TX	5015	10189807
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	TX	9522	10189807
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	TX	9432	10189807
Method EPA 9014			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	10193803
Total cyanide	TX	1645	10193803
Method EPA 9038			
Analyte	AB	Analyte ID	Method ID
Sulfate	TX	2000	10196608



Texas Commission on Environmental Quality



NELAP - Recognized Laboratory Fields of Accreditation

ALS Laboratory Group, Environmental Services Division (Houston, Texas)

10450 Stancliff Road, Suite 210
Houston, TX 77099-4338

Certificate: T104704231-19-23
Expiration Date: 4/30/2020
Issue Date: 5/1/2019

These fields of accreditation supercede all previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: Solid & Chemical Materials

Method EPA 9040

Analyte	AB	Analyte ID	Method ID
Corrosivity	TX	1615	10197203
pH	TX	1900	10196802

Method EPA 9045

Analyte	AB	Analyte ID	Method ID
Corrosivity	TX	1615	10197805
pH	TX	1900	10197805

Method EPA 9050

Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	10198604

Method EPA 9056

Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10199209
Chloride	TX	1575	10199209
Fluoride	TX	1730	10199209
Nitrate as N	TX	1810	10199209
Nitrate-nitrite	TX	1820	10199209
Nitrite as N	TX	1840	10199209
Orthophosphate as P	TX	1870	10199209
Sulfate	TX	2000	10199209

Method EPA 9060

Analyte	AB	Analyte ID	Method ID
Total Organic Carbon (TOC)	TX	2040	10200201

Method EPA 9065

Analyte	AB	Analyte ID	Method ID
Total phenolics	TX	1905	10200405

Method EPA 9071

Analyte	AB	Analyte ID	Method ID
n-Hexane Extractable Material (HEM) (O&G)	TX	1803	10201204



Texas Commission on Environmental Quality



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ALS Laboratory Group, Environmental Services Division (Houston, Texas)

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Matrix: Solid & Chemical Materials

Method	AB	Analyte ID	Method ID
EPA 9095			
Analyte Paint Filter Liquids Test	TX	10312	10204009
EPA 9250			
Analyte Chloride	TX	1575	10207202
SM 2320 B			
Analyte Alkalinity as CaCO3	TX	1505	20045005
SM 2510 B			
Analyte Conductivity	TX	1610	20048004
SM 2540 G			
Analyte Residue-total (total solids)	TX	1950	20005203
SSA/ASA Part 3:34			
Analyte Carbon, organic (Walkley-Black)	TX	10340	SSA/ASA Pt 3:34
TCEQ 1005			
Analyte Total Petroleum Hydrocarbons (TPH)	TX	2050	90019208



10450 Stancliff Rd. Suite 210
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February 10, 2020

Eric Matzner
Golder Associates Inc.
2201 Double Creek Drive
Suite 4004
Round Rock, TX 78664

Work Order: **HS20011451**

Laboratory Results for: **Houston TX-Wood Preserving Works**

Dear Eric,

ALS Environmental received 5 sample(s) on Jan 30, 2020 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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20011451

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
- R10 Other problems or anomalies.
The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20011451

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.



Dane J. Wacasey

Laboratory Review Checklist: Reportable Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/10/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20011451			
Reviewer Name: Bernadette Fini				Prep Batch Number(s): 150183,R355572,R355975			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?	X				
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		X			1
		Were MS/MSD RPDs within laboratory QC limits?		X			2
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference effects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Supporting Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/10/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20011451			
Reviewer Name: Bernadette Fini				Prep Batch Number(s): 150183,R355572,R355975			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);

NA = Not Applicable;

NR = Not Reviewed;

R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ALS Laboratory Group		LRC Date: 02/10/2020
Project Name: Houston TX-Wood Preserving Works		Laboratory Job Number: HS20011451
Reviewer Name: Bernadette Fini		Prep Batch Number(s): 150183,R355572,R355975
ER# ⁵	Description	
1	<p>Batch 150183, Semivolatile Organics Method SW8270, sample HS20011422-01, MSD was performed on unrelated sample.</p> <p>Batch z355572, Volatile Organics Method SW8260, sample HS20011456-02, MS and MSD were performed on unrelated sample.</p>	
2	Batch 150183, Semivolatile Organics Method SW8270, sample HS20011422-01, MS/MSD RPD is for an unrelated sample.	
<p>Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.</p> <p>O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);</p> <p>NA = Not Applicable;</p> <p>NR = Not Reviewed;</p> <p>R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).</p>		

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20011451

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20011451-01	SO-1620-SG22 (0.5-1) 20200129	Soil		29-Jan-2020 09:45	30-Jan-2020 16:40	<input type="checkbox"/>
HS20011451-02	SO-1620-SG22 (5.5-6) 20200129	Soil		29-Jan-2020 10:30	30-Jan-2020 16:40	<input type="checkbox"/>
HS20011451-03	SO-1620-SG21 (0.5-1) 20200129	Soil		29-Jan-2020 11:30	30-Jan-2020 16:40	<input type="checkbox"/>
HS20011451-04	SO-1620-SG21 (5.5-6) 20200129	Soil		29-Jan-2020 14:15	30-Jan-2020 16:40	<input type="checkbox"/>
HS20011451-05	SO-1620-SG20 (0.5-1) 20200129	Soil		29-Jan-2020 15:00	30-Jan-2020 16:40	<input checked="" type="checkbox"/>

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG22 (0.5-1) 20200129
 Collection Date: 29-Jan-2020 09:45

ANALYTICAL REPORT
 WorkOrder:HS20011451
 Lab ID:HS20011451-01
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00061	0.0061	mg/Kg-dry	1	04-Feb-2020 03:37
Ethylbenzene	U		0.00085	0.0061	mg/Kg-dry	1	04-Feb-2020 03:37
Xylenes, Total	U		0.0012	0.0061	mg/Kg-dry	1	04-Feb-2020 03:37
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>114</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>04-Feb-2020 03:37</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>105</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>04-Feb-2020 03:37</i>
<i>Surr: Dibromofluoromethane</i>	<i>109</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>04-Feb-2020 03:37</i>
<i>Surr: Toluene-d8</i>	<i>104</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>04-Feb-2020 03:37</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 31-Jan-2020		Analyst: GEY	
Naphthalene	0.14		0.00072	0.0039	mg/Kg-dry	1	03-Feb-2020 19:59
<i>Surr: 2-Fluorobiphenyl</i>	<i>89.1</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>03-Feb-2020 19:59</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>98.1</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>03-Feb-2020 19:59</i>
<i>Surr: Nitrobenzene-d5</i>	<i>72.7</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>03-Feb-2020 19:59</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: MZD			
Percent Moisture	16.9		0.0100	0.0100	wt%	1	10-Feb-2020 08:28

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG22 (5.5-6) 20200129
 Collection Date: 29-Jan-2020 10:30

ANALYTICAL REPORT
 WorkOrder:HS20011451
 Lab ID:HS20011451-02
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	U		0.00056	0.0056	mg/Kg-dry	1	04-Feb-2020 03:59
Ethylbenzene	U		0.00079	0.0056	mg/Kg-dry	1	04-Feb-2020 03:59
Xylenes, Total	U		0.0011	0.0056	mg/Kg-dry	1	04-Feb-2020 03:59
<i>Surr: 1,2-Dichloroethane-d4</i>		112		70-126	%REC	1	04-Feb-2020 03:59
<i>Surr: 4-Bromofluorobenzene</i>		104		70-130	%REC	1	04-Feb-2020 03:59
<i>Surr: Dibromofluoromethane</i>		106		70-130	%REC	1	04-Feb-2020 03:59
<i>Surr: Toluene-d8</i>		102		70-130	%REC	1	04-Feb-2020 03:59
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 31-Jan-2020		Analyst: GEY
Naphthalene	U		0.00072	0.0039	mg/Kg-dry	1	31-Jan-2020 20:29
<i>Surr: 2-Fluorobiphenyl</i>		86.4		43-125	%REC	1	31-Jan-2020 20:29
<i>Surr: 4-Terphenyl-d14</i>		95.7		32-125	%REC	1	31-Jan-2020 20:29
<i>Surr: Nitrobenzene-d5</i>		72.0		37-125	%REC	1	31-Jan-2020 20:29
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: MZD		
Percent Moisture		16.4	0.0100	0.0100	wt%	1	10-Feb-2020 08:28

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG21 (0.5-1) 20200129
 Collection Date: 29-Jan-2020 11:30

ANALYTICAL REPORT

WorkOrder:HS20011451
 Lab ID:HS20011451-03
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260					Analyst: WLR
Benzene		U	0.00088	0.0088	mg/Kg-dry	1	04-Feb-2020 04:22
Ethylbenzene		U	0.0012	0.0088	mg/Kg-dry	1	04-Feb-2020 04:22
Xylenes, Total		U	0.0018	0.0088	mg/Kg-dry	1	04-Feb-2020 04:22
<i>Surr: 1,2-Dichloroethane-d4</i>	109			70-126	%REC	1	04-Feb-2020 04:22
<i>Surr: 4-Bromofluorobenzene</i>	104			70-130	%REC	1	04-Feb-2020 04:22
<i>Surr: Dibromofluoromethane</i>	105			70-130	%REC	1	04-Feb-2020 04:22
<i>Surr: Toluene-d8</i>	103			70-130	%REC	1	04-Feb-2020 04:22
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270				Prep:SW3541 / 31-Jan-2020	Analyst: GEY
Naphthalene	0.022		0.00068	0.0038	mg/Kg-dry	1	03-Feb-2020 20:18
<i>Surr: 2-Fluorobiphenyl</i>	83.7			43-125	%REC	1	03-Feb-2020 20:18
<i>Surr: 4-Terphenyl-d14</i>	97.1			32-125	%REC	1	03-Feb-2020 20:18
<i>Surr: Nitrobenzene-d5</i>	72.5			37-125	%REC	1	03-Feb-2020 20:18
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: MZD
Percent Moisture	12.4		0.0100	0.0100	wt%	1	10-Feb-2020 08:28

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG21 (5.5-6) 20200129
 Collection Date: 29-Jan-2020 14:15

ANALYTICAL REPORT
 WorkOrder:HS20011451
 Lab ID:HS20011451-04
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260					Analyst: WLR
Benzene	U		0.00053	0.0053	mg/Kg-dry	1	04-Feb-2020 04:45
Ethylbenzene	U		0.00074	0.0053	mg/Kg-dry	1	04-Feb-2020 04:45
Xylenes, Total	U		0.0011	0.0053	mg/Kg-dry	1	04-Feb-2020 04:45
Surr: 1,2-Dichloroethane-d4	106			70-126	%REC	1	04-Feb-2020 04:45
Surr: 4-Bromofluorobenzene	103			70-130	%REC	1	04-Feb-2020 04:45
Surr: Dibromofluoromethane	105			70-130	%REC	1	04-Feb-2020 04:45
Surr: Toluene-d8	104			70-130	%REC	1	04-Feb-2020 04:45
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270				Prep:SW3541 / 31-Jan-2020	Analyst: GEY
Naphthalene	0.010		0.00071	0.0039	mg/Kg-dry	1	31-Jan-2020 21:07
Surr: 2-Fluorobiphenyl	93.4			43-125	%REC	1	31-Jan-2020 21:07
Surr: 4-Terphenyl-d14	101			32-125	%REC	1	31-Jan-2020 21:07
Surr: Nitrobenzene-d5	76.5			37-125	%REC	1	31-Jan-2020 21:07
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: MZD
Percent Moisture	16.2		0.0100	0.0100	wt%	1	10-Feb-2020 08:28

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

Weight / Prep Log

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20011451

Batch ID: 3589 **Start Date:** 31 Jan 2020 09:41 **End Date:** 31 Jan 2020 09:41
Method: VOLATILES BY SW8260C

Sample ID	Container	Sample Wt/Vol	Final Volume	Weight Factor	Container Type
HS20011451-01	1	4.941 (g)	5 (mL)	1.01	TerraCore (5035A)
HS20011451-02	1	5.297 (g)	5 (mL)	0.94	TerraCore (5035A)
HS20011451-03	1	3.243 (g)	5 (mL)	1.54	TerraCore (5035A)
HS20011451-04	1	5.707 (g)	5 (mL)	0.88	TerraCore (5035A)

Batch ID: 150183 **Start Date:** 31 Jan 2020 07:28 **End Date:** 31 Jan 2020 14:00
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541 **Prep Code:** 3541_B_LOW

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20011451-01	1	30.19 (g)	1 (mL)	0.03312
HS20011451-02	1	30.11 (g)	1 (mL)	0.03321
HS20011451-03	1	30.04 (g)	1 (mL)	0.03329
HS20011451-04	1	30.21 (g)	1 (mL)	0.0331

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20011451

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 150183 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20011451-01	SO-1620-SG22 (0.5-1) 20200129	29 Jan 2020 09:45		31 Jan 2020 07:28	03 Feb 2020 19:59	1
HS20011451-02	SO-1620-SG22 (5.5-6) 20200129	29 Jan 2020 10:30		31 Jan 2020 07:28	31 Jan 2020 20:29	1
HS20011451-03	SO-1620-SG21 (0.5-1) 20200129	29 Jan 2020 11:30		31 Jan 2020 07:28	03 Feb 2020 20:18	1
HS20011451-04	SO-1620-SG21 (5.5-6) 20200129	29 Jan 2020 14:15		31 Jan 2020 07:28	31 Jan 2020 21:07	1
Batch ID: R355572 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20011451-01	SO-1620-SG22 (0.5-1) 20200129	29 Jan 2020 09:45			04 Feb 2020 03:37	1
HS20011451-02	SO-1620-SG22 (5.5-6) 20200129	29 Jan 2020 10:30			04 Feb 2020 03:59	1
HS20011451-03	SO-1620-SG21 (0.5-1) 20200129	29 Jan 2020 11:30			04 Feb 2020 04:22	1
HS20011451-04	SO-1620-SG21 (5.5-6) 20200129	29 Jan 2020 14:15			04 Feb 2020 04:45	1
Batch ID: R355975 (0)		Test Name : MOISTURE - ASTM D2216			Matrix: Soil	
HS20011451-01	SO-1620-SG22 (0.5-1) 20200129	29 Jan 2020 09:45			10 Feb 2020 08:28	1
HS20011451-02	SO-1620-SG22 (5.5-6) 20200129	29 Jan 2020 10:30			10 Feb 2020 08:28	1
HS20011451-03	SO-1620-SG21 (0.5-1) 20200129	29 Jan 2020 11:30			10 Feb 2020 08:28	1
HS20011451-04	SO-1620-SG21 (5.5-6) 20200129	29 Jan 2020 14:15			10 Feb 2020 08:28	1

WorkOrder: HS20011451
InstrumentID: SV-7
Test Code: 8270_LOW_S
Test Number: SW8270
Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0018	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20011451
 InstrumentID: VOA8
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0013	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0014	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0014	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20011451

QC BATCH REPORT

Batch ID: 150183 (0)		Instrument: SV-7		Method: LOW-LEVEL SEMIVOLATILES BY 8270D						
MBLK	Sample ID: MBLK-150183	Units: ug/Kg			Analysis Date: 31-Jan-2020 10:33					
Client ID:	Run ID: SV-7_355477	SeqNo: 5455791		PrepDate: 31-Jan-2020		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Naphthalene	U	3.3								
Surr: 2-Fluorobiphenyl	154.1	0	167	0	92.3	43 - 125				
Surr: 4-Terphenyl-d14	171.7	0	167	0	103	32 - 125				
Surr: Nitrobenzene-d5	156.1	0	167	0	93.5	37 - 125				
LCS	Sample ID: LCS-150183	Units: ug/Kg			Analysis Date: 31-Jan-2020 10:52					
Client ID:	Run ID: SV-7_355477	SeqNo: 5455792		PrepDate: 31-Jan-2020		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Naphthalene	153	3.3	167	0	91.6	50 - 125				
Surr: 2-Fluorobiphenyl	151.2	0	167	0	90.6	43 - 125				
Surr: 4-Terphenyl-d14	157.9	0	167	0	94.5	32 - 125				
Surr: Nitrobenzene-d5	157.8	0	167	0	94.5	37 - 125				
MS	Sample ID: HS20011422-01MS	Units: ug/Kg			Analysis Date: 31-Jan-2020 12:28					
Client ID:	Run ID: SV-7_355477	SeqNo: 5455797		PrepDate: 31-Jan-2020		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Naphthalene	132.7	3.3	166.9	5.281	76.3	50 - 125				
Surr: 2-Fluorobiphenyl	135.6	0	166.9	0	81.2	43 - 125				
Surr: 4-Terphenyl-d14	161.8	0	166.9	0	96.9	32 - 125				
Surr: Nitrobenzene-d5	118.8	0	166.9	0	71.2	37 - 125				
MSD	Sample ID: HS20011422-01MSD	Units: ug/Kg			Analysis Date: 31-Jan-2020 12:47					
Client ID:	Run ID: SV-7_355477	SeqNo: 5455798		PrepDate: 31-Jan-2020		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Naphthalene	83.57	3.3	166.8	5.281	46.9	50 - 125	132.7	45.4	30	SR
Surr: 2-Fluorobiphenyl	80.37	0	166.8	0	48.2	43 - 125	135.6	51.1	30	R
Surr: 4-Terphenyl-d14	154.8	0	166.8	0	92.8	32 - 125	161.8	4.43	30	
Surr: Nitrobenzene-d5	79.51	0	166.8	0	47.7	37 - 125	118.8	39.7	30	R

The following samples were analyzed in this batch: HS20011451-01 HS20011451-02 HS20011451-03 HS20011451-04

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20011451

QC BATCH REPORT

Batch ID: R355572 (0)		Instrument: VOA8		Method: VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKS2-020320	Units: ug/Kg			Analysis Date: 03-Feb-2020 21:08				
Client ID:	Run ID: VOA8_355572	SeqNo: 5457712		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	55.45	0	50	0	111	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	53	0	50	0	106	80 - 120			
<i>Surr: Dibromofluoromethane</i>	54.1	0	50	0	108	80 - 119			
<i>Surr: Toluene-d8</i>	52.29	0	50	0	105	81 - 118			

LCS	Sample ID: VLCSS2-020320	Units: ug/Kg			Analysis Date: 03-Feb-2020 20:22				
Client ID:	Run ID: VOA8_355572	SeqNo: 5457711		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	49.8	5.0	50	0	99.6	75 - 124			
Ethylbenzene	48.47	5.0	50	0	96.9	70 - 123			
Xylenes, Total	149.3	5.0	150	0	99.5	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	60.1	0	50	0	120	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	53.76	0	50	0	108	80 - 120			
<i>Surr: Dibromofluoromethane</i>	55.9	0	50	0	112	80 - 119			
<i>Surr: Toluene-d8</i>	50.9	0	50	0	102	81 - 118			

MS	Sample ID: HS20011456-02MS	Units: ug/Kg			Analysis Date: 03-Feb-2020 21:54				
Client ID:	Run ID: VOA8_355572	SeqNo: 5457714		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	33.22	4.9	49	0	67.8	70 - 130			S
Ethylbenzene	29.37	4.9	49	0	59.9	70 - 130			S
Xylenes, Total	82.6	4.9	147	0	56.2	70 - 130			S
<i>Surr: 1,2-Dichloroethane-d4</i>	61.13	0	49	0	125	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	55.77	0	49	0	114	70 - 130			
<i>Surr: Dibromofluoromethane</i>	55.83	0	49	0	114	70 - 130			
<i>Surr: Toluene-d8</i>	43.91	0	49	0	89.6	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20011451

QC BATCH REPORT

Batch ID: R355572 (0)		Instrument: VOA8		Method: VOLATILES BY SW8260C							
MSD	Sample ID: HS20011456-02MSD	Units: ug/Kg			Analysis Date: 03-Feb-2020 22:16						
Client ID:	Run ID: VOA8_355572	SeqNo: 5457715		PrepDate:		DF: 1					
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Benzene	32.95	5.0	50	0	65.9	70 - 130	33.22	0.823	30	S	
Ethylbenzene	30.67	5.0	50	0	61.3	70 - 130	29.37	4.34	30	S	
Xylenes, Total	89.52	5.0	150	0	59.7	70 - 130	82.6	8.04	30	S	
<i>Surr: 1,2-Dichloroethane-d4</i>	61.26	0	50	0	123	70 - 126	61.13	0.221	30		
<i>Surr: 4-Bromofluorobenzene</i>	54.06	0	50	0	108	70 - 130	55.77	3.11	30		
<i>Surr: Dibromofluoromethane</i>	58.31	0	50	0	117	70 - 130	55.83	4.35	30		
<i>Surr: Toluene-d8</i>	52.29	0	50	0	105	70 - 130	43.91	17.4	30		

The following samples were analyzed in this batch: HS20011451-01 HS20011451-02 HS20011451-03 HS20011451-04

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20011451

QC BATCH REPORT

Batch ID: R355975 (0) **Instrument:** Balance1 **Method:** MOISTURE - ASTM D2216

DUP	Sample ID: HS20011451-04DUP	Units: wt%	Analysis Date: 10-Feb-2020 08:28							
Client ID: SO-1620-SG21 (5.5-6) 20200129	Run ID: Balance1_355975	SeqNo: 5466359	PrepDate: DF: 1							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Percent Moisture	17.3	0.0100					16.2	6.57	20
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The following samples were analyzed in this batch:

HS20011451-01	HS20011451-02	HS20011451-03	HS20011451-04
---------------	---------------	---------------	---------------

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20011451

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg-dry	Milligrams per Kilogram- Dry weight corrected

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2020	31-Dec-2020
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	T104704231-19-25	30-Apr-2020

Sample Receipt Checklist

Client Name: PBW
Work Order: HS20011451

Date/Time Received: 30-Jan-2020 16:40
Received by: JRM

Checklist completed by: Nilesh D. Ranchod
eSignature
Date: 30-Jan-2020

Reviewed by: Dane J. Wacasey
eSignature
Date: 5-Feb-2020

Matrices: Soil

Carrier name: Client

- Shipping container/cooler in good condition? Yes [checked] No [] Not Present []
Custody seals intact on shipping container/cooler? Yes [checked] No [] Not Present []
Custody seals intact on sample bottles? Yes [] No [] Not Present [checked]
VOA/TX1005/TX1006 Solids in hermetically sealed vials? Yes [checked] No [] Not Present []
Chain of custody present? Yes [checked] No []
Chain of custody signed when relinquished and received? Yes [checked] No []
Samplers name present on COC? Yes [checked] No []
Chain of custody agrees with sample labels? Yes [] No [checked]
Samples in proper container/bottle? Yes [checked] No []
Sample containers intact? Yes [checked] No []
Sufficient sample volume for indicated test? Yes [checked] No []
All samples received within holding time? Yes [checked] No []
Container/Temp Blank temperature in compliance? Yes [checked] No []

1 Page(s)
COC IDs:214102

Temperature(s)/Thermometer(s): 0.4C UC/C IR # 25
Cooler(s)/Kit(s): 44381
Date/Time sample(s) sent to storage: 01/30/2020 21:00
Water - VOA vials have zero headspace? Yes [] No [] No VOA vials submitted [checked]
Water - pH acceptable upon receipt? Yes [] No [] N/A [checked]
pH adjusted? Yes [] No [] N/A [checked]
pH adjusted by:

Login Notes: Sample count differ COC=5 Rec'd 4 containers; all 2oz amber bottles empty

Client Contacted: Date Contacted: Person Contacted:
Contacted By: Regarding:
Comments:
Corrective Action:



Cincinnati, OH
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Fort Collins, CO
+1 970 490 1511

Holland, MI
+1 616 399 6070

Chain of Custody Form

Page 1 of 1

COC ID: 214102

HS20011451

Golder Associates Inc.
Houston TX-Wood Preserving Works



Customer Information		ALS Project Manager:	
Purchase Order		Project Information	
Work Order	UPRR/Kevin Peterburs	Project Name	Houston TX-Wood Preserving Works
Company Name	Golder Associates Inc.	Project Number	1620-11-Rev0 SR 92688
Send Report To	Eric Matzner	Bill To Company	Union Pacific Railroad- A/P
Address	2201 Double Creek Drive	Invoice Attn	Accounts Payable
	Suite 4004	Address	1400 Douglas Street
City/State/Zip	Round Rock, TX 78664	Address	Stop 0750
Phone	(512) 671-3434	City/State/Zip	Omaha NE 681790750
Fax	(512) 671-3446	Phone	
e-Mail Address	Eric_Matzner@golder.com	Fax	
		e-Mail Address	


A 8260_S (5652652 B,E,X)
 B 8270_LOW_S (5632532 SVOC - Naphthalene only)
 C MOIST_ASTM (5631931 Gen.Chem. MOIST%)
 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	SO-1820-SG022 (0.5-1) 20200129	1-29-20	0945	Soil	8.9	5	X	X	X								
2	SG022 (5.5-6)		1030														
3	SG021 (0.5-1)		1130														
4	SG021 (5.5-6)		1415														
5	SG020 (0.5-1)		1500														
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign <i>Anthony Reid</i>		Shipment Method <i>Hand Delivered</i>		Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> STD 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour				Results Due Date:	
Relinquished by: <i>[Signature]</i>		Date: <i>1-30-20</i>	Time: <i>1640</i>	Received by:		Notes: UPRR HWPW 1620-11			
Relinquished by: <i>[Signature]</i>		Date: <i>1/30/20</i>	Time: <i>16:40</i>	Received by (Laboratory): <i>J. Matzner</i>		Cooler ID: <i>44381</i>	Cooler Temp: <i>2.4</i>	QC Package: (Check One Box Below)	
Logged by (Laboratory):		Date:	Time:	Checked by (Laboratory):				<input type="checkbox"/> Level II Std OC	<input checked="" type="checkbox"/> TRRP Checklist
Preservative Key: 1-HCl 2-HNO ₃ 3-H ₂ SO ₄ 4-NaOH 5-Na ₂ S ₂ O ₃ 6-NaHSO ₄ 7-Other 8-4°C 9-5035								<input type="checkbox"/> Level III Std OC/Rel Date	<input type="checkbox"/> TRRP Level IV
								<input type="checkbox"/> Level IV SW846/CLP	<input type="checkbox"/> Other

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.

Copyright 2011 by ALS Environmental.

 ALS 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	u4381	CUSTODY SEAL		Seal Broken By:
		Date: 1-30-19	Time: 09:40	DM
		Name: Anthony Rold	Company: u4381	Date: 01/30/20

u4381 01/30/20



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

February 14, 2020

Eric Matzner
Golder Associates Inc.
2201 Double Creek Drive
Suite 4004
Round Rock, TX 78664

Work Order: **HS20020120**

Laboratory Results for: **Houston TX-Wood Preserving Works**

Dear Eric,

ALS Environmental received 9 sample(s) on Feb 04, 2020 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,

A handwritten signature in black ink, appearing to read 'Dane J. Wacasey'.

Generated By: DAYNA.FISHER
Dane J. Wacasey

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020120

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
- R10 Other problems or anomalies.
The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020120

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.



Dane J. Wacasey

Laboratory Review Checklist: Reportable Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/14/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020120			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 150335, R355926, R356283			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?	X				
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		X			1
		Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference effects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Supporting Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/14/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020120			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 150335, R355926, R356283			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);

NA = Not Applicable;

NR = Not Reviewed;

R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ALS Laboratory Group	LRC Date: 02/14/2020
Project Name: Houston TX-Wood Preserving Works	Laboratory Job Number: HS20020120
Reviewer Name: Dane Wacasey	Prep Batch Number(s): 150335, R355926, R356283

ER# ⁵	Description
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1	Batch R355926, Volatiles by Method SW8260, Sample HS20020179-09, MS and MSD were performed on an unrelated sample.
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Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);
NA = Not Applicable;
NR = Not Reviewed;
R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20020120

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20020120-01	SO-1620-SG-18(0.5-1)-2020203	Soil		03-Feb-2020 09:45	04-Feb-2020 13:00	<input type="checkbox"/>
HS20020120-02	SO-1620-SG-18(5.5-6)-2020203	Soil		03-Feb-2020 10:00	04-Feb-2020 13:00	<input type="checkbox"/>
HS20020120-03	SO-1620-SG-9(0.5-1)-2020203	Soil		03-Feb-2020 11:00	04-Feb-2020 13:00	<input type="checkbox"/>
HS20020120-04	SO-1620-SG-9(5.5-6)-2020203	Soil		03-Feb-2020 11:35	04-Feb-2020 13:00	<input type="checkbox"/>
HS20020120-05	SO-1620-SG-13(0.5-1)-2020203	Soil		03-Feb-2020 14:15	04-Feb-2020 13:00	<input type="checkbox"/>
HS20020120-06	SO-1620-SG-13(5.5-6)-2020203	Soil		03-Feb-2020 14:45	04-Feb-2020 13:00	<input type="checkbox"/>
HS20020120-07	SO-1620-SG-3(0.5-1)-2020203	Soil		03-Feb-2020 12:10	04-Feb-2020 13:00	<input checked="" type="checkbox"/>
HS20020120-08	SO-1620-SG-3(5.5-6)-2020203	Soil		03-Feb-2020 12:40	04-Feb-2020 13:00	<input checked="" type="checkbox"/>
HS20020120-09	SO-1620-DUP1-2020203	Soil		03-Feb-2020 12:40	04-Feb-2020 13:00	<input type="checkbox"/>

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG-18(0.5-1)-2020203
 Collection Date: 03-Feb-2020 09:45

ANALYTICAL REPORT

WorkOrder:HS20020120
 Lab ID:HS20020120-01
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C			Method:SW8260			Analyst: QX	
Benzene	0.0034	J	0.00048	0.0048	mg/Kg-dry	1	08-Feb-2020 18:34
Ethylbenzene	0.0034	J	0.00067	0.0048	mg/Kg-dry	1	08-Feb-2020 18:34
Xylenes, Total	0.0056		0.00095	0.0048	mg/Kg-dry	1	08-Feb-2020 18:34
Surr: 1,2-Dichloroethane-d4	88.2			70-126	%REC	1	08-Feb-2020 18:34
Surr: 4-Bromofluorobenzene	96.3			70-130	%REC	1	08-Feb-2020 18:34
Surr: Dibromofluoromethane	89.4			70-130	%REC	1	08-Feb-2020 18:34
Surr: Toluene-d8	97.7			70-130	%REC	1	08-Feb-2020 18:34
LOW-LEVEL SEMIVOLATILES BY 8270D			Method:SW8270			Prep:SW3541 / 05-Feb-2020 Analyst: LG	
Naphthalene		U	0.00069	0.0038	mg/Kg-dry	1	06-Feb-2020 17:00
Surr: 2-Fluorobiphenyl	87.0			43-125	%REC	1	06-Feb-2020 17:00
Surr: 4-Terphenyl-d14	84.2			32-125	%REC	1	06-Feb-2020 17:00
Surr: Nitrobenzene-d5	75.9			37-125	%REC	1	06-Feb-2020 17:00
MOISTURE - ASTM D2216			Method:ASTM D2216			Analyst: MWG	
Percent Moisture	13.7		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG-18(5.5-6)-2020203
 Collection Date: 03-Feb-2020 10:00

ANALYTICAL REPORT

WorkOrder:HS20020120
 Lab ID:HS20020120-02
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: QX			
Benzene	U		0.00054	0.0054	mg/Kg-dry	1	08-Feb-2020 18:59
Ethylbenzene	U		0.00076	0.0054	mg/Kg-dry	1	08-Feb-2020 18:59
Xylenes, Total	U		0.0011	0.0054	mg/Kg-dry	1	08-Feb-2020 18:59
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>87.5</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 18:59</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>96.8</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 18:59</i>
<i>Surr: Dibromofluoromethane</i>	<i>90.7</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 18:59</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 18:59</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 05-Feb-2020		Analyst: LG	
Naphthalene	0.0041		0.00070	0.0038	mg/Kg-dry	1	06-Feb-2020 17:19
<i>Surr: 2-Fluorobiphenyl</i>	<i>79.2</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>06-Feb-2020 17:19</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>88.4</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>06-Feb-2020 17:19</i>
<i>Surr: Nitrobenzene-d5</i>	<i>77.3</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>06-Feb-2020 17:19</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: MWG			
Percent Moisture	14.8		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG-9(0.5-1)-2020203
 Collection Date: 03-Feb-2020 11:00

ANALYTICAL REPORT

WorkOrder:HS20020120
 Lab ID:HS20020120-03
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260					Analyst: QX
Benzene		U	0.00052	0.0052	mg/Kg-dry	1	08-Feb-2020 19:24
Ethylbenzene		U	0.00074	0.0052	mg/Kg-dry	1	08-Feb-2020 19:24
Xylenes, Total		U	0.0010	0.0052	mg/Kg-dry	1	08-Feb-2020 19:24
Surr: 1,2-Dichloroethane-d4	88.2			70-126	%REC	1	08-Feb-2020 19:24
Surr: 4-Bromofluorobenzene	95.6			70-130	%REC	1	08-Feb-2020 19:24
Surr: Dibromofluoromethane	90.9			70-130	%REC	1	08-Feb-2020 19:24
Surr: Toluene-d8	99.9			70-130	%REC	1	08-Feb-2020 19:24
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270				Prep:SW3541 / 05-Feb-2020	Analyst: LG
Naphthalene	0.0042		0.00074	0.0041	mg/Kg-dry	1	06-Feb-2020 17:38
Surr: 2-Fluorobiphenyl	81.0			43-125	%REC	1	06-Feb-2020 17:38
Surr: 4-Terphenyl-d14	88.8			32-125	%REC	1	06-Feb-2020 17:38
Surr: Nitrobenzene-d5	81.0			37-125	%REC	1	06-Feb-2020 17:38
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: MWG
Percent Moisture	20.0		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG-9(5.5-6)-2020203
 Collection Date: 03-Feb-2020 11:35

ANALYTICAL REPORT

WorkOrder:HS20020120
 Lab ID:HS20020120-04
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260					Analyst: QX
Benzene		U	0.00082	0.0082	mg/Kg-dry	1	08-Feb-2020 19:49
Ethylbenzene		U	0.0012	0.0082	mg/Kg-dry	1	08-Feb-2020 19:49
Xylenes, Total		U	0.0016	0.0082	mg/Kg-dry	1	08-Feb-2020 19:49
<i>Surr: 1,2-Dichloroethane-d4</i>	86.6			70-126	%REC	1	08-Feb-2020 19:49
<i>Surr: 4-Bromofluorobenzene</i>	95.2			70-130	%REC	1	08-Feb-2020 19:49
<i>Surr: Dibromofluoromethane</i>	92.6			70-130	%REC	1	08-Feb-2020 19:49
<i>Surr: Toluene-d8</i>	100.0			70-130	%REC	1	08-Feb-2020 19:49
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270				Prep:SW3541 / 05-Feb-2020	Analyst: LG
Naphthalene		U	0.00072	0.0039	mg/Kg-dry	1	06-Feb-2020 17:58
<i>Surr: 2-Fluorobiphenyl</i>	82.1			43-125	%REC	1	06-Feb-2020 17:58
<i>Surr: 4-Terphenyl-d14</i>	80.5			32-125	%REC	1	06-Feb-2020 17:58
<i>Surr: Nitrobenzene-d5</i>	74.4			37-125	%REC	1	06-Feb-2020 17:58
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: MWG
Percent Moisture	17.3		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG-13(0.5-1)-2020203
 Collection Date: 03-Feb-2020 14:15

ANALYTICAL REPORT

WorkOrder:HS20020120
 Lab ID:HS20020120-05
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260					Analyst: QX
Benzene		U	0.00076	0.0076	mg/Kg-dry	1	08-Feb-2020 20:14
Ethylbenzene		U	0.0011	0.0076	mg/Kg-dry	1	08-Feb-2020 20:14
Xylenes, Total		U	0.0015	0.0076	mg/Kg-dry	1	08-Feb-2020 20:14
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>87.1</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 20:14</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.1</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 20:14</i>
<i>Surr: Dibromofluoromethane</i>	<i>89.2</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 20:14</i>
<i>Surr: Toluene-d8</i>	<i>102</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 20:14</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270				Prep:SW3541 / 05-Feb-2020	Analyst: LG
Naphthalene		U	0.00075	0.0041	mg/Kg-dry	1	06-Feb-2020 18:17
<i>Surr: 2-Fluorobiphenyl</i>	<i>78.0</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>06-Feb-2020 18:17</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>80.9</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>06-Feb-2020 18:17</i>
<i>Surr: Nitrobenzene-d5</i>	<i>72.2</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>06-Feb-2020 18:17</i>
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: MWG
Percent Moisture	20.0		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG-13(5.5-6)-2020203
 Collection Date: 03-Feb-2020 14:45

ANALYTICAL REPORT

WorkOrder:HS20020120
 Lab ID:HS20020120-06
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260					Analyst: QX
Benzene		U	0.00049	0.0049	mg/Kg-dry	1	08-Feb-2020 20:39
Ethylbenzene		U	0.00068	0.0049	mg/Kg-dry	1	08-Feb-2020 20:39
Xylenes, Total		U	0.00097	0.0049	mg/Kg-dry	1	08-Feb-2020 20:39
<i>Surr: 1,2-Dichloroethane-d4</i>	88.2			70-126	%REC	1	08-Feb-2020 20:39
<i>Surr: 4-Bromofluorobenzene</i>	96.6			70-130	%REC	1	08-Feb-2020 20:39
<i>Surr: Dibromofluoromethane</i>	92.8			70-130	%REC	1	08-Feb-2020 20:39
<i>Surr: Toluene-d8</i>	98.8			70-130	%REC	1	08-Feb-2020 20:39
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270				Prep:SW3541 / 05-Feb-2020	Analyst: LG
Naphthalene		U	0.00071	0.0039	mg/Kg-dry	1	06-Feb-2020 18:36
<i>Surr: 2-Fluorobiphenyl</i>	69.5			43-125	%REC	1	06-Feb-2020 18:36
<i>Surr: 4-Terphenyl-d14</i>	83.0			32-125	%REC	1	06-Feb-2020 18:36
<i>Surr: Nitrobenzene-d5</i>	71.5			37-125	%REC	1	06-Feb-2020 18:36
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: MWG
Percent Moisture	15.7		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-DUP1-2020203
 Collection Date: 03-Feb-2020 12:40

ANALYTICAL REPORT

WorkOrder:HS20020120
 Lab ID:HS20020120-09
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: QX			
Benzene	U		0.00040	0.0040	mg/Kg-dry	1	08-Feb-2020 21:04
Ethylbenzene	U		0.00056	0.0040	mg/Kg-dry	1	08-Feb-2020 21:04
Xylenes, Total	U		0.00080	0.0040	mg/Kg-dry	1	08-Feb-2020 21:04
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>88.7</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 21:04</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.6</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 21:04</i>
<i>Surr: Dibromofluoromethane</i>	<i>93.0</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 21:04</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>08-Feb-2020 21:04</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 05-Feb-2020		Analyst: LG	
Naphthalene	U		0.00069	0.0038	mg/Kg-dry	1	06-Feb-2020 18:55
<i>Surr: 2-Fluorobiphenyl</i>	<i>76.1</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>06-Feb-2020 18:55</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>83.6</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>06-Feb-2020 18:55</i>
<i>Surr: Nitrobenzene-d5</i>	<i>75.4</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>06-Feb-2020 18:55</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: MWG			
Percent Moisture	14.2		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Weight / Prep Log

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020120

Batch ID: 3597 **Start Date:** 05 Feb 2020 10:00 **End Date:** 05 Feb 2020 10:00
Method: VOLATILES BY SW8260C

Sample ID	Container	Sample Wt/Vol	Final Volume	Weight Factor	Container Type
HS20020120-01	1	6.133 (g)	5 (mL)	0.82	TerraCore (5035A)
HS20020120-02	1	5.413 (g)	5 (mL)	0.92	TerraCore (5035A)
HS20020120-03	1	5.923 (g)	5 (mL)	0.84	TerraCore (5035A)
HS20020120-04	1	3.683 (g)	5 (mL)	1.36	TerraCore (5035A)
HS20020120-05	1	4.14 (g)	5 (mL)	1.21	TerraCore (5035A)
HS20020120-06	1	6.075 (g)	5 (mL)	0.82	TerraCore (5035A)
HS20020120-09	1	7.218 (g)	5 (mL)	0.69	TerraCore (5035A)

Batch ID: 150335 **Start Date:** 05 Feb 2020 11:25 **End Date:** 05 Feb 2020 15:30
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541 **Prep Code:** 3541_B_LOW

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20020120-01		30.02 (g)	1 (mL)	0.03331
HS20020120-02		30.34 (g)	1 (mL)	0.03296
HS20020120-03		30.22 (g)	1 (mL)	0.03309
HS20020120-04		30.39 (g)	1 (mL)	0.03291
HS20020120-05		30.15 (g)	1 (mL)	0.03317
HS20020120-06		30.12 (g)	1 (mL)	0.0332
HS20020120-09		30.2 (g)	1 (mL)	0.03311

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020120

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 150335 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20020120-01	SO-1620-SG-18(0.5-1)-2020203	03 Feb 2020 09:45		05 Feb 2020 11:25	06 Feb 2020 17:00	1
HS20020120-02	SO-1620-SG-18(5.5-6)-2020203	03 Feb 2020 10:00		05 Feb 2020 11:25	06 Feb 2020 17:19	1
HS20020120-03	SO-1620-SG-9(0.5-1)-2020203	03 Feb 2020 11:00		05 Feb 2020 11:25	06 Feb 2020 17:38	1
HS20020120-04	SO-1620-SG-9(5.5-6)-2020203	03 Feb 2020 11:35		05 Feb 2020 11:25	06 Feb 2020 17:58	1
HS20020120-05	SO-1620-SG-13(0.5-1)-2020203	03 Feb 2020 14:15		05 Feb 2020 11:25	06 Feb 2020 18:17	1
HS20020120-06	SO-1620-SG-13(5.5-6)-2020203	03 Feb 2020 14:45		05 Feb 2020 11:25	06 Feb 2020 18:36	1
HS20020120-09	SO-1620-DUP1-2020203	03 Feb 2020 12:40		05 Feb 2020 11:25	06 Feb 2020 18:55	1
Batch ID: R355926 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020120-01	SO-1620-SG-18(0.5-1)-2020203	03 Feb 2020 09:45			08 Feb 2020 18:34	1
HS20020120-02	SO-1620-SG-18(5.5-6)-2020203	03 Feb 2020 10:00			08 Feb 2020 18:59	1
HS20020120-03	SO-1620-SG-9(0.5-1)-2020203	03 Feb 2020 11:00			08 Feb 2020 19:24	1
HS20020120-04	SO-1620-SG-9(5.5-6)-2020203	03 Feb 2020 11:35			08 Feb 2020 19:49	1
HS20020120-05	SO-1620-SG-13(0.5-1)-2020203	03 Feb 2020 14:15			08 Feb 2020 20:14	1
HS20020120-06	SO-1620-SG-13(5.5-6)-2020203	03 Feb 2020 14:45			08 Feb 2020 20:39	1
HS20020120-09	SO-1620-DUP1-2020203	03 Feb 2020 12:40			08 Feb 2020 21:04	1
Batch ID: R356283 (0)		Test Name : MOISTURE - ASTM D2216			Matrix: Soil	
HS20020120-01	SO-1620-SG-18(0.5-1)-2020203	03 Feb 2020 09:45			13 Feb 2020 11:17	1
HS20020120-02	SO-1620-SG-18(5.5-6)-2020203	03 Feb 2020 10:00			13 Feb 2020 11:17	1
HS20020120-03	SO-1620-SG-9(0.5-1)-2020203	03 Feb 2020 11:00			13 Feb 2020 11:17	1
HS20020120-04	SO-1620-SG-9(5.5-6)-2020203	03 Feb 2020 11:35			13 Feb 2020 11:17	1
HS20020120-05	SO-1620-SG-13(0.5-1)-2020203	03 Feb 2020 14:15			13 Feb 2020 11:17	1
HS20020120-06	SO-1620-SG-13(5.5-6)-2020203	03 Feb 2020 14:45			13 Feb 2020 11:17	1
HS20020120-09	SO-1620-DUP1-2020203	03 Feb 2020 12:40			13 Feb 2020 11:17	1

WorkOrder: HS20020120
 InstrumentID: SV-6
 Test Code: 8270_LOW_S
 Test Number: SW8270
 Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0019	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20020120
 InstrumentID: VOA5
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0016	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0016	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0016	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020120

QC BATCH REPORT

Batch ID: 150335 (0) **Instrument:** SV-6 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

MBLK		Sample ID: MBLK-150335		Units: ug/Kg		Analysis Date: 06-Feb-2020 08:25			
Client ID:		Run ID: SV-6_355779		SeqNo: 5463959		PrepDate: 05-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	U	3.3							
Surr: 2-Fluorobiphenyl	127.7	0	167	0	76.5	43 - 125			
Surr: 4-Terphenyl-d14	129.2	0	167	0	77.4	32 - 125			
Surr: Nitrobenzene-d5	111.8	0	167	0	66.9	37 - 125			

LCS		Sample ID: LCS-150335		Units: ug/Kg		Analysis Date: 06-Feb-2020 08:44			
Client ID:		Run ID: SV-6_355779		SeqNo: 5463960		PrepDate: 05-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	135.8	3.3	167	0	81.3	50 - 125			
Surr: 2-Fluorobiphenyl	135.7	0	167	0	81.2	43 - 125			
Surr: 4-Terphenyl-d14	133.2	0	167	0	79.8	32 - 125			
Surr: Nitrobenzene-d5	124.9	0	167	0	74.8	37 - 125			

MS		Sample ID: HS20020018-24MS		Units: ug/Kg		Analysis Date: 06-Feb-2020 15:02			
Client ID:		Run ID: SV-6_355779		SeqNo: 5463962		PrepDate: 05-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	108.8	3.3	166.8	2.438	63.8	50 - 125			
Surr: 2-Fluorobiphenyl	106.2	0	166.8	0	63.7	43 - 125			
Surr: 4-Terphenyl-d14	113.2	0	166.8	0	67.8	32 - 125			
Surr: Nitrobenzene-d5	104.5	0	166.8	0	62.6	37 - 125			

MSD		Sample ID: HS20020018-24MSD		Units: ug/Kg		Analysis Date: 06-Feb-2020 15:21			
Client ID:		Run ID: SV-6_355779		SeqNo: 5463963		PrepDate: 05-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	109.2	3.3	166.1	2.438	64.2	50 - 125	108.8	0.295	30
Surr: 2-Fluorobiphenyl	109.2	0	166.1	0	65.8	43 - 125	106.2	2.78	30
Surr: 4-Terphenyl-d14	112.8	0	166.1	0	67.9	32 - 125	113.2	0.348	30
Surr: Nitrobenzene-d5	97.48	0	166.1	0	58.7	37 - 125	104.5	6.96	30

The following samples were analyzed in this batch: HS20020120-01 HS20020120-02 HS20020120-03 HS20020120-04
 HS20020120-05 HS20020120-06 HS20020120-09

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020120

QC BATCH REPORT

Batch ID: R355926 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKS1-020820	Units: ug/Kg			Analysis Date: 08-Feb-2020 12:20				
Client ID:	Run ID: VOA5_355926	SeqNo: 5465160		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	44.68	0	50	0	89.4	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	48.29	0	50	0	96.6	80 - 120			
<i>Surr: Dibromofluoromethane</i>	46.86	0	50	0	93.7	80 - 119			
<i>Surr: Toluene-d8</i>	49.02	0	50	0	98.0	81 - 118			

LCS	Sample ID: VLCSS1-020820	Units: ug/Kg			Analysis Date: 08-Feb-2020 11:30				
Client ID:	Run ID: VOA5_355926	SeqNo: 5465159		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	51.97	5.0	50	0	104	75 - 124			
Ethylbenzene	56.35	5.0	50	0	113	70 - 123			
Xylenes, Total	151.2	5.0	150	0	101	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	47.79	0	50	0	95.6	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	49.74	0	50	0	99.5	80 - 120			
<i>Surr: Dibromofluoromethane</i>	50.68	0	50	0	101	80 - 119			
<i>Surr: Toluene-d8</i>	49.98	0	50	0	100.0	81 - 118			

MS	Sample ID: HS20020179-09MS	Units: ug/Kg			Analysis Date: 08-Feb-2020 13:10				
Client ID:	Run ID: VOA5_355926	SeqNo: 5465162		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	34.97	4.8	48.5	0	72.1	70 - 130			
Ethylbenzene	34.05	4.8	48.5	0	70.2	70 - 130			
Xylenes, Total	92.59	4.8	145.5	0	63.6	70 - 130			S
<i>Surr: 1,2-Dichloroethane-d4</i>	47.1	0	48.5	0	97.1	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	48.18	0	48.5	0	99.3	70 - 130			
<i>Surr: Dibromofluoromethane</i>	48.78	0	48.5	0	101	70 - 130			
<i>Surr: Toluene-d8</i>	48.47	0	48.5	0	99.9	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020120

QC BATCH REPORT

Batch ID: R355926 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C						
MSD	Sample ID: HS20020179-09MSD	Units: ug/Kg			Analysis Date: 08-Feb-2020 13:35					
Client ID:	Run ID: VOA5_355926	SeqNo: 5465163		PrepDate:		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	36.35	5.2	51.5	0	70.6	70 - 130	34.97	3.87	30	
Ethylbenzene	35.45	5.2	51.5	0	68.8	70 - 130	34.05	4.03	30	S
Xylenes, Total	96.33	5.2	154.5	0	62.4	70 - 130	92.59	3.97	30	S
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>50.64</i>	<i>0</i>	<i>51.5</i>	<i>0</i>	<i>98.3</i>	<i>70 - 126</i>	<i>47.1</i>	<i>7.25</i>	<i>30</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>51.32</i>	<i>0</i>	<i>51.5</i>	<i>0</i>	<i>99.6</i>	<i>70 - 130</i>	<i>48.18</i>	<i>6.3</i>	<i>30</i>	
<i>Surr: Dibromofluoromethane</i>	<i>52.29</i>	<i>0</i>	<i>51.5</i>	<i>0</i>	<i>102</i>	<i>70 - 130</i>	<i>48.78</i>	<i>6.95</i>	<i>30</i>	
<i>Surr: Toluene-d8</i>	<i>52.49</i>	<i>0</i>	<i>51.5</i>	<i>0</i>	<i>102</i>	<i>70 - 130</i>	<i>48.47</i>	<i>7.97</i>	<i>30</i>	

The following samples were analyzed in this batch:

HS20020120-01	HS20020120-02	HS20020120-03	HS20020120-04
HS20020120-05	HS20020120-06	HS20020120-09	

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020120

QC BATCH REPORT

Batch ID: R356283 (0)		Instrument: Balance1		Method: MOISTURE - ASTM D2216					
DUP	Sample ID: HS20020120-09DUP	Units: wt%		Analysis Date: 13-Feb-2020 11:17					
Client ID: SO-1620-DUP1-2020203	Run ID: Balance1_356283	SeqNo: 5473179		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Percent Moisture	13.6	0.0100					14.2	4.32	20
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The following samples were analyzed in this batch:

HS20020120-01	HS20020120-02	HS20020120-03	HS20020120-04
HS20020120-05	HS20020120-06	HS20020120-09	

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020120

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg-dry	Milligrams per Kilogram- Dry weight corrected

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2020	31-Dec-2020
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	T104704231-19-25	30-Apr-2020

Sample Receipt Checklist

Client Name: PBW
Work Order: HS20020120

Date/Time Received: 04-Feb-2020 13:00
Received by: PS

Checklist completed by: Nilesh D. Ranchod
eSignature
Date: 4-Feb-2020

Reviewed by: Dane J. Wacasey
eSignature
Date: 5-Feb-2020

Matrices: Soil

Carrier name: ALS Courier

- Shipping container/cooler in good condition? Yes [checked] No [] Not Present []
Custody seals intact on shipping container/cooler? Yes [] No [] Not Present [checked]
Custody seals intact on sample bottles? Yes [] No [] Not Present [checked]
VOA/TX1005/TX1006 Solids in hermetically sealed vials? Yes [checked] No [] Not Present []
Chain of custody present? Yes [checked] No []
Chain of custody signed when relinquished and received? Yes [checked] No []
Samplers name present on COC? Yes [checked] No []
Chain of custody agrees with sample labels? Yes [] No [checked]
Samples in proper container/bottle? Yes [checked] No []
Sample containers intact? Yes [checked] No []
Sufficient sample volume for indicated test? Yes [] No [checked]
All samples received within holding time? Yes [checked] No []
Container/Temp Blank temperature in compliance? Yes [checked] No []

1 Page(s)
COC IDs:214093

Temperature(s)/Thermometer(s): 1.6°C UC/C IR # 25
Cooler(s)/Kit(s): 43453
Date/Time sample(s) sent to storage: 02/04/2020 18:00
Water - VOA vials have zero headspace? Yes [] No [] No VOA vials submitted [checked]
Water - pH acceptable upon receipt? Yes [] No [] N/A [checked]
pH adjusted? Yes [] No [] N/A [checked]
pH adjusted by:

Login Notes: Sample Count Differ all samples COC=5 Received 4.
Sample SG-3 (5.5-6) 2oz amber bulk received empty. (2/4/20: Per M. Hermiston, SG-3 samples will be re-collected. Place SG-3 samples on hold)

Client Contacted: Date Contacted: Person Contacted:
Contacted By: Regarding:
Comments:
Corrective Action:



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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 For

Page 1 of 1

COC ID: 214093

HS20020120

Golder Associates Inc.
Houston TX-Wood Preserving Works



Customer Information		Project Information		ALS Project Manager:																	
Purchase Order	UPRR/Kevin Peterburs	Project Name	Houston TX-Wood Preserving Works	A																	
Work Order		Project Number	1620-11-Rev0 SR 92688	B																	
Company Name	Golder Associates Inc.	Bill To Company	Union Pacific Railroad- A/P	C																	
Send Report To	Eric Matzner	Invoice Attn	Accounts Payable	D																	
Address	2201 Double Creek Drive Suite 4004	Address	1400 Douglas Street Stop 0750	E																	
City/State/Zip	Round Rock, TX 78664	City/State/Zip	Omaha NE 681790750	F																	
Phone	(512) 671-3434	Phone		G																	
Fax	(512) 671-3446	Fax		H																	
e-Mail Address	Eric_Matzner@golder.com	e-Mail Address		I																	
				J																	

8260_S (5652652 B,E,X)
 8270_LOW_S (5632532 SVOC - Naphthalene only)
 MOIST_ASTM (5631931 Gen.Chem. MOIST%)

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	SO-1620-56-18 (0.5-1) - 2020203	2/3/20	0945	Soil	8.9	5	X	X	X								
2	56-18 (5.5-6)		1006														
3	56-9 (0.5-1)		1100														
4	56-9 (5.5-6)		1135														
5	56-13 (0.5-1)	1415	1415														
6	56-13 (5.5-6)		1445														
7	56-3 (0.5-1)		1210														
8	56-3 (5.5-6)		1240														
9	DUP-1		1240														
10																	

Sampler(s) Please Print & Sign <i>Tom Nickels</i>		Shipment Method <i>Lab Courier</i>		Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> STD 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour				Results Due Date:			
Relinquished by: <i>[Signature]</i>		Date: 2/4/20	Time: 0800	Received by: <i>[Signature]</i>		Notes: UPRR HWPW 1620-11					
Relinquished by: <i>[Signature]</i>		Date: 2-4-20	Time: 0830	Received by (Laboratory): <i>[Signature]</i>		Cooler ID: U3435	Cooler Temp: 1.6	QC Package: (Check One Box Below)			
Logged by (Laboratory): <i>[Signature]</i>		Date: 2/4/20	Time: 1300	Checked by (Laboratory): <i>[Signature]</i>		<input type="checkbox"/> Level II Std CC	<input checked="" type="checkbox"/> TRRP Checklist				
Preservative Key: 1-HCl 2-HNO ₃ 3-H ₂ SO ₄ 4-NaOH 5-Na ₂ S ₂ O ₈ 6-NaHSO ₄ 7-Other 8-4°C 9-5035						<input type="checkbox"/> Level III Std CC/Raw Data	<input type="checkbox"/> TRRP Level IV				
						<input type="checkbox"/> Level IV SW/846/CLP	<input type="checkbox"/> Other				

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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February 14, 2020

Eric Matzner
Golder Associates Inc.
2201 Double Creek Drive
Suite 4004
Round Rock, TX 78664

Work Order: **HS20020243**

Laboratory Results for: **Houston TX-Wood Preserving Works**

Dear Eric,

ALS Environmental received 4 sample(s) on Feb 06, 2020 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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
- R10 Other problems or anomalies.
The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.



Dane J. Wacasey

Laboratory Review Checklist: Reportable Data

Laboratory Name: ALS Laboratory Group			LRC Date: 02/14/2020				
Project Name: Houston TX-Wood Preserving Works			Laboratory Job Number: HS20020243				
Reviewer Name: Dane Wacasey			Prep Batch Number(s): 150435, R355985, R356088, R356209, R356241				
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?	X				
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		X			1
		Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference affects on the sample results?	X				2
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Supporting Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/14/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020243			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 150435, R355985, R356088, R356209, R356241			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);
NA = Not Applicable;
NR = Not Reviewed;
R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ALS Laboratory Group	LRC Date: 02/14/2020
Project Name: Houston TX-Wood Preserving Works	Laboratory Job Number: HS20020243
Reviewer Name: Dane Wacasey	Prep Batch Number(s): 150435, R355985, R356088, R356209, R356241

ER# ⁵	Description
1	Batch 150435, Semivolatiles by method SW8270, Sample HS20020244-01, MS was performed on an unrelated sample. Batch R355985, Volatiles by Method SW8260, Sample HS20020280-02, MS was performed on an unrelated sample.
2	Batch 150435, Semivolatiles by method SW8270, Sample SO-1620-SG11(0.5-1) 20200206, The GCMS semi-volatile extract of this sample was run at a dilution due to a high level of matrix interference.

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
 O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);
 NA = Not Applicable;
 NR = Not Reviewed;
 R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20020243

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20020243-01	SO-1620-SG03(0.5-1) 20200205	Soil		05-Feb-2020 10:30	06-Feb-2020 16:05	<input type="checkbox"/>
HS20020243-02	SO-1620-SG03(5.5-6) 20200205	Soil		05-Feb-2020 10:45	06-Feb-2020 16:05	<input type="checkbox"/>
HS20020243-03	SO-1620-SG11(0.5-1) 20200206	Soil		06-Feb-2020 13:40	06-Feb-2020 16:05	<input type="checkbox"/>
HS20020243-04	SO-1620-SG11(5.5-6) 20200206	Soil		06-Feb-2020 14:00	06-Feb-2020 16:05	<input type="checkbox"/>

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG03(0.5-1) 20200205
 Collection Date: 05-Feb-2020 10:30

ANALYTICAL REPORT
 WorkOrder:HS20020243
 Lab ID:HS20020243-01
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED	
VOLATILES BY SW8260C		Method:SW8260					Analyst: QX	
Benzene	U		0.00037	0.0037	mg/Kg-dry	1	10-Feb-2020 21:02	
Ethylbenzene	U		0.00052	0.0037	mg/Kg-dry	1	10-Feb-2020 21:02	
Xylenes, Total	0.0066		0.00075	0.0037	mg/Kg-dry	1	10-Feb-2020 21:02	
Surr: 1,2-Dichloroethane-d4	102			70-126	%REC	1	10-Feb-2020 21:02	
Surr: 4-Bromofluorobenzene	100			70-130	%REC	1	10-Feb-2020 21:02	
Surr: Dibromofluoromethane	99.1			70-130	%REC	1	10-Feb-2020 21:02	
Surr: Toluene-d8	101			70-130	%REC	1	10-Feb-2020 21:02	
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270					Prep:SW3541 / 07-Feb-2020 Analyst: GEY	
Naphthalene	0.0018	J	0.00072	0.0040	mg/Kg-dry	1	07-Feb-2020 20:28	
Surr: 2-Fluorobiphenyl	78.8			43-125	%REC	1	07-Feb-2020 20:28	
Surr: 4-Terphenyl-d14	74.4			32-125	%REC	1	07-Feb-2020 20:28	
Surr: Nitrobenzene-d5	56.9			37-125	%REC	1	07-Feb-2020 20:28	
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: DFF	
Percent Moisture	17.2		0.0100	0.0100	wt%	1	12-Feb-2020 13:39	

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG03(5.5-6) 20200205
 Collection Date: 05-Feb-2020 10:45

ANALYTICAL REPORT

WorkOrder:HS20020243
 Lab ID:HS20020243-02
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260					Analyst: QX
Benzene	U		0.00071	0.0071	mg/Kg-dry	1	11-Feb-2020 15:54
Ethylbenzene	U		0.0010	0.0071	mg/Kg-dry	1	11-Feb-2020 15:54
Xylenes, Total	U		0.0014	0.0071	mg/Kg-dry	1	11-Feb-2020 15:54
Surr: 1,2-Dichloroethane-d4	114			70-126	%REC	1	11-Feb-2020 15:54
Surr: 4-Bromofluorobenzene	105			70-130	%REC	1	11-Feb-2020 15:54
Surr: Dibromofluoromethane	106			70-130	%REC	1	11-Feb-2020 15:54
Surr: Toluene-d8	106			70-130	%REC	1	11-Feb-2020 15:54
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270				Prep:SW3541 / 07-Feb-2020	Analyst: GEY
Naphthalene	0.0017	J	0.00069	0.0038	mg/Kg-dry	1	07-Feb-2020 20:47
Surr: 2-Fluorobiphenyl	67.4			43-125	%REC	1	07-Feb-2020 20:47
Surr: 4-Terphenyl-d14	72.1			32-125	%REC	1	07-Feb-2020 20:47
Surr: Nitrobenzene-d5	50.2			37-125	%REC	1	07-Feb-2020 20:47
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: DFF
Percent Moisture	13.7		0.0100	0.0100	wt%	1	12-Feb-2020 13:39

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG11(0.5-1) 20200206
 Collection Date: 06-Feb-2020 13:40

ANALYTICAL REPORT

WorkOrder:HS20020243
 Lab ID:HS20020243-03
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: QX			
Benzene	U		0.00070	0.0070	mg/Kg-dry	1	11-Feb-2020 16:19
Ethylbenzene	U		0.00098	0.0070	mg/Kg-dry	1	11-Feb-2020 16:19
Xylenes, Total	U		0.0014	0.0070	mg/Kg-dry	1	11-Feb-2020 16:19
Surr: 1,2-Dichloroethane-d4	118			70-126	%REC	1	11-Feb-2020 16:19
Surr: 4-Bromofluorobenzene	103			70-130	%REC	1	11-Feb-2020 16:19
Surr: Dibromofluoromethane	108			70-130	%REC	1	11-Feb-2020 16:19
Surr: Toluene-d8	106			70-130	%REC	1	11-Feb-2020 16:19
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 07-Feb-2020		Analyst: GEY	
Naphthalene	0.0084	J	0.0065	0.036	mg/Kg-dry	10	07-Feb-2020 21:06
Surr: 2-Fluorobiphenyl	88.6			43-125	%REC	10	07-Feb-2020 21:06
Surr: 4-Terphenyl-d14	82.4			32-125	%REC	10	07-Feb-2020 21:06
Surr: Nitrobenzene-d5	61.4			37-125	%REC	10	07-Feb-2020 21:06
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	8.37		0.0100	0.0100	wt%	1	12-Feb-2020 13:39

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG11(5.5-6) 20200206
 Collection Date: 06-Feb-2020 14:00

ANALYTICAL REPORT

WorkOrder:HS20020243
 Lab ID:HS20020243-04
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260					Analyst: WLR
Benzene		U	0.00032	0.0032	mg/Kg-dry	1	13-Feb-2020 16:56
Ethylbenzene		U	0.00045	0.0032	mg/Kg-dry	1	13-Feb-2020 16:56
Xylenes, Total		U	0.00064	0.0032	mg/Kg-dry	1	13-Feb-2020 16:56
<i>Surr: 1,2-Dichloroethane-d4</i>	89.0			70-126	%REC	1	13-Feb-2020 16:56
<i>Surr: 4-Bromofluorobenzene</i>	96.5			70-130	%REC	1	13-Feb-2020 16:56
<i>Surr: Dibromofluoromethane</i>	93.9			70-130	%REC	1	13-Feb-2020 16:56
<i>Surr: Toluene-d8</i>	102			70-130	%REC	1	13-Feb-2020 16:56
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270				Prep:SW3541 / 07-Feb-2020	Analyst: GEY
Naphthalene	0.0011	J	0.00069	0.0038	mg/Kg-dry	1	07-Feb-2020 21:25
<i>Surr: 2-Fluorobiphenyl</i>	73.2			43-125	%REC	1	07-Feb-2020 21:25
<i>Surr: 4-Terphenyl-d14</i>	59.3			32-125	%REC	1	07-Feb-2020 21:25
<i>Surr: Nitrobenzene-d5</i>	49.7			37-125	%REC	1	07-Feb-2020 21:25
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: DFF
Percent Moisture	12.8		0.0100	0.0100	wt%	1	12-Feb-2020 13:39

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

Weight / Prep Log

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

Batch ID: 3602 **Start Date:** 07 Feb 2020 09:46 **End Date:** 07 Feb 2020 09:46
Method: VOLATILES BY SW8260C

Sample ID	Container	Sample Wt/Vol	Final Volume	Weight Factor	Container Type
HS20020243-01	1	8.032 (g)	5 (mL)	0.62	TerraCore (5035A)
HS20020243-02	1	4.05 (g)	5 (mL)	1.23	TerraCore (5035A)
HS20020243-03	1	3.902 (g)	5 (mL)	1.28	TerraCore (5035A)
HS20020243-04	1	8.912 (g)	5 (mL)	0.56	TerraCore (5035A)

Batch ID: 150435 **Start Date:** 07 Feb 2020 08:00 **End Date:** 07 Feb 2020 15:30
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541 **Prep Code:** 3541_B_LOW

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20020243-01		30.01 (g)	1 (mL)	0.03332
HS20020243-02		30.05 (g)	1 (mL)	0.03328
HS20020243-03		30.04 (g)	1 (mL)	0.03329
HS20020243-04		30.09 (g)	1 (mL)	0.03323

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 150435 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20020243-01	SO-1620-SG03(0.5-1) 20200205	05 Feb 2020 10:30		07 Feb 2020 08:00	07 Feb 2020 20:28	1
HS20020243-02	SO-1620-SG03(5.5-6) 20200205	05 Feb 2020 10:45		07 Feb 2020 08:00	07 Feb 2020 20:47	1
HS20020243-03	SO-1620-SG11(0.5-1) 20200206	06 Feb 2020 13:40		07 Feb 2020 08:00	07 Feb 2020 21:06	10
HS20020243-04	SO-1620-SG11(5.5-6) 20200206	06 Feb 2020 14:00		07 Feb 2020 08:00	07 Feb 2020 21:25	1
Batch ID: R355985 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020243-01	SO-1620-SG03(0.5-1) 20200205	05 Feb 2020 10:30			10 Feb 2020 21:02	1
Batch ID: R356088 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020243-02	SO-1620-SG03(5.5-6) 20200205	05 Feb 2020 10:45			11 Feb 2020 15:54	1
HS20020243-03	SO-1620-SG11(0.5-1) 20200206	06 Feb 2020 13:40			11 Feb 2020 16:19	1
Batch ID: R356209 (0)		Test Name : MOISTURE - ASTM D2216			Matrix: Soil	
HS20020243-01	SO-1620-SG03(0.5-1) 20200205	05 Feb 2020 10:30			12 Feb 2020 13:39	1
HS20020243-02	SO-1620-SG03(5.5-6) 20200205	05 Feb 2020 10:45			12 Feb 2020 13:39	1
HS20020243-03	SO-1620-SG11(0.5-1) 20200206	06 Feb 2020 13:40			12 Feb 2020 13:39	1
HS20020243-04	SO-1620-SG11(5.5-6) 20200206	06 Feb 2020 14:00			12 Feb 2020 13:39	1
Batch ID: R356241 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020243-04	SO-1620-SG11(5.5-6) 20200206	06 Feb 2020 14:00			13 Feb 2020 16:56	1

WorkOrder: HS20020243
 InstrumentID: SV-7
 Test Code: 8270_LOW_S
 Test Number: SW8270
 Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0018	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20020243
 InstrumentID: VOA5
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0016	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0016	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0016	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

QC BATCH REPORT

Batch ID: 150435 (0)		Instrument: SV-7		Method: LOW-LEVEL SEMIVOLATILES BY 8270D						
MBLK	Sample ID: MBLK-150435	Units: ug/Kg			Analysis Date: 07-Feb-2020 11:34					
Client ID:	Run ID: SV-7_355905	SeqNo: 5464751		PrepDate: 07-Feb-2020		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Naphthalene	U	3.3								
Surr: 2-Fluorobiphenyl	103.6	0	167	0	62.1	43 - 125				
Surr: 4-Terphenyl-d14	123.6	0	167	0	74.0	32 - 125				
Surr: Nitrobenzene-d5	94.28	0	167	0	56.5	37 - 125				
LCS	Sample ID: LCS-150435	Units: ug/Kg			Analysis Date: 07-Feb-2020 11:53					
Client ID:	Run ID: SV-7_355905	SeqNo: 5464752		PrepDate: 07-Feb-2020		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Naphthalene	120.9	3.3	167	0	72.4	50 - 125				
Surr: 2-Fluorobiphenyl	129.4	0	167	0	77.5	43 - 125				
Surr: 4-Terphenyl-d14	135.5	0	167	0	81.1	32 - 125				
Surr: Nitrobenzene-d5	108.9	0	167	0	65.2	37 - 125				
MS	Sample ID: HS20020244-01MS	Units: ug/Kg			Analysis Date: 07-Feb-2020 16:39					
Client ID:	Run ID: SV-7_355905	SeqNo: 5465991		PrepDate: 07-Feb-2020		DF: 10				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Naphthalene	447.5	33	166.7	394	32.0	50 - 125			S	
Surr: 2-Fluorobiphenyl	150.4	0	166.7	0	90.2	43 - 125				
Surr: 4-Terphenyl-d14	105.7	0	166.7	0	63.4	32 - 125				
Surr: Nitrobenzene-d5	132	0	166.7	0	79.2	37 - 125				
MSD	Sample ID: HS20020244-01MSD	Units: ug/Kg			Analysis Date: 07-Feb-2020 16:58					
Client ID:	Run ID: SV-7_355905	SeqNo: 5465992		PrepDate: 07-Feb-2020		DF: 10				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Naphthalene	525.7	33	166.6	394	79.0	50 - 125	447.5	16.1	30	
Surr: 2-Fluorobiphenyl	159.4	0	166.6	0	95.7	43 - 125	150.4	5.81	30	
Surr: 4-Terphenyl-d14	104.4	0	166.6	0	62.7	32 - 125	105.7	1.15	30	
Surr: Nitrobenzene-d5	158.3	0	166.6	0	95.0	37 - 125	132	18.1	30	

The following samples were analyzed in this batch: HS20020243-01 HS20020243-02 HS20020243-03 HS20020243-04

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

QC BATCH REPORT

Batch ID: R355985 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKS1-021020	Units: ug/Kg			Analysis Date: 10-Feb-2020 12:43				
Client ID:	Run ID: VOA5_355985	SeqNo: 5466616		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	49.26	0	50	0	98.5	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	49.3	0	50	0	98.6	80 - 120			
<i>Surr: Dibromofluoromethane</i>	47.86	0	50	0	95.7	80 - 119			
<i>Surr: Toluene-d8</i>	49.84	0	50	0	99.7	81 - 118			

LCS	Sample ID: VLCSS1-021020	Units: ug/Kg			Analysis Date: 10-Feb-2020 11:53				
Client ID:	Run ID: VOA5_355985	SeqNo: 5466615		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	47.28	5.0	50	0	94.6	75 - 124			
Ethylbenzene	50.95	5.0	50	0	102	70 - 123			
Xylenes, Total	134.9	5.0	150	0	89.9	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	47.85	0	50	0	95.7	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	48.72	0	50	0	97.4	80 - 120			
<i>Surr: Dibromofluoromethane</i>	49.94	0	50	0	99.9	80 - 119			
<i>Surr: Toluene-d8</i>	48.92	0	50	0	97.8	81 - 118			

MS	Sample ID: HS20020280-02MS	Units: ug/Kg			Analysis Date: 10-Feb-2020 14:22				
Client ID:	Run ID: VOA5_355985	SeqNo: 5466619		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	33.09	4.8	48.5	0	68.2	70 - 130			S
Ethylbenzene	23.88	4.8	48.5	0	49.2	70 - 130			S
Xylenes, Total	61.38	4.8	145.5	4.78	38.9	70 - 130			S
<i>Surr: 1,2-Dichloroethane-d4</i>	47.86	0	48.5	0	98.7	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	48.37	0	48.5	0	99.7	70 - 130			
<i>Surr: Dibromofluoromethane</i>	48.23	0	48.5	0	99.4	70 - 130			
<i>Surr: Toluene-d8</i>	48.16	0	48.5	0	99.3	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

QC BATCH REPORT

Batch ID: R355985 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C						
MSD	Sample ID: HS20020280-02MSD	Units: ug/Kg			Analysis Date: 10-Feb-2020 14:47					
Client ID:	Run ID: VOA5_355985	SeqNo: 5466620		PrepDate:		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	44.38	5.0	50.5	0	87.9	70 - 130	33.09	29.1	30	
Ethylbenzene	31.59	5.0	50.5	0	62.6	70 - 130	23.88	27.8	30	S
Xylenes, Total	80.08	5.0	151.5	4.78	49.7	70 - 130	61.38	26.4	30	S
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>49.11</i>	<i>0</i>	<i>50.5</i>	<i>0</i>	<i>97.3</i>	<i>70 - 126</i>	<i>47.86</i>	<i>2.58</i>	<i>30</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>50.61</i>	<i>0</i>	<i>50.5</i>	<i>0</i>	<i>100</i>	<i>70 - 130</i>	<i>48.37</i>	<i>4.52</i>	<i>30</i>	
<i>Surr: Dibromofluoromethane</i>	<i>51.23</i>	<i>0</i>	<i>50.5</i>	<i>0</i>	<i>101</i>	<i>70 - 130</i>	<i>48.23</i>	<i>6.04</i>	<i>30</i>	
<i>Surr: Toluene-d8</i>	<i>50.91</i>	<i>0</i>	<i>50.5</i>	<i>0</i>	<i>101</i>	<i>70 - 130</i>	<i>48.16</i>	<i>5.54</i>	<i>30</i>	

The following samples were analyzed in this batch: HS20020243-01

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

QC BATCH REPORT

Batch ID: R356088 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKS1-022011	Units: ug/Kg			Analysis Date: 11-Feb-2020 13:24				
Client ID:	Run ID: VOA5_356088	SeqNo: 5468643		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	59.86	0	50	0	120	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	52.54	0	50	0	105	80 - 120			
<i>Surr: Dibromofluoromethane</i>	53.86	0	50	0	108	80 - 119			
<i>Surr: Toluene-d8</i>	52.74	0	50	0	105	81 - 118			

LCS	Sample ID: VLCSS1-022011	Units: ug/Kg			Analysis Date: 11-Feb-2020 12:35				
Client ID:	Run ID: VOA5_356088	SeqNo: 5468642		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	59.21	5.0	50	0	118	75 - 124			
Ethylbenzene	59.17	5.0	50	0	118	70 - 123			
Xylenes, Total	157.5	5.0	150	0	105	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	57.36	0	50	0	115	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	53.37	0	50	0	107	80 - 120			
<i>Surr: Dibromofluoromethane</i>	56.8	0	50	0	114	80 - 119			
<i>Surr: Toluene-d8</i>	53.01	0	50	0	106	81 - 118			

MS	Sample ID: HS20020288-11MS	Units: ug/Kg			Analysis Date: 11-Feb-2020 14:39				
Client ID:	Run ID: VOA5_356088	SeqNo: 5468645		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	48.37	5.3	53	0	91.3	70 - 130			
Ethylbenzene	45.68	5.3	53	0	86.2	70 - 130			
Xylenes, Total	122.4	5.3	159	0	77.0	70 - 130			
<i>Surr: 1,2-Dichloroethane-d4</i>	62.72	0	53	0	118	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	56.62	0	53	0	107	70 - 130			
<i>Surr: Dibromofluoromethane</i>	60.52	0	53	0	114	70 - 130			
<i>Surr: Toluene-d8</i>	56.29	0	53	0	106	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

QC BATCH REPORT

Batch ID: R356088 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C						
MSD	Sample ID: HS20020288-11MSD	Units: ug/Kg			Analysis Date: 11-Feb-2020 15:04					
Client ID:	Run ID: VOA5_356088	SeqNo: 5468646		PrepDate:		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	50.5	5.3	53	0	95.3	70 - 130	48.37	4.32	30	
Ethylbenzene	47.93	5.3	53	0	90.4	70 - 130	45.68	4.81	30	
Xylenes, Total	128.6	5.3	159	0	80.9	70 - 130	122.4	4.94	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>63.79</i>	<i>0</i>	<i>53</i>	<i>0</i>	<i>120</i>	<i>70 - 126</i>	<i>62.72</i>	<i>1.69</i>	<i>30</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>57.15</i>	<i>0</i>	<i>53</i>	<i>0</i>	<i>108</i>	<i>70 - 130</i>	<i>56.62</i>	<i>0.93</i>	<i>30</i>	
<i>Surr: Dibromofluoromethane</i>	<i>60.69</i>	<i>0</i>	<i>53</i>	<i>0</i>	<i>115</i>	<i>70 - 130</i>	<i>60.52</i>	<i>0.289</i>	<i>30</i>	
<i>Surr: Toluene-d8</i>	<i>56.37</i>	<i>0</i>	<i>53</i>	<i>0</i>	<i>106</i>	<i>70 - 130</i>	<i>56.29</i>	<i>0.149</i>	<i>30</i>	

The following samples were analyzed in this batch: HS20020243-02 HS20020243-03

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

QC BATCH REPORT

Batch ID: R356241 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKS1-021320	Units: ug/Kg			Analysis Date: 13-Feb-2020 14:52				
Client ID:	Run ID: VOA5_356241	SeqNo: 5472076		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	44.98	0	50	0	90.0	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	49.47	0	50	0	98.9	80 - 120			
<i>Surr: Dibromofluoromethane</i>	48.02	0	50	0	96.0	80 - 119			
<i>Surr: Toluene-d8</i>	51.05	0	50	0	102	81 - 118			

LCS	Sample ID: VLCSS1-021320	Units: ug/Kg			Analysis Date: 13-Feb-2020 14:02				
Client ID:	Run ID: VOA5_356241	SeqNo: 5472075		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	57	5.0	50	0	114	75 - 124			
Ethylbenzene	59.18	5.0	50	0	118	70 - 123			
Xylenes, Total	178.5	5.0	150	0	119	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	48.05	0	50	0	96.1	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	49.7	0	50	0	99.4	80 - 120			
<i>Surr: Dibromofluoromethane</i>	50.37	0	50	0	101	80 - 119			
<i>Surr: Toluene-d8</i>	49.56	0	50	0	99.1	81 - 118			

MS	Sample ID: HS20020243-04MS	Units: ug/Kg			Analysis Date: 13-Feb-2020 16:07				
Client ID: SO-1620-SG11(5.5-6) 20200206	Run ID: VOA5_356241	SeqNo: 5472463		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	57.37	5.0	50	0	115	70 - 130			
Ethylbenzene	58.66	5.0	50	0	117	70 - 130			
Xylenes, Total	175	5.0	150	0	117	70 - 130			
<i>Surr: 1,2-Dichloroethane-d4</i>	47.79	0	50	0	95.6	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	49.77	0	50	0	99.5	70 - 130			
<i>Surr: Dibromofluoromethane</i>	50.12	0	50	0	100	70 - 130			
<i>Surr: Toluene-d8</i>	50.23	0	50	0	100	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

QC BATCH REPORT

Batch ID: R356241 (0) **Instrument:** VOA5 **Method:** VOLATILES BY SW8260C

MSD		Sample ID: HS20020243-04MSD			Units: ug/Kg		Analysis Date: 13-Feb-2020 16:31			
Client ID: SO-1620-SG11(5.5-6) 20200206		Run ID: VOA5_356241			SeqNo: 5472464		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	54.71	5.2	52	0	105	70 - 130	57.37	4.74	30	
Ethylbenzene	54.49	5.2	52	0	105	70 - 130	58.66	7.38	30	
Xylenes, Total	166.4	5.2	156	0	107	70 - 130	175	5.07	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>49.83</i>	<i>0</i>	<i>52</i>	<i>0</i>	<i>95.8</i>	<i>70 - 126</i>	<i>47.79</i>	<i>4.17</i>	<i>30</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>51.63</i>	<i>0</i>	<i>52</i>	<i>0</i>	<i>99.3</i>	<i>70 - 130</i>	<i>49.77</i>	<i>3.68</i>	<i>30</i>	
<i>Surr: Dibromofluoromethane</i>	<i>52.03</i>	<i>0</i>	<i>52</i>	<i>0</i>	<i>100</i>	<i>70 - 130</i>	<i>50.12</i>	<i>3.73</i>	<i>30</i>	
<i>Surr: Toluene-d8</i>	<i>52.62</i>	<i>0</i>	<i>52</i>	<i>0</i>	<i>101</i>	<i>70 - 130</i>	<i>50.23</i>	<i>4.64</i>	<i>30</i>	

The following samples were analyzed in this batch: HS20020243-04

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

QC BATCH REPORT

Batch ID: R356209 (0)	Instrument: Balance1	Method: MOISTURE - ASTM D2216
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DUP	Sample ID: HS20020243-04DUP	Units: wt%	Analysis Date: 12-Feb-2020 13:39							
Client ID: SO-1620-SG11(5.5-6) 20200206	Run ID: Balance1_356209	SeqNo: 5471563	PrepDate: DF: 1							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Percent Moisture	12.9	0.0100	12.8	0.778	20
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The following samples were analyzed in this batch:

HS20020243-01	HS20020243-02	HS20020243-03	HS20020243-04
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Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020243

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg-dry	Milligrams per Kilogram- Dry weight corrected

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2020	31-Dec-2020
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	T104704231-19-25	30-Apr-2020

Sample Receipt Checklist

Client Name: PBW
Work Order: HS20020243

Date/Time Received: 06-Feb-2020 16:05
Received by: DDG

Checklist completed by: Nilesh D. Ranchod
eSignature
Date: 6-Feb-2020

Reviewed by: Dane J. Wacasey
eSignature
Date: 10-Feb-2020

Matrices: Soil

Carrier name: ALS Courier

- Shipping container/cooler in good condition? Yes [checked] No [] Not Present []
Custody seals intact on shipping container/cooler? Yes [] No [] Not Present [checked]
Custody seals intact on sample bottles? Yes [] No [] Not Present [checked]
VOA/TX1005/TX1006 Solids in hermetically sealed vials? Yes [] No [] Not Present [checked]
Chain of custody present? Yes [checked] No []
Chain of custody signed when relinquished and received? Yes [checked] No []
Samplers name present on COC? Yes [checked] No []
Chain of custody agrees with sample labels? Yes [] No [checked]
Samples in proper container/bottle? Yes [checked] No []
Sample containers intact? Yes [checked] No []
Sufficient sample volume for indicated test? Yes [checked] No []
All samples received within holding time? Yes [checked] No []
Container/Temp Blank temperature in compliance? Yes [checked] No []

1 Page(s)
COC IDs:214094

Temperature(s)/Thermometer(s): 1.2C UC/C IR # 25
Cooler(s)/Kit(s): 44839
Date/Time sample(s) sent to storage: 02/06/2020 20:00
Water - VOA vials have zero headspace? Yes [] No [] No VOA vials submitted [checked]
Water - pH acceptable upon receipt? Yes [] No [] N/A [checked]
pH adjusted? Yes [] No [] N/A [checked]
pH adjusted by:

Login Notes: Sample Count differ COC= 5 Rec'd = 4

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 1

COC ID: 214094

HS20020243

Golder Associates Inc.
Houston TX-Wood Preserving Works



ALS Project Manager:

Customer Information		Project Information	
Purchase Order	UPRR/Kevin Peterburs	Project Name	Houston TX-Wood Preserving Works
Work Order		Project Number	1620-11-Rev0 SR 92688
Company Name	Golder Associates Inc.	Bill To Company	Union Pacific Railroad- A/P
Send Report To	Eric Matzner	Invoice Attn	Accounts Payable
Address	2201 Double Creek Drive	Address	1400 Douglas Street
	Suite 4004		Stop 0750
City/State/Zip	Round Rock, TX 78664	City/State/Zip	Omaha NE 681790750
Phone	(512) 671-3434	Phone	
Fax	(512) 671-3446	Fax	
e-Mail Address	Eric_Matzner@golder.com	e-Mail Address	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	SO-1620-SG03 (0.5-1) 20200205	2-5-2020	1030	Soil	8.9	5	X	X	X								
2	SG03 (5.5-6) 20200205		1045				X	X	X								
3	SG11 (0.5-1) 20200206	2-6-2020	1340				X	X	X								
4	SG11 (5.5-6) 20200206		1400				X	X	X								
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign <i>Anthony Reed</i>	Shipment Method	Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> STD 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour	Results Due Date:
Relinquished by: <i>[Signature]</i>	Date: 2-6-20 Time: 1445	Received by: <i>[Signature]</i>	Notes: UPRR HWPW 1620-11
Relinquished by: <i>[Signature]</i>	Date: 2-6-20 Time: 1400	Received by (Laboratory): <i>[Signature]</i>	Cooler ID: 44837 Cooler Temp: 4.2
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):
QC Package: (Check One Box Below) <input type="checkbox"/> Level II Std OC <input type="checkbox"/> Level III Std QC/Raw Data <input type="checkbox"/> Level IV SW348/CLP <input checked="" type="checkbox"/> TRRP Checklist <input type="checkbox"/> TRRP Level IV			

Preservative Key: 1-HCl 2-HNO₃ 3-H₂SO₄ 4-NaOH 5-Na₂S₂O₃ 6-NaHSO₄ 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
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February 17, 2020

Eric Matzner
Golder Associates Inc.
2201 Double Creek Drive
Suite 4004
Round Rock, TX 78664

Work Order: **HS20020308**

Laboratory Results for: **Houston TX-Wood Preserving Works**

Dear Eric,

ALS Environmental received 4 sample(s) on Feb 07, 2020 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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020308

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
- R10 Other problems or anomalies.
The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020308

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.



Dane J. Wacasey

Laboratory Review Checklist: Reportable Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/17/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020308			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 150518, R356283, R356340			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?			X		
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		X			1
		Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				2
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference effects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Supporting Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/17/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020308			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 150518, R356283, R356340			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section)					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);

NA = Not Applicable;

NR = Not Reviewed;

R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ALS Laboratory Group	LRC Date: 02/17/2020
Project Name: Houston TX-Wood Preserving Works	Laboratory Job Number: HS20020308
Reviewer Name: Dane Wacasey	Prep Batch Number(s): 150518, R356283, R356340

ER# ⁵	Description
1	Batch 150518, Semivolatiles by Method SW8270, Sample HS20020315-01, MS and MSD were performed on an unrelated sample
2	Batch 150518, Semivolatiles by Method SW8270, Sample SO-1620-SG10(0.5-1)20200207: One or more of the GCMS semi-volatile internal standards were recovered at <50%. There are no target analytes associated with the failing internal standards.

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
 O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);
 NA = Not Applicable;
 NR = Not Reviewed;
 R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20020308

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20020308-01	SO-1620-SG10(0.5-1)20200207	Soil		07-Feb-2020 11:10	07-Feb-2020 16:40	<input type="checkbox"/>
HS20020308-02	SO-1620-SG10(5.5-6)20200207	Soil		07-Feb-2020 11:30	07-Feb-2020 16:40	<input type="checkbox"/>
HS20020308-03	SO-1620-SG08(0.5-1)20200207	Soil		07-Feb-2020 14:00	07-Feb-2020 16:40	<input type="checkbox"/>
HS20020308-04	SO-1620-SG08(5.5-6)20200207	Soil		07-Feb-2020 14:20	07-Feb-2020 16:40	<input type="checkbox"/>

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG10(0.5-1)20200207
 Collection Date: 07-Feb-2020 11:10

ANALYTICAL REPORT

WorkOrder:HS20020308
 Lab ID:HS20020308-01
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00052	0.0052	mg/Kg-dry	1	15-Feb-2020 12:09
Ethylbenzene	U		0.00072	0.0052	mg/Kg-dry	1	15-Feb-2020 12:09
Xylenes, Total	U		0.0010	0.0052	mg/Kg-dry	1	15-Feb-2020 12:09
Surr: 1,2-Dichloroethane-d4	73.8			70-126	%REC	1	15-Feb-2020 12:09
Surr: 4-Bromofluorobenzene	92.4			70-130	%REC	1	15-Feb-2020 12:09
Surr: Dibromofluoromethane	85.3			70-130	%REC	1	15-Feb-2020 12:09
Surr: Toluene-d8	109			70-130	%REC	1	15-Feb-2020 12:09
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 11-Feb-2020		Analyst: GEY	
Naphthalene	0.0056		0.00067	0.0037	mg/Kg-dry	1	12-Feb-2020 00:24
Surr: 2-Fluorobiphenyl	75.4			43-125	%REC	1	12-Feb-2020 00:24
Surr: 4-Terphenyl-d14	78.4			32-125	%REC	1	12-Feb-2020 00:24
Surr: Nitrobenzene-d5	42.3			37-125	%REC	1	12-Feb-2020 00:24
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: MWG			
Percent Moisture	11.1		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG10(5.5-6)20200207
 Collection Date: 07-Feb-2020 11:30

ANALYTICAL REPORT
 WorkOrder:HS20020308
 Lab ID:HS20020308-02
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00039	0.0039	mg/Kg-dry	1	15-Feb-2020 12:32
Ethylbenzene	U		0.00054	0.0039	mg/Kg-dry	1	15-Feb-2020 12:32
Xylenes, Total	U		0.00077	0.0039	mg/Kg-dry	1	15-Feb-2020 12:32
<i>Surr: 1,2-Dichloroethane-d4</i>	88.2			70-126	%REC	1	15-Feb-2020 12:32
<i>Surr: 4-Bromofluorobenzene</i>	94.6			70-130	%REC	1	15-Feb-2020 12:32
<i>Surr: Dibromofluoromethane</i>	90.9			70-130	%REC	1	15-Feb-2020 12:32
<i>Surr: Toluene-d8</i>	103			70-130	%REC	1	15-Feb-2020 12:32
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 11-Feb-2020		Analyst: GEY	
Naphthalene	U		0.00072	0.0040	mg/Kg-dry	1	11-Feb-2020 20:36
<i>Surr: 2-Fluorobiphenyl</i>	66.7			43-125	%REC	1	11-Feb-2020 20:36
<i>Surr: 4-Terphenyl-d14</i>	81.0			32-125	%REC	1	11-Feb-2020 20:36
<i>Surr: Nitrobenzene-d5</i>	59.6			37-125	%REC	1	11-Feb-2020 20:36
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: MWG			
Percent Moisture	17.0		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG08(0.5-1)20200207
 Collection Date: 07-Feb-2020 14:00

ANALYTICAL REPORT

WorkOrder:HS20020308
 Lab ID:HS20020308-03
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	SQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00062	0.0062	mg/Kg-dry	1	15-Feb-2020 12:55
Ethylbenzene	U		0.00087	0.0062	mg/Kg-dry	1	15-Feb-2020 12:55
Xylenes, Total	U		0.0012	0.0062	mg/Kg-dry	1	15-Feb-2020 12:55
Surr: 1,2-Dichloroethane-d4	77.6			70-126	%REC	1	15-Feb-2020 12:55
Surr: 4-Bromofluorobenzene	93.0			70-130	%REC	1	15-Feb-2020 12:55
Surr: Dibromofluoromethane	88.5			70-130	%REC	1	15-Feb-2020 12:55
Surr: Toluene-d8	108			70-130	%REC	1	15-Feb-2020 12:55
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 11-Feb-2020		Analyst: GEY	
Naphthalene	0.0034	J	0.00068	0.0037	mg/Kg-dry	1	11-Feb-2020 21:33
Surr: 2-Fluorobiphenyl	68.7			43-125	%REC	1	11-Feb-2020 21:33
Surr: 4-Terphenyl-d14	69.0			32-125	%REC	1	11-Feb-2020 21:33
Surr: Nitrobenzene-d5	60.1			37-125	%REC	1	11-Feb-2020 21:33
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: MWG			
Percent Moisture	11.9		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG08(5.5-6)20200207
 Collection Date: 07-Feb-2020 14:20

ANALYTICAL REPORT

WorkOrder:HS20020308
 Lab ID:HS20020308-04
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	SQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00038	0.0038	mg/Kg-dry	1	15-Feb-2020 13:18
Ethylbenzene	U		0.00053	0.0038	mg/Kg-dry	1	15-Feb-2020 13:18
Xylenes, Total	U		0.00075	0.0038	mg/Kg-dry	1	15-Feb-2020 13:18
Surr: 1,2-Dichloroethane-d4	77.6			70-126	%REC	1	15-Feb-2020 13:18
Surr: 4-Bromofluorobenzene	92.7			70-130	%REC	1	15-Feb-2020 13:18
Surr: Dibromofluoromethane	86.9			70-130	%REC	1	15-Feb-2020 13:18
Surr: Toluene-d8	107			70-130	%REC	1	15-Feb-2020 13:18
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 11-Feb-2020		Analyst: GEY	
Naphthalene	0.0014	J	0.00070	0.0039	mg/Kg-dry	1	11-Feb-2020 20:55
Surr: 2-Fluorobiphenyl	77.7			43-125	%REC	1	11-Feb-2020 20:55
Surr: 4-Terphenyl-d14	83.0			32-125	%REC	1	11-Feb-2020 20:55
Surr: Nitrobenzene-d5	67.9			37-125	%REC	1	11-Feb-2020 20:55
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: MWG			
Percent Moisture	15.1		0.0100	0.0100	wt%	1	13-Feb-2020 11:17

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

Weight / Prep Log

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020308

Batch ID: 3601 **Start Date:** 07 Feb 2020 09:08 **End Date:** 07 Feb 2020 09:08
Method: VOLATILES BY SW8260C

Sample ID	Container	Sample Wt/Vol	Final Volume	Weight Factor	Container Type
HS20020308-01	1	5.418 (g)	5 (mL)	0.92	TerraCore (5035A)
HS20020308-02	1	7.784 (g)	5 (mL)	0.64	TerraCore (5035A)
HS20020308-03	1	4.594 (g)	5 (mL)	1.09	TerraCore (5035A)
HS20020308-04	1	7.789 (g)	5 (mL)	0.64	TerraCore (5035A)

Batch ID: 150518 **Start Date:** 11 Feb 2020 10:30 **End Date:** 11 Feb 2020 13:30
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541 **Prep Code:** 3541_B_LOW

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20020308-01		30.11 (g)	1 (mL)	0.03321
HS20020308-02		30.09 (g)	1 (mL)	0.03323
HS20020308-03		30.04 (g)	1 (mL)	0.03329
HS20020308-04		30.2 (g)	1 (mL)	0.03311

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020308

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 150518 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20020308-01	SO-1620-SG10(0.5-1) 20200207	07 Feb 2020 11:10		11 Feb 2020 10:30	12 Feb 2020 00:24	1
HS20020308-02	SO-1620-SG10(5.5-6) 20200207	07 Feb 2020 11:30		11 Feb 2020 10:30	11 Feb 2020 20:36	1
HS20020308-03	SO-1620-SG08(0.5-1) 20200207	07 Feb 2020 14:00		11 Feb 2020 10:30	11 Feb 2020 21:33	1
HS20020308-04	SO-1620-SG08(5.5-6) 20200207	07 Feb 2020 14:20		11 Feb 2020 10:30	11 Feb 2020 20:55	1
Batch ID: R356283 (0)		Test Name : MOISTURE - ASTM D2216			Matrix: Soil	
HS20020308-01	SO-1620-SG10(0.5-1) 20200207	07 Feb 2020 11:10			13 Feb 2020 11:17	1
HS20020308-02	SO-1620-SG10(5.5-6) 20200207	07 Feb 2020 11:30			13 Feb 2020 11:17	1
HS20020308-03	SO-1620-SG08(0.5-1) 20200207	07 Feb 2020 14:00			13 Feb 2020 11:17	1
HS20020308-04	SO-1620-SG08(5.5-6) 20200207	07 Feb 2020 14:20			13 Feb 2020 11:17	1
Batch ID: R356340 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020308-01	SO-1620-SG10(0.5-1) 20200207	07 Feb 2020 11:10			15 Feb 2020 12:09	1
HS20020308-02	SO-1620-SG10(5.5-6) 20200207	07 Feb 2020 11:30			15 Feb 2020 12:32	1
HS20020308-03	SO-1620-SG08(0.5-1) 20200207	07 Feb 2020 14:00			15 Feb 2020 12:55	1
HS20020308-04	SO-1620-SG08(5.5-6) 20200207	07 Feb 2020 14:20			15 Feb 2020 13:18	1

WorkOrder: HS20020308
 InstrumentID: SV-7
 Test Code: 8270_LOW_S
 Test Number: SW8270
 Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0018	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20020308
 InstrumentID: VOA8
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0013	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0014	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0014	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020308

QC BATCH REPORT

Batch ID: 150518 (0) **Instrument:** SV-7 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

MBLK		Sample ID: MBLK-150518		Units: ug/Kg		Analysis Date: 11-Feb-2020 14:16			
Client ID:		Run ID: SV-7_356089		SeqNo: 5468650		PrepDate: 11-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	U	3.3							
Surr: 2-Fluorobiphenyl	88.44	0	167	0	53.0	43 - 125			
Surr: 4-Terphenyl-d14	118.8	0	167	0	71.1	32 - 125			
Surr: Nitrobenzene-d5	110	0	167	0	65.9	37 - 125			

LCS		Sample ID: LCS-150518		Units: ug/Kg		Analysis Date: 11-Feb-2020 14:35			
Client ID:		Run ID: SV-7_356089		SeqNo: 5468651		PrepDate: 11-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	91.52	3.3	167	0	54.8	50 - 125			
Surr: 2-Fluorobiphenyl	108	0	167	0	64.7	43 - 125			
Surr: 4-Terphenyl-d14	111.2	0	167	0	66.6	32 - 125			
Surr: Nitrobenzene-d5	69.56	0	167	0	41.7	37 - 125			

MS		Sample ID: HS20020315-01MS		Units: ug/Kg		Analysis Date: 11-Feb-2020 16:29			
Client ID:		Run ID: SV-7_356089		SeqNo: 5468655		PrepDate: 11-Feb-2020		DF: 100	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	5995	990	166.4	6348	-212	50 - 125			SO
Surr: 2-Fluorobiphenyl	U	0	166.4	0	0	43 - 125			S
Surr: 4-Terphenyl-d14	U	0	166.4	0	0	32 - 125			S
Surr: Nitrobenzene-d5	U	0	166.4	0	0	37 - 125			S

MSD		Sample ID: HS20020315-01MSD		Units: ug/Kg		Analysis Date: 11-Feb-2020 16:48			
Client ID:		Run ID: SV-7_356089		SeqNo: 5468656		PrepDate: 11-Feb-2020		DF: 100	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	7056	990	166.2	6348	426	50 - 125	5995	16.3	30 SO
Surr: 2-Fluorobiphenyl	U	0	166.2	0	0	43 - 125	0	0	30 S
Surr: 4-Terphenyl-d14	U	0	166.2	0	0	32 - 125	0	0	30 S
Surr: Nitrobenzene-d5	U	0	166.2	0	0	37 - 125	0	0	30 S

The following samples were analyzed in this batch: HS20020308-01 HS20020308-02 HS20020308-03 HS20020308-04

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020308

QC BATCH REPORT

Batch ID: R356340 (0)		Instrument: VOA8		Method: VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKS1-021520	Units: ug/Kg			Analysis Date: 15-Feb-2020 10:37				
Client ID:	Run ID: VOA8_356340	SeqNo: 5474381		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	38.39	0	50	0	76.8	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	47.41	0	50	0	94.8	80 - 120			
<i>Surr: Dibromofluoromethane</i>	41.87	0	50	0	83.7	80 - 119			
<i>Surr: Toluene-d8</i>	54.45	0	50	0	109	81 - 118			

LCS	Sample ID: VLCSS1-021520	Units: ug/Kg			Analysis Date: 15-Feb-2020 09:52				
Client ID:	Run ID: VOA8_356340	SeqNo: 5474380		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	49.89	5.0	50	0	99.8	75 - 124			
Ethylbenzene	54.19	5.0	50	0	108	70 - 123			
Xylenes, Total	157.2	5.0	150	0	105	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	40.31	0	50	0	80.6	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	47.65	0	50	0	95.3	80 - 120			
<i>Surr: Dibromofluoromethane</i>	45.8	0	50	0	91.6	80 - 119			
<i>Surr: Toluene-d8</i>	52.33	0	50	0	105	81 - 118			

MS	Sample ID: HS20020334-01MS	Units: ug/Kg			Analysis Date: 15-Feb-2020 19:24				
Client ID:	Run ID: VOA8_356340	SeqNo: 5474402		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	51.68	5.0	49.5	0	104	70 - 130			
Ethylbenzene	51.59	5.0	49.5	0	104	70 - 130			
Xylenes, Total	152.9	5.0	148.5	0	103	70 - 130			
<i>Surr: 1,2-Dichloroethane-d4</i>	47.55	0	49.5	0	96.1	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	50.16	0	49.5	0	101	70 - 130			
<i>Surr: Dibromofluoromethane</i>	49.39	0	49.5	0	99.8	70 - 130			
<i>Surr: Toluene-d8</i>	49.98	0	49.5	0	101	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020308

QC BATCH REPORT

Batch ID: R356340 (0) **Instrument:** VOA8 **Method:** VOLATILES BY SW8260C

MSD		Sample ID: HS20020334-01MSD			Units: ug/Kg		Analysis Date: 15-Feb-2020 11:46			
Client ID:		Run ID: VOA8_356340			SeqNo: 5474383		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	49.35	5.0	50	0	98.7	70 - 130	51.68	4.61	30	
Ethylbenzene	50.79	5.0	50	0	102	70 - 130	51.59	1.58	30	
Xylenes, Total	148.4	5.0	150	0	99.0	70 - 130	152.9	2.96	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>44.94</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>89.9</i>	<i>70 - 126</i>	<i>47.55</i>	<i>5.64</i>	<i>30</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>49.81</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>99.6</i>	<i>70 - 130</i>	<i>50.16</i>	<i>0.696</i>	<i>30</i>	
<i>Surr: Dibromofluoromethane</i>	<i>48.83</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>97.7</i>	<i>70 - 130</i>	<i>49.39</i>	<i>1.15</i>	<i>30</i>	
<i>Surr: Toluene-d8</i>	<i>51.03</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>102</i>	<i>70 - 130</i>	<i>49.98</i>	<i>2.08</i>	<i>30</i>	

The following samples were analyzed in this batch: HS20020308-01 HS20020308-02 HS20020308-03 HS20020308-04

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020308

QC BATCH REPORT

Batch ID: R356283 (0) **Instrument:** Balance1 **Method:** MOISTURE - ASTM D2216

DUP	Sample ID: HS20020120-09DUP	Units: wt%	Analysis Date: 13-Feb-2020 11:17							
Client ID:	Run ID: Balance1_356283	SeqNo: 5473179	PrepDate: DF: 1							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Percent Moisture	13.6	0.0100					14.2	4.32	20
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The following samples were analyzed in this batch: HS20020308-01 HS20020308-02 HS20020308-03 HS20020308-04

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020308

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg-dry	Milligrams per Kilogram- Dry weight corrected

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2020	31-Dec-2020
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	T104704231-19-25	30-Apr-2020

Sample Receipt Checklist

Client Name: PBW
Work Order: HS20020308

Date/Time Received: 07-Feb-2020 16:40
Received by: DDG

Checklist completed by: Paresh M. Giga
eSignature
Date: 7-Feb-2020

Reviewed by: Dane J. Wacasey
eSignature
Date: 10-Feb-2020

Matrices: Soil

Carrier name: ALS Courier

- Shipping container/cooler in good condition? Yes [checked] No [] Not Present []
Custody seals intact on shipping container/cooler? Yes [] No [] Not Present [checked]
Custody seals intact on sample bottles? Yes [] No [] Not Present [checked]
VOA/TX1005/TX1006 Solids in hermetically sealed vials? Yes [checked] No [] Not Present []
Chain of custody present? Yes [checked] No []
Chain of custody signed when relinquished and received? Yes [checked] No []
Samplers name present on COC? Yes [checked] No []
Chain of custody agrees with sample labels? Yes [checked] No []
Samples in proper container/bottle? Yes [checked] No []
Sample containers intact? Yes [checked] No []
Sufficient sample volume for indicated test? Yes [checked] No []
All samples received within holding time? Yes [checked] No []
Container/Temp Blank temperature in compliance? Yes [checked] No []

Temperature(s)/Thermometer(s): 0.8c U/c IR25
Cooler(s)/Kit(s): 25749
Date/Time sample(s) sent to storage: 2/7/2020 17:30

- Water - VOA vials have zero headspace? Yes [] No [] No VOA vials submitted [checked]
Water - pH acceptable upon receipt? Yes [] No [] N/A [checked]
pH adjusted? Yes [] No [] N/A [checked]

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:



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 1 of 1

COC ID: 214095

HS20020308

Golder Associates Inc.
Houston, TX-Wood Preserving Works



Customer Information		ALS Project Manager:	
Purchase Order	UPRR/Kevin Peterburs	Project Name	Houston TX-Wood Preserving Works
Work Order		Project Number	1620-11-Rev0 SR 92688
Company Name	Golder Associates Inc.	Bill To Company	Union Pacific Railroad- A/P
Send Report To	Eric Matzner	Invoice Attn	Accounts Payable
Address	2201 Double Creek Drive Suite 4004	Address	1400 Douglas Street Stop 0750
City/State/Zip	Round Rock, TX 78664	City/State/Zip	Omaha NE 681790750
Phone	(512) 671-3434	Phone	
Fax	(512) 671-3446	Fax	
e-Mail Address	Eric_Matzner@golder.com	e-Mail Address	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	SO-1620-SG10 (0.5-1)	2020 02 07	2-7-20	1110	Soil	8.9	5	X	X	X							
2	SG10 (5.5-6)	2020 02 07	2 7 20	1130													
3	SG08 (0.5-1)	2020 02 07		1400													
4	SG08 (5.5-6)	2020 02 07		1420													
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Anthony Retel

Relinquished by: [Signature] Date: 2-7-20 Time: 15:40

Relinquished by: [Signature] Date: 2-7-20 Time: 16:40

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

Shipment Method: _____ Required Turnaround Time: (Check Box) STD 10 Wk Days 5 Wk Days 2 Wk Days 24 Hour

Notes: UPRR HWPW 1620-11

QC Package: (Check One Box Below) Level II Std QC TRRP Checklist Level III Std QC/Raw Data TRRP Level IV Level IV SW-846/CLP

Cooler ID: 25749 Cooler Temp: 4°C

Preservative Key: 1-HCl 2-HNO₃ 3-H₂SO₄ 4-NaOH 5-Na₂S₂O₃ 6-NaHSO₄ 7-Other 8-4°C 9-5035

ote: 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

February 19, 2020

Eric Matzner
Golder Associates Inc.
2201 Double Creek Drive
Suite 4004
Round Rock, TX 78664

Work Order: **HS20020445**

Laboratory Results for: **Houston TX-Wood Preserving Works**

Dear Eric,

ALS Environmental received 6 sample(s) on Feb 11, 2020 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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020445

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
- R10 Other problems or anomalies.
The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020445

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.



Dane J. Wacasey

Laboratory Review Checklist: Reportable Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/19/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020445			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 150597,R356342,R356458			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?	X				
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
		Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				1
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference effects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Supporting Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/19/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020445			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 150597,R356342,R356458			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);

NA = Not Applicable;

NR = Not Reviewed;

R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ALS Laboratory Group	LRC Date: 02/19/2020
Project Name: Houston TX-Wood Preserving Works	Laboratory Job Number: HS20020445
Reviewer Name: Dane Wacasey	Prep Batch Number(s): 150597,R356342,R356458

ER# ⁵	Description
1	Semivolatile Organics Method SW2870, sample SO-1620-SG02(0.5-1) 20200210, Internal standard Perylene-d12 shifted due to possible matrix effect. There are no target analyte associated with this internal standard.

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);
NA = Not Applicable;
NR = Not Reviewed;
R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20020445

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20020445-01	SO-1620-SG05(0.5-1) 20200210	Soil		10-Feb-2020 09:50	11-Feb-2020 13:15	<input type="checkbox"/>
HS20020445-02	SO-1620-SG05(5.5-6) 20200210	Soil		10-Feb-2020 10:10	11-Feb-2020 13:15	<input type="checkbox"/>
HS20020445-03	SO-1620-SG04(0.5-1) 20200210	Soil		10-Feb-2020 13:20	11-Feb-2020 13:15	<input type="checkbox"/>
HS20020445-04	SO-1620-SG04(5.5-6) 20200210	Soil		10-Feb-2020 13:30	11-Feb-2020 13:15	<input type="checkbox"/>
HS20020445-05	SO-1620-SG02(0.5-1) 20200210	Soil		10-Feb-2020 15:50	11-Feb-2020 13:15	<input type="checkbox"/>
HS20020445-06	SO-1620-SG02(5.5-6) 20200210	Soil		10-Feb-2020 16:00	11-Feb-2020 13:15	<input type="checkbox"/>

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG05(0.5-1) 20200210
 Collection Date: 10-Feb-2020 09:50

ANALYTICAL REPORT

WorkOrder:HS20020445
 Lab ID:HS20020445-01
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00037	0.0037	mg/Kg-dry	1	15-Feb-2020 16:01
Ethylbenzene	U		0.00051	0.0037	mg/Kg-dry	1	15-Feb-2020 16:01
Xylenes, Total	U		0.00073	0.0037	mg/Kg-dry	1	15-Feb-2020 16:01
Surr: 1,2-Dichloroethane-d4	86.9			70-126	%REC	1	15-Feb-2020 16:01
Surr: 4-Bromofluorobenzene	93.5			70-130	%REC	1	15-Feb-2020 16:01
Surr: Dibromofluoromethane	92.3			70-130	%REC	1	15-Feb-2020 16:01
Surr: Toluene-d8	105			70-130	%REC	1	15-Feb-2020 16:01
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Feb-2020		Analyst: GEY	
Naphthalene	0.0049		0.00066	0.0037	mg/Kg-dry	1	13-Feb-2020 23:20
Surr: 2-Fluorobiphenyl	69.2			43-125	%REC	1	13-Feb-2020 23:20
Surr: 4-Terphenyl-d14	75.0			32-125	%REC	1	13-Feb-2020 23:20
Surr: Nitrobenzene-d5	50.2			37-125	%REC	1	13-Feb-2020 23:20
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	9.74		0.0100	0.0100	wt%	1	17-Feb-2020 10:26

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG05(5.5-6) 20200210
 Collection Date: 10-Feb-2020 10:10

ANALYTICAL REPORT
 WorkOrder:HS20020445
 Lab ID:HS20020445-02
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00078	0.0078	mg/Kg-dry	1	15-Feb-2020 16:26
Ethylbenzene	U		0.0011	0.0078	mg/Kg-dry	1	15-Feb-2020 16:26
Xylenes, Total	U		0.0016	0.0078	mg/Kg-dry	1	15-Feb-2020 16:26
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>81.9</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 16:26</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>93.7</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 16:26</i>
<i>Surr: Dibromofluoromethane</i>	<i>91.5</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 16:26</i>
<i>Surr: Toluene-d8</i>	<i>102</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 16:26</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Feb-2020		Analyst: GEY	
Naphthalene	U		0.00074	0.0041	mg/Kg-dry	1	13-Feb-2020 19:32
<i>Surr: 2-Fluorobiphenyl</i>	<i>90.5</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>13-Feb-2020 19:32</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>79.8</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>13-Feb-2020 19:32</i>
<i>Surr: Nitrobenzene-d5</i>	<i>47.3</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>13-Feb-2020 19:32</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	19.0		0.0100	0.0100	wt%	1	17-Feb-2020 10:26

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG04(0.5-1) 20200210
 Collection Date: 10-Feb-2020 13:20

ANALYTICAL REPORT

WorkOrder:HS20020445
 Lab ID:HS20020445-03
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00044	0.0044	mg/Kg-dry	1	15-Feb-2020 16:51
Ethylbenzene	U		0.00061	0.0044	mg/Kg-dry	1	15-Feb-2020 16:51
Xylenes, Total	U		0.00087	0.0044	mg/Kg-dry	1	15-Feb-2020 16:51
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>83.5</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 16:51</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>94.7</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 16:51</i>
<i>Surr: Dibromofluoromethane</i>	<i>92.7</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 16:51</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 16:51</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Feb-2020		Analyst: GEY	
Naphthalene	U		0.00071	0.0039	mg/Kg-dry	1	14-Feb-2020 13:25
<i>Surr: 2-Fluorobiphenyl</i>	<i>89.3</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>14-Feb-2020 13:25</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>76.5</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>14-Feb-2020 13:25</i>
<i>Surr: Nitrobenzene-d5</i>	<i>57.9</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>14-Feb-2020 13:25</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	15.3		0.0100	0.0100	wt%	1	17-Feb-2020 10:26

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG04(5.5-6) 20200210
 Collection Date: 10-Feb-2020 13:30

ANALYTICAL REPORT

WorkOrder:HS20020445
 Lab ID:HS20020445-04
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00068	0.0068	mg/Kg-dry	1	15-Feb-2020 17:16
Ethylbenzene	U		0.00096	0.0068	mg/Kg-dry	1	15-Feb-2020 17:16
Xylenes, Total	U		0.0014	0.0068	mg/Kg-dry	1	15-Feb-2020 17:16
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>82.9</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 17:16</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>95.6</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 17:16</i>
<i>Surr: Dibromofluoromethane</i>	<i>91.9</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 17:16</i>
<i>Surr: Toluene-d8</i>	<i>103</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 17:16</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Feb-2020		Analyst: GEY	
Naphthalene	U		0.00072	0.0040	mg/Kg-dry	1	13-Feb-2020 20:10
<i>Surr: 2-Fluorobiphenyl</i>	<i>80.6</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>13-Feb-2020 20:10</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>84.1</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>13-Feb-2020 20:10</i>
<i>Surr: Nitrobenzene-d5</i>	<i>56.1</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>13-Feb-2020 20:10</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	17.2		0.0100	0.0100	wt%	1	17-Feb-2020 10:26

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG02(0.5-1) 20200210
 Collection Date: 10-Feb-2020 15:50

ANALYTICAL REPORT

WorkOrder:HS20020445
 Lab ID:HS20020445-05
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260					Analyst: WLR
Benzene		U	0.00053	0.0053	mg/Kg-dry	1	15-Feb-2020 17:41
Ethylbenzene		U	0.00075	0.0053	mg/Kg-dry	1	15-Feb-2020 17:41
Xylenes, Total		U	0.0011	0.0053	mg/Kg-dry	1	15-Feb-2020 17:41
<i>Surr: 1,2-Dichloroethane-d4</i>	83.5			70-126	%REC	1	15-Feb-2020 17:41
<i>Surr: 4-Bromofluorobenzene</i>	93.5			70-130	%REC	1	15-Feb-2020 17:41
<i>Surr: Dibromofluoromethane</i>	92.6			70-130	%REC	1	15-Feb-2020 17:41
<i>Surr: Toluene-d8</i>	102			70-130	%REC	1	15-Feb-2020 17:41
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270				Prep:SW3541 / 13-Feb-2020	Analyst: GEY
Naphthalene	0.0024	J	0.00071	0.0039	mg/Kg-dry	1	14-Feb-2020 20:41
<i>Surr: 2-Fluorobiphenyl</i>	66.7			43-125	%REC	1	14-Feb-2020 20:41
<i>Surr: 4-Terphenyl-d14</i>	82.0			32-125	%REC	1	14-Feb-2020 20:41
<i>Surr: Nitrobenzene-d5</i>	51.3			37-125	%REC	1	14-Feb-2020 20:41
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: DFF
Percent Moisture	15.6		0.0100	0.0100	wt%	1	17-Feb-2020 10:26

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG02(5.5-6) 20200210
 Collection Date: 10-Feb-2020 16:00

ANALYTICAL REPORT

WorkOrder:HS20020445
 Lab ID:HS20020445-06
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00037	0.0037	mg/Kg-dry	1	15-Feb-2020 18:06
Ethylbenzene	U		0.00051	0.0037	mg/Kg-dry	1	15-Feb-2020 18:06
Xylenes, Total	U		0.00073	0.0037	mg/Kg-dry	1	15-Feb-2020 18:06
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>84.3</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 18:06</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>94.2</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 18:06</i>
<i>Surr: Dibromofluoromethane</i>	<i>89.3</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 18:06</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 18:06</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Feb-2020		Analyst: GEY	
Naphthalene	U		0.00079	0.0043	mg/Kg-dry	1	13-Feb-2020 20:29
<i>Surr: 2-Fluorobiphenyl</i>	<i>62.8</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>13-Feb-2020 20:29</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>75.3</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>13-Feb-2020 20:29</i>
<i>Surr: Nitrobenzene-d5</i>	<i>58.3</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>13-Feb-2020 20:29</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	23.8		0.0100	0.0100	wt%	1	17-Feb-2020 10:26

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

Weight / Prep Log

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020445

Batch ID: 3611 **Start Date:** 13 Feb 2020 12:33 **End Date:** 13 Feb 2020 12:33
Method: VOLATILES BY SW8260C

Sample ID	Container	Sample Wt/Vol	Final Volume	Weight Factor	Container Type
HS20020445-01	1	7.52 (g)	5 (mL)	0.66	TerraCore (5035A)
HS20020445-02	1	3.922 (g)	5 (mL)	1.27	TerraCore (5035A)
HS20020445-03	1	6.778 (g)	5 (mL)	0.74	TerraCore (5035A)
HS20020445-04	1	4.416 (g)	5 (mL)	1.13	TerraCore (5035A)
HS20020445-05	1	5.562 (g)	5 (mL)	0.9	TerraCore (5035A)
HS20020445-06	1	8.94 (g)	5 (mL)	0.56	TerraCore (5035A)

Batch ID: 150597 **Start Date:** 13 Feb 2020 11:26 **End Date:** 13 Feb 2020 16:00
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541 **Prep Code:** 3541_B_LOW

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20020445-01		30.02 (g)	1 (mL)	0.03331
HS20020445-02		30.12 (g)	1 (mL)	0.0332
HS20020445-03		30.14 (g)	1 (mL)	0.03318
HS20020445-04		30.19 (g)	1 (mL)	0.03312
HS20020445-05		30.14 (g)	1 (mL)	0.03318
HS20020445-06		30.09 (g)	1 (mL)	0.03323

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020445

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 150597 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20020445-01	SO-1620-SG05(0.5-1) 20200210	10 Feb 2020 09:50		13 Feb 2020 11:26	13 Feb 2020 23:20	1
HS20020445-02	SO-1620-SG05(5.5-6) 20200210	10 Feb 2020 10:10		13 Feb 2020 11:26	13 Feb 2020 19:32	1
HS20020445-03	SO-1620-SG04(0.5-1) 20200210	10 Feb 2020 13:20		13 Feb 2020 11:26	14 Feb 2020 13:25	1
HS20020445-04	SO-1620-SG04(5.5-6) 20200210	10 Feb 2020 13:30		13 Feb 2020 11:26	13 Feb 2020 20:10	1
HS20020445-05	SO-1620-SG02(0.5-1) 20200210	10 Feb 2020 15:50		13 Feb 2020 11:26	14 Feb 2020 20:41	1
HS20020445-06	SO-1620-SG02(5.5-6) 20200210	10 Feb 2020 16:00		13 Feb 2020 11:26	13 Feb 2020 20:29	1
Batch ID: R356342 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020445-01	SO-1620-SG05(0.5-1) 20200210	10 Feb 2020 09:50			15 Feb 2020 16:01	1
HS20020445-02	SO-1620-SG05(5.5-6) 20200210	10 Feb 2020 10:10			15 Feb 2020 16:26	1
HS20020445-03	SO-1620-SG04(0.5-1) 20200210	10 Feb 2020 13:20			15 Feb 2020 16:51	1
HS20020445-04	SO-1620-SG04(5.5-6) 20200210	10 Feb 2020 13:30			15 Feb 2020 17:16	1
HS20020445-05	SO-1620-SG02(0.5-1) 20200210	10 Feb 2020 15:50			15 Feb 2020 17:41	1
HS20020445-06	SO-1620-SG02(5.5-6) 20200210	10 Feb 2020 16:00			15 Feb 2020 18:06	1
Batch ID: R356458 (0)		Test Name : MOISTURE - ASTM D2216			Matrix: Soil	
HS20020445-01	SO-1620-SG05(0.5-1) 20200210	10 Feb 2020 09:50			17 Feb 2020 10:26	1
HS20020445-02	SO-1620-SG05(5.5-6) 20200210	10 Feb 2020 10:10			17 Feb 2020 10:26	1
HS20020445-03	SO-1620-SG04(0.5-1) 20200210	10 Feb 2020 13:20			17 Feb 2020 10:26	1
HS20020445-04	SO-1620-SG04(5.5-6) 20200210	10 Feb 2020 13:30			17 Feb 2020 10:26	1
HS20020445-05	SO-1620-SG02(0.5-1) 20200210	10 Feb 2020 15:50			17 Feb 2020 10:26	1
HS20020445-06	SO-1620-SG02(5.5-6) 20200210	10 Feb 2020 16:00			17 Feb 2020 10:26	1

WorkOrder: HS20020445
 InstrumentID: SV-7
 Test Code: 8270_LOW_S
 Test Number: SW8270
 Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0018	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20020445
 InstrumentID: VOA5
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0016	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0016	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0016	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020445

QC BATCH REPORT

Batch ID: 150597 (0) **Instrument:** SV-7 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

MBLK		Sample ID: MBLK-150597		Units: ug/Kg		Analysis Date: 13-Feb-2020 16:22				
Client ID:		Run ID: SV-7_356280		SeqNo: 5473119		PrepDate: 13-Feb-2020		DF: 1		
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Naphthalene	U	3.3								
Surr: 2-Fluorobiphenyl	128.7	0	167	0	77.1	43 - 125				
Surr: 4-Terphenyl-d14	146	0	167	0	87.4	32 - 125				
Surr: Nitrobenzene-d5	119.2	0	167	0	71.4	37 - 125				

LCS		Sample ID: LCS-150597		Units: ug/Kg		Analysis Date: 13-Feb-2020 16:41				
Client ID:		Run ID: SV-7_356280		SeqNo: 5473120		PrepDate: 13-Feb-2020		DF: 1		
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Naphthalene	97.38	3.3	167	0	58.3	50 - 125				
Surr: 2-Fluorobiphenyl	86.63	0	167	0	51.9	43 - 125				
Surr: 4-Terphenyl-d14	109.5	0	167	0	65.5	32 - 125				
Surr: Nitrobenzene-d5	117.4	0	167	0	70.3	37 - 125				

MS		Sample ID: HS20020501-02MS		Units: ug/Kg		Analysis Date: 14-Feb-2020 12:00				
Client ID:		Run ID: SV-7_356313		SeqNo: 5473790		PrepDate: 13-Feb-2020		DF: 1		
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Naphthalene	150.7	3.3	166.6	3.15	88.6	50 - 125				
Surr: 2-Fluorobiphenyl	147.3	0	166.6	0	88.5	43 - 125				
Surr: 4-Terphenyl-d14	144.9	0	166.6	0	87.0	32 - 125				
Surr: Nitrobenzene-d5	95.46	0	166.6	0	57.3	37 - 125				

MSD		Sample ID: HS20020501-02MSD		Units: ug/Kg		Analysis Date: 13-Feb-2020 19:13				
Client ID:		Run ID: SV-7_356280		SeqNo: 5473127		PrepDate: 13-Feb-2020		DF: 1		
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Naphthalene	135.9	3.3	166.4	3.15	79.8	50 - 125	150.7	10.3	30	
Surr: 2-Fluorobiphenyl	134.9	0	166.4	0	81.1	43 - 125	147.3	8.77	30	
Surr: 4-Terphenyl-d14	141	0	166.4	0	84.8	32 - 125	144.9	2.73	30	
Surr: Nitrobenzene-d5	109.9	0	166.4	0	66.0	37 - 125	95.46	14.1	30	

The following samples were analyzed in this batch: HS20020445-01 HS20020445-02 HS20020445-03 HS20020445-04
 HS20020445-05 HS20020445-06

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020445

QC BATCH REPORT

Batch ID: R356342 (0) **Instrument:** VOA5 **Method:** VOLATILES BY SW8260C

MBLK		Sample ID: VBLKS1-021520		Units: ug/Kg		Analysis Date: 15-Feb-2020 10:38			
Client ID:		Run ID: VOA5_356342		SeqNo: 5474460		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	45.4	0	50	0	90.8	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	47.6	0	50	0	95.2	80 - 120			
<i>Surr: Dibromofluoromethane</i>	46.63	0	50	0	93.3	80 - 119			
<i>Surr: Toluene-d8</i>	49.33	0	50	0	98.7	81 - 118			

LCS		Sample ID: VLCSS1-021520		Units: ug/Kg		Analysis Date: 15-Feb-2020 09:48			
Client ID:		Run ID: VOA5_356342		SeqNo: 5474459		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	53.58	5.0	50	0	107	75 - 124			
Ethylbenzene	54.61	5.0	50	0	109	70 - 123			
Xylenes, Total	164.4	5.0	150	0	110	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	47.23	0	50	0	94.5	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	48.41	0	50	0	96.8	80 - 120			
<i>Surr: Dibromofluoromethane</i>	50.12	0	50	0	100	80 - 119			
<i>Surr: Toluene-d8</i>	49.87	0	50	0	99.7	81 - 118			

MS		Sample ID: HS20020288-10MS		Units: ug/Kg		Analysis Date: 15-Feb-2020 11:28			
Client ID:		Run ID: VOA5_356342		SeqNo: 5474462		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	45.6	4.8	48	0	95.0	70 - 130			
Ethylbenzene	42.51	4.8	48	0	88.6	70 - 130			
Xylenes, Total	129.8	4.8	144	0	90.1	70 - 130			
<i>Surr: 1,2-Dichloroethane-d4</i>	44.43	0	48	0	92.6	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	47.23	0	48	0	98.4	70 - 130			
<i>Surr: Dibromofluoromethane</i>	46.9	0	48	0	97.7	70 - 130			
<i>Surr: Toluene-d8</i>	48.33	0	48	0	101	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020445

QC BATCH REPORT

Batch ID: R356342 (0) **Instrument:** VOA5 **Method:** VOLATILES BY SW8260C

MSD		Sample ID: HS20020288-10MSD			Units: ug/Kg		Analysis Date: 15-Feb-2020 11:53			
Client ID:		Run ID: VOA5_356342			SeqNo: 5474463		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	37.07	4.8	48	0	77.2	70 - 130	45.6	20.6	30	
Ethylbenzene	35.46	4.8	48	0	73.9	70 - 130	42.51	18.1	30	
Xylenes, Total	106.4	4.8	144	0	73.9	70 - 130	129.8	19.8	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	45.65	0	48	0	95.1	70 - 126	44.43	2.72	30	
<i>Surr: 4-Bromofluorobenzene</i>	46.55	0	48	0	97.0	70 - 130	47.23	1.45	30	
<i>Surr: Dibromofluoromethane</i>	48.59	0	48	0	101	70 - 130	46.9	3.54	30	
<i>Surr: Toluene-d8</i>	48.64	0	48	0	101	70 - 130	48.33	0.631	30	

The following samples were analyzed in this batch:

HS20020445-01	HS20020445-02	HS20020445-03	HS20020445-04
HS20020445-05	HS20020445-06		

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020445

QC BATCH REPORT

Batch ID: R356458 (0) Instrument: Balance1 Method: MOISTURE - ASTM D2216

DUP	Sample ID: HS20020445-06DUP	Units: wt%	Analysis Date: 17-Feb-2020 10:26							
Client ID: SO-1620-SG02(5.5-6) 20200210	Run ID: Balance1_356458	SeqNo: 5476887	PrepDate: DF: 1							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Percent Moisture 22.2 0.0100 23.8 6.96 20

The following samples were analyzed in this batch:	HS20020445-01	HS20020445-02	HS20020445-03	HS20020445-04
	HS20020445-05	HS20020445-06		

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020445

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg-dry	Milligrams per Kilogram- Dry weight corrected

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2020	31-Dec-2020
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	T104704231-19-25	30-Apr-2020

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20020445

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS20020445-01	SO-1620-SG05(0.5-1) 20200210	Login	2/11/2020 3:58:43 PM	NDR	SPA207
HS20020445-01	SO-1620-SG05(0.5-1) 20200210	Login	2/11/2020 3:58:43 PM	NDR	J036
HS20020445-02	SO-1620-SG05(5.5-6) 20200210	Login	2/11/2020 3:58:43 PM	NDR	SPA207
HS20020445-02	SO-1620-SG05(5.5-6) 20200210	Login	2/11/2020 3:58:43 PM	NDR	J036
HS20020445-03	SO-1620-SG04(0.5-1) 20200210	Login	2/11/2020 3:58:43 PM	NDR	SPA207
HS20020445-03	SO-1620-SG04(0.5-1) 20200210	Login	2/11/2020 3:58:43 PM	NDR	J036
HS20020445-04	SO-1620-SG04(5.5-6) 20200210	Login	2/11/2020 3:58:43 PM	NDR	SPA207
HS20020445-04	SO-1620-SG04(5.5-6) 20200210	Login	2/11/2020 3:58:43 PM	NDR	J036

Sample Receipt Checklist

Client Name: PBW
Work Order: HS20020445

Date/Time Received: 11-Feb-2020 13:15
Received by: DDG

Checklist completed by: Nilesh D. Ranchod
eSignature
Date: 11-Feb-2020

Reviewed by: Corey Grandits
eSignature
Date: 11-Feb-2020

Matrices: Soil

Carrier name: ALS Courier

- Shipping container/cooler in good condition? Yes [checked] No [] Not Present []
Custody seals intact on shipping container/cooler? Yes [] No [] Not Present [checked]
Custody seals intact on sample bottles? Yes [] No [] Not Present [checked]
VOA/TX1005/TX1006 Solids in hermetically sealed vials? Yes [] No [] Not Present [checked]
Chain of custody present? Yes [checked] No []
Chain of custody signed when relinquished and received? Yes [checked] No []
Samplers name present on COC? Yes [checked] No []
Chain of custody agrees with sample labels? Yes [] No [checked]
Samples in proper container/bottle? Yes [checked] No []
Sample containers intact? Yes [checked] No []
Sufficient sample volume for indicated test? Yes [checked] No []
All samples received within holding time? Yes [checked] No []
Container/Temp Blank temperature in compliance? Yes [checked] No []

1 Page(s)
COC IDs:214096

Temperature(s)/Thermometer(s): 1.8C UC/C IR # 25
Cooler(s)/Kit(s): 43416
Date/Time sample(s) sent to storage: 02/11/2020 17:00
Water - VOA vials have zero headspace? Yes [] No [] No VOA vials submitted [checked]
Water - pH acceptable upon receipt? Yes [] No [] N/A [checked]
pH adjusted? Yes [] No [] N/A [checked]
pH adjusted by:

Login Notes: Sample Count differ COC= 5 Rec'd = 4

Client Contacted: Date Contacted: Person Contacted:
Contacted By: Regarding:
Comments:
Corrective Action:



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: 214096

HS20020445

Golder Associates Inc.
Houston TX-Wood Preserving Works



Customer Information		Project Information	
Purchase Order	UPRR/Kevin Peterburs	Project Name	Houston TX-Wood Preserving Works
Work Order		Project Number	1620-11-Rev0 SR 92688
Company Name	Golder Associates Inc.	Bill To Company	Union Pacific Railroad- A/P
Send Report To	Eric Matzner	Invoice Attn	Accounts Payable
Address	2201 Double Creek Drive	Address	1400 Douglas Street
	Suite 4004		Stop 0750
City/State/Zip	Round Rock, TX 78664	City/State/Zip	Omaha NE 681790750
Phone	(512) 671-3434	Phone	
Fax	(512) 671-3446	Fax	
e-Mail Address	Eric_Matzner@golder.com	e-Mail Address	

A 8260_S (5652652 B,E,X)
 B 8270_LOW_S (5632532 SVOC - Naphthalene only)
 C MOIST_ASTM (5631931 Gen.Chem. MOIST%)
 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	SO-1620-SG05 (0.5-1) 20200210	2-10-20	0950	Soil	8.9	5	X	X	X								
2	SG05 (5.5-6) 20200210		1010														
3	SG04 (0.5-1)		1320														
4	SG04 (5.5-6)		1330														
5	SG02 (0.5-1)		1550														
6	SG02 (5.5-6)		1600														
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: *Anthony Patel*

Shipment Method: _____ Required Turnaround Time: (Check Box) STD 1st Wk Days 5 Wk Days 2 Wk Days 24 Hour

Results Due Date: _____

Relinquished by: *[Signature]* Date: 2-11-20 Time: 1200
 Received by: *[Signature]*
 Relinquished by: *[Signature]* Date: 2/12/20 Time: 1315
 Received by (Laboratory): *[Signature]*
 Logged by (Laboratory): *[Signature]* Date: _____ Time: _____
 Checked by (Laboratory): _____

Notes: UPRR HWPW 1620-11

Preservative Key: 1-HCl 2-HNO₃ 3-H₂SO₄ 4-NaOH 5-Na₂S₂O₃ 6-NaHSO₄ 7-Other 8-4°C 9-5035

Cooler ID: 03416 Cooler Temp: 4.3

QC Package: (Check One Box Below)
 Level II Std QC
 Level III Std QC/Run Date
 Level IV SWAG/OLP
 TRRP Checklist
 TRRP Level IV

ote: 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
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February 24, 2020

Eric Matzner
Golder Associates Inc.
2201 Double Creek Drive
Suite 4004
Round Rock, TX 78664

Work Order: **HS20020506**

Laboratory Results for: **Houston TX-Wood Preserving Works**

Dear Eric,

ALS Environmental received 7 sample(s) on Feb 12, 2020 for the analysis presented in the following report.

This is a REVISED REPORT. Please see the Case Narrative for discussion concerning this revision.

Regards,

Generated By: DANE.WACASEY
Dane J. Wacasey

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20020506

CASE NARRATIVE

Work Order Comments

- This report was revised February 24, 2020 in order to adjust sample collection date for the field duplicate sample from 2/11/2020 to 2/12/2020.
-

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
- R10 Other problems or anomalies.
The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.



Dane J. Wacasey

Laboratory Review Checklist: Reportable Data

Laboratory Name: ALS Laboratory Group			LRC Date: 02/19/2020				
Project Name: Houston TX-Wood Preserving Works			Laboratory Job Number: HS20020506				
Reviewer Name: Dane Wacasey			Prep Batch Number(s): 150608, 150621, R356340, R356342, R356347, R356526				
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?	X				
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
		Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				1
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference affects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Supporting Data

Laboratory Name: ALS Laboratory Group		LRC Date: 02/19/2020					
Project Name: Houston TX-Wood Preserving Works		Laboratory Job Number: HS20020506					
Reviewer Name: Dane Wacasey		Prep Batch Number(s): 150608, 150621, R356340, R356342, R356347, R356526					
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);

NA = Not Applicable;

NR = Not Reviewed;

R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ALS Laboratory Group		LRC Date: 02/19/2020
Project Name: Houston TX-Wood Preserving Works		Laboratory Job Number: HS20020506
Reviewer Name: Dane Wacasey		Prep Batch Number(s): 150608, 150621, R356340, R356342, R356347, R356526
ER#⁵	Description	
1	Batch 150621, Semivolatiles by Method SW8270, Sample SO-1620-FD01-20200212: Internal standard Perylene-d12 shifted due to possible matrix effect. There are no target analytes associated with compound.	
Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period. O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable); NA = Not Applicable; NR = Not Reviewed; R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).		

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20020506

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20020506-01	SO-1620-SG01(0.5-1)-20200211	Soil		11-Feb-2020 11:50	12-Feb-2020 15:40	<input type="checkbox"/>
HS20020506-02	SO-1620-SG01(5.5-6)-20200211	Soil		11-Feb-2020 12:10	12-Feb-2020 15:40	<input type="checkbox"/>
HS20020506-03	SO-1620-SG20(0.5-1)-20200211	Soil		11-Feb-2020 15:00	12-Feb-2020 15:40	<input type="checkbox"/>
HS20020506-04	SO-1620-SG20(5.5-6)-20200211	Soil		11-Feb-2020 15:20	12-Feb-2020 15:40	<input type="checkbox"/>
HS20020506-05	SO-1620-SG19(0.5-1)-20200212	Soil		12-Feb-2020 11:20	12-Feb-2020 15:40	<input type="checkbox"/>
HS20020506-06	SO-1620-SG19(5.5-6)-20200212	Soil		12-Feb-2020 11:35	12-Feb-2020 15:40	<input type="checkbox"/>
HS20020506-07	SO-1620-FD01-20200212	Soil		12-Feb-2020 00:00	12-Feb-2020 15:40	<input type="checkbox"/>

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG01(0.5-1)-20200211
 Collection Date: 11-Feb-2020 11:50

ANALYTICAL REPORT

WorkOrder:HS20020506
 Lab ID:HS20020506-01
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	U		0.00059	0.0059	mg/Kg-dry	1	15-Feb-2020 14:47
Ethylbenzene	U		0.00082	0.0059	mg/Kg-dry	1	15-Feb-2020 14:47
Xylenes, Total	U		0.0012	0.0059	mg/Kg-dry	1	15-Feb-2020 14:47
<i>Surr: 1,2-Dichloroethane-d4</i>	82.9			70-126	%REC	1	15-Feb-2020 14:47
<i>Surr: 4-Bromofluorobenzene</i>	95.2			70-130	%REC	1	15-Feb-2020 14:47
<i>Surr: Dibromofluoromethane</i>	91.5			70-130	%REC	1	15-Feb-2020 14:47
<i>Surr: Toluene-d8</i>	103			70-130	%REC	1	15-Feb-2020 14:47
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 13-Feb-2020		Analyst: LG
Naphthalene	U		0.00070	0.0038	mg/Kg-dry	1	17-Feb-2020 17:34
<i>Surr: 2-Fluorobiphenyl</i>	62.7			43-125	%REC	1	17-Feb-2020 17:34
<i>Surr: 4-Terphenyl-d14</i>	62.4			32-125	%REC	1	17-Feb-2020 17:34
<i>Surr: Nitrobenzene-d5</i>	41.5			37-125	%REC	1	17-Feb-2020 17:34
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: DFF		
Percent Moisture	14.7		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG01(5.5-6)-20200211
 Collection Date: 11-Feb-2020 12:10

ANALYTICAL REPORT

WorkOrder:HS20020506
 Lab ID:HS20020506-02
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	U		0.00082	0.0082	mg/Kg-dry	1	15-Feb-2020 15:12
Ethylbenzene	U		0.0011	0.0082	mg/Kg-dry	1	15-Feb-2020 15:12
Xylenes, Total	U		0.0016	0.0082	mg/Kg-dry	1	15-Feb-2020 15:12
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>82.9</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 15:12</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>96.0</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 15:12</i>
<i>Surr: Dibromofluoromethane</i>	<i>91.0</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 15:12</i>
<i>Surr: Toluene-d8</i>	<i>103</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 15:12</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 13-Feb-2020		Analyst: LG
Naphthalene	U		0.00073	0.0040	mg/Kg-dry	1	17-Feb-2020 17:53
<i>Surr: 2-Fluorobiphenyl</i>	<i>92.9</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 17:53</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>80.1</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 17:53</i>
<i>Surr: Nitrobenzene-d5</i>	<i>63.7</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 17:53</i>
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: DFF		
Percent Moisture	17.8		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG20(0.5-1)-20200211
 Collection Date: 11-Feb-2020 15:00

ANALYTICAL REPORT

WorkOrder:HS20020506
 Lab ID:HS20020506-03
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	SQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00080	0.0080	mg/Kg-dry	1	15-Feb-2020 15:36
Ethylbenzene	U		0.0011	0.0080	mg/Kg-dry	1	15-Feb-2020 15:36
Xylenes, Total	U		0.0016	0.0080	mg/Kg-dry	1	15-Feb-2020 15:36
<i>Surr: 1,2-Dichloroethane-d4</i>	83.8			70-126	%REC	1	15-Feb-2020 15:36
<i>Surr: 4-Bromofluorobenzene</i>	94.2			70-130	%REC	1	15-Feb-2020 15:36
<i>Surr: Dibromofluoromethane</i>	91.1			70-130	%REC	1	15-Feb-2020 15:36
<i>Surr: Toluene-d8</i>	102			70-130	%REC	1	15-Feb-2020 15:36
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Feb-2020		Analyst: LG	
Naphthalene	U		0.00069	0.0038	mg/Kg-dry	1	17-Feb-2020 18:12
<i>Surr: 2-Fluorobiphenyl</i>	72.9			43-125	%REC	1	17-Feb-2020 18:12
<i>Surr: 4-Terphenyl-d14</i>	81.7			32-125	%REC	1	17-Feb-2020 18:12
<i>Surr: Nitrobenzene-d5</i>	58.8			37-125	%REC	1	17-Feb-2020 18:12
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	12.8		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG20(5.5-6)-20200211
 Collection Date: 11-Feb-2020 15:20

ANALYTICAL REPORT

WorkOrder:HS20020506
 Lab ID:HS20020506-04
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00072	0.0072	mg/Kg-dry	1	15-Feb-2020 13:41
Ethylbenzene	U		0.0010	0.0072	mg/Kg-dry	1	15-Feb-2020 13:41
Xylenes, Total	U		0.0014	0.0072	mg/Kg-dry	1	15-Feb-2020 13:41
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>81.5</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 13:41</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>94.9</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 13:41</i>
<i>Surr: Dibromofluoromethane</i>	<i>89.2</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 13:41</i>
<i>Surr: Toluene-d8</i>	<i>105</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 13:41</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Feb-2020		Analyst: LG	
Naphthalene	U		0.00071	0.0039	mg/Kg-dry	1	17-Feb-2020 18:31
<i>Surr: 2-Fluorobiphenyl</i>	<i>87.8</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 18:31</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>83.9</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 18:31</i>
<i>Surr: Nitrobenzene-d5</i>	<i>59.3</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 18:31</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	16.8		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG19(0.5-1)-20200212
 Collection Date: 12-Feb-2020 11:20

ANALYTICAL REPORT
 WorkOrder:HS20020506
 Lab ID:HS20020506-05
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00059	0.0059	mg/Kg-dry	1	17-Feb-2020 10:14
Ethylbenzene	U		0.00082	0.0059	mg/Kg-dry	1	17-Feb-2020 10:14
Xylenes, Total	U		0.0012	0.0059	mg/Kg-dry	1	17-Feb-2020 10:14
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>81.6</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 10:14</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>90.1</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 10:14</i>
<i>Surr: Dibromofluoromethane</i>	<i>92.9</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 10:14</i>
<i>Surr: Toluene-d8</i>	<i>100</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 10:14</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Feb-2020		Analyst: LG	
Naphthalene	U		0.00069	0.0038	mg/Kg-dry	1	17-Feb-2020 18:50
<i>Surr: 2-Fluorobiphenyl</i>	<i>75.2</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 18:50</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>90.7</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 18:50</i>
<i>Surr: Nitrobenzene-d5</i>	<i>67.0</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 18:50</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	14.1		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG19(5.5-6)-20200212
 Collection Date: 12-Feb-2020 11:35

ANALYTICAL REPORT
 WorkOrder:HS20020506
 Lab ID:HS20020506-06
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00062	0.0062	mg/Kg-dry	1	15-Feb-2020 14:27
Ethylbenzene	U		0.00087	0.0062	mg/Kg-dry	1	15-Feb-2020 14:27
Xylenes, Total	U		0.0012	0.0062	mg/Kg-dry	1	15-Feb-2020 14:27
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>81.7</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 14:27</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>96.8</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 14:27</i>
<i>Surr: Dibromofluoromethane</i>	<i>89.3</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 14:27</i>
<i>Surr: Toluene-d8</i>	<i>108</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>15-Feb-2020 14:27</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Feb-2020		Analyst: LG	
Naphthalene	U		0.00071	0.0039	mg/Kg-dry	1	17-Feb-2020 19:10
<i>Surr: 2-Fluorobiphenyl</i>	<i>51.8</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 19:10</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>65.3</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 19:10</i>
<i>Surr: Nitrobenzene-d5</i>	<i>43.9</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>17-Feb-2020 19:10</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	15.1		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-FD01-20200212
 Collection Date: 12-Feb-2020 00:00

ANALYTICAL REPORT
 WorkOrder:HS20020506
 Lab ID:HS20020506-07
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	SQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00060	0.0060	mg/Kg-dry	1	15-Feb-2020 14:49
Ethylbenzene	U		0.00083	0.0060	mg/Kg-dry	1	15-Feb-2020 14:49
Xylenes, Total	U		0.0012	0.0060	mg/Kg-dry	1	15-Feb-2020 14:49
Surr: 1,2-Dichloroethane-d4	86.9			70-126	%REC	1	15-Feb-2020 14:49
Surr: 4-Bromofluorobenzene	92.6			70-130	%REC	1	15-Feb-2020 14:49
Surr: Dibromofluoromethane	91.9			70-130	%REC	1	15-Feb-2020 14:49
Surr: Toluene-d8	105			70-130	%REC	1	15-Feb-2020 14:49
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 13-Feb-2020		Analyst: GEY	
Naphthalene	0.0053		0.00071	0.0039	mg/Kg-dry	1	14-Feb-2020 20:22
Surr: 2-Fluorobiphenyl	76.4			43-125	%REC	1	14-Feb-2020 20:22
Surr: 4-Terphenyl-d14	98.9			32-125	%REC	1	14-Feb-2020 20:22
Surr: Nitrobenzene-d5	71.3			37-125	%REC	1	14-Feb-2020 20:22
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	15.3		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

Weight / Prep Log

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

Batch ID: 3612	Start Date: 13 Feb 2020 14:50	End Date: 13 Feb 2020 14:50
Method: VOLATILES BY SW8260C		

Sample ID	Container	Sample Wt/Vol	Final Volume	Weight Factor	Container Type
HS20020506-01	1	4.978 (g)	5 (mL)	1	TerraCore (5035A)
HS20020506-02	1	3.722 (g)	5 (mL)	1.34	TerraCore (5035A)
HS20020506-03	1	3.579 (g)	5 (mL)	1.4	TerraCore (5035A)
HS20020506-04	1	4.215 (g)	5 (mL)	1.19	TerraCore (5035A)
HS20020506-05	1	4.974 (g)	5 (mL)	1.01	TerraCore (5035A)
HS20020506-06	1	4.771 (g)	5 (mL)	1.05	TerraCore (5035A)
HS20020506-07	1	4.955 (g)	5 (mL)	1.01	TerraCore (5035A)

Batch ID: 150608	Start Date: 13 Feb 2020 13:39	End Date: 13 Feb 2020 18:00
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541	Prep Code: 3541_B_LOW	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20020506-01		30.35 (g)	1 (mL)	0.03295
HS20020506-02		30.14 (g)	1 (mL)	0.03318
HS20020506-03		30.1 (g)	1 (mL)	0.03322
HS20020506-04		30.27 (g)	1 (mL)	0.03304
HS20020506-05		30.16 (g)	1 (mL)	0.03316
HS20020506-06		30.02 (g)	1 (mL)	0.03331

Batch ID: 150621	Start Date: 13 Feb 2020 16:41	End Date: 13 Feb 2020 20:00
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541	Prep Code: 3541_B_LOW	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20020506-07		30 (g)	1 (mL)	0.03333

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 150608 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20020506-01	SO-1620-SG01(0.5-1)-20200211	11 Feb 2020 11:50		13 Feb 2020 13:39	17 Feb 2020 17:34	1
HS20020506-02	SO-1620-SG01(5.5-6)-20200211	11 Feb 2020 12:10		13 Feb 2020 13:39	17 Feb 2020 17:53	1
HS20020506-03	SO-1620-SG20(0.5-1)-20200211	11 Feb 2020 15:00		13 Feb 2020 13:39	17 Feb 2020 18:12	1
HS20020506-04	SO-1620-SG20(5.5-6)-20200211	11 Feb 2020 15:20		13 Feb 2020 13:39	17 Feb 2020 18:31	1
HS20020506-05	SO-1620-SG19(0.5-1)-20200212	12 Feb 2020 11:20		13 Feb 2020 13:39	17 Feb 2020 18:50	1
HS20020506-06	SO-1620-SG19(5.5-6)-20200212	12 Feb 2020 11:35		13 Feb 2020 13:39	17 Feb 2020 19:10	1
Batch ID: 150621 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20020506-07	SO-1620-FD01-20200212	12 Feb 2020 00:00		13 Feb 2020 16:41	14 Feb 2020 20:22	1
Batch ID: R356340 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020506-04	SO-1620-SG20(5.5-6)-20200211	11 Feb 2020 15:20			15 Feb 2020 13:41	1
HS20020506-06	SO-1620-SG19(5.5-6)-20200212	12 Feb 2020 11:35			15 Feb 2020 14:27	1
HS20020506-07	SO-1620-FD01-20200212	12 Feb 2020 00:00			15 Feb 2020 14:49	1
Batch ID: R356342 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020506-01	SO-1620-SG01(0.5-1)-20200211	11 Feb 2020 11:50			15 Feb 2020 14:47	1
HS20020506-02	SO-1620-SG01(5.5-6)-20200211	11 Feb 2020 12:10			15 Feb 2020 15:12	1
HS20020506-03	SO-1620-SG20(0.5-1)-20200211	11 Feb 2020 15:00			15 Feb 2020 15:36	1
Batch ID: R356347 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020506-05	SO-1620-SG19(0.5-1)-20200212	12 Feb 2020 11:20			17 Feb 2020 10:14	1
Batch ID: R356526 (0)		Test Name : MOISTURE - ASTM D2216			Matrix: Soil	
HS20020506-01	SO-1620-SG01(0.5-1)-20200211	11 Feb 2020 11:50			18 Feb 2020 09:20	1
HS20020506-02	SO-1620-SG01(5.5-6)-20200211	11 Feb 2020 12:10			18 Feb 2020 09:20	1
HS20020506-03	SO-1620-SG20(0.5-1)-20200211	11 Feb 2020 15:00			18 Feb 2020 09:20	1
HS20020506-04	SO-1620-SG20(5.5-6)-20200211	11 Feb 2020 15:20			18 Feb 2020 09:20	1
HS20020506-05	SO-1620-SG19(0.5-1)-20200212	12 Feb 2020 11:20			18 Feb 2020 09:20	1
HS20020506-06	SO-1620-SG19(5.5-6)-20200212	12 Feb 2020 11:35			18 Feb 2020 09:20	1
HS20020506-07	SO-1620-FD01-20200212	12 Feb 2020 00:00			18 Feb 2020 09:20	1

WorkOrder: HS20020506
InstrumentID: SV-6
Test Code: 8270_LOW_S
Test Number: SW8270
Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0019	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20020506
 InstrumentID: SV-7
 Test Code: 8270_LOW_S
 Test Number: SW8270
 Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0018	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20020506
 InstrumentID: VOA5
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0016	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0016	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0016	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

WorkOrder: HS20020506
 InstrumentID: VOA8
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0013	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0014	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0014	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

WorkOrder: HS20020506
 InstrumentID: Balance1
 Test Code: MOIST_ASTM
 Test Number: ASTM D2216
 Test Name: Moisture - ASTM D2216

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: wt%

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Percent Moisture	MOIST	0.0100	0.0100	0.0100	0.0100

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

QC BATCH REPORT

Batch ID: 150608 (0) **Instrument:** SV-6 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

MBLK		Sample ID: MBLK-150608		Units: ug/Kg		Analysis Date: 13-Feb-2020 17:29			
Client ID:		Run ID: SV-6_356229		SeqNo: 5472906		PrepDate: 13-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	U	3.3							
Surr: 2-Fluorobiphenyl	127.4	0	167	0	76.3	43 - 125			
Surr: 4-Terphenyl-d14	123.1	0	167	0	73.7	32 - 125			
Surr: Nitrobenzene-d5	118.2	0	167	0	70.8	37 - 125			

LCS		Sample ID: LCS-150608		Units: ug/Kg		Analysis Date: 13-Feb-2020 17:48			
Client ID:		Run ID: SV-6_356229		SeqNo: 5472907		PrepDate: 13-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	133.9	3.3	167	0	80.2	50 - 125			
Surr: 2-Fluorobiphenyl	139.8	0	167	0	83.7	43 - 125			
Surr: 4-Terphenyl-d14	142.8	0	167	0	85.5	32 - 125			
Surr: Nitrobenzene-d5	127.2	0	167	0	76.2	37 - 125			

MS		Sample ID: HS20020449-01MS		Units: ug/Kg		Analysis Date: 14-Feb-2020 11:51			
Client ID:		Run ID: SV-6_356287		SeqNo: 5473656		PrepDate: 13-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	116.6	3.3	166.7	0	70.0	50 - 125			
Surr: 2-Fluorobiphenyl	127.2	0	166.7	0	76.3	43 - 125			
Surr: 4-Terphenyl-d14	129.4	0	166.7	0	77.6	32 - 125			
Surr: Nitrobenzene-d5	107	0	166.7	0	64.2	37 - 125			

MSD		Sample ID: HS20020449-01MSD		Units: ug/Kg		Analysis Date: 14-Feb-2020 12:10			
Client ID:		Run ID: SV-6_356287		SeqNo: 5473657		PrepDate: 13-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	115.5	3.3	165	0	70.0	50 - 125	116.6	0.905	30
Surr: 2-Fluorobiphenyl	124.1	0	165	0	75.2	43 - 125	127.2	2.46	30
Surr: 4-Terphenyl-d14	118.8	0	165	0	72.0	32 - 125	129.4	8.49	30
Surr: Nitrobenzene-d5	106.2	0	165	0	64.4	37 - 125	107	0.758	30

The following samples were analyzed in this batch: HS20020506-01 HS20020506-02 HS20020506-03 HS20020506-04
 HS20020506-05 HS20020506-06

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

QC BATCH REPORT

Batch ID: 150621 (0) **Instrument:** SV-7 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

MBLK		Sample ID: MBLK-150621		Units: ug/Kg		Analysis Date: 14-Feb-2020 11:22			
Client ID:		Run ID: SV-7_356313		SeqNo: 5475049		PrepDate: 13-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	U	3.3							
Surr: 2-Fluorobiphenyl	108.8	0	167	0	65.1	43 - 125			
Surr: 4-Terphenyl-d14	120.7	0	167	0	72.3	32 - 125			
Surr: Nitrobenzene-d5	90.27	0	167	0	54.1	37 - 125			

LCS		Sample ID: LCS-150621		Units: ug/Kg		Analysis Date: 14-Feb-2020 11:41			
Client ID:		Run ID: SV-7_356313		SeqNo: 5475050		PrepDate: 13-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	123	3.3	167	0	73.6	50 - 125			
Surr: 2-Fluorobiphenyl	122	0	167	0	73.1	43 - 125			
Surr: 4-Terphenyl-d14	133.5	0	167	0	79.9	32 - 125			
Surr: Nitrobenzene-d5	108.7	0	167	0	65.1	37 - 125			

MS		Sample ID: HS20020518-01MS		Units: ug/Kg		Analysis Date: 14-Feb-2020 12:47			
Client ID:		Run ID: SV-7_356313		SeqNo: 5475052		PrepDate: 13-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	117.8	3.3	167	0.6599	70.2	50 - 125			
Surr: 2-Fluorobiphenyl	110.4	0	167	0	66.1	43 - 125			
Surr: 4-Terphenyl-d14	130.2	0	167	0	78.0	32 - 125			
Surr: Nitrobenzene-d5	89.84	0	167	0	53.8	37 - 125			

MSD		Sample ID: HS20020518-01MSD		Units: ug/Kg		Analysis Date: 18-Feb-2020 00:44			
Client ID:		Run ID: SV-7_356439		SeqNo: 5476514		PrepDate: 13-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	120.3	3.3	167	0.6599	71.6	50 - 125	117.8	2.08	30
Surr: 2-Fluorobiphenyl	108.4	0	167	0	64.9	43 - 125	110.4	1.8	30
Surr: 4-Terphenyl-d14	126.5	0	167	0	75.8	32 - 125	130.2	2.89	30
Surr: Nitrobenzene-d5	97.75	0	167	0	58.5	37 - 125	89.84	8.43	30

The following samples were analyzed in this batch: HS20020506-07

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

QC BATCH REPORT

Batch ID: R356340 (0) **Instrument:** VOA8 **Method:** VOLATILES BY SW8260C

MBLK		Sample ID: VBLKS1-021520		Units: ug/Kg		Analysis Date: 15-Feb-2020 10:37			
Client ID:		Run ID: VOA8_356340		SeqNo: 5474381		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	38.39	0	50	0	76.8	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	47.41	0	50	0	94.8	80 - 120			
<i>Surr: Dibromofluoromethane</i>	41.87	0	50	0	83.7	80 - 119			
<i>Surr: Toluene-d8</i>	54.45	0	50	0	109	81 - 118			

LCS		Sample ID: VLCSS1-021520		Units: ug/Kg		Analysis Date: 15-Feb-2020 09:52			
Client ID:		Run ID: VOA8_356340		SeqNo: 5474380		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	49.89	5.0	50	0	99.8	75 - 124			
Ethylbenzene	54.19	5.0	50	0	108	70 - 123			
Xylenes, Total	157.2	5.0	150	0	105	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	40.31	0	50	0	80.6	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	47.65	0	50	0	95.3	80 - 120			
<i>Surr: Dibromofluoromethane</i>	45.8	0	50	0	91.6	80 - 119			
<i>Surr: Toluene-d8</i>	52.33	0	50	0	105	81 - 118			

MS		Sample ID: HS20020334-01MS		Units: ug/Kg		Analysis Date: 15-Feb-2020 19:24			
Client ID:		Run ID: VOA8_356340		SeqNo: 5474402		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	51.68	5.0	49.5	0	104	70 - 130			
Ethylbenzene	51.59	5.0	49.5	0	104	70 - 130			
Xylenes, Total	152.9	5.0	148.5	0	103	70 - 130			
<i>Surr: 1,2-Dichloroethane-d4</i>	47.55	0	49.5	0	96.1	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	50.16	0	49.5	0	101	70 - 130			
<i>Surr: Dibromofluoromethane</i>	49.39	0	49.5	0	99.8	70 - 130			
<i>Surr: Toluene-d8</i>	49.98	0	49.5	0	101	70 - 130			

Revision: 1

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

QC BATCH REPORT

Batch ID: R356340 (0) **Instrument:** VOA8 **Method:** VOLATILES BY SW8260C

MSD		Sample ID: HS20020334-01MSD			Units: ug/Kg		Analysis Date: 15-Feb-2020 11:46			
Client ID:		Run ID: VOA8_356340			SeqNo: 5474383		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	49.35	5.0	50	0	98.7	70 - 130	51.68	4.61	30	
Ethylbenzene	50.79	5.0	50	0	102	70 - 130	51.59	1.58	30	
Xylenes, Total	148.4	5.0	150	0	99.0	70 - 130	152.9	2.96	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>44.94</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>89.9</i>	<i>70 - 126</i>	<i>47.55</i>	<i>5.64</i>	<i>30</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>49.81</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>99.6</i>	<i>70 - 130</i>	<i>50.16</i>	<i>0.696</i>	<i>30</i>	
<i>Surr: Dibromofluoromethane</i>	<i>48.83</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>97.7</i>	<i>70 - 130</i>	<i>49.39</i>	<i>1.15</i>	<i>30</i>	
<i>Surr: Toluene-d8</i>	<i>51.03</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>102</i>	<i>70 - 130</i>	<i>49.98</i>	<i>2.08</i>	<i>30</i>	

The following samples were analyzed in this batch: HS20020506-04 HS20020506-06 HS20020506-07

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

QC BATCH REPORT

Batch ID: R356342 (0) **Instrument:** VOA5 **Method:** VOLATILES BY SW8260C

MBLK		Sample ID: VBLKS1-021520		Units: ug/Kg		Analysis Date: 15-Feb-2020 10:38			
Client ID:		Run ID: VOA5_356342		SeqNo: 5474460		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	45.4	0	50	0	90.8	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	47.6	0	50	0	95.2	80 - 120			
<i>Surr: Dibromofluoromethane</i>	46.63	0	50	0	93.3	80 - 119			
<i>Surr: Toluene-d8</i>	49.33	0	50	0	98.7	81 - 118			

LCS		Sample ID: VLCSS1-021520		Units: ug/Kg		Analysis Date: 15-Feb-2020 09:48			
Client ID:		Run ID: VOA5_356342		SeqNo: 5474459		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	53.58	5.0	50	0	107	75 - 124			
Ethylbenzene	54.61	5.0	50	0	109	70 - 123			
Xylenes, Total	164.4	5.0	150	0	110	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	47.23	0	50	0	94.5	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	48.41	0	50	0	96.8	80 - 120			
<i>Surr: Dibromofluoromethane</i>	50.12	0	50	0	100	80 - 119			
<i>Surr: Toluene-d8</i>	49.87	0	50	0	99.7	81 - 118			

MS		Sample ID: HS20020288-10MS		Units: ug/Kg		Analysis Date: 15-Feb-2020 11:28			
Client ID:		Run ID: VOA5_356342		SeqNo: 5474462		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	45.6	4.8	48	0	95.0	70 - 130			
Ethylbenzene	42.51	4.8	48	0	88.6	70 - 130			
Xylenes, Total	129.8	4.8	144	0	90.1	70 - 130			
<i>Surr: 1,2-Dichloroethane-d4</i>	44.43	0	48	0	92.6	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	47.23	0	48	0	98.4	70 - 130			
<i>Surr: Dibromofluoromethane</i>	46.9	0	48	0	97.7	70 - 130			
<i>Surr: Toluene-d8</i>	48.33	0	48	0	101	70 - 130			

Revision: 1

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

QC BATCH REPORT

Batch ID: R356342 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C						
MSD	Sample ID: HS20020288-10MSD	Units: ug/Kg			Analysis Date: 15-Feb-2020 11:53					
Client ID:	Run ID: VOA5_356342	SeqNo: 5474463		PrepDate:		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	37.07	4.8	48	0	77.2	70 - 130	45.6	20.6	30	
Ethylbenzene	35.46	4.8	48	0	73.9	70 - 130	42.51	18.1	30	
Xylenes, Total	106.4	4.8	144	0	73.9	70 - 130	129.8	19.8	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	45.65	0	48	0	95.1	70 - 126	44.43	2.72	30	
<i>Surr: 4-Bromofluorobenzene</i>	46.55	0	48	0	97.0	70 - 130	47.23	1.45	30	
<i>Surr: Dibromofluoromethane</i>	48.59	0	48	0	101	70 - 130	46.9	3.54	30	
<i>Surr: Toluene-d8</i>	48.64	0	48	0	101	70 - 130	48.33	0.631	30	

The following samples were analyzed in this batch: HS20020506-01 HS20020506-02 HS20020506-03

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

QC BATCH REPORT

Batch ID: R356347 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKS1-021720	Units: ug/Kg			Analysis Date: 17-Feb-2020 09:25				
Client ID:	Run ID: VOA5_356347	SeqNo: 5474687		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	43.64	0	50	0	87.3	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	46.48	0	50	0	93.0	80 - 120			
<i>Surr: Dibromofluoromethane</i>	47.05	0	50	0	94.1	80 - 119			
<i>Surr: Toluene-d8</i>	49.59	0	50	0	99.2	81 - 118			

LCS	Sample ID: VLCSS1-021720	Units: ug/Kg			Analysis Date: 17-Feb-2020 08:35				
Client ID:	Run ID: VOA5_356347	SeqNo: 5474686		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	55.18	5.0	50	0	110	75 - 124			
Ethylbenzene	55.2	5.0	50	0	110	70 - 123			
Xylenes, Total	166.1	5.0	150	0	111	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	46.03	0	50	0	92.1	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	47.82	0	50	0	95.6	80 - 120			
<i>Surr: Dibromofluoromethane</i>	50.21	0	50	0	100	80 - 119			
<i>Surr: Toluene-d8</i>	49.94	0	50	0	99.9	81 - 118			

MS	Sample ID: HS20020533-09MS	Units: ug/Kg			Analysis Date: 17-Feb-2020 11:29				
Client ID:	Run ID: VOA5_356347	SeqNo: 5475037		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	48.07	5.1	51	0	94.3	70 - 130			
Ethylbenzene	48.17	5.1	51	0	94.5	70 - 130			
Xylenes, Total	143.4	5.1	153	0	93.7	70 - 130			
<i>Surr: 1,2-Dichloroethane-d4</i>	46.89	0	51	0	91.9	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	48.14	0	51	0	94.4	70 - 130			
<i>Surr: Dibromofluoromethane</i>	51.35	0	51	0	101	70 - 130			
<i>Surr: Toluene-d8</i>	51.16	0	51	0	100	70 - 130			

Revision: 1

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

QC BATCH REPORT

Batch ID: R356347 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C						
MSD	Sample ID: HS20020533-09MSD	Units: ug/Kg			Analysis Date: 17-Feb-2020 11:54					
Client ID:	Run ID: VOA5_356347	SeqNo: 5475038		PrepDate:		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	46.11	5.0	50	0	92.2	70 - 130	48.07	4.17	30	
Ethylbenzene	45.33	5.0	50	0	90.7	70 - 130	48.17	6.08	30	
Xylenes, Total	136.9	5.0	150	0	91.3	70 - 130	143.4	4.6	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>46.52</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>93.0</i>	<i>70 - 126</i>	<i>46.89</i>	<i>0.8</i>	<i>30</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>47.95</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>95.9</i>	<i>70 - 130</i>	<i>48.14</i>	<i>0.404</i>	<i>30</i>	
<i>Surr: Dibromofluoromethane</i>	<i>50.78</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>102</i>	<i>70 - 130</i>	<i>51.35</i>	<i>1.12</i>	<i>30</i>	
<i>Surr: Toluene-d8</i>	<i>50.25</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>100</i>	<i>70 - 130</i>	<i>51.16</i>	<i>1.81</i>	<i>30</i>	

The following samples were analyzed in this batch: HS20020506-05

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

QC BATCH REPORT

Batch ID: R356526 (0) **Instrument:** Balance1 **Method:** MOISTURE - ASTM D2216

DUP Sample ID: **HS20020571-06DUP** Units: **wt%** Analysis Date: **18-Feb-2020 09:20**
 Client ID: Run ID: **Balance1_356526** SeqNo: **5478088** PrepDate: DF: **1**
 Analyte Result MQL SPK Val SPK Ref Value %REC Control Limit RPD Ref Value %RPD RPD Limit Qual

Percent Moisture 15.1 0.0100 15.2 0.66 20

The following samples were analyzed in this batch:

HS20020506-01	HS20020506-02	HS20020506-03	HS20020506-04
HS20020506-05	HS20020506-06	HS20020506-07	

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020506

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg-dry	Milligrams per Kilogram- Dry weight corrected

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2020	31-Dec-2020
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	T104704231-19-25	30-Apr-2020

Sample Receipt Checklist

Client Name: PBW
Work Order: HS20020506

Date/Time Received: 12-Feb-2020 15:40
Received by: DDG

Checklist completed by: Paresh M. Giga
eSignature
Date: 12-Feb-2020

Reviewed by: Dane J. Wacasey
eSignature
Date: 13-Feb-2020

Matrices: Soil

Carrier name: ALS Courier

- Shipping container/cooler in good condition? Yes [checked] No [] Not Present []
Custody seals intact on shipping container/cooler? Yes [] No [] Not Present [checked]
Custody seals intact on sample bottles? Yes [] No [] Not Present [checked]
VOA/TX1005/TX1006 Solids in hermetically sealed vials? Yes [checked] No [] Not Present []
Chain of custody present? Yes [checked] No []
Chain of custody signed when relinquished and received? Yes [checked] No []
Samplers name present on COC? Yes [checked] No []
Chain of custody agrees with sample labels? Yes [checked] No []
Samples in proper container/bottle? Yes [checked] No []
Sample containers intact? Yes [checked] No []
Sufficient sample volume for indicated test? Yes [checked] No []
All samples received within holding time? Yes [checked] No []
Container/Temp Blank temperature in compliance? Yes [checked] No []

1 Page(s)
COC IDs:214097

Temperature(s)/Thermometer(s): 0.9°C uc/c IR25
Cooler(s)/Kit(s): 45557
Date/Time sample(s) sent to storage: 2/12/2020 18:25
Water - VOA vials have zero headspace? Yes [] No [] No VOA vials submitted [checked]
Water - pH acceptable upon receipt? Yes [] No [] N/A [checked]
pH adjusted? Yes [] No [] N/A [checked]
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 ____ of ____

COC ID: 214097

HS20020506

Golder Associates Inc.
Houston TX-Wood Preserving Works



ALS Project Manager:

Customer Information		Project Information	
Purchase Order	UPRR/Kevin Peterburs	Project Name	Houston TX-Wood Preserving Works
Work Order		Project Number	1620-11-Rev0 SR 92688
Company Name	Golder Associates Inc.	Bill To Company	Union Pacific Railroad- A/P
Send Report To	Eric Matzner	Invoice Attn	Accounts Payable
Address	2201 Double Creek Drive	Address	1400 Douglas Street
	Suite 4004		Stop 0750
City/State/Zip	Round Rock, TX 78664	City/State/Zip	Omaha NE 681790750
Phone	(512) 671-3434	Phone	
Fax	(512) 671-3446	Fax	
e-Mail Address	Eric_Matzner@golder.com	e-Mail Address	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	SO-1620-SG10 (0.5-1) 20200211	2-11-20	1150	Soil	8.9	5	X	X	X								
2	SG10 (5.5-6) 20200211		1210														
3	SG20 (0.5-1) 20200211		1500														
4	SG20 (5.5-6) 20200211		1520														
5	SG19 (0.5-1) 20200212	2-12-20	1120														
6	SG19 (5.5-6) 20200212		1135														
7	Duplicate						X	X	X								
8																	
9																	
10																	

Sampler(s) Please Print & Sign <i>Anthony Reid</i>		Shipment Method	Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> STD 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour		Results Due Date:
Relinquished by: <i>[Signature]</i>	Date: 2-12-20 Time: 1400	Received by: <i>[Signature]</i>	Notes: UPRR HWPW 1620-11		
Relinquished by: <i>[Signature]</i>	Date: 2-12-20 Time: 1540	Received by (Laboratory): <i>[Signature]</i>	Cooler ID: 45557	Cooler Temp: 0.9	QC Package: (Check One Box Below) <input type="checkbox"/> Level II Std OC <input type="checkbox"/> Level III Std OC/Pass Date <input type="checkbox"/> Level IV SW946/CLP <input checked="" type="checkbox"/> TRRP Check List <input type="checkbox"/> TRRP Level IV
Logged by (Laboratory):	Date: _____ Time: _____	Checked by (Laboratory):			

Preservative Key: 1-HCl 2-HNO₃ 3-H₂SO₄ 4-NaOH 5-Na₂S₂O₃ 6-NaHSO₄ 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

February 20, 2020

Eric Matzner
Golder Associates Inc.
2201 Double Creek Drive
Suite 4004
Round Rock, TX 78664

Work Order: **HS20020571**

Laboratory Results for: **Houston TX-Wood Preserving Works**

Dear Eric,

ALS Environmental received 6 sample(s) on Feb 13, 2020 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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020571

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
- R10 Other problems or anomalies.
The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020571

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.



Dane J. Wacasey

Laboratory Review Checklist: Reportable Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/20/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020571			
Reviewer Name: Corey Grandits				Prep Batch Number(s): 150668,150728,R356419,R356526			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?	X				
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		X			1
		Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference affects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Supporting Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/20/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020571			
Reviewer Name: Corey Grandits				Prep Batch Number(s): 150668,150728,R356419,R356526			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);

NA = Not Applicable;

NR = Not Reviewed;

R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ALS Laboratory Group	LRC Date: 02/20/2020
Project Name: Houston TX-Wood Preserving Works	Laboratory Job Number: HS20020571
Reviewer Name: Corey Grandits	Prep Batch Number(s): 150668,150728,R356419,R356526

ER#⁵	Description
1	Batch R354619, Volatile Organics Method SW8260, sample HS20020397-01, MS and MSD were performed on unrelated sample.

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);
NA = Not Applicable;
NR = Not Reviewed;
R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20020571

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20020571-01	SO-1620-SG17(0.5-1)20200212	Soil		12-Feb-2020 15:40	13-Feb-2020 18:01	<input type="checkbox"/>
HS20020571-02	SO-1620-SG17(5.5-6)20200212	Soil		12-Feb-2020 15:50	13-Feb-2020 18:01	<input type="checkbox"/>
HS20020571-03	SO-1620-SG16(0.5-1)20200213	Soil		13-Feb-2020 12:15	13-Feb-2020 18:01	<input type="checkbox"/>
HS20020571-04	SO-1620-SG16(5.5-6)20200213	Soil		13-Feb-2020 12:30	13-Feb-2020 18:01	<input type="checkbox"/>
HS20020571-05	SO-1620-SG15(0.5-1)20200213	Soil		13-Feb-2020 14:30	13-Feb-2020 18:01	<input type="checkbox"/>
HS20020571-06	SO-1620-SG15(5.5-6)20200213	Soil		13-Feb-2020 14:40	13-Feb-2020 18:01	<input type="checkbox"/>

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG17(0.5-1)20200212
 Collection Date: 12-Feb-2020 15:40

ANALYTICAL REPORT

WorkOrder:HS20020571
 Lab ID:HS20020571-01
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00071	0.0071	mg/Kg-dry	1	18-Feb-2020 00:53
Ethylbenzene	U		0.0010	0.0071	mg/Kg-dry	1	18-Feb-2020 00:53
Xylenes, Total	U		0.0014	0.0071	mg/Kg-dry	1	18-Feb-2020 00:53
<i>Surr: 1,2-Dichloroethane-d4</i>	79.2			70-126	%REC	1	18-Feb-2020 00:53
<i>Surr: 4-Bromofluorobenzene</i>	91.5			70-130	%REC	1	18-Feb-2020 00:53
<i>Surr: Dibromofluoromethane</i>	88.2			70-130	%REC	1	18-Feb-2020 00:53
<i>Surr: Toluene-d8</i>	109			70-130	%REC	1	18-Feb-2020 00:53
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 17-Feb-2020		Analyst: GEY	
Naphthalene	0.0095		0.00070	0.0038	mg/Kg-dry	1	19-Feb-2020 15:55
<i>Surr: 2-Fluorobiphenyl</i>	74.2			43-125	%REC	1	19-Feb-2020 15:55
<i>Surr: 4-Terphenyl-d14</i>	89.2			32-125	%REC	1	19-Feb-2020 15:55
<i>Surr: Nitrobenzene-d5</i>	60.6			37-125	%REC	1	19-Feb-2020 15:55
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	13.7		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG17(5.5-6)20200212
 Collection Date: 12-Feb-2020 15:50

ANALYTICAL REPORT

WorkOrder:HS20020571
 Lab ID:HS20020571-02
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00079	0.0079	mg/Kg-dry	1	18-Feb-2020 01:16
Ethylbenzene	U		0.0011	0.0079	mg/Kg-dry	1	18-Feb-2020 01:16
Xylenes, Total	U		0.0016	0.0079	mg/Kg-dry	1	18-Feb-2020 01:16
Surr: 1,2-Dichloroethane-d4	83.9			70-126	%REC	1	18-Feb-2020 01:16
Surr: 4-Bromofluorobenzene	99.0			70-130	%REC	1	18-Feb-2020 01:16
Surr: Dibromofluoromethane	91.0			70-130	%REC	1	18-Feb-2020 01:16
Surr: Toluene-d8	109			70-130	%REC	1	18-Feb-2020 01:16
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 17-Feb-2020		Analyst: GEY	
Naphthalene	0.0015	J	0.00073	0.0040	mg/Kg-dry	1	19-Feb-2020 16:14
Surr: 2-Fluorobiphenyl	77.0			43-125	%REC	1	19-Feb-2020 16:14
Surr: 4-Terphenyl-d14	73.4			32-125	%REC	1	19-Feb-2020 16:14
Surr: Nitrobenzene-d5	52.0			37-125	%REC	1	19-Feb-2020 16:14
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	17.8		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG16(0.5-1)20200213
 Collection Date: 13-Feb-2020 12:15

ANALYTICAL REPORT
 WorkOrder:HS20020571
 Lab ID:HS20020571-03
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	SQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00066	0.0066	mg/Kg-dry	1	18-Feb-2020 01:39
Ethylbenzene	U		0.00093	0.0066	mg/Kg-dry	1	18-Feb-2020 01:39
Xylenes, Total	U		0.0013	0.0066	mg/Kg-dry	1	18-Feb-2020 01:39
Surr: 1,2-Dichloroethane-d4	80.6			70-126	%REC	1	18-Feb-2020 01:39
Surr: 4-Bromofluorobenzene	97.3			70-130	%REC	1	18-Feb-2020 01:39
Surr: Dibromofluoromethane	88.6			70-130	%REC	1	18-Feb-2020 01:39
Surr: Toluene-d8	108			70-130	%REC	1	18-Feb-2020 01:39
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 17-Feb-2020		Analyst: GEY	
Naphthalene	0.0099		0.00069	0.0038	mg/Kg-dry	1	19-Feb-2020 16:34
Surr: 2-Fluorobiphenyl	68.8			43-125	%REC	1	19-Feb-2020 16:34
Surr: 4-Terphenyl-d14	99.4			32-125	%REC	1	19-Feb-2020 16:34
Surr: Nitrobenzene-d5	64.2			37-125	%REC	1	19-Feb-2020 16:34
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	13.1		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG16(5.5-6)20200213
 Collection Date: 13-Feb-2020 12:30

ANALYTICAL REPORT

WorkOrder:HS20020571
 Lab ID:HS20020571-04
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00068	0.0068	mg/Kg-dry	1	18-Feb-2020 02:02
Ethylbenzene	U		0.00095	0.0068	mg/Kg-dry	1	18-Feb-2020 02:02
Xylenes, Total	U		0.0014	0.0068	mg/Kg-dry	1	18-Feb-2020 02:02
<i>Surr: 1,2-Dichloroethane-d4</i>	76.0			70-126	%REC	1	18-Feb-2020 02:02
<i>Surr: 4-Bromofluorobenzene</i>	94.4			70-130	%REC	1	18-Feb-2020 02:02
<i>Surr: Dibromofluoromethane</i>	86.3			70-130	%REC	1	18-Feb-2020 02:02
<i>Surr: Toluene-d8</i>	105			70-130	%REC	1	18-Feb-2020 02:02
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 17-Feb-2020		Analyst: LG	
Naphthalene	U		0.00071	0.0039	mg/Kg-dry	1	18-Feb-2020 20:21
<i>Surr: 2-Fluorobiphenyl</i>	75.9			43-125	%REC	1	18-Feb-2020 20:21
<i>Surr: 4-Terphenyl-d14</i>	83.6			32-125	%REC	1	18-Feb-2020 20:21
<i>Surr: Nitrobenzene-d5</i>	58.1			37-125	%REC	1	18-Feb-2020 20:21
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	17.2		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG15(0.5-1)20200213
 Collection Date: 13-Feb-2020 14:30

ANALYTICAL REPORT

WorkOrder:HS20020571
 Lab ID:HS20020571-05
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	SQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00050	0.0050	mg/Kg-dry	1	18-Feb-2020 02:25
Ethylbenzene	U		0.00070	0.0050	mg/Kg-dry	1	18-Feb-2020 02:25
Xylenes, Total	U		0.0010	0.0050	mg/Kg-dry	1	18-Feb-2020 02:25
Surr: 1,2-Dichloroethane-d4	80.7			70-126	%REC	1	18-Feb-2020 02:25
Surr: 4-Bromofluorobenzene	96.9			70-130	%REC	1	18-Feb-2020 02:25
Surr: Dibromofluoromethane	88.2			70-130	%REC	1	18-Feb-2020 02:25
Surr: Toluene-d8	107			70-130	%REC	1	18-Feb-2020 02:25
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 18-Feb-2020		Analyst: GEY	
Naphthalene	0.014		0.00067	0.0037	mg/Kg-dry	1	19-Feb-2020 15:35
Surr: 2-Fluorobiphenyl	45.0			43-125	%REC	1	19-Feb-2020 15:35
Surr: 4-Terphenyl-d14	60.0			32-125	%REC	1	19-Feb-2020 15:35
Surr: Nitrobenzene-d5	39.9			37-125	%REC	1	19-Feb-2020 15:35
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	10.6		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG15(5.5-6)20200213
 Collection Date: 13-Feb-2020 14:40

ANALYTICAL REPORT

WorkOrder:HS20020571
 Lab ID:HS20020571-06
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00032	0.0032	mg/Kg-dry	1	18-Feb-2020 02:48
Ethylbenzene	U		0.00045	0.0032	mg/Kg-dry	1	18-Feb-2020 02:48
Xylenes, Total	U		0.00065	0.0032	mg/Kg-dry	1	18-Feb-2020 02:48
<i>Surr: 1,2-Dichloroethane-d4</i>	78.6			70-126	%REC	1	18-Feb-2020 02:48
<i>Surr: 4-Bromofluorobenzene</i>	97.5			70-130	%REC	1	18-Feb-2020 02:48
<i>Surr: Dibromofluoromethane</i>	88.1			70-130	%REC	1	18-Feb-2020 02:48
<i>Surr: Toluene-d8</i>	109			70-130	%REC	1	18-Feb-2020 02:48
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 18-Feb-2020		Analyst: GEY	
Naphthalene	U		0.00071	0.0039	mg/Kg-dry	1	19-Feb-2020 13:38
<i>Surr: 2-Fluorobiphenyl</i>	53.8			43-125	%REC	1	19-Feb-2020 13:38
<i>Surr: 4-Terphenyl-d14</i>	64.6			32-125	%REC	1	19-Feb-2020 13:38
<i>Surr: Nitrobenzene-d5</i>	48.4			37-125	%REC	1	19-Feb-2020 13:38
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	15.2		0.0100	0.0100	wt%	1	18-Feb-2020 09:20

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

Weight / Prep Log

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020571

Batch ID: 3615 **Start Date:** 14 Feb 2020 14:41 **End Date:** 14 Feb 2020 14:41
Method: VOLATILES BY SW8260C

Sample ID	Container	Sample Wt/Vol	Final Volume	Weight Factor	Container Type
HS20020571-01	1	4.065 (g)	5 (mL)	1.23	TerraCore (5035A)
HS20020571-02	1	3.853 (g)	5 (mL)	1.3	TerraCore (5035A)
HS20020571-03	1	4.352 (g)	5 (mL)	1.15	TerraCore (5035A)
HS20020571-04	1	4.448 (g)	5 (mL)	1.12	TerraCore (5035A)
HS20020571-05	1	5.638 (g)	5 (mL)	0.89	TerraCore (5035A)
HS20020571-06	1	9.1 (g)	5 (mL)	0.55	TerraCore (5035A)

Batch ID: 150668 **Start Date:** 17 Feb 2020 07:30 **End Date:** 17 Feb 2020 10:15
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541 **Prep Code:** 3541_B_LOW

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20020571-01		30.01 (g)	1 (mL)	0.03332
HS20020571-02		30.2 (g)	1 (mL)	0.03311
HS20020571-03		30.06 (g)	1 (mL)	0.03327
HS20020571-04		30.49 (g)	1 (mL)	0.0328

Batch ID: 150728 **Start Date:** 18 Feb 2020 11:34 **End Date:** 18 Feb 2020 17:30
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541 **Prep Code:** 3541_B_LOW

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20020571-05		30.01 (g)	1 (mL)	0.03332
HS20020571-06		30.03 (g)	1 (mL)	0.0333

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020571

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 150668 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20020571-01	SO-1620-SG17(0.5-1) 20200212	12 Feb 2020 15:40		17 Feb 2020 07:30	19 Feb 2020 15:55	1
HS20020571-02	SO-1620-SG17(5.5-6) 20200212	12 Feb 2020 15:50		17 Feb 2020 07:30	19 Feb 2020 16:14	1
HS20020571-03	SO-1620-SG16(0.5-1) 20200213	13 Feb 2020 12:15		17 Feb 2020 07:30	19 Feb 2020 16:34	1
HS20020571-04	SO-1620-SG16(5.5-6) 20200213	13 Feb 2020 12:30		17 Feb 2020 07:30	18 Feb 2020 20:21	1
Batch ID: 150728 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20020571-05	SO-1620-SG15(0.5-1) 20200213	13 Feb 2020 14:30		18 Feb 2020 11:34	19 Feb 2020 15:35	1
HS20020571-06	SO-1620-SG15(5.5-6) 20200213	13 Feb 2020 14:40		18 Feb 2020 11:34	19 Feb 2020 13:38	1
Batch ID: R356419 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020571-01	SO-1620-SG17(0.5-1) 20200212	12 Feb 2020 15:40			18 Feb 2020 00:53	1
HS20020571-02	SO-1620-SG17(5.5-6) 20200212	12 Feb 2020 15:50			18 Feb 2020 01:16	1
HS20020571-03	SO-1620-SG16(0.5-1) 20200213	13 Feb 2020 12:15			18 Feb 2020 01:39	1
HS20020571-04	SO-1620-SG16(5.5-6) 20200213	13 Feb 2020 12:30			18 Feb 2020 02:02	1
HS20020571-05	SO-1620-SG15(0.5-1) 20200213	13 Feb 2020 14:30			18 Feb 2020 02:25	1
HS20020571-06	SO-1620-SG15(5.5-6) 20200213	13 Feb 2020 14:40			18 Feb 2020 02:48	1
Batch ID: R356526 (0)		Test Name : MOISTURE - ASTM D2216			Matrix: Soil	
HS20020571-01	SO-1620-SG17(0.5-1) 20200212	12 Feb 2020 15:40			18 Feb 2020 09:20	1
HS20020571-02	SO-1620-SG17(5.5-6) 20200212	12 Feb 2020 15:50			18 Feb 2020 09:20	1
HS20020571-03	SO-1620-SG16(0.5-1) 20200213	13 Feb 2020 12:15			18 Feb 2020 09:20	1
HS20020571-04	SO-1620-SG16(5.5-6) 20200213	13 Feb 2020 12:30			18 Feb 2020 09:20	1
HS20020571-05	SO-1620-SG15(0.5-1) 20200213	13 Feb 2020 14:30			18 Feb 2020 09:20	1
HS20020571-06	SO-1620-SG15(5.5-6) 20200213	13 Feb 2020 14:40			18 Feb 2020 09:20	1

WorkOrder: HS20020571
InstrumentID: SV-7
Test Code: 8270_LOW_S
Test Number: SW8270
Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0018	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20020571
InstrumentID: SV-6
Test Code: 8270_LOW_S
Test Number: SW8270
Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0019	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20020571
 InstrumentID: VOA8
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0013	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0014	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0014	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

WorkOrder: HS20020571
 InstrumentID: Balance1
 Test Code: MOIST_ASTM
 Test Number: ASTM D2216
 Test Name: Moisture - ASTM D2216

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: wt%

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Percent Moisture	MOIST	0.0100	0.0100	0.0100	0.0100

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020571

QC BATCH REPORT

Batch ID: 150668 (0) **Instrument:** SV-6 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

MBLK		Sample ID: MBLK-150668		Units: ug/Kg		Analysis Date: 18-Feb-2020 10:47			
Client ID:		Run ID: SV-6_356483		SeqNo: 5477344		PrepDate: 17-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	U	3.3							
Surr: 2-Fluorobiphenyl	149.5	0	167	0	89.5	43 - 125			
Surr: 4-Terphenyl-d14	162.8	0	167	0	97.5	32 - 125			
Surr: Nitrobenzene-d5	115.6	0	167	0	69.2	37 - 125			

LCS		Sample ID: LCS-150668		Units: ug/Kg		Analysis Date: 18-Feb-2020 11:06			
Client ID:		Run ID: SV-6_356483		SeqNo: 5477345		PrepDate: 17-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	152.4	3.3	167	0	91.3	50 - 125			
Surr: 2-Fluorobiphenyl	144.9	0	167	0	86.8	43 - 125			
Surr: 4-Terphenyl-d14	157.4	0	167	0	94.2	32 - 125			
Surr: Nitrobenzene-d5	110.3	0	167	0	66.1	37 - 125			

MS		Sample ID: HS20020618-01MS		Units: ug/Kg		Analysis Date: 18-Feb-2020 13:01			
Client ID:		Run ID: SV-6_356483		SeqNo: 5477347		PrepDate: 17-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	154.2	3.3	165.7	2.907	91.3	50 - 125			
Surr: 2-Fluorobiphenyl	150.4	0	165.7	0	90.8	43 - 125			
Surr: 4-Terphenyl-d14	155.6	0	165.7	0	93.9	32 - 125			
Surr: Nitrobenzene-d5	110.9	0	165.7	0	67.0	37 - 125			

MSD		Sample ID: HS20020618-01MSD		Units: ug/Kg		Analysis Date: 18-Feb-2020 13:20			
Client ID:		Run ID: SV-6_356483		SeqNo: 5477348		PrepDate: 17-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	143.4	3.3	165.8	2.907	84.7	50 - 125	154.2	7.27	30
Surr: 2-Fluorobiphenyl	139.8	0	165.8	0	84.3	43 - 125	150.4	7.31	30
Surr: 4-Terphenyl-d14	147.3	0	165.8	0	88.8	32 - 125	155.6	5.5	30
Surr: Nitrobenzene-d5	100.1	0	165.8	0	60.4	37 - 125	110.9	10.3	30

The following samples were analyzed in this batch: HS20020571-01 HS20020571-02 HS20020571-03 HS20020571-04

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020571

QC BATCH REPORT

Batch ID: 150728 (0) **Instrument:** SV-7 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

MBLK		Sample ID: MBLK-150728		Units: ug/Kg		Analysis Date: 19-Feb-2020 10:03			
Client ID:		Run ID: SV-7_356549		SeqNo: 5479049		PrepDate: 18-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	U	3.3							
Surr: 2-Fluorobiphenyl	85.05	0	167	0	50.9	43 - 125			
Surr: 4-Terphenyl-d14	104.2	0	167	0	62.4	32 - 125			
Surr: Nitrobenzene-d5	78.83	0	167	0	47.2	37 - 125			

LCS		Sample ID: LCS-150728		Units: ug/Kg		Analysis Date: 19-Feb-2020 10:22			
Client ID:		Run ID: SV-7_356549		SeqNo: 5479050		PrepDate: 18-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	110.1	3.3	167	0	65.9	50 - 125			
Surr: 2-Fluorobiphenyl	103.1	0	167	0	61.7	43 - 125			
Surr: 4-Terphenyl-d14	111.3	0	167	0	66.7	32 - 125			
Surr: Nitrobenzene-d5	103.7	0	167	0	62.1	37 - 125			

MS		Sample ID: HS20020646-08MS		Units: ug/Kg		Analysis Date: 19-Feb-2020 14:17			
Client ID:		Run ID: SV-7_356549		SeqNo: 5479109		PrepDate: 18-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	112.9	3.3	165	0	68.4	50 - 125			
Surr: 2-Fluorobiphenyl	92.79	0	165	0	56.2	43 - 125			
Surr: 4-Terphenyl-d14	112.9	0	165	0	68.4	32 - 125			
Surr: Nitrobenzene-d5	92.08	0	165	0	55.8	37 - 125			

MSD		Sample ID: HS20020646-08MSD		Units: ug/Kg		Analysis Date: 19-Feb-2020 14:37			
Client ID:		Run ID: SV-7_356549		SeqNo: 5479110		PrepDate: 18-Feb-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	103.5	3.3	166.6	0	62.1	50 - 125	112.9	8.7	30
Surr: 2-Fluorobiphenyl	84.78	0	166.6	0	50.9	43 - 125	92.79	9.02	30
Surr: 4-Terphenyl-d14	111.3	0	166.6	0	66.8	32 - 125	112.9	1.4	30
Surr: Nitrobenzene-d5	74.44	0	166.6	0	44.7	37 - 125	92.08	21.2	30

The following samples were analyzed in this batch: HS20020571-05 HS20020571-06

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020571

QC BATCH REPORT

Batch ID: R356419 (0)		Instrument: VOA8		Method: VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKS2-021720	Units: ug/Kg			Analysis Date: 17-Feb-2020 21:04				
Client ID:	Run ID: VOA8_356419	SeqNo: 5475882		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	40.58	0	50	0	81.2	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	45.93	0	50	0	91.9	80 - 120			
<i>Surr: Dibromofluoromethane</i>	45.06	0	50	0	90.1	80 - 119			
<i>Surr: Toluene-d8</i>	50.63	0	50	0	101	81 - 118			

LCS	Sample ID: VLCSS2-021720	Units: ug/Kg			Analysis Date: 17-Feb-2020 20:18				
Client ID:	Run ID: VOA8_356419	SeqNo: 5475881		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	49.93	5.0	50	0	99.9	75 - 124			
Ethylbenzene	49.66	5.0	50	0	99.3	70 - 123			
Xylenes, Total	146.1	5.0	150	0	97.4	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	46.26	0	50	0	92.5	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	49.67	0	50	0	99.3	80 - 120			
<i>Surr: Dibromofluoromethane</i>	49.24	0	50	0	98.5	80 - 119			
<i>Surr: Toluene-d8</i>	49.65	0	50	0	99.3	81 - 118			

MS	Sample ID: HS20020397-01MS	Units: ug/Kg			Analysis Date: 17-Feb-2020 21:50				
Client ID:	Run ID: VOA8_356419	SeqNo: 5475884		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Benzene	35.15	4.9	49	0	71.7	70 - 130			
Ethylbenzene	26.61	4.9	49	0	54.3	70 - 130			S
Xylenes, Total	77.68	4.9	147	0	52.8	70 - 130			S
<i>Surr: 1,2-Dichloroethane-d4</i>	47.61	0	49	0	97.2	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	49.55	0	49	0	101	70 - 130			
<i>Surr: Dibromofluoromethane</i>	49.43	0	49	0	101	70 - 130			
<i>Surr: Toluene-d8</i>	49.45	0	49	0	101	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020571

QC BATCH REPORT

Batch ID: R356419 (0)		Instrument: VOA8		Method: VOLATILES BY SW8260C						
MSD	Sample ID: HS20020397-01MSD	Units: ug/Kg			Analysis Date: 17-Feb-2020 22:13					
Client ID:	Run ID: VOA8_356419	SeqNo: 5475885		PrepDate:		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	41.85	4.9	49	0	85.4	70 - 130	35.15	17.4	30	
Ethylbenzene	26.7	4.9	49	0	54.5	70 - 130	26.61	0.348	30	S
Xylenes, Total	75.56	4.9	147	0	51.4	70 - 130	77.68	2.77	30	S
<i>Surr: 1,2-Dichloroethane-d4</i>	61.16	0	49	0	125	70 - 126	47.61	24.9	30	
<i>Surr: 4-Bromofluorobenzene</i>	50.78	0	49	0	104	70 - 130	49.55	2.45	30	
<i>Surr: Dibromofluoromethane</i>	59.17	0	49	0	121	70 - 130	49.43	17.9	30	
<i>Surr: Toluene-d8</i>	48.03	0	49	0	98.0	70 - 130	49.45	2.91	30	

The following samples were analyzed in this batch:

HS20020571-01	HS20020571-02	HS20020571-03	HS20020571-04
HS20020571-05	HS20020571-06		

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020571

QC BATCH REPORT

Batch ID: R356526 (0)		Instrument: Balance1		Method: MOISTURE - ASTM D2216					
DUP	Sample ID: HS20020571-06DUP	Units: wt%		Analysis Date: 18-Feb-2020 09:20					
Client ID: SO-1620-SG15(5.5-6)20200213	Run ID: Balance1_356526	SeqNo: 5478088		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Percent Moisture	15.1	0.0100					15.2	0.66	20
------------------	------	--------	--	--	--	--	------	------	----

The following samples were analyzed in this batch:

HS20020571-01	HS20020571-02	HS20020571-03	HS20020571-04
HS20020571-05	HS20020571-06		

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020571

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg-dry	Milligrams per Kilogram- Dry weight corrected

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2020	31-Dec-2020
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	T104704231-19-25	30-Apr-2020

Sample Receipt Checklist

Client Name: PBW
Work Order: HS20020571

Date/Time Received: 13-Feb-2020 18:01
Received by: JRM

Checklist completed by: Paresh M. Giga
eSignature
Date: 13-Feb-2020

Reviewed by: Dane J. Wacasey
eSignature
Date: 14-Feb-2020

Matrices: Soil

Carrier name: Client

- Shipping container/cooler in good condition? Yes [checked] No [] Not Present []
Custody seals intact on shipping container/cooler? Yes [] No [] Not Present [checked]
Custody seals intact on sample bottles? Yes [] No [] Not Present [checked]
VOA/TX1005/TX1006 Solids in hermetically sealed vials? Yes [checked] No [] Not Present []
Chain of custody present? Yes [checked] No []
Chain of custody signed when relinquished and received? Yes [checked] No []
Samplers name present on COC? Yes [checked] No []
Chain of custody agrees with sample labels? Yes [checked] No []
Samples in proper container/bottle? Yes [checked] No []
Sample containers intact? Yes [checked] No []
Sufficient sample volume for indicated test? Yes [checked] No []
All samples received within holding time? Yes [checked] No []
Container/Temp Blank temperature in compliance? Yes [checked] No []

1 Page(s)
COC IDs:214098

Temperature(s)/Thermometer(s): 2.3°C UC/C IR11
Cooler(s)/Kit(s): 43057
Date/Time sample(s) sent to storage: 2/13/2020 19:40
Water - VOA vials have zero headspace? Yes [] No [] No VOA vials submitted [checked]
Water - pH acceptable upon receipt? Yes [] No [] N/A [checked]
pH adjusted? Yes [] No [] N/A [checked]
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

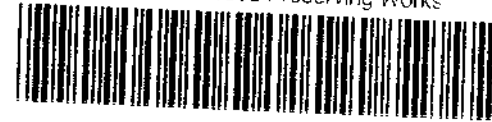
Chain of Custody Form

Page ___ of ___

COC ID: 214098

HS20020571

Golder Associates Inc.
Houston TX-Wood Preserving Works



Customer Information		Project Information		ALS Project Manager:	
Purchase Order	UPRR/Kevin Peterburs	Project Name	Houston TX-Wood Preserving Works	A	8260_S (5652652 B,E,X)
Work Order		Project Number	1620-11-Rev0 SR 92688	B	8270_LOW_S (5632532 SVOC - Naphthalene only)
Company Name	Golder Associates Inc.	Bill To Company	Union Pacific Railroad- A/P	C	MOIST_ASTM (5631031 Gen.Chem. MOIST%)
Send Report To	Eric Matzner	Invoice Attn	Accounts Payable	D	
Address	2201 Double Creek Drive Suite 4004	Address	1400 Douglas Street Stop 0750	E	
City/State/Zip	Round Rock, TX 78664	City/State/Zip	Omaha NE 681790750	F	
Phone	(512) 671-3434	Phone		G	
Fax	(512) 671-3445	Fax		H	
e-Mail Address	Eric_Matzner@golder.com	e-Mail Address		I	
				J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	SO-1620-SG17 (0.5-1) 20200212	2-12-20	1540	Soil	8.9	5	X	X	X								
2	SG17 (5.5-6)	2-12-20	1550														
3	SG16 (0.5-1) 20200213	2-13-20	1215														
4	SG16 (0.5-6)		1230														
5	SG15 (0.5-1)		1430														
6	SG15 (5.5-6)		1440														
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign <i>Anthony Reid</i>		Shipment Method	Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> STD 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour		Results Due Date:
Relinquished by:	Date: 2-13-20 Time: 18:01	Received by:	Notes: UPRR HWPW 1620-11		
Relinquished by:	Date: 2/13/20 Time: 18:01	Received by (Laboratory): J. WYACIAN	Cooler ID: 43057	Cooler Temp.: 2.3	QC Package: (Check One Box Below)
Logged by (Laboratory):	Date: 2/13/20 Time: 18:01	Checked by (Laboratory):			<input type="checkbox"/> Level II Std QC <input type="checkbox"/> Level III Std QC/Raw Data <input type="checkbox"/> Level IV SWS/RCLP <input type="checkbox"/> Other
Preservative Key: 1-HCl 2-HNO ₃ 3-H ₂ SO ₄ 4-NaOH 5-Na ₂ S ₂ O ₃ 6-NaHSO ₄ 7-Other 8-4°C 9-5035			<input checked="" type="checkbox"/> TRRP Checklist <input type="checkbox"/> TRRP Level IV		

ote: 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

February 26, 2020

Eric Matzner
Golder Associates Inc.
2201 Double Creek Drive
Suite 4004
Round Rock, TX 78664

Work Order: **HS20020741**

Laboratory Results for: **Houston TX-Wood Preserving Works**

Dear Eric,

ALS Environmental received 8 sample(s) on Feb 18, 2020 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,

A handwritten signature in black ink, appearing to read 'Dane J. Wacasey'.

Generated By: JUMOKE.LAWAL
Dane J. Wacasey

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020741

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
- R10 Other problems or anomalies.
The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020741

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.



Dane J. Wacasey

Laboratory Review Checklist: Reportable Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/26/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020741			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 150835,R356625,R356904			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?			X		
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
		Were MS/MSD RPDs within laboratory QC limits?		X			1
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference effects on the sample results?	X				2
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Supporting Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 02/26/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20020741			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 150835,R356625,R356904			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);

NA = Not Applicable;

NR = Not Reviewed;

R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ALS Laboratory Group		LRC Date: 02/26/2020
Project Name: Houston TX-Wood Preserving Works		Laboratory Job Number: HS20020741
Reviewer Name: Dane Wacasey		Prep Batch Number(s): 150835,R356625,R356904
ER# ⁵	Description	
1	Batch 150835, Semivolatile Organics Method SW8270, sample HS2020747-03, MS/MSD RPD is for an unrelated sample.	
2	Batch 150835, Semivolatile Organics Method SW8270, samples SO-1620-SG07(0.5-1)20200217 and SO-1620-SG06(0.5-1)20200217: the GCMS semi-volatile extract of this sample was run at a dilution due to a high level of matrix interference.	
<p>Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.</p> <p>O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable); NA = Not Applicable; NR = Not Reviewed; R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).</p>		

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20020741

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20020741-01	SO-1620-SG12(0.5-1)20200217	Soil		17-Feb-2020 09:11	18-Feb-2020 17:40	<input type="checkbox"/>
HS20020741-02	SO-1620-SG12(5.5-6)20200217	Soil		17-Feb-2020 09:30	18-Feb-2020 17:40	<input type="checkbox"/>
HS20020741-03	SO-1620-SG07(0.5-1)20200217	Soil		17-Feb-2020 10:50	18-Feb-2020 17:40	<input type="checkbox"/>
HS20020741-04	SO-1620-SG07(5.5-6)20200217	Soil		17-Feb-2020 11:10	18-Feb-2020 17:40	<input type="checkbox"/>
HS20020741-05	SO-1620-SG06(0.5-1)20200217	Soil		17-Feb-2020 14:00	18-Feb-2020 17:40	<input type="checkbox"/>
HS20020741-06	SO-1620-SG06(5.5-6)20200217	Soil		17-Feb-2020 14:15	18-Feb-2020 17:40	<input type="checkbox"/>
HS20020741-07	SO-1620-SG14(0.5-1)20200217	Soil		17-Feb-2020 16:15	18-Feb-2020 17:40	<input type="checkbox"/>
HS20020741-08	SO-1620-SG14(5.5-6)20200217	Soil		17-Feb-2020 16:30	18-Feb-2020 17:40	<input type="checkbox"/>

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG12(0.5-1)20200217
 Collection Date: 17-Feb-2020 09:11

ANALYTICAL REPORT

WorkOrder:HS20020741
 Lab ID:HS20020741-01
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00062	0.0062	mg/Kg-dry	1	20-Feb-2020 10:54
Ethylbenzene	U		0.00087	0.0062	mg/Kg-dry	1	20-Feb-2020 10:54
Xylenes, Total	U		0.0012	0.0062	mg/Kg-dry	1	20-Feb-2020 10:54
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>84.1</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>20-Feb-2020 10:54</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.1</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>20-Feb-2020 10:54</i>
<i>Surr: Dibromofluoromethane</i>	<i>88.9</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>20-Feb-2020 10:54</i>
<i>Surr: Toluene-d8</i>	<i>107</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>20-Feb-2020 10:54</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 20-Feb-2020		Analyst: LG	
Naphthalene	0.0039		0.00067	0.0037	mg/Kg-dry	1	21-Feb-2020 22:53
<i>Surr: 2-Fluorobiphenyl</i>	<i>58.3</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>21-Feb-2020 22:53</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>70.0</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>21-Feb-2020 22:53</i>
<i>Surr: Nitrobenzene-d5</i>	<i>44.2</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>21-Feb-2020 22:53</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	10.2		0.0100	0.0100	wt%	1	24-Feb-2020 09:04

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG12(5.5-6)20200217
 Collection Date: 17-Feb-2020 09:30

ANALYTICAL REPORT

WorkOrder:HS20020741
 Lab ID:HS20020741-02
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	U		0.00060	0.0060	mg/Kg-dry	1	20-Feb-2020 11:32
Ethylbenzene	U		0.00084	0.0060	mg/Kg-dry	1	20-Feb-2020 11:32
Xylenes, Total	U		0.0012	0.0060	mg/Kg-dry	1	20-Feb-2020 11:32
<i>Surr: 1,2-Dichloroethane-d4</i>	76.1			70-126	%REC	1	20-Feb-2020 11:32
<i>Surr: 4-Bromofluorobenzene</i>	96.3			70-130	%REC	1	20-Feb-2020 11:32
<i>Surr: Dibromofluoromethane</i>	86.6			70-130	%REC	1	20-Feb-2020 11:32
<i>Surr: Toluene-d8</i>	108			70-130	%REC	1	20-Feb-2020 11:32
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 20-Feb-2020		Analyst: LG
Naphthalene	U		0.00071	0.0039	mg/Kg-dry	1	21-Feb-2020 23:13
<i>Surr: 2-Fluorobiphenyl</i>	74.4			43-125	%REC	1	21-Feb-2020 23:13
<i>Surr: 4-Terphenyl-d14</i>	86.6			32-125	%REC	1	21-Feb-2020 23:13
<i>Surr: Nitrobenzene-d5</i>	52.7			37-125	%REC	1	21-Feb-2020 23:13
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: DFF		
Percent Moisture	16.2		0.0100	0.0100	wt%	1	24-Feb-2020 09:04

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG07(0.5-1)20200217
 Collection Date: 17-Feb-2020 10:50

ANALYTICAL REPORT

WorkOrder:HS20020741
 Lab ID:HS20020741-03
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	SQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene		U	0.00058	0.0058	mg/Kg-dry	1	20-Feb-2020 11:55
Ethylbenzene		U	0.00082	0.0058	mg/Kg-dry	1	20-Feb-2020 11:55
Xylenes, Total		U	0.0012	0.0058	mg/Kg-dry	1	20-Feb-2020 11:55
<i>Surr: 1,2-Dichloroethane-d4</i>	71.8			70-126	%REC	1	20-Feb-2020 11:55
<i>Surr: 4-Bromofluorobenzene</i>	91.4			70-130	%REC	1	20-Feb-2020 11:55
<i>Surr: Dibromofluoromethane</i>	82.9			70-130	%REC	1	20-Feb-2020 11:55
<i>Surr: Toluene-d8</i>	108			70-130	%REC	1	20-Feb-2020 11:55
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 20-Feb-2020		Analyst: LG
Naphthalene	0.0071	J	0.0034	0.019	mg/Kg-dry	5	21-Feb-2020 23:32
<i>Surr: 2-Fluorobiphenyl</i>	75.1			43-125	%REC	5	21-Feb-2020 23:32
<i>Surr: 4-Terphenyl-d14</i>	94.4			32-125	%REC	5	21-Feb-2020 23:32
<i>Surr: Nitrobenzene-d5</i>	51.8			37-125	%REC	5	21-Feb-2020 23:32
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: DFF		
Percent Moisture	13.4		0.0100	0.0100	wt%	1	24-Feb-2020 09:04

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG07(5.5-6)20200217
 Collection Date: 17-Feb-2020 11:10

ANALYTICAL REPORT

WorkOrder:HS20020741
 Lab ID:HS20020741-04
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	U		0.00036	0.0036	mg/Kg-dry	1	20-Feb-2020 12:18
Ethylbenzene	U		0.00050	0.0036	mg/Kg-dry	1	20-Feb-2020 12:18
Xylenes, Total	U		0.00072	0.0036	mg/Kg-dry	1	20-Feb-2020 12:18
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>70.8</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>20-Feb-2020 12:18</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>94.3</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>20-Feb-2020 12:18</i>
<i>Surr: Dibromofluoromethane</i>	<i>83.0</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>20-Feb-2020 12:18</i>
<i>Surr: Toluene-d8</i>	<i>110</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>20-Feb-2020 12:18</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 20-Feb-2020		Analyst: LG
Naphthalene	U		0.00072	0.0040	mg/Kg-dry	1	24-Feb-2020 12:11
<i>Surr: 2-Fluorobiphenyl</i>	<i>78.0</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>24-Feb-2020 12:11</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>85.4</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>24-Feb-2020 12:11</i>
<i>Surr: Nitrobenzene-d5</i>	<i>65.1</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>24-Feb-2020 12:11</i>
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: DFF		
Percent Moisture	16.8		0.0100	0.0100	wt%	1	24-Feb-2020 09:04

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG06(0.5-1)20200217
 Collection Date: 17-Feb-2020 14:00

ANALYTICAL REPORT

WorkOrder:HS20020741
 Lab ID:HS20020741-05
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00065	0.0065	mg/Kg-dry	1	20-Feb-2020 12:41
Ethylbenzene	U		0.00091	0.0065	mg/Kg-dry	1	20-Feb-2020 12:41
Xylenes, Total	U		0.0013	0.0065	mg/Kg-dry	1	20-Feb-2020 12:41
<i>Surr: 1,2-Dichloroethane-d4</i>	70.7			70-126	%REC	1	20-Feb-2020 12:41
<i>Surr: 4-Bromofluorobenzene</i>	91.2			70-130	%REC	1	20-Feb-2020 12:41
<i>Surr: Dibromofluoromethane</i>	82.2			70-130	%REC	1	20-Feb-2020 12:41
<i>Surr: Toluene-d8</i>	110			70-130	%REC	1	20-Feb-2020 12:41
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 20-Feb-2020		Analyst: LG	
Naphthalene	U		0.0067	0.037	mg/Kg-dry	10	24-Feb-2020 18:52
<i>Surr: 2-Fluorobiphenyl</i>	69.7			43-125	%REC	10	24-Feb-2020 18:52
<i>Surr: 4-Terphenyl-d14</i>	74.4			32-125	%REC	10	24-Feb-2020 18:52
<i>Surr: Nitrobenzene-d5</i>	56.0			37-125	%REC	10	24-Feb-2020 18:52
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	10.3		0.0100	0.0100	wt%	1	24-Feb-2020 09:04

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG06(5.5-6)20200217
 Collection Date: 17-Feb-2020 14:15

ANALYTICAL REPORT
 WorkOrder:HS20020741
 Lab ID:HS20020741-06
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00042	0.0042	mg/Kg-dry	1	20-Feb-2020 13:04
Ethylbenzene	U		0.00059	0.0042	mg/Kg-dry	1	20-Feb-2020 13:04
Xylenes, Total	U		0.00084	0.0042	mg/Kg-dry	1	20-Feb-2020 13:04
<i>Surr: 1,2-Dichloroethane-d4</i>	71.9			70-126	%REC	1	20-Feb-2020 13:04
<i>Surr: 4-Bromofluorobenzene</i>	93.9			70-130	%REC	1	20-Feb-2020 13:04
<i>Surr: Dibromofluoromethane</i>	83.9			70-130	%REC	1	20-Feb-2020 13:04
<i>Surr: Toluene-d8</i>	110			70-130	%REC	1	20-Feb-2020 13:04
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 20-Feb-2020		Analyst: LG	
Naphthalene	U		0.00071	0.0039	mg/Kg-dry	1	24-Feb-2020 12:30
<i>Surr: 2-Fluorobiphenyl</i>	69.7			43-125	%REC	1	24-Feb-2020 12:30
<i>Surr: 4-Terphenyl-d14</i>	77.5			32-125	%REC	1	24-Feb-2020 12:30
<i>Surr: Nitrobenzene-d5</i>	56.2			37-125	%REC	1	24-Feb-2020 12:30
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	15.5		0.0100	0.0100	wt%	1	24-Feb-2020 09:04

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG14(0.5-1)20200217
 Collection Date: 17-Feb-2020 16:15

ANALYTICAL REPORT

WorkOrder:HS20020741
 Lab ID:HS20020741-07
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00030	0.0030	mg/Kg-dry	1	20-Feb-2020 13:27
Ethylbenzene	U		0.00042	0.0030	mg/Kg-dry	1	20-Feb-2020 13:27
Xylenes, Total	U		0.00061	0.0030	mg/Kg-dry	1	20-Feb-2020 13:27
Surr: 1,2-Dichloroethane-d4	73.0			70-126	%REC	1	20-Feb-2020 13:27
Surr: 4-Bromofluorobenzene	91.5			70-130	%REC	1	20-Feb-2020 13:27
Surr: Dibromofluoromethane	84.1			70-130	%REC	1	20-Feb-2020 13:27
Surr: Toluene-d8	110			70-130	%REC	1	20-Feb-2020 13:27
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 20-Feb-2020		Analyst: LG	
Naphthalene	0.0027	J	0.00069	0.0038	mg/Kg-dry	1	24-Feb-2020 19:11
Surr: 2-Fluorobiphenyl	67.9			43-125	%REC	1	24-Feb-2020 19:11
Surr: 4-Terphenyl-d14	82.2			32-125	%REC	1	24-Feb-2020 19:11
Surr: Nitrobenzene-d5	49.2			37-125	%REC	1	24-Feb-2020 19:11
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	14.1		0.0100	0.0100	wt%	1	24-Feb-2020 09:04

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG14(5.5-6)20200217
 Collection Date: 17-Feb-2020 16:30

ANALYTICAL REPORT

WorkOrder:HS20020741
 Lab ID:HS20020741-08
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene		U	0.00037	0.0037	mg/Kg-dry	1	20-Feb-2020 13:50
Ethylbenzene		U	0.00051	0.0037	mg/Kg-dry	1	20-Feb-2020 13:50
Xylenes, Total		U	0.00073	0.0037	mg/Kg-dry	1	20-Feb-2020 13:50
<i>Surr: 1,2-Dichloroethane-d4</i>	83.5			70-126	%REC	1	20-Feb-2020 13:50
<i>Surr: 4-Bromofluorobenzene</i>	96.3			70-130	%REC	1	20-Feb-2020 13:50
<i>Surr: Dibromofluoromethane</i>	86.8			70-130	%REC	1	20-Feb-2020 13:50
<i>Surr: Toluene-d8</i>	107			70-130	%REC	1	20-Feb-2020 13:50
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 20-Feb-2020		Analyst: LG	
Naphthalene		U	0.00077	0.0042	mg/Kg-dry	1	24-Feb-2020 12:50
<i>Surr: 2-Fluorobiphenyl</i>	73.7			43-125	%REC	1	24-Feb-2020 12:50
<i>Surr: 4-Terphenyl-d14</i>	80.2			32-125	%REC	1	24-Feb-2020 12:50
<i>Surr: Nitrobenzene-d5</i>	58.7			37-125	%REC	1	24-Feb-2020 12:50
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: DFF			
Percent Moisture	22.0		0.0100	0.0100	wt%	1	24-Feb-2020 09:04

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

Weight / Prep Log

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020741

Batch ID: 3620 **Start Date:** 19 Feb 2020 09:43 **End Date:** 19 Feb 2020 09:43
Method: VOLATILES BY SW8260C

Sample ID	Container	Sample Wt/Vol	Final Volume	Weight Factor	Container Type
HS20020741-01	1	4.471 (g)	5 (mL)	1.12	TerraCore (5035A)
HS20020741-02	1	4.941 (g)	5 (mL)	1.01	TerraCore (5035A)
HS20020741-03	1	4.928 (g)	5 (mL)	1.01	TerraCore (5035A)
HS20020741-04	1	8.391 (g)	5 (mL)	0.6	TerraCore (5035A)
HS20020741-05	1	4.269 (g)	5 (mL)	1.17	TerraCore (5035A)
HS20020741-06	1	7.075 (g)	5 (mL)	0.71	TerraCore (5035A)
HS20020741-07	1	9.694 (g)	5 (mL)	0.52	TerraCore (5035A)
HS20020741-08	1	8.796 (g)	5 (mL)	0.57	TerraCore (5035A)

Batch ID: 150835 **Start Date:** 21 Feb 2020 09:00 **End Date:** 21 Feb 2020 11:30
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541 **Prep Code:** 3541_B_LOW

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20020741-01		30.05 (g)	1 (mL)	0.03328
HS20020741-02		30.15 (g)	1 (mL)	0.03317
HS20020741-03		30.22 (g)	1 (mL)	0.03309
HS20020741-04		30.01 (g)	1 (mL)	0.03332
HS20020741-05		30.09 (g)	1 (mL)	0.03323
HS20020741-06		30.1 (g)	1 (mL)	0.03322
HS20020741-07		30.24 (g)	1 (mL)	0.03307
HS20020741-08		30.16 (g)	1 (mL)	0.03316

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020741

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 150835 (0)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20020741-01	SO-1620-SG12(0.5-1) 20200217	17 Feb 2020 09:11		20 Feb 2020 14:27	21 Feb 2020 22:53	1
HS20020741-02	SO-1620-SG12(5.5-6) 20200217	17 Feb 2020 09:30		20 Feb 2020 14:27	21 Feb 2020 23:13	1
HS20020741-03	SO-1620-SG07(0.5-1) 20200217	17 Feb 2020 10:50		20 Feb 2020 14:27	21 Feb 2020 23:32	5
HS20020741-04	SO-1620-SG07(5.5-6) 20200217	17 Feb 2020 11:10		20 Feb 2020 14:27	24 Feb 2020 12:11	1
HS20020741-05	SO-1620-SG06(0.5-1) 20200217	17 Feb 2020 14:00		20 Feb 2020 14:27	24 Feb 2020 18:52	10
HS20020741-06	SO-1620-SG06(5.5-6) 20200217	17 Feb 2020 14:15		20 Feb 2020 14:27	24 Feb 2020 12:30	1
HS20020741-07	SO-1620-SG14(0.5-1) 20200217	17 Feb 2020 16:15		20 Feb 2020 14:27	24 Feb 2020 19:11	1
HS20020741-08	SO-1620-SG14(5.5-6) 20200217	17 Feb 2020 16:30		20 Feb 2020 14:27	24 Feb 2020 12:50	1
Batch ID: R356625 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20020741-01	SO-1620-SG12(0.5-1) 20200217	17 Feb 2020 09:11			20 Feb 2020 10:54	1
HS20020741-02	SO-1620-SG12(5.5-6) 20200217	17 Feb 2020 09:30			20 Feb 2020 11:32	1
HS20020741-03	SO-1620-SG07(0.5-1) 20200217	17 Feb 2020 10:50			20 Feb 2020 11:55	1
HS20020741-04	SO-1620-SG07(5.5-6) 20200217	17 Feb 2020 11:10			20 Feb 2020 12:18	1
HS20020741-05	SO-1620-SG06(0.5-1) 20200217	17 Feb 2020 14:00			20 Feb 2020 12:41	1
HS20020741-06	SO-1620-SG06(5.5-6) 20200217	17 Feb 2020 14:15			20 Feb 2020 13:04	1
HS20020741-07	SO-1620-SG14(0.5-1) 20200217	17 Feb 2020 16:15			20 Feb 2020 13:27	1
HS20020741-08	SO-1620-SG14(5.5-6) 20200217	17 Feb 2020 16:30			20 Feb 2020 13:50	1
Batch ID: R356904 (0)		Test Name : MOISTURE - ASTM D2216			Matrix: Soil	
HS20020741-01	SO-1620-SG12(0.5-1) 20200217	17 Feb 2020 09:11			24 Feb 2020 09:04	1
HS20020741-02	SO-1620-SG12(5.5-6) 20200217	17 Feb 2020 09:30			24 Feb 2020 09:04	1
HS20020741-03	SO-1620-SG07(0.5-1) 20200217	17 Feb 2020 10:50			24 Feb 2020 09:04	1
HS20020741-04	SO-1620-SG07(5.5-6) 20200217	17 Feb 2020 11:10			24 Feb 2020 09:04	1
HS20020741-05	SO-1620-SG06(0.5-1) 20200217	17 Feb 2020 14:00			24 Feb 2020 09:04	1
HS20020741-06	SO-1620-SG06(5.5-6) 20200217	17 Feb 2020 14:15			24 Feb 2020 09:04	1
HS20020741-07	SO-1620-SG14(0.5-1) 20200217	17 Feb 2020 16:15			24 Feb 2020 09:04	1
HS20020741-08	SO-1620-SG14(5.5-6) 20200217	17 Feb 2020 16:30			24 Feb 2020 09:04	1

WorkOrder: HS20020741
 InstrumentID: SV-6
 Test Code: 8270_LOW_S
 Test Number: SW8270
 Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0019	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20020741
 InstrumentID: VOA8
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0013	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0014	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0014	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020741

QC BATCH REPORT

Batch ID: 150835 (0)		Instrument: SV-6		Method: LOW-LEVEL SEMIVOLATILES BY 8270D						
MBLK	Sample ID: MBLK-150835	Units: ug/Kg			Analysis Date: 21-Feb-2020 12:39					
Client ID:	Run ID: SV-6_356813	SeqNo: 5483518		PrepDate: 20-Feb-2020		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Naphthalene	U	3.3								
Surr: 2-Fluorobiphenyl	133.5	0	167	0	79.9	43 - 125				
Surr: 4-Terphenyl-d14	142.1	0	167	0	85.1	32 - 125				
Surr: Nitrobenzene-d5	99.1	0	167	0	59.3	37 - 125				
LCS	Sample ID: LCS-150835	Units: ug/Kg			Analysis Date: 21-Feb-2020 12:58					
Client ID:	Run ID: SV-6_356813	SeqNo: 5483519		PrepDate: 20-Feb-2020		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Naphthalene	134.3	3.3	167	0	80.4	50 - 125				
Surr: 2-Fluorobiphenyl	117.3	0	167	0	70.3	43 - 125				
Surr: 4-Terphenyl-d14	128.5	0	167	0	77.0	32 - 125				
Surr: Nitrobenzene-d5	88.94	0	167	0	53.3	37 - 125				
MS	Sample ID: HS20020747-03MS	Units: ug/Kg			Analysis Date: 21-Feb-2020 14:53					
Client ID:	Run ID: SV-6_356813	SeqNo: 5483525		PrepDate: 20-Feb-2020		DF: 10				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Naphthalene	98.19	33	166.5	0	59.0	50 - 125				
Surr: 2-Fluorobiphenyl	78.99	0	166.5	0	47.4	43 - 125				
Surr: 4-Terphenyl-d14	113.2	0	166.5	0	68.0	32 - 125				
Surr: Nitrobenzene-d5	88.58	0	166.5	0	53.2	37 - 125				
MSD	Sample ID: HS20020747-03MSD	Units: ug/Kg			Analysis Date: 21-Feb-2020 15:13					
Client ID:	Run ID: SV-6_356813	SeqNo: 5483526		PrepDate: 20-Feb-2020		DF: 10				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Naphthalene	120.4	33	166.8	0	72.2	50 - 125	98.19	20.3	30	
Surr: 2-Fluorobiphenyl	105.1	0	166.8	0	63.0	43 - 125	78.99	28.4	30	
Surr: 4-Terphenyl-d14	157.7	0	166.8	0	94.6	32 - 125	113.2	32.9	30 R	
Surr: Nitrobenzene-d5	80.46	0	166.8	0	48.2	37 - 125	88.58	9.6	30	

The following samples were analyzed in this batch:

HS20020741-01	HS20020741-02	HS20020741-03	HS20020741-04
HS20020741-05	HS20020741-06	HS20020741-07	HS20020741-08

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020741

QC BATCH REPORT

Batch ID: R356625 (0)		Instrument: VOA8		Method: VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKS1-022020	Units: ug/Kg			Analysis Date: 20-Feb-2020 08:59				
Client ID:	Run ID: VOA8_356625	SeqNo: 5480014		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	38.11	0	50	0	76.2	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	47.13	0	50	0	94.3	80 - 120			
<i>Surr: Dibromofluoromethane</i>	40.47	0	50	0	80.9	80 - 119			
<i>Surr: Toluene-d8</i>	54.37	0	50	0	109	81 - 118			

LCS	Sample ID: VLCSS1-022020	Units: ug/Kg			Analysis Date: 20-Feb-2020 08:13				
Client ID:	Run ID: VOA8_356625	SeqNo: 5480013		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	51.78	5.0	50	0	104	75 - 124			
Ethylbenzene	58.4	5.0	50	0	117	70 - 123			
Xylenes, Total	167.2	5.0	150	0	111	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	41.73	0	50	0	83.5	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	48.42	0	50	0	96.8	80 - 120			
<i>Surr: Dibromofluoromethane</i>	43.09	0	50	0	86.2	80 - 119			
<i>Surr: Toluene-d8</i>	54.62	0	50	0	109	81 - 118			

MS	Sample ID: HS20020791-01MS	Units: ug/Kg			Analysis Date: 20-Feb-2020 10:08				
Client ID:	Run ID: VOA8_356625	SeqNo: 5480017		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	42.4	5.0	50	0	84.8	70 - 130			
Ethylbenzene	44.02	5.0	50	0	88.0	70 - 130			
Xylenes, Total	131.4	5.0	150	0	87.6	70 - 130			
<i>Surr: 1,2-Dichloroethane-d4</i>	43.44	0	50	0	86.9	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	46.9	0	50	0	93.8	70 - 130			
<i>Surr: Dibromofluoromethane</i>	45.81	0	50	0	91.6	70 - 130			
<i>Surr: Toluene-d8</i>	49.23	0	50	0	98.5	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020741

QC BATCH REPORT

Batch ID: R356625 (0) **Instrument:** VOA8 **Method:** VOLATILES BY SW8260C

MSD	Sample ID: HS20020791-01MSD	Units: ug/Kg			Analysis Date: 20-Feb-2020 10:31					
Client ID:	Run ID: VOA8_356625	SeqNo: 5480018		PrepDate:		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	48.19	5.0	50	0	96.4	70 - 130	42.4	12.8	30	
Ethylbenzene	50.92	5.0	50	0	102	70 - 130	44.02	14.5	30	
Xylenes, Total	150.2	5.0	150	0	100	70 - 130	131.4	13.4	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	42.11	0	50	0	84.2	70 - 126	43.44	3.11	30	
<i>Surr: 4-Bromofluorobenzene</i>	48.87	0	50	0	97.7	70 - 130	46.9	4.12	30	
<i>Surr: Dibromofluoromethane</i>	47.03	0	50	0	94.1	70 - 130	45.81	2.61	30	
<i>Surr: Toluene-d8</i>	53.14	0	50	0	106	70 - 130	49.23	7.64	30	

The following samples were analyzed in this batch:

HS20020741-01	HS20020741-02	HS20020741-03	HS20020741-04
HS20020741-05	HS20020741-06	HS20020741-07	HS20020741-08

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020741

QC BATCH REPORT

Batch ID: R356904 (0) **Instrument:** Balance1 **Method:** MOISTURE - ASTM D2216

DUP Sample ID: **HS20020770-05DUP** Units: **wt%** Analysis Date: **24-Feb-2020 09:04**
Client ID: Run ID: **Balance1_356904** SeqNo: **5485414** PrepDate: DF: **1**
Analyte Result MQL SPK Val SPK Ref Value %REC Control Limit RPD Ref Value %RPD RPD Limit Qual

Percent Moisture 10.4 0.0100 10.4 0 20

The following samples were analyzed in this batch: HS20020741-01 HS20020741-02 HS20020741-03 HS20020741-04
HS20020741-05 HS20020741-06 HS20020741-07 HS20020741-08

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20020741

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg-dry	Milligrams per Kilogram- Dry weight corrected

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2020	31-Dec-2020
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	T104704231-19-25	30-Apr-2020

Sample Receipt Checklist

Client Name: PBW
Work Order: HS20020741

Date/Time Received: 18-Feb-2020 17:40
Received by: DDG

Checklist completed by: Jared R. Makan
eSignature
Date: 18-Feb-2020

Reviewed by: Dane J. Wacasey
eSignature
Date: 19-Feb-2020

Matrices: Soil

Carrier name: ALS Courier

- Shipping container/cooler in good condition? Yes [checked] No [] Not Present []
Custody seals intact on shipping container/cooler? Yes [checked] No [] Not Present []
Custody seals intact on sample bottles? Yes [] No [] Not Present [checked]
VOA/TX1005/TX1006 Solids in hermetically sealed vials? Yes [checked] No [] Not Present []
Chain of custody present? Yes [checked] No []
Chain of custody signed when relinquished and received? Yes [checked] No []
Samplers name present on COC? Yes [checked] No []
Chain of custody agrees with sample labels? Yes [checked] No []
Samples in proper container/bottle? Yes [checked] No []
Sample containers intact? Yes [checked] No []
Sufficient sample volume for indicated test? Yes [checked] No []
All samples received within holding time? Yes [checked] No []
Container/Temp Blank temperature in compliance? Yes [checked] No []

Temperature(s)/Thermometer(s): 0.7°C/0.7°C UC/C IR25
Cooler(s)/Kit(s): 45571
Date/Time sample(s) sent to storage: 02/18/2020 18:55

- Water - VOA vials have zero headspace? Yes [] No [] No VOA vials submitted [checked]
Water - pH acceptable upon receipt? Yes [] No [] N/A [checked]
pH adjusted? Yes [] No [] N/A [checked]

pH adjusted by:

Login Notes: All sample bottle count differ - COC = 5, received 4 bottles.

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:



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 1 of 1

COC ID: **214099**

HS20020741

Golder Associates Inc.
Houston TX-Wood Preserving Works



Customer Information		ALS Project Manager:	
Purchase Order	UPRR/Kevin Peterburs	Project Name	Houston TX-Wood Preserving Works
Work Order		Project Number	1620-11-Rev0 SR 92688
Company Name	Golder Associates Inc.	Bill To Company	Union Pacific Railroad- A/P
Send Report To	Eric Matzner	Invoice Attn	Accounts Payable
Address	2201 Double Creek Drive	Address	1400 Douglas Street
	Suite 4004		Stop 0750
City/State/Zip	Round Rock, TX 78664	City/State/Zip	Omaha NE 681790750
Phone	(512) 671-3434	Phone	
Fax	(512) 671-3446	Fax	
e-Mail Address	Eric_Matzner@golder.com	e-Mail Address	

A 8260_S (5652652 B.E.X)
 B 8270_LOW_S (5632532 SVOC- Naphthalene only)
 C MOIST_ASTM (5631931 Gen.Chem. MOIST%)
 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	SO-1620-GA12 (0.5-1)	20200217	2-17-20	0911	Soil	0.9											
2	SG12 (5.5-6)		0930			5	X	X	X								
3	SG07 (0.5-1)		1050														
4	SG07 (5.5-6)		1110														
5	SG06 (0.5-1)		1400														
6	SG06 (5.5-6)		1415														
7	SG14 (0.5-1)		1615														
8	SG14 (5.5-6)		1630														
9																	
10																	

Sampler(s) Please Print & Sign: Anthony Reid

Relinquished by: [Signature] Date: 2-18-20 Time: 11:50

Received by: [Signature] Date: 2-18-20 Time: 17:45

QC Package: (Check One Box Below)
 Level II Std CC
 Level III Std OCV/Raw Date
 Level IV SWM/CLP
 TRFP Checklist
 TRFP Level IV


Notes: UPRR HWPW 1620-11

Cooler ID: 2155-21 Cooler Temp: 0-7

Preservative Key: 1-HCl 2-HNO₃ 3-H₂SO₄ 4-NaOH 5-Na₂S₂O₃ 6-NaHSO₄ 7-Other 8-4°C 9-5035

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.

Copyright 2011 by ALS Environmental.

 ALS 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5687	CUSTODY SEAL		Seal Broken By:
	Date: 2-18-20	Time: 12:20	SM
	Name: Andrew Field	Company: Geo Lab	Date: 02/18/20

45571

RED LAB



Memorandum

July 10, 2020

To: Eric Matzner Ref. No.: 11183954-1620

From: ^{ck} Chris G. Knight/eew/674-NF Tel: 512-506-8803

CC: Jesse Orth, Jon Lang; Julie Lidstone

**Subject: Data Usability Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
June 2020**

1. Scope of Data Usability Study

This document details a Data Usability Summary (DUS) of analytical results for soil samples collected in support of the Soil Gas Probes at the Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works site during June 2020. Samples were submitted to ALS Environmental (ALS), located in Houston, Texas and are reported in data package HS20060975. The intended use of the data is to support the Soil Gas Probes at the site by providing current concentration of chemicals of concern.

Data were reviewed and validated by Chris G. Knight of GHD, in accordance with Title 30 of the Texas Administrative Code Section 350.54 (30 TAC 350.54) as described in the Texas Commission on Environmental Quality (TCEQ) Regulatory Guidance document entitled "Review and Reporting of COC Concentration Data under TRRP", (RG-366/TRRP-13), revised May 2010, herein referred to as "TRRP-13 Guidance". Evaluation of the data was based on information obtained from the chain of custody forms, the finished report forms, method blank data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spikes (MS), field quality assurance/quality control samples (QA/QC), the laboratory review checklists (LRC), and the laboratory exception report (ER).

A sample collection and analysis summary is presented in Table 1. This summary provides a cross-reference of field sample identification numbers and location identification. Each sample is assigned a unique field identification number.

The validated sample results are presented in Table 2. A summary of the analytical methodology is presented in Table 3.



2. Laboratory Qualifications

The Laboratory's quality assurance program is consistent with the quality standards outlined in the National Environmental Laboratory Accreditation Program (NELAP). This laboratory was accredited under Texas Certification number # TX104704231 at the time the analysis was performed and the certificate is included in Attachment A.

3. Project Objectives

3.1 Sampling/Analytical QA/QC Objectives

The QA/QC program was designed to identify contamination resulting from the sampling, sample transport and analytical process through the analysis of method blanks. The QA/QC program was designed to evaluate the quality of the resulting data with respect to bias and precision through analysis of LCS and MS analyses.

4. Data Review/Validation Results

4.1 Sample Holding Time and Preservation

Samples were shipped with a chain of custody and the paper work was filled out properly with the following exceptions:

- i) SG-24(5.5-6) – The sample time on the container labels (15:00) differs from the chain of custody (15:50). The sample was logged in using the sample time listed on the chain of custody. No further action was required.
- ii) SG25(0.5-1) – The methanol preserved method 5035 volatile organic compounds (VOCs) container was received empty. No further action was required.

All samples were delivered on ice and stored by the laboratory at the required temperature (0-6°C).

The sample chain of custody documents and the analytical report were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

4.2 Sample Containers

Sample containers used were certified pre-cleaned glass containers provided by the laboratory. These containers meet or exceed analyte specifications established in the United States Environmental Protection Agency (USEPA) *Specifications and Guidance for Contaminant-free Sample Containers*.

4.3 Calibrations

According to the LRC, initial calibration and continuing calibration data met the criteria for the selected method.



4.4 Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures. As these were not discrete samples handled in the field, these blanks are not listed on the sample identification cross-reference list found in the data package.

For this study, laboratory method blanks were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch and results are reported in the laboratory data package.

The method blank results were non-detect or below the method quantitation limit (MQL), indicating that laboratory contamination was not a factor for this investigation.

4.5 Internal Standard and Surrogate Spike Recoveries

Recoveries of internal standards are addressed in the LRC of the data package. All internal standard recoveries associated with the compounds of interest were acceptable per the LRC.

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for VOCs and naphthalene are spiked with surrogate compounds prior to sample analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices. The recovery ranges established by the laboratory are adopted as the acceptance criteria for the project. Each individual surrogate compound is expected to meet the laboratory control limits. According to the TRRP-13 Guidelines, one outlying surrogate is acceptable for methods with multiple surrogate spike compounds as long as the recovery is at least ten percent.

Surrogate recoveries were assessed against laboratory control limits and/or the guidance in TRRP-13. All surrogate recoveries met the above criteria.

4.6 Laboratory Control Sample Analysis

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The recovery ranges established by the laboratory are adopted as the acceptance criteria for the project.

For this study, LCS were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch.

The LCS contained all compounds specified in the methods. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

4.7 Matrix Spike Analysis

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with known concentrations of the analytes of interest and analyzed as MS/matrix spike duplicate (MSD) samples. The relative percent difference (RPD) between the MS and MSD is used to assess analytical precision.



The laboratory performed MS/MSD analyses on non-site samples. These cannot be used to assess accuracy and precision for the site samples.

4.8 Field Procedures

Golder Associates, Inc. collected soil samples in accordance with their Standard Operating Procedures (SOP) for sample collection.

4.9 Analyte Reporting

The laboratory reported detected results for each analyte down to the sample detection limit (SDL), which is defined as the method detection limit (MDL) with sample-specific adjustments for dilutions, aliquot size, volumes, etc. Positive analyte detections less than the MQL but greater than the SDL were qualified as estimated (J) in Table 2.

The detectability check standard (DCS) results supported the laboratory MDLs.

All soil results were reported on a dry weight basis.

5. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are usable for the purpose of supporting the Soil Gas Probes at the site by providing current concentration of chemicals of concern in soil samples without qualification.

Table 1

Sample Collection and Analysis Summary
Soil Gas Probes
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
June 2020

Sample Identification	Location	Matrix	Initial Sample Depth (ft bgs)	Final Sample Depth (ft bgs)	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters	
							VOCs	Naphthalene
SO-1620-SG25(0.5-1)20200618	SG-25	Soil	0.5	1	06/18/2020	08:30	X	X
SO-1620-SG25(5.5-6)20200618	SG-25	Soil	5.5	6	06/18/2020	08:58	X	X
SO-1620-SG13R(0.5-1)20200618	SG-13R	Soil	0.5	1	06/18/2020	10:00	X	X
SO-1620-SG13R(5.5-6)20200618	SG-13R	Soil	5.5	6	06/18/2020	10:30	X	X
SO-1620-SG27(5.5-6)20200618	SG-27	Soil	5.5	6	06/18/2020	10:30	X	X
SO-1620-SG23(0.5-1)20200618	SG-23	Soil	0.5	1	06/18/2020	13:08	X	X
SO-1620-SG23(5.5-6)20200618	SG-23	Soil	5.5	6	06/18/2020	13:30	X	X
SO-1620-SG24(0.5-1)20200618	SG-24	Soil	0.5	1	06/18/2020	14:49	X	X
SO-1620-SG24(5.5-6)20200618	SG-24	Soil	5.5	6	06/18/2020	15:50	X	X
SO-1620-SG26(0.5-1)20200619	SG-26	Soil	0.5	1	06/19/2020	09:15	X	X
SO-1620-SG26(5.5-6)20200619	SG-26	Soil	5.5	6	06/19/2020	09:52	X	X
SO-1620-SG27(0.5-1)20200619	SG-27	Soil	0.5	1	06/19/2020	10:10	X	X

Notes:

ft bgs - Feet Below Ground Surface
VOCs - Volatile Organic Compounds

Table 2

**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
June 2020**

Location ID:	SG-13R	SG-13R	SG-23	SG-23
Sample Name:	SO-1620-SG13R(0.5-1)20200618	SO-1620-SG13R(5.5-6)20200618	SO-1620-SG23(0.5-1)20200618	SO-1620-SG23(5.5-6)20200618
Sample Date:	06/18/2020	06/18/2020	06/18/2020	06/18/2020
Depth:	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs

Parameters Unit

Volatile Organic Compounds

Benzene	mg/kg	<0.00053	<0.00044	<0.00031	<0.00032
Ethylbenzene	mg/kg	<0.00075	<0.00062	<0.00044	<0.00044
Xylenes (total)	mg/kg	<0.0011	<0.00089	<0.00062	<0.00064

Semi-volatile Organic Compounds

Naphthalene	mg/kg	<0.00074	<0.00073	0.00071 J	<0.00071
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**Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
June 2020**

Location ID:	SG-24	SG-24	SG-25	SG-25
Sample Name:	SO-1620-SG24(0.5-1)20200618	SO-1620-SG24(5.5-6)20200618	SO-1620-SG25(0.5-1)20200618	SO-1620-SG25(5.5-6)20200618
Sample Date:	06/18/2020	06/18/2020	06/18/2020	06/18/2020
Depth:	0.5-1 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs	5.5-6 ft bgs

Parameters	Unit				
Volatile Organic Compounds					
Benzene	mg/kg	<0.00038	<0.00030	<0.00068	<0.00030
Ethylbenzene	mg/kg	<0.00053	<0.00043	<0.00095	<0.00042
Xylenes (total)	mg/kg	<0.00076	<0.00061	<0.0014	<0.00059
Semi-volatile Organic Compounds					
Naphthalene	mg/kg	0.0010 J	<0.00069	0.0046	<0.00070

Table 2

Analytical Results Summary
Soil Gas Probes
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
June 2020

Location ID:	SG-26	SG-26	SG-27	SG-27
Sample Name:	SO-1620-SG26(0.5-1)20200619	SO-1620-SG26(5.5-6)20200619	SO-1620-SG27(5.5-6)20200618	SO-1620-SG27(0.5-1)20200619
Sample Date:	06/19/2020	06/19/2020	06/18/2020	06/19/2020
Depth:	0.5-1 ft bgs	5.5-6 ft bgs	5.5-6 ft bgs	0.5-1 ft bgs

Parameters	Unit				
Volatile Organic Compounds					
Benzene	mg/kg	<0.00046	<0.00039	<0.00039	<0.00069
Ethylbenzene	mg/kg	<0.00064	<0.00054	<0.00054	<0.00097
Xylenes (total)	mg/kg	<0.00092	<0.00077	<0.00077	<0.0014
Semi-volatile Organic Compounds					
Naphthalene	mg/kg	0.0039	<0.00069	0.0018 J	0.0022 J

Notes:

ft bgs - Feet below ground surface

< - Not detected at the associated reporting limit

J - Estimated concentration

Table 3

Analytical Methods
Soil Gas Probes
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
June 2020

Parameter	Method	Matrix	Holding Time	
			Collection to Extraction (Days)	Extraction to Analysis (Days)
VOCs	SW-846 8260C	Soil	-	14
Naphthalene	SW-846 8270D	Soil	14	40

Notes:

VOCs - Volatile Organic Compounds

"-" - Not Applicable

Method References:

SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions

Attachment A

Laboratory NELAP Certificate



Texas Commission on Environmental Quality



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Issue Date: 5/1/2020

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Matrix: *Drinking Water*

Method EPA 1613

Analyte	AB	Analyte ID	Method ID
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10120408

Method EPA 200.8

Analyte	AB	Analyte ID	Method ID
Copper	TX	1055	10014605
Lead	TX	1075	10014605



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Matrix: Non-Potable Water

Method	Analyte	AB	Analyte ID	Method ID
Method EPA 1010	Ignitability	TX	1780	10116606
Method EPA 120.1	Conductivity	TX	1610	10006403
Method EPA 1311	TCLP	TX	849	10118806
Method EPA 1312	SPLP	TX	850	10119003
Method EPA 160.4	Residue-volatile	TX	1970	10010409
Method EPA 1613	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TX	9516	10120408
	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TX	9519	10120408
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	TX	9420	10120408
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD)	TX	9426	10120408
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	TX	9423	10120408
	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	TX	9471	10120408
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCDD)	TX	9453	10120408
	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCDF)	TX	9474	10120408
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,6,7,8-HxCDD)	TX	9456	10120408
	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCDF)	TX	9477	10120408
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCDD)	TX	9459	10120408
	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-PeCDF)	TX	9543	10120408
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	TX	9540	10120408
	2,3,4,6,7,8-Hexachlorodibenzofuran (2,3,4,6,7,8-HxCDF)	TX	9480	10120408



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Matrix: Non-Potable Water

2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	TX	9549	10120408
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	TX	9612	10120408
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10120408
Total Heptachlorodibenzofuran (Total HpCDF)	TX	9444	10120408
Total Heptachlorodibenzo-p-dioxin (Total HpCDD)	TX	9438	10120408
Total Hexachlorodibenzofuran (Total HxCDF)	TX	9483	10120408
Total Hexachlorodibenzo-p-dioxin (Total HxCDD)	TX	9468	10120408
Total Pentachlorodibenzofuran (Total PeCDF)	TX	9552	10120408
Total Pentachlorodibenzo-p-dioxin (Total PeCDD)	TX	9555	10120408
Total Tetrachlorodibenzofuran (Total TCDF)	TX	9615	10120408
Total Tetrachlorodibenzo-p-dioxin (Total TCDD)	TX	9609	10120408
Method EPA 1664			
Analyte	AB	Analyte ID	Method ID
n-Hexane Extractable Material (HEM) (O&G)	TX	1803	10127807
Method EPA 180.1			
Analyte	AB	Analyte ID	Method ID
Turbidity	TX	2055	10011606
Method EPA 200.8			
Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10014605
Antimony	TX	1005	10014605
Arsenic	TX	1010	10014605
Barium	TX	1015	10014605
Beryllium	TX	1020	10014605
Boron	TX	1025	10014605
Cadmium	TX	1030	10014605
Calcium	TX	1035	10014605
Chromium	TX	1040	10014605
Cobalt	TX	1050	10014605
Copper	TX	1055	10014605
Iron	TX	1070	10014605



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Matrix: Non-Potable Water

Lead	TX	1075	10014605
Magnesium	TX	1085	10014605
Manganese	TX	1090	10014605
Molybdenum	TX	1100	10014605
Nickel	TX	1105	10014605
Potassium	TX	1125	10014605
Selenium	TX	1140	10014605
Silver	TX	1150	10014605
Sodium	TX	1155	10014605
Strontium	TX	1160	10014605
Thallium	TX	1165	10014605
Tin	TX	1175	10014605
Titanium	TX	1180	10014605
Uranium	TX	3035	10014605
Vanadium	TX	1185	10014605
Zinc	TX	1190	10014605

Method EPA 245.1

Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10036609

Method EPA 300.0

Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10053200
Chloride	TX	1575	10053200
Fluoride	TX	1730	10053200
Nitrate as N	TX	1810	10053200
Nitrate-nitrite	TX	1820	10053200
Nitrite as N	TX	1840	10053200
Orthophosphate as P	TX	1870	10053200
Sulfate	TX	2000	10053200

Method EPA 325.1

Analyte	AB	Analyte ID	Method ID
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Matrix: Non-Potable Water

Chloride	TX	1575	10056801
Method EPA 335.1			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	10060001
Method EPA 335.2			
Analyte	AB	Analyte ID	Method ID
Total cyanide	TX	1645	10278203
Method EPA 335.4			
Analyte	AB	Analyte ID	Method ID
Total cyanide	TX	1645	10061402
Method EPA 350.3			
Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	10064401
Method EPA 365.3			
Analyte	AB	Analyte ID	Method ID
Orthophosphate as P	TX	1870	10070801
Phosphorus	TX	1910	10070801
Method EPA 375.4			
Analyte	AB	Analyte ID	Method ID
Sulfate	TX	2000	10073800
Method EPA 376.1			
Analyte	AB	Analyte ID	Method ID
Sulfide	TX	2005	10074201
Method EPA 410.4			
Analyte	AB	Analyte ID	Method ID
Chemical oxygen demand (COD)	TX	1565	10077404
Method EPA 415.1			
Analyte	AB	Analyte ID	Method ID
Total Organic Carbon (TOC)	TX	2040	10078407
Method EPA 420.1			
Analyte	AB	Analyte ID	Method ID
Total phenolics	TX	1905	10079400



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Matrix: Non-Potable Water

Method EPA 420.4

Analyte	AB	Analyte ID	Method ID
Total phenolics	TX	1905	10080203

Method EPA 6020

Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10156419
Antimony	TX	1005	10156419
Arsenic	TX	1010	10156419
Barium	TX	1015	10156419
Beryllium	TX	1020	10156419
Boron	TX	1025	10156419
Cadmium	TX	1030	10156419
Calcium	TX	1035	10156419
Chromium	TX	1040	10156419
Cobalt	TX	1050	10156419
Copper	TX	1055	10156419
Iron	TX	1070	10156419
Lead	TX	1075	10156419
Lithium	TX	1080	10156419
Magnesium	TX	1085	10156419
Manganese	TX	1090	10156419
Molybdenum	TX	1100	10156419
Nickel	TX	1105	10156419
Potassium	TX	1125	10156419
Selenium	TX	1140	10156419
Silver	TX	1150	10156419
Sodium	TX	1155	10156419
Strontium	TX	1160	10156419
Thallium	TX	1165	10156419
Tin	TX	1175	10156419
Titanium	TX	1180	10156419



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Matrix: Non-Potable Water

Vanadium	TX	1185	10156419
Zinc	TX	1190	10156419

Method EPA 608

Analyte	AB	Analyte ID	Method ID
4,4'-DDD	TX	7355	10103603
4,4'-DDE	TX	7360	10103603
4,4'-DDT	TX	7365	10103603
Aldrin	TX	7025	10103603
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10103603
alpha-Chlordane	TX	7240	10103603
Aroclor-1016 (PCB-1016)	TX	8880	10103603
Aroclor-1221 (PCB-1221)	TX	8885	10103603
Aroclor-1232 (PCB-1232)	TX	8890	10103603
Aroclor-1242 (PCB-1242)	TX	8895	10103603
Aroclor-1248 (PCB-1248)	TX	8900	10103603
Aroclor-1254 (PCB-1254)	TX	8905	10103603
Aroclor-1260 (PCB-1260)	TX	8910	10103603
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10103603
Chlordane (tech.)	TX	7250	10103603
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10103603
Dieldrin	TX	7470	10103603
Endosulfan I	TX	7510	10103603
Endosulfan II	TX	7515	10103603
Endosulfan sulfate	TX	7520	10103603
Endrin	TX	7540	10103603
Endrin aldehyde	TX	7530	10103603
Endrin ketone	TX	7535	10103603
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10103603
gamma-Chlordane	TX	7245	10103603
Heptachlor	TX	7685	10103603



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Matrix: Non-Potable Water

Heptachlor epoxide	TX	7690	10103603
Methoxychlor	TX	7810	10103603
Toxaphene (Chlorinated camphene)	TX	8250	10103603

Method EPA 624

Analyte	AB	Analyte ID	Method ID
1,1,1-Trichloroethane	TX	5160	10107207
1,1,1,2-Tetrachloroethane	TX	5110	10107207
1,1,2-Trichloroethane	TX	5165	10107207
1,1-Dichloroethane	TX	4630	10107207
1,1-Dichloroethylene	TX	4640	10107207
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10107207
1,2-Dichlorobenzene	TX	4610	10107207
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10107207
1,2-Dichloropropane	TX	4655	10107207
1,3-Dichlorobenzene	TX	4615	10107207
1,4-Dichlorobenzene	TX	4620	10107207
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10107207
2-Chloroethyl vinyl ether	TX	4500	10107207
Acetone (2-Propanone)	TX	4315	10107207
Acrolein (Propenal)	TX	4325	10107207
Acrylonitrile	TX	4340	10107207
Benzene	TX	4375	10107207
Bromodichloromethane	TX	4395	10107207
Bromoform	TX	4400	10107207
Carbon tetrachloride	TX	4455	10107207
Chlorobenzene	TX	4475	10107207
Chlorodibromomethane	TX	4575	10107207
Chloroethane (Ethyl chloride)	TX	4485	10107207
Chloroform	TX	4505	10107207
cis-1,2-Dichloroethylene	TX	4645	10107207



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Matrix: Non-Potable Water

cis-1,3-Dichloropropene	TX	4680	10107207
Ethylbenzene	TX	4765	10107207
m+p-xylene	TX	5240	10107207
Methyl bromide (Bromomethane)	TX	4950	10107207
Methyl chloride (Chloromethane)	TX	4960	10107207
Methyl tert-butyl ether (MTBE)	TX	5000	10107207
Methylene chloride (Dichloromethane)	TX	4975	10107207
Naphthalene	TX	5005	10107207
o-Xylene	TX	5250	10107207
Tetrachloroethylene (Perchloroethylene)	TX	5115	10107207
Toluene	TX	5140	10107207
trans-1,2-Dichloroethylene	TX	4700	10107207
trans-1,3-Dichloropropylene	TX	4685	10107207
Trichloroethene (Trichloroethylene)	TX	5170	10107207
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10107207
Vinyl chloride	TX	5235	10107207
Xylene (total)	TX	5260	10107207

Method EPA 625

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10107401
1,2,4-Trichlorobenzene	TX	5155	10107401
1,2-Dichlorobenzene	TX	4610	10107401
1,2-Diphenylhydrazine	TX	6220	10107401
1,3-Dichlorobenzene	TX	4615	10107401
1,4-Dichlorobenzene	TX	4620	10107401
2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl)ether)	TX	4659	10107401
2,4,5-Trichlorophenol	TX	6835	10107401
2,4,6-Trichlorophenol	TX	6840	10107401
2,4-Dichlorophenol	TX	6000	10107401
2,4-Dimethylphenol	TX	6130	10107401



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Matrix: Non-Potable Water

2,4-Dinitrophenol	TX	6175	10107401
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10107401
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10107401
2-Chloronaphthalene	TX	5795	10107401
2-Chlorophenol	TX	5800	10107401
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10107401
2-Methylphenol (o-Cresol)	TX	6400	10107401
2-Nitrophenol	TX	6490	10107401
3,3'-Dichlorobenzidine	TX	5945	10107401
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10107401
4-Chloro-3-methylphenol	TX	5700	10107401
4-Chlorophenyl phenylether	TX	5825	10107401
4-Methylphenol (p-Cresol)	TX	6410	10107401
4-Nitrophenol	TX	6500	10107401
Acenaphthene	TX	5500	10107401
Acenaphthylene	TX	5505	10107401
Anthracene	TX	5555	10107401
Benzidine	TX	5595	10107401
Benzo(a)anthracene	TX	5575	10107401
Benzo(a)pyrene	TX	5580	10107401
Benzo(b)fluoranthene	TX	5585	10107401
Benzo(g,h,i)perylene	TX	5590	10107401
Benzo(k)fluoranthene	TX	5600	10107401
bis(2-Chloroethoxy)methane	TX	5760	10107401
bis(2-Chloroethyl) ether	TX	5765	10107401
bis(2-Ethylhexyl) phthalate (Di(2-Ethylhexyl) phthalate, DEHP)	TX	6065	10107401
Butyl benzyl phthalate	TX	5670	10107401
Chrysene	TX	5855	10107401
Dibenz(a,h) anthracene	TX	5895	10107401
Diethyl phthalate	TX	6070	10107401



Texas Commission on Environmental Quality



NELAP - Recognized Laboratory Fields of Accreditation

ALS Laboratory Group, Environmental Services Division (Houston, Texas)

10450 Stancliff Road, Suite 210
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Certificate: T104704231-20-26
Expiration Date: 4/30/2021
Issue Date: 5/1/2020

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Matrix: Non-Potable Water

Dimethyl phthalate	TX	6135	10107401
Di-n-butyl phthalate	TX	5925	10107401
Di-n-octyl phthalate	TX	6200	10107401
Fluoranthene	TX	6265	10107401
Fluorene	TX	6270	10107401
Hexachlorobenzene	TX	6275	10107401
Hexachlorobutadiene	TX	4835	10107401
Hexachlorocyclopentadiene	TX	6285	10107401
Hexachloroethane	TX	4840	10107401
Indeno(1,2,3-cd) pyrene	TX	6315	10107401
Isophorone	TX	6320	10107401
Naphthalene	TX	5005	10107401
Nitrobenzene	TX	5015	10107401
n-Nitrosodiethylamine	TX	6525	10107401
n-Nitrosodimethylamine	TX	6530	10107401
n-Nitrosodi-n-butylamine	TX	5025	10107401
n-Nitrosodi-n-propylamine	TX	6545	10107401
n-Nitrosodiphenylamine	TX	6535	10107401
Pentachlorobenzene	TX	6590	10107401
Pentachlorophenol	TX	6605	10107401
Phenanthrene	TX	6615	10107401
Phenol	TX	6625	10107401
Pyrene	TX	6665	10107401
Pyridine	TX	5095	10107401
Method EPA 7196			
Analyte	AB	Analyte ID	Method ID
Chromium (VI)	TX	1045	10162206
Method EPA 7470			
Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10165603



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Matrix: Non-Potable Water

Method EPA 8011

Analyte	AB	Analyte ID	Method ID
1,2,3-Trichloropropane	TX	5180	10173009
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10173009
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10173009

Method EPA 8015

Analyte	AB	Analyte ID	Method ID
Diesel range organics (DRO)	TX	9369	10173203
Ethanol	TX	4750	10173203
Ethylene glycol	TX	4785	10173203
Gasoline range organics (GRO)	TX	9408	10173203
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10173203
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10173203
Methanol	TX	4930	10173203
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10173203
n-Propanol (1-Propanol)	TX	5055	10173203
Propylene Glycol	TX	6657	10173203
tert-Butyl alcohol	TX	4420	10173203

Method EPA 8081

Analyte	AB	Analyte ID	Method ID
4,4'-DDD	TX	7355	10178402
4,4'-DDE	TX	7360	10178402
4,4'-DDT	TX	7365	10178402
Aldrin	TX	7025	10178402
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10178402
alpha-Chlordane	TX	7240	10178402
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10178402
Chlordane (tech.)	TX	7250	10178402
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10178402
Dieldrin	TX	7470	10178402
Endosulfan I	TX	7510	10178402



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Matrix: Non-Potable Water

Endosulfan II	TX	7515	10178402
Endosulfan sulfate	TX	7520	10178402
Endrin	TX	7540	10178402
Endrin aldehyde	TX	7530	10178402
Endrin ketone	TX	7535	10178402
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10178402
gamma-Chlordane	TX	7245	10178402
Heptachlor	TX	7685	10178402
Heptachlor epoxide	TX	7690	10178402
Hexachlorobenzene	TX	6275	10178402
Methoxychlor	TX	7810	10178402
Mirex	TX	7870	10178402
Toxaphene (Chlorinated camphene)	TX	8250	10178402

Method EPA 8082

Analyte	AB	Analyte ID	Method ID
Aroclor-1016 (PCB-1016)	TX	8880	10179201
Aroclor-1221 (PCB-1221)	TX	8885	10179201
Aroclor-1232 (PCB-1232)	TX	8890	10179201
Aroclor-1242 (PCB-1242)	TX	8895	10179201
Aroclor-1248 (PCB-1248)	TX	8900	10179201
Aroclor-1254 (PCB-1254)	TX	8905	10179201
Aroclor-1260 (PCB-1260)	TX	8910	10179201
PCBs (total)	TX	8870	10179201

Method EPA 8151

Analyte	AB	Analyte ID	Method ID
2,4,5-T	TX	8655	10183003
2,4-D	TX	8545	10183003
2,4-DB	TX	8560	10183003
Dalapon	TX	8555	10183003
Dicamba	TX	8595	10183003
Dichloroprop (Dichloroprop, Weedone)	TX	8605	10183003



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Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10183003
MCPA	TX	7775	10183003
MCPP	TX	7780	10183003
Silvex (2,4,5-TP)	TX	8650	10183003

Method EPA 8260

Analyte	AB	Analyte ID	Method ID
1,1,1,2-Tetrachloroethane	TX	5105	10184404
1,1,1-Trichloroethane	TX	5160	10184404
1,1,2,2-Tetrachloroethane	TX	5110	10184404
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	TX	5195	10184404
1,1,2-Trichloroethane	TX	5165	10184404
1,1-Dichloroethane	TX	4630	10184404
1,1-Dichloroethylene	TX	4640	10184404
1,1-Dichloropropene	TX	4670	10184404
1,2,3-Trichlorobenzene	TX	5150	10184404
1,2,3-Trichloropropane	TX	5180	10184404
1,2,4-Trichlorobenzene	TX	5155	10184404
1,2,4-Trimethylbenzene	TX	5210	10184404
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10184404
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10184404
1,2-Dichlorobenzene	TX	4610	10184404
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10184404
1,2-Dichloropropane	TX	4655	10184404
1,3,5-Trimethylbenzene	TX	5215	10184404
1,3-Dichlorobenzene	TX	4615	10184404
1,3-Dichloropropane	TX	4660	10184404
1,4-Dichlorobenzene	TX	4620	10184404
1,4-Dioxane (1,4-Diethyleneoxide)	TX	4735	10184404
1-Chlorohexane	TX	4510	10184404
1-Propanol	TX	5060	10184404



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Matrix: Non-Potable Water

2,2-Dichloropropane	TX	4665	10184404
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10184404
2-Chloroethyl vinyl ether	TX	4500	10184404
2-Chlorotoluene	TX	4535	10184404
2-Hexanone (MBK)	TX	4860	10184404
2-Pentanone	TX	5045	10184404
4-Chlorotoluene	TX	4540	10184404
4-Isopropyltoluene (p-Cymene)	TX	4915	10184404
4-Methyl-2-pentanone (MIBK)	TX	4995	10184404
Acetone (2-Propanone)	TX	4315	10184404
Acetonitrile	TX	4320	10184404
Acrolein (Propenal)	TX	4325	10184404
Acrylonitrile	TX	4340	10184404
Allyl alcohol	TX	4350	10184404
Allyl chloride (3-Chloropropene)	TX	4355	10184404
Benzene	TX	4375	10184404
Benzyl chloride	TX	5635	10184404
Bromobenzene	TX	4385	10184404
Bromochloromethane	TX	4390	10184404
Bromodichloromethane	TX	4395	10184404
Bromoform	TX	4400	10184404
Carbon disulfide	TX	4450	10184404
Carbon tetrachloride	TX	4455	10184404
Chlorobenzene	TX	4475	10184404
Chlorodibromomethane	TX	4575	10184404
Chloroethane (Ethyl chloride)	TX	4485	10184404
Chloroform	TX	4505	10184404
Chloroprene (2-Chloro-1,3-butadiene)	TX	4525	10184404
cis-1,2-Dichloroethylene	TX	4645	10184404
cis-1,3-Dichloropropene	TX	4680	10184404



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Matrix: Non-Potable Water

Dibromofluoromethane	TX	4590	10184404
Dibromomethane (Methylene bromide)	TX	4595	10184404
Dichlorodifluoromethane (Freon-12)	TX	4625	10184404
Diethyl ether	TX	4725	10184404
Di-isopropylether (DIPE)	TX	9375	10184404
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	TX	4745	10184404
Ethanol	TX	4750	10184404
Ethyl acetate	TX	4755	10184404
Ethyl methacrylate	TX	4810	10184404
Ethylbenzene	TX	4765	10184404
Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)	TX	4770	10184404
Hexachlorobutadiene	TX	4835	10184404
Iodomethane (Methyl iodide)	TX	4870	10184404
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10184404
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10184404
Isopropylbenzene (Cumene)	TX	4900	10184404
m+p-xylene	TX	5240	10184404
Methacrylonitrile	TX	4925	10184404
Methyl acetate	TX	4940	10184404
Methyl acrylate	TX	4945	10184404
Methyl bromide (Bromomethane)	TX	4950	10184404
Methyl chloride (Chloromethane)	TX	4960	10184404
Methyl methacrylate	TX	4990	10184404
Methyl tert-butyl ether (MTBE)	TX	5000	10184404
Methylcyclohexane	TX	4965	10184404
Methylene chloride (Dichloromethane)	TX	4975	10184404
Naphthalene	TX	5005	10184404
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10184404
n-Butylbenzene	TX	4435	10184404
n-Propylbenzene	TX	5090	10184404



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Matrix: Non-Potable Water

o-Xylene	TX	5250	10184404
Propionitrile (Ethyl cyanide)	TX	5080	10184404
Pyridine	TX	5095	10184404
sec-Butylbenzene	TX	4440	10184404
Styrene	TX	5100	10184404
T-amylmethylether (TAME)	TX	4370	10184404
tert-Butyl alcohol	TX	4420	10184404
tert-Butylbenzene	TX	4445	10184404
Tetrachloroethylene (Perchloroethylene)	TX	5115	10184404
Toluene	TX	5140	10184404
trans-1,2-Dichloroethylene	TX	4700	10184404
trans-1,3-Dichloropropylene	TX	4685	10184404
trans-1,4-Dichloro-2-butene	TX	4605	10184404
Trichloroethene (Trichloroethylene)	TX	5170	10184404
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10184404
Vinyl acetate	TX	5225	10184404
Vinyl chloride	TX	5235	10184404
Xylene (total)	TX	5260	10184404

Method EPA 8270

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10185203
1,2,4-Trichlorobenzene	TX	5155	10185203
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10185203
1,2-Dichlorobenzene	TX	4610	10185203
1,2-Dinitrobenzene	TX	6155	10185203
1,2-Diphenylhydrazine	TX	6220	10185203
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10185203
1,3-Dichlorobenzene	TX	4615	10185203
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10185203
1,4-Dichlorobenzene	TX	4620	10185203



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Matrix: Non-Potable Water

1,4-Dinitrobenzene	TX	6165	10185203
1,4-Naphthoquinone	TX	6420	10185203
1,4-Phenylenediamine	TX	6630	10185203
1-Chloronaphthalene	TX	5790	10185203
1-Naphthylamine	TX	6425	10185203
2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl)ether)	TX	4659	10185203
2,3,4,6-Tetrachlorophenol	TX	6735	10185203
2,4,5-Trichlorophenol	TX	6835	10185203
2,4,5-Trimethylaniline	TX	6880	10185203
2,4,6-Trichlorophenol	TX	6840	10185203
2,4-Diaminotoluene	TX	5880	10185203
2,4-Dichlorophenol	TX	6000	10185203
2,4-Dimethylphenol	TX	6130	10185203
2,4-Dinitrophenol	TX	6175	10185203
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10185203
2,6-Dichlorophenol	TX	6005	10185203
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10185203
2-Acetylaminofluorene	TX	5515	10185203
2-Chloronaphthalene	TX	5795	10185203
2-Chlorophenol	TX	5800	10185203
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10185203
2-Methylaniline (o-Toluidine)	TX	5145	10185203
2-Methylnaphthalene	TX	6385	10185203
2-Methylphenol (o-Cresol)	TX	6400	10185203
2-Naphthylamine	TX	6430	10185203
2-Nitroaniline	TX	6460	10185203
2-Nitrophenol	TX	6490	10185203
2-Picoline (2-Methylpyridine)	TX	5050	10185203
3,3'-Dichlorobenzidine	TX	5945	10185203
3,3'-Dimethylbenzidine	TX	6120	10185203



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Matrix: Non-Potable Water

3-Methylcholanthrene	TX	6355	10185203
3-Methylphenol (m-Cresol)	TX	6405	10185203
3-Nitroaniline	TX	6465	10185203
4-Aminobiphenyl	TX	5540	10185203
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10185203
4-Chloro-3-methylphenol	TX	5700	10185203
4-Chloroaniline	TX	5745	10185203
4-Chlorophenyl phenylether	TX	5825	10185203
4-Dimethyl aminoazobenzene	TX	6105	10185203
4-Methylphenol (p-Cresol)	TX	6410	10185203
4-Nitroaniline	TX	6470	10185203
4-Nitrobiphenyl	TX	6480	10185203
4-Nitrophenol	TX	6500	10185203
4-Nitroquinoline-1-oxide	TX	6510	10185203
5-Chloro-2-methylaniline	TX	5695	10185203
5-Nitro-o-toluidine	TX	6570	10185203
7,12-Dimethylbenz(a) anthracene	TX	6115	10185203
a-a-Dimethylphenethylamine	TX	6125	10185203
Acenaphthene	TX	5500	10185203
Acenaphthylene	TX	5505	10185203
Acetophenone	TX	5510	10185203
Aniline	TX	5545	10185203
Anthracene	TX	5555	10185203
Aramite	TX	5560	10185203
Atrazine	TX	7065	10185203
Azinphos-methyl (Guthion)	TX	7075	10185203
Azobenzene	TX	5562	10185203
Benzenethiol (Thiophenol)	TX	6750	10185203
Benzidine	TX	5595	10185203
Benzo(a)anthracene	TX	5575	10185203



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Matrix: Non-Potable Water

Benzo(a)pyrene	TX	5580	10185203
Benzo(b)fluoranthene	TX	5585	10185203
Benzo(e)pyrene	TX	5605	10185203
Benzo(g,h,i)perylene	TX	5590	10185203
Benzo(k)fluoranthene	TX	5600	10185203
Benzoic acid	TX	5610	10185203
Benzyl alcohol	TX	5630	10185203
Biphenyl	TX	5640	10185203
bis(2-Chloroethoxy)methane	TX	5760	10185203
bis(2-Chloroethyl) ether	TX	5765	10185203
bis(2-Ethylhexyl) phthalate (Di(2-Ethylhexyl) phthalate, DEHP)	TX	6065	10185203
Butyl benzyl phthalate	TX	5670	10185203
Caprolactam	TX	7180	10185203
Captan	TX	7190	10185203
Carbaryl (Sevin)	TX	7195	10185203
Carbazole	TX	5680	10185203
Carbophenothion	TX	7220	10185203
Chlorobenzilate	TX	7260	10185203
Chrysene	TX	5855	10185203
Coumaphos	TX	7315	10185203
Demeton	TX	7390	10185203
Demeton	TX	7390	10185203
Demeton-o	TX	7395	10185203
Demeton-s	TX	7385	10185203
Diallate	TX	7405	10185203
Dibenz(a,h) anthracene	TX	5895	10185203
Dibenz(a,j) acridine	TX	5900	10185203
Dibenzofuran	TX	5905	10185203
Dichlorovos (DDVP, Dichlorvos)	TX	8610	10185203
Diethyl phthalate	TX	6070	10185203



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Matrix: Non-Potable Water

Dimethoate	TX	7475	10185203
Dimethoate	TX	7475	10185203
Dimethyl phthalate	TX	6135	10185203
Di-n-butyl phthalate	TX	5925	10185203
Di-n-octyl phthalate	TX	6200	10185203
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10185203
Dioxathion	TX	7495	10185203
Diphenylamine	TX	6205	10185203
Disulfoton	TX	8625	10185203
Ethion	TX	7565	10185203
Ethyl methanesulfonate	TX	6260	10185203
Famphur	TX	7580	10185203
Fluoranthene	TX	6265	10185203
Fluorene	TX	6270	10185203
Hexachlorobenzene	TX	6275	10185203
Hexachlorobutadiene	TX	4835	10185203
Hexachlorocyclopentadiene	TX	6285	10185203
Hexachloroethane	TX	4840	10185203
Hexachlorophene	TX	6290	10185203
Hexachloropropene	TX	6295	10185203
Indeno(1,2,3-cd) pyrene	TX	6315	10185203
Isodrin	TX	7725	10185203
Isophorone	TX	6320	10185203
Isosafrole	TX	6325	10185203
Kepone	TX	7740	10185203
Maleic anhydride	TX	6335	10185203
Methapyrilene	TX	6345	10185203
Methyl methanesulfonate	TX	6375	10185203
Methyl parathion (Parathion, methyl)	TX	7825	10185203
Mevinphos	TX	7850	10185203



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Issue Date: 5/1/2020

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Matrix: Non-Potable Water

Naled	TX	7905	10185203
Naphthalene	TX	5005	10185203
Nitrobenzene	TX	5015	10185203
n-Nitrosodiethylamine	TX	6525	10185203
n-Nitrosodimethylamine	TX	6530	10185203
n-Nitrosodi-n-butylamine	TX	5025	10185203
n-Nitrosodi-n-propylamine	TX	6545	10185203
n-Nitrosodiphenylamine	TX	6535	10185203
n-Nitrosomethylethylamine	TX	6550	10185203
n-Nitrosomorpholine	TX	6555	10185203
n-Nitrosopiperidine	TX	6560	10185203
n-Nitrosopyrrolidine	TX	6565	10185203
o,o,o-Triethyl phosphorothioate	TX	8290	10185203
o-Anisidine	TX	5550	10185203
Parathion, ethyl	TX	7955	10185203
p-Cresidine	TX	5860	10185203
Pentachlorobenzene	TX	6590	10185203
Pentachloronitrobenzene (PCNB)	TX	6600	10185203
Pentachlorophenol	TX	6605	10185203
Phenacetin	TX	6610	10185203
Phenanthrene	TX	6615	10185203
Phenol	TX	6625	10185203
Phorate	TX	7985	10185203
Phosmet (Imidan)	TX	8000	10185203
Phthalic anhydride	TX	6640	10185203
Pronamide (Kerb)	TX	6650	10185203
Pyrene	TX	6665	10185203
Pyridine	TX	5095	10185203
Quinoline	TX	6670	10185203
Resorcinol	TX	6680	10185203



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Matrix: Non-Potable Water

Safrole	TX	6685	10185203
Sulfotepp	TX	8155	10185203
Terbufos	TX	8185	10185203
Tetrachlorvinphos (Stirophos, Gardona)	TX	8197	10185203
Thionazin (Zinophos)	TX	8235	10185203
Toluene diisocyanate	TX	6775	10185203
Trifluralin (Treflan)	TX	8295	10185203

Method EPA 8290

Analyte	AB	Analyte ID	Method ID
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TX	9516	10187209
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TX	9519	10187209
1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	TX	9420	10187209
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD)	TX	9426	10187209
1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	TX	9423	10187209
1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	TX	9471	10187209
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCDD)	TX	9453	10187209
1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCDF)	TX	9474	10187209
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-HxCDD)	TX	9456	10187209
1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCDF)	TX	9477	10187209
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCDD)	TX	9459	10187209
1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-PeCDF)	TX	9543	10187209
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	TX	9540	10187209
2,3,4,6,7,8-Hexachlorodibenzofuran (2,3,4,6,7,8-HxCDF)	TX	9480	10187209
2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	TX	9549	10187209
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	TX	9612	10187209
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10187209
Total Heptachlorodibenzofuran (Total HpCDF)	TX	9444	10187209
Total Heptachlorodibenzo-p-dioxin (Total HpCDD)	TX	9438	10187209
Total Hexachlorodibenzofuran (Total HxCDF)	TX	9483	10187209
Total Hexachlorodibenzo-p-dioxin (Total HxCDD)	TX	9468	10187209



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Matrix: Non-Potable Water

Total Pentachlorodibenzofuran (Total PeCDF)	TX	9552	10187209
Total Pentachlorodibenzo-p-dioxin (Total PeCDD)	TX	9555	10187209
Total Tetrachlorodibenzofuran (Total TCDF)	TX	9615	10187209
Total Tetrachlorodibenzo-p-dioxin (Total TCDD)	TX	9609	10187209
Method EPA 8316			
Analyte	AB	Analyte ID	Method ID
Acrylamide	TX	4330	10188202
Method EPA 8330			
Analyte	AB	Analyte ID	Method ID
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10189807
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10189807
2,4,6-Trinitrotoluene (2,4,6-TNT)	TX	9651	10189807
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10189807
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10189807
2-Amino-4,6-dinitrotoluene (2-am-dnt)	TX	9303	10189807
2-Nitrotoluene	TX	9507	10189807
3-Nitrotoluene	TX	9510	10189807
4-Amino-2,6-dinitrotoluene (4-am-dnt)	TX	9306	10189807
4-Nitrotoluene	TX	9513	10189807
Methyl-2,4,6-trinitrophenylnitramine (tetryl)	TX	6415	10189807
Nitrobenzene	TX	5015	10189807
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	TX	9522	10189807
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	TX	9432	10189807
Method EPA 9014			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	10193803
Total cyanide	TX	1645	10193803
Method EPA 9038			
Analyte	AB	Analyte ID	Method ID
Sulfate	TX	2000	10196608



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Matrix: Non-Potable Water

Method	Analyte	AB	Analyte ID	Method ID
EPA 9040	pH	TX	1900	10196802
EPA 9050	Conductivity	TX	1610	10198604
EPA 9056	Bromide	TX	1540	10199209
	Chloride	TX	1575	10199209
	Fluoride	TX	1730	10199209
	Nitrate as N	TX	1810	10199209
	Nitrate-nitrite	TX	1820	10199209
	Nitrite as N	TX	1840	10199209
	Orthophosphate as P	TX	1870	10199209
	Sulfate	TX	2000	10199209
EPA 9060	Total Organic Carbon (TOC)	TX	2040	10200201
EPA 9065	Total phenolics	TX	1905	10200405
EPA 9066	Total phenolics	TX	1905	10200609
EPA 9250	Chloride	TX	1575	10207202
EPA RSK 175	2-methylpropane (Isobutane)	TX	4942	10212905



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Matrix: Non-Potable Water

Ethane	TX	4747	10212905
Ethene	TX	4752	10212905
Methane	TX	4926	10212905
n-Butane	TX	5007	10212905
n-Propane	TX	5029	10212905
Method HACH 8000			
Analyte	AB	Analyte ID	Method ID
Chemical oxygen demand (COD)	TX	1565	60003001
Method SM 2120 B			
Analyte	AB	Analyte ID	Method ID
Color	TX	1605	20223807
Method SM 2310 B (4a)			
Analyte	AB	Analyte ID	Method ID
Acidity, as CaCO ₃	TX	1500	20002806
Method SM 2320 B			
Analyte	AB	Analyte ID	Method ID
Alkalinity as CaCO ₃	TX	1505	20045005
Method SM 2340 B			
Analyte	AB	Analyte ID	Method ID
Total hardness as CaCO ₃	TX	1755	20046008
Method SM 2510 B			
Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	20048004
Method SM 2540 B			
Analyte	AB	Analyte ID	Method ID
Residue-total (total solids)	TX	1950	20004608
Method SM 2540 C			
Analyte	AB	Analyte ID	Method ID
Residue-filterable (TDS)	TX	1955	20049803
Method SM 2540 D			
Analyte	AB	Analyte ID	Method ID



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Matrix: Non-Potable Water

Residue-nonfilterable (TSS)	TX	1960	20004802
Method SM 3500-Cr B			
Analyte	AB	Analyte ID	Method ID
Chromium (VI)	TX	1045	20065809
Method SM 4500-CI F			
Analyte	AB	Analyte ID	Method ID
Total residual chlorine	TX	1940	20080482
Method SM 4500-Cl ⁻ E			
Analyte	AB	Analyte ID	Method ID
Chloride	TX	1575	20019209
Method SM 4500-CN ⁻ C			
Analyte	AB	Analyte ID	Method ID
Total cyanide	TX	1645	20020808
Method SM 4500-CN ⁻ E			
Analyte	AB	Analyte ID	Method ID
Total cyanide	TX	1645	20021209
Method SM 4500-CN ⁻ G			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	20021607
Method SM 4500-H+ B			
Analyte	AB	Analyte ID	Method ID
pH	TX	1900	20104603
Method SM 4500-NH3 D			
Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	20108809
Kjeldahl Nitrogen (Total Kjeldahl Nitrogen-TKN)	TX	1790	20108809
Method SM 4500-NH3 F			
Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	20023001
Method SM 4500-O G			
Analyte	AB	Analyte ID	Method ID
Oxygen, dissolved	TX	1880	20025405



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Matrix: Non-Potable Water

Method	Analyte	AB	Analyte ID	Method ID
Method SM 4500-P E				
	Orthophosphate as P	TX	1870	20025803
	Phosphorus	TX	1910	20025803
Method SM 4500-S2 ⁻ D				
	Sulfide	TX	2005	20125400
Method SM 4500-S2 ⁻ F				
	Sulfide	TX	2005	20126209
Method SM 4500-SiO ₂ D				
	Silica as SiO ₂	TX	1990	20127202
Method SM 4500-SO ₃ ⁻ B				
	Sulfite	TX	2015	20026806
Method SM 5210 B				
	Biochemical oxygen demand (BOD)	TX	1530	20027401
	Carbonaceous BOD, CBOD	TX	1555	20027401
Method SM 5310 B				
	Total Organic Carbon (TOC)	TX	2040	20137206
Method SM 5310 C				
	Total Organic Carbon (TOC)	TX	2040	20138209
Method SM 5540 C				
	Surfactants - MBAS	TX	2025	20144405
Method TCEQ 1005				
	Total Petroleum Hydrocarbons (TPH)	TX	2050	90019208



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Matrix: Solid & Chemical Materials

Method ASTM D2216

Analyte	AB	Analyte ID	Method ID
Moisture	TX	10337	ASTM D2216-05

Method EPA 1010

Analyte	AB	Analyte ID	Method ID
Ignitability	TX	1780	10116606

Method EPA 1030

Analyte	AB	Analyte ID	Method ID
Ignitability	TX	1780	10117201

Method EPA 1311

Analyte	AB	Analyte ID	Method ID
TCLP	TX	849	10118806

Method EPA 1312

Analyte	AB	Analyte ID	Method ID
SPLP	TX	850	10119003

Method EPA 200.8

Analyte	AB	Analyte ID	Method ID
Uranium	TX	3035	10014605

Method EPA 300.0

Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10053200
Chloride	TX	1575	10053200
Fluoride	TX	1730	10053200
Nitrate as N	TX	1810	10053200
Nitrate-nitrite	TX	1820	10053200
Nitrite as N	TX	1840	10053200
Orthophosphate as P	TX	1870	10053200
Sulfate	TX	2000	10053200

Method EPA 310.1

Analyte	AB	Analyte ID	Method ID
Alkalinity as CaCO3	TX	1505	10054805



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Matrix: Solid & Chemical Materials

Method EPA 350.3

Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	10064401

Method EPA 365.3

Analyte	AB	Analyte ID	Method ID
Orthophosphate as P	TX	1870	10070801
Phosphorus	TX	1910	10070801

Method EPA 6020

Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10156204
Antimony	TX	1005	10156204
Arsenic	TX	1010	10156204
Barium	TX	1015	10156204
Beryllium	TX	1020	10156204
Boron	TX	1025	10156204
Cadmium	TX	1030	10156204
Calcium	TX	1035	10156204
Chromium	TX	1040	10156204
Cobalt	TX	1050	10156204
Copper	TX	1055	10156204
Iron	TX	1070	10156204
Lead	TX	1075	10156204
Lithium	TX	1080	10156204
Magnesium	TX	1085	10156204
Manganese	TX	1090	10156204
Molybdenum	TX	1100	10156204
Nickel	TX	1105	10156204
Potassium	TX	1125	10156204
Selenium	TX	1140	10156204
Silver	TX	1150	10156204
Sodium	TX	1155	10156204



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Strontium	TX	1160	10156204
Thallium	TX	1165	10156204
Tin	TX	1175	10156204
Titanium	TX	1180	10156204
Vanadium	TX	1185	10156204
Zinc	TX	1190	10156204
Method EPA 7196			
Analyte	AB	Analyte ID	Method ID
Chromium (VI)	TX	1045	10162206
Method EPA 7470			
Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10165603
Method EPA 7471			
Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10166004
Method EPA 8015			
Analyte	AB	Analyte ID	Method ID
Diesel range organics (DRO)	TX	9369	10173203
Ethanol	TX	4750	10173203
Ethylene glycol	TX	4785	10173203
Gasoline range organics (GRO)	TX	9408	10173203
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10173203
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10173203
Methanol	TX	4930	10173203
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10173203
n-Propanol (1-Propanol)	TX	5055	10173203
Propylene Glycol	TX	6657	10173203
tert-Butyl alcohol	TX	4420	10173203
Method EPA 8081			
Analyte	AB	Analyte ID	Method ID
4,4'-DDD	TX	7355	10178402



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Matrix: Solid & Chemical Materials

4,4'-DDE	TX	7360	10178402
4,4'-DDT	TX	7365	10178402
Aldrin	TX	7025	10178402
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10178402
alpha-Chlordane	TX	7240	10178402
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10178402
Chlordane (tech.)	TX	7250	10178402
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10178402
Dieldrin	TX	7470	10178402
Endosulfan I	TX	7510	10178402
Endosulfan II	TX	7515	10178402
Endosulfan sulfate	TX	7520	10178402
Endrin	TX	7540	10178402
Endrin aldehyde	TX	7530	10178402
Endrin ketone	TX	7535	10178402
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10178402
gamma-Chlordane	TX	7245	10178402
Heptachlor	TX	7685	10178402
Heptachlor epoxide	TX	7690	10178402
Methoxychlor	TX	7810	10178402
Mirex	TX	7870	10178402
Toxaphene (Chlorinated camphene)	TX	8250	10178402

Method EPA 8082

Analyte	AB	Analyte ID	Method ID
Aroclor-1016 (PCB-1016)	TX	8880	10179201
Aroclor-1221 (PCB-1221)	TX	8885	10179201
Aroclor-1232 (PCB-1232)	TX	8890	10179201
Aroclor-1242 (PCB-1242)	TX	8895	10179201
Aroclor-1248 (PCB-1248)	TX	8900	10179201
Aroclor-1254 (PCB-1254)	TX	8905	10179201



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Matrix: Solid & Chemical Materials

Aroclor-1260 (PCB-1260)	TX	8910	10179201
PCBs (total)	TX	8870	10179201
Method EPA 8260			
Analyte	AB	Analyte ID	Method ID
1,1,1,2-Tetrachloroethane	TX	5105	10184404
1,1,1-Trichloroethane	TX	5160	10184404
1,1,2,2-Tetrachloroethane	TX	5110	10184404
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	TX	5195	10184404
1,1,2-Trichloroethane	TX	5165	10184404
1,1-Dichloroethane	TX	4630	10184404
1,1-Dichloroethylene	TX	4640	10184404
1,1-Dichloropropene	TX	4670	10184404
1,2,3-Trichlorobenzene	TX	5150	10184404
1,2,3-Trichloropropane	TX	5180	10184404
1,2,4-Trichlorobenzene	TX	5155	10184404
1,2,4-Trimethylbenzene	TX	5210	10184404
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10184404
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10184404
1,2-Dichlorobenzene	TX	4610	10184404
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10184404
1,2-Dichloropropane	TX	4655	10184404
1,3,5-Trimethylbenzene	TX	5215	10184404
1,3-Dichlorobenzene	TX	4615	10184404
1,3-Dichloropropane	TX	4660	10184404
1,4-Dichlorobenzene	TX	4620	10184404
1,4-Dioxane (1,4-Diethyleneoxide)	TX	4735	10184404
1-Chlorohexane	TX	4510	10184404
1-Propanol	TX	5060	10184404
2,2-Dichloropropane	TX	4665	10184404
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10184404



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Matrix: Solid & Chemical Materials

2-Chloroethyl vinyl ether	TX	4500	10184404
2-Chlorotoluene	TX	4535	10184404
2-Hexanone (MBK)	TX	4860	10184404
4-Chlorotoluene	TX	4540	10184404
4-Isopropyltoluene (p-Cymene)	TX	4915	10184404
4-Methyl-2-pentanone (MIBK)	TX	4995	10184404
Acetone (2-Propanone)	TX	4315	10184404
Acetonitrile	TX	4320	10184404
Acrolein (Propenal)	TX	4325	10184404
Acrylonitrile	TX	4340	10184404
Allyl chloride (3-Chloropropene)	TX	4355	10184404
Benzene	TX	4375	10184404
Benzyl chloride	TX	5635	10184404
Bromobenzene	TX	4385	10184404
Bromochloromethane	TX	4390	10184404
Bromodichloromethane	TX	4395	10184404
Bromoform	TX	4400	10184404
Carbon disulfide	TX	4450	10184404
Carbon tetrachloride	TX	4455	10184404
Chlorobenzene	TX	4475	10184404
Chlorodibromomethane	TX	4575	10184404
Chloroethane (Ethyl chloride)	TX	4485	10184404
Chloroform	TX	4505	10184404
Chloroprene (2-Chloro-1,3-butadiene)	TX	4525	10184404
cis-1,2-Dichloroethylene	TX	4645	10184404
cis-1,3-Dichloropropene	TX	4680	10184404
Dibromofluoromethane	TX	4590	10184404
Dibromomethane (Methylene bromide)	TX	4595	10184404
Dichlorodifluoromethane (Freon-12)	TX	4625	10184404
Diethyl ether	TX	4725	10184404



Texas Commission on Environmental Quality



NELAP - Recognized Laboratory Fields of Accreditation

ALS Laboratory Group, Environmental Services Division (Houston, Texas)

10450 Stancliff Road, Suite 210
Houston, TX 77099-4338

Certificate: T104704231-20-26
Expiration Date: 4/30/2021
Issue Date: 5/1/2020

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Matrix: Solid & Chemical Materials

Epichlorohydrin (1-Chloro-2,3-epoxypropane)	TX	4745	10184404
Ethanol	TX	4750	10184404
Ethyl acetate	TX	4755	10184404
Ethyl methacrylate	TX	4810	10184404
Ethylbenzene	TX	4765	10184404
Ethylene oxide	TX	4795	10184404
Hexachlorobutadiene	TX	4835	10184404
Iodomethane (Methyl iodide)	TX	4870	10184404
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10184404
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10184404
Isopropylbenzene (Cumene)	TX	4900	10184404
m+p-xylene	TX	5240	10184404
Methacrylonitrile	TX	4925	10184404
Methyl acetate	TX	4940	10184404
Methyl acrylate	TX	4945	10184404
Methyl bromide (Bromomethane)	TX	4950	10184404
Methyl chloride (Chloromethane)	TX	4960	10184404
Methyl methacrylate	TX	4990	10184404
Methyl tert-butyl ether (MTBE)	TX	5000	10184404
Methylcyclohexane	TX	4965	10184404
Methylene chloride (Dichloromethane)	TX	4975	10184404
Naphthalene	TX	5005	10184404
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10184404
n-Butylbenzene	TX	4435	10184404
n-Propylbenzene	TX	5090	10184404
o-Xylene	TX	5250	10184404
Pentachloroethane	TX	5035	10184404
Propionitrile (Ethyl cyanide)	TX	5080	10184404
Pyridine	TX	5095	10184404
sec-Butylbenzene	TX	4440	10184404



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Matrix: Solid & Chemical Materials

Styrene	TX	5100	10184404
tert-Butyl alcohol	TX	4420	10184404
tert-Butylbenzene	TX	4445	10184404
Tetrachloroethylene (Perchloroethylene)	TX	5115	10184404
Toluene	TX	5140	10184404
trans-1,2-Dichloroethylene	TX	4700	10184404
trans-1,3-Dichloropropylene	TX	4685	10184404
trans-1,4-Dichloro-2-butene	TX	4605	10184404
Trichloroethene (Trichloroethylene)	TX	5170	10184404
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10184404
Vinyl acetate	TX	5225	10184404
Vinyl chloride	TX	5235	10184404
Xylene (total)	TX	5260	10184404

Method EPA 8270

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10185203
1,2,4-Trichlorobenzene	TX	5155	10185203
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10185203
1,2-Dichlorobenzene	TX	4610	10185203
1,2-Dinitrobenzene	TX	6155	10185203
1,2-Diphenylhydrazine	TX	6220	10185203
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10185203
1,3-Dichlorobenzene	TX	4615	10185203
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10185203
1,4-Dichlorobenzene	TX	4620	10185203
1,4-Dinitrobenzene	TX	6165	10185203
1,4-Naphthoquinone	TX	6420	10185203
1,4-Phenylenediamine	TX	6630	10185203
1-Chloronaphthalene	TX	5790	10185203
1-Naphthylamine	TX	6425	10185203



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Matrix: Solid & Chemical Materials

2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl)ether)	TX	4659	10185203
2,3,4,6-Tetrachlorophenol	TX	6735	10185203
2,4,5-Trichlorophenol	TX	6835	10185203
2,4,5-Trimethylaniline	TX	6880	10185203
2,4,6-Trichlorophenol	TX	6840	10185203
2,4-Diaminotoluene	TX	5880	10185203
2,4-Dichlorophenol	TX	6000	10185203
2,4-Dimethylphenol	TX	6130	10185203
2,4-Dinitrophenol	TX	6175	10185203
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10185203
2,6-Dichlorophenol	TX	6005	10185203
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10185203
2-Acetylamino fluorene	TX	5515	10185203
2-Chloronaphthalene	TX	5795	10185203
2-Chlorophenol	TX	5800	10185203
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10185203
2-Methylaniline (o-Toluidine)	TX	5145	10185203
2-Methylnaphthalene	TX	6385	10185203
2-Methylphenol (o-Cresol)	TX	6400	10185203
2-Naphthylamine	TX	6430	10185203
2-Nitroaniline	TX	6460	10185203
2-Nitrophenol	TX	6490	10185203
2-Picoline (2-Methylpyridine)	TX	5050	10185203
3,3'-Dichlorobenzidine	TX	5945	10185203
3,3'-Dimethylbenzidine	TX	6120	10185203
3-Methylcholanthrene	TX	6355	10185203
3-Methylphenol (m-Cresol)	TX	6405	10185203
3-Nitroaniline	TX	6465	10185203
4-Aminobiphenyl	TX	5540	10185203
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10185203



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Matrix: Solid & Chemical Materials

4-Chloro-3-methylphenol	TX	5700	10185203
4-Chloroaniline	TX	5745	10185203
4-Chlorophenyl phenylether	TX	5825	10185203
4-Methylphenol (p-Cresol)	TX	6410	10185203
4-Nitroaniline	TX	6470	10185203
4-Nitrophenol	TX	6500	10185203
4-Nitroquinoline-1-oxide	TX	6510	10185203
5-Nitro-o-toluidine	TX	6570	10185203
7,12-Dimethylbenz(a) anthracene	TX	6115	10185203
a-a-Dimethylphenethylamine	TX	6125	10185203
Acenaphthene	TX	5500	10185203
Acenaphthylene	TX	5505	10185203
Acetophenone	TX	5510	10185203
Aniline	TX	5545	10185203
Anthracene	TX	5555	10185203
Aramite	TX	5560	10185203
Atrazine	TX	7065	10185203
Azinphos-methyl (Guthion)	TX	7075	10185203
Azobenzene	TX	5562	10185203
Benzenethiol (Thiophenol)	TX	6750	10185203
Benzidine	TX	5595	10185203
Benzo(a)anthracene	TX	5575	10185203
Benzo(a)pyrene	TX	5580	10185203
Benzo(b)fluoranthene	TX	5585	10185203
Benzo(e)pyrene	TX	5605	10185203
Benzo(g,h,i)perylene	TX	5590	10185203
Benzo(k)fluoranthene	TX	5600	10185203
Benzoic acid	TX	5610	10185203
Benzyl alcohol	TX	5630	10185203
Biphenyl	TX	5640	10185203



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Matrix: Solid & Chemical Materials

bis(2-Chloroethoxy)methane	TX	5760	10185203
bis(2-Chloroethyl) ether	TX	5765	10185203
bis(2-Ethylhexyl) phthalate (Di(2-Ethylhexyl) phthalate, DEHP)	TX	6065	10185203
Butyl benzyl phthalate	TX	5670	10185203
Caprolactam	TX	7180	10185203
Carbaryl (Sevin)	TX	7195	10185203
Carbazole	TX	5680	10185203
Carbophenothion	TX	7220	10185203
Chlorobenzilate	TX	7260	10185203
Chrysene	TX	5855	10185203
Demeton	TX	7390	10185203
Demeton-o	TX	7395	10185203
Demeton-s	TX	7385	10185203
Diallate	TX	7405	10185203
Dibenz(a,h) anthracene	TX	5895	10185203
Dibenz(a,j) acridine	TX	5900	10185203
Dibenzo(a,e) pyrene	TX	5890	10185203
Dibenzofuran	TX	5905	10185203
Dichlorvos (DDVP, Dichlorvos)	TX	8610	10185203
Diethyl phthalate	TX	6070	10185203
Dimethoate	TX	7475	10185203
Dimethyl phthalate	TX	6135	10185203
Di-n-butyl phthalate	TX	5925	10185203
Di-n-octyl phthalate	TX	6200	10185203
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10185203
Diphenylamine	TX	6205	10185203
Disulfoton	TX	8625	10185203
Ethyl methanesulfonate	TX	6260	10185203
Fluoranthene	TX	6265	10185203
Fluorene	TX	6270	10185203



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Matrix: Solid & Chemical Materials

Hexachlorobenzene	TX	6275	10185203
Hexachlorobutadiene	TX	4835	10185203
Hexachlorocyclopentadiene	TX	6285	10185203
Hexachloroethane	TX	4840	10185203
Hexachlorophene	TX	6290	10185203
Hexachloropropene	TX	6295	10185203
Indeno(1,2,3-cd) pyrene	TX	6315	10185203
Isodrin	TX	7725	10185203
Isophorone	TX	6320	10185203
Isosafrole	TX	6325	10185203
Kepone	TX	7740	10185203
Malathion	TX	7770	10185203
Methapyrilene	TX	6345	10185203
Methyl methanesulfonate	TX	6375	10185203
Methyl parathion (Parathion, methyl)	TX	7825	10185203
Mevinphos	TX	7850	10185203
Naphthalene	TX	5005	10185203
Nitrobenzene	TX	5015	10185203
n-Nitrosodiethylamine	TX	6525	10185203
n-Nitrosodimethylamine	TX	6530	10185203
n-Nitrosodi-n-butylamine	TX	5025	10185203
n-Nitrosodi-n-propylamine	TX	6545	10185203
n-Nitrosodiphenylamine	TX	6535	10185203
n-Nitrosomethylethylamine	TX	6550	10185203
n-Nitrosomorpholine	TX	6555	10185203
n-Nitrosopiperidine	TX	6560	10185203
n-Nitrosopyrrolidine	TX	6565	10185203
o,o,o-Triethyl phosphorothioate	TX	8290	10185203
o-Anisidine	TX	5550	10185203
Parathion, ethyl	TX	7955	10185203



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Matrix: Solid & Chemical Materials

p-Cresidine	TX	5860	10185203
Pentachlorobenzene	TX	6590	10185203
Pentachloronitrobenzene (PCNB)	TX	6600	10185203
Pentachlorophenol	TX	6605	10185203
Phenacetin	TX	6610	10185203
Phenanthrene	TX	6615	10185203
Phenol	TX	6625	10185203
Phorate	TX	7985	10185203
Pronamide (Kerb)	TX	6650	10185203
Pyrene	TX	6665	10185203
Pyridine	TX	5095	10185203
Quinoline	TX	6670	10185203
Safrole	TX	6685	10185203
Sulfotepp	TX	8155	10185203
Terbufos	TX	8185	10185203
Tetrachlorvinphos (Stirophos, Gardona)	TX	8197	10185203
Thionazin (Zinophos)	TX	8235	10185203
Toluene diisocyanate	TX	6775	10185203

Method EPA 8290

Analyte	AB	Analyte ID	Method ID
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TX	9516	10187209
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TX	9519	10187209
1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	TX	9420	10187209
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD)	TX	9426	10187209
1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	TX	9423	10187209
1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	TX	9471	10187209
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCDD)	TX	9453	10187209
1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCDF)	TX	9474	10187209
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-HxCDD)	TX	9456	10187209
1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCDF)	TX	9477	10187209



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Matrix: Solid & Chemical Materials

1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCDD)	TX	9459	10187209
1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-PeCDF)	TX	9543	10187209
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	TX	9540	10187209
2,3,4,6,7,8-Hexachlorodibenzofuran (2,3,4,6,7,8-HxCDF)	TX	9480	10187209
2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	TX	9549	10187209
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	TX	9612	10187209
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	TX	9618	10187209
Total Heptachlorodibenzofuran (Total HpCDF)	TX	9444	10187209
Total Heptachlorodibenzo-p-dioxin (Total HpCDD)	TX	9438	10187209
Total Hexachlorodibenzofuran (Total HxCDF)	TX	9483	10187209
Total Hexachlorodibenzo-p-dioxin (Total HxCDD)	TX	9468	10187209
Total Pentachlorodibenzofuran (Total PeCDF)	TX	9552	10187209
Total Pentachlorodibenzo-p-dioxin (Total PeCDD)	TX	9555	10187209
Total Tetrachlorodibenzofuran (Total TCDF)	TX	9615	10187209
Total Tetrachlorodibenzo-p-dioxin (Total TCDD)	TX	9609	10187209

Method EPA 8316

Analyte	AB	Analyte ID	Method ID
Acrylamide	TX	4330	10188202

Method EPA 8330

Analyte	AB	Analyte ID	Method ID
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10189807
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10189807
2,4,6-Trinitrotoluene (2,4,6-TNT)	TX	9651	10189807
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10189807
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10189807
2-Amino-4,6-dinitrotoluene (2-am-dnt)	TX	9303	10189807
2-Nitrotoluene	TX	9507	10189807
3-Nitrotoluene	TX	9510	10189807
4-Amino-2,6-dinitrotoluene (4-am-dnt)	TX	9306	10189807
4-Nitrotoluene	TX	9513	10189807
Methyl-2,4,6-trinitrophenylnitramine (tetryl)	TX	6415	10189807



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Matrix: Solid & Chemical Materials

Nitrobenzene	TX	5015	10189807
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	TX	9522	10189807
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	TX	9432	10189807
Method EPA 9014			
Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	10193803
Total cyanide	TX	1645	10193803
Method EPA 9038			
Analyte	AB	Analyte ID	Method ID
Sulfate	TX	2000	10196608
Method EPA 9040			
Analyte	AB	Analyte ID	Method ID
Corrosivity	TX	1615	10197203
pH	TX	1900	10196802
Method EPA 9045			
Analyte	AB	Analyte ID	Method ID
Corrosivity	TX	1615	10197805
pH	TX	1900	10197805
Method EPA 9050			
Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	10198604
Method EPA 9056			
Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10199209
Chloride	TX	1575	10199209
Fluoride	TX	1730	10199209
Nitrate as N	TX	1810	10199209
Nitrate-nitrite	TX	1820	10199209
Nitrite as N	TX	1840	10199209
Orthophosphate as P	TX	1870	10199209
Sulfate	TX	2000	10199209



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Matrix: Solid & Chemical Materials

Method	Analyte	AB	Analyte ID	Method ID
EPA 9060	Total Organic Carbon (TOC)	TX	2040	10200201
EPA 9065	Total phenolics	TX	1905	10200405
EPA 9071	n-Hexane Extractable Material (HEM) (O&G)	TX	1803	10201204
EPA 9095	Paint Filter Liquids Test	TX	10312	10204009
EPA 9250	Chloride	TX	1575	10207202
SM 2320 B	Alkalinity as CaCO3	TX	1505	20045005
SM 2510 B	Conductivity	TX	1610	20048004
SM 2540 G	Residue-total (total solids)	TX	1950	20005203
SSA/ASA Part 3:34	Carbon, organic (Walkley-Black)	TX	10340	SSA/ASA Pt 3:34
TCEQ 1005	Total Petroleum Hydrocarbons (TPH)	TX	2050	90019208



10450 Stancliff Rd. Suite 210
Houston, TX 77099
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June 29, 2020

Eric Matzner
Golder Associates Inc.
2201 Double Creek Drive
Suite 4004
Round Rock, TX 78664

Work Order: **HS20060975**

Laboratory Results for: **Houston TX-Wood Preserving Works**

Dear Eric Matzner,

ALS Environmental received 12 sample(s) on Jun 19, 2020 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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
- R10 Other problems or anomalies.
The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.



Dane J. Wacasey

Laboratory Review Checklist: Reportable Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 06/29/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20060975			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 154767,R363651,R363717,R364091			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?	X				
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
		Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference effects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Supporting Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 06/29/2020			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS20060975			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 154767,R363651,R363717,R364091			
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section)					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);

NA = Not Applicable;

NR = Not Reviewed;

R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ALS Laboratory Group	LRC Date: 06/29/2020
Project Name: Houston TX-Wood Preserving Works	Laboratory Job Number: HS20060975
Reviewer Name: Dane Wacasey	Prep Batch Number(s): 154767,R363651,R363717,R364091

ER# ⁵	Description
	No exceptions

Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable);
NA = Not Applicable;
NR = Not Reviewed;
R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
Work Order: HS20060975

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20060975-01	SO-1620-SG25(0.5-1)20200618	Soil		18-Jun-2020 08:30	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-02	SO-1620-SG25(5.5-6)20200618	Soil		18-Jun-2020 08:58	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-03	SO-1620-SG13R(0.5-1)20200618	Soil		18-Jun-2020 10:00	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-04	SO-1620-SG13R(5.5-6)20200618	Soil		18-Jun-2020 10:30	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-05	SO-1620-SG23(0.5-1)20200618	Soil		18-Jun-2020 13:08	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-06	SO-1620-SG23(5.5-6)20200618	Soil		18-Jun-2020 13:30	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-07	SO-1620-SG24(0.5-1)20200618	Soil		18-Jun-2020 14:49	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-08	SO-1620-SG24(5.5-6)20200618	Soil		18-Jun-2020 15:50	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-09	SO-1620-SG26(0.5-1)20200619	Soil		19-Jun-2020 09:15	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-10	SO-1620-SG26(5.5-6)20200619	Soil		19-Jun-2020 09:52	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-11	SO-1620-SG27(0.5-1)20200619	Soil		19-Jun-2020 10:10	19-Jun-2020 13:00	<input type="checkbox"/>
HS20060975-12	SO-1620-SG27(5.5-6)20200618	Soil		18-Jun-2020 10:30	19-Jun-2020 13:00	<input type="checkbox"/>

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG25(0.5-1)20200618
 Collection Date: 18-Jun-2020 08:30

ANALYTICAL REPORT

WorkOrder:HS20060975
 Lab ID:HS20060975-01
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	SQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	U		0.00068	0.0068	mg/Kg-dry	1	22-Jun-2020 16:09
Ethylbenzene	U		0.00095	0.0068	mg/Kg-dry	1	22-Jun-2020 16:09
Xylenes, Total	U		0.0014	0.0068	mg/Kg-dry	1	22-Jun-2020 16:09
<i>Surr: 1,2-Dichloroethane-d4</i>	83.4			70-126	%REC	1	22-Jun-2020 16:09
<i>Surr: 4-Bromofluorobenzene</i>	97.2			70-130	%REC	1	22-Jun-2020 16:09
<i>Surr: Dibromofluoromethane</i>	91.9			70-130	%REC	1	22-Jun-2020 16:09
<i>Surr: Toluene-d8</i>	102			70-130	%REC	1	22-Jun-2020 16:09
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 23-Jun-2020		Analyst: GEY
Naphthalene	0.0046		0.00066	0.0036	mg/Kg-dry	1	27-Jun-2020 23:39
<i>Surr: 2-Fluorobiphenyl</i>	52.6			43-125	%REC	1	27-Jun-2020 23:39
<i>Surr: 4-Terphenyl-d14</i>	59.9			32-125	%REC	1	27-Jun-2020 23:39
<i>Surr: Nitrobenzene-d5</i>	66.0			37-125	%REC	1	27-Jun-2020 23:39
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: JAC		
Percent Moisture	8.93		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG25(5.5-6)20200618
 Collection Date: 18-Jun-2020 08:58

ANALYTICAL REPORT
 WorkOrder:HS20060975
 Lab ID:HS20060975-02
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	U		0.00030	0.0030	mg/Kg-dry	1	22-Jun-2020 16:34
Ethylbenzene	U		0.00042	0.0030	mg/Kg-dry	1	22-Jun-2020 16:34
Xylenes, Total	U		0.00059	0.0030	mg/Kg-dry	1	22-Jun-2020 16:34
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>84.0</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 16:34</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.8</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 16:34</i>
<i>Surr: Dibromofluoromethane</i>	<i>91.6</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 16:34</i>
<i>Surr: Toluene-d8</i>	<i>102</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 16:34</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 23-Jun-2020		Analyst: GEY
Naphthalene	U		0.00070	0.0038	mg/Kg-dry	1	27-Jun-2020 20:03
<i>Surr: 2-Fluorobiphenyl</i>	<i>65.1</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 20:03</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>75.1</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 20:03</i>
<i>Surr: Nitrobenzene-d5</i>	<i>64.4</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 20:03</i>
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: JAC		
Percent Moisture	14.0		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG13R(0.5-1)20200618
 Collection Date: 18-Jun-2020 10:00

ANALYTICAL REPORT

WorkOrder:HS20060975
 Lab ID:HS20060975-03
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene	U		0.00053	0.0053	mg/Kg-dry	1	22-Jun-2020 16:59
Ethylbenzene	U		0.00075	0.0053	mg/Kg-dry	1	22-Jun-2020 16:59
Xylenes, Total	U		0.0011	0.0053	mg/Kg-dry	1	22-Jun-2020 16:59
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>84.5</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 16:59</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.3</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 16:59</i>
<i>Surr: Dibromofluoromethane</i>	<i>89.9</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 16:59</i>
<i>Surr: Toluene-d8</i>	<i>102</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 16:59</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 23-Jun-2020		Analyst: GEY
Naphthalene	U		0.00074	0.0041	mg/Kg-dry	1	27-Jun-2020 20:23
<i>Surr: 2-Fluorobiphenyl</i>	<i>49.4</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 20:23</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>65.2</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 20:23</i>
<i>Surr: Nitrobenzene-d5</i>	<i>51.4</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 20:23</i>
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: JAC		
Percent Moisture	19.4		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG13R(5.5-6)20200618
 Collection Date: 18-Jun-2020 10:30

ANALYTICAL REPORT

WorkOrder:HS20060975
 Lab ID:HS20060975-04
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00044	0.0044	mg/Kg-dry	1	22-Jun-2020 17:24
Ethylbenzene	U		0.00062	0.0044	mg/Kg-dry	1	22-Jun-2020 17:24
Xylenes, Total	U		0.00089	0.0044	mg/Kg-dry	1	22-Jun-2020 17:24
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>82.9</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 17:24</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.5</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 17:24</i>
<i>Surr: Dibromofluoromethane</i>	<i>89.8</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 17:24</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 17:24</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 23-Jun-2020		Analyst: GEY	
Naphthalene	U		0.00073	0.0040	mg/Kg-dry	1	27-Jun-2020 20:43
<i>Surr: 2-Fluorobiphenyl</i>	<i>47.7</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 20:43</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>79.4</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 20:43</i>
<i>Surr: Nitrobenzene-d5</i>	<i>69.2</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 20:43</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: JAC			
Percent Moisture	17.7		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG23(0.5-1)20200618
 Collection Date: 18-Jun-2020 13:08

ANALYTICAL REPORT

WorkOrder:HS20060975
 Lab ID:HS20060975-05
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00031	0.0031	mg/Kg-dry	1	22-Jun-2020 17:49
Ethylbenzene	U		0.00044	0.0031	mg/Kg-dry	1	22-Jun-2020 17:49
Xylenes, Total	U		0.00062	0.0031	mg/Kg-dry	1	22-Jun-2020 17:49
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>85.0</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 17:49</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>96.9</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 17:49</i>
<i>Surr: Dibromofluoromethane</i>	<i>90.5</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 17:49</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>22-Jun-2020 17:49</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 23-Jun-2020		Analyst: GEY	
Naphthalene	0.00071	J	0.00070	0.0038	mg/Kg-dry	1	27-Jun-2020 21:02
<i>Surr: 2-Fluorobiphenyl</i>	<i>59.2</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 21:02</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>73.0</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 21:02</i>
<i>Surr: Nitrobenzene-d5</i>	<i>57.9</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 21:02</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: JAC			
Percent Moisture	15.0		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG23(5.5-6)20200618
 Collection Date: 18-Jun-2020 13:30

ANALYTICAL REPORT
 WorkOrder:HS20060975
 Lab ID:HS20060975-06
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00032	0.0032	mg/Kg-dry	1	23-Jun-2020 02:08
Ethylbenzene	U		0.00044	0.0032	mg/Kg-dry	1	23-Jun-2020 02:08
Xylenes, Total	U		0.00064	0.0032	mg/Kg-dry	1	23-Jun-2020 02:08
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>85.8</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 02:08</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>98.1</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 02:08</i>
<i>Surr: Dibromofluoromethane</i>	<i>88.5</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 02:08</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 02:08</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 23-Jun-2020		Analyst: GEY	
Naphthalene	U		0.00071	0.0039	mg/Kg-dry	1	27-Jun-2020 21:22
<i>Surr: 2-Fluorobiphenyl</i>	<i>67.8</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 21:22</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>70.6</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 21:22</i>
<i>Surr: Nitrobenzene-d5</i>	<i>68.1</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 21:22</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: JAC			
Percent Moisture	16.6		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG24(0.5-1)20200618
 Collection Date: 18-Jun-2020 14:49

ANALYTICAL REPORT

WorkOrder:HS20060975
 Lab ID:HS20060975-07
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00038	0.0038	mg/Kg-dry	1	23-Jun-2020 02:33
Ethylbenzene	U		0.00053	0.0038	mg/Kg-dry	1	23-Jun-2020 02:33
Xylenes, Total	U		0.00076	0.0038	mg/Kg-dry	1	23-Jun-2020 02:33
<i>Surr: 1,2-Dichloroethane-d4</i>	84.2			70-126	%REC	1	23-Jun-2020 02:33
<i>Surr: 4-Bromofluorobenzene</i>	98.3			70-130	%REC	1	23-Jun-2020 02:33
<i>Surr: Dibromofluoromethane</i>	88.7			70-130	%REC	1	23-Jun-2020 02:33
<i>Surr: Toluene-d8</i>	103			70-130	%REC	1	23-Jun-2020 02:33
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 23-Jun-2020		Analyst: GEY	
Naphthalene	0.0010	J	0.00069	0.0038	mg/Kg-dry	1	27-Jun-2020 21:41
<i>Surr: 2-Fluorobiphenyl</i>	45.5			43-125	%REC	1	27-Jun-2020 21:41
<i>Surr: 4-Terphenyl-d14</i>	63.5			32-125	%REC	1	27-Jun-2020 21:41
<i>Surr: Nitrobenzene-d5</i>	51.6			37-125	%REC	1	27-Jun-2020 21:41
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: JAC			
Percent Moisture	14.4		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG24(5.5-6)20200618
 Collection Date: 18-Jun-2020 15:50

ANALYTICAL REPORT

WorkOrder:HS20060975
 Lab ID:HS20060975-08
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED	
VOLATILES BY SW8260C		Method:SW8260					Analyst: WLR	
Benzene	U		0.00030	0.0030	mg/Kg-dry	1	23-Jun-2020 02:58	
Ethylbenzene	U		0.00043	0.0030	mg/Kg-dry	1	23-Jun-2020 02:58	
Xylenes, Total	U		0.00061	0.0030	mg/Kg-dry	1	23-Jun-2020 02:58	
<i>Surr: 1,2-Dichloroethane-d4</i>	83.9			70-126	%REC	1	23-Jun-2020 02:58	
<i>Surr: 4-Bromofluorobenzene</i>	98.7			70-130	%REC	1	23-Jun-2020 02:58	
<i>Surr: Dibromofluoromethane</i>	88.5			70-130	%REC	1	23-Jun-2020 02:58	
<i>Surr: Toluene-d8</i>	102			70-130	%REC	1	23-Jun-2020 02:58	
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270					Prep:SW3541 / 23-Jun-2020 Analyst: GEY	
Naphthalene	U		0.00069	0.0038	mg/Kg-dry	1	27-Jun-2020 22:01	
<i>Surr: 2-Fluorobiphenyl</i>	52.8			43-125	%REC	1	27-Jun-2020 22:01	
<i>Surr: 4-Terphenyl-d14</i>	65.6			32-125	%REC	1	27-Jun-2020 22:01	
<i>Surr: Nitrobenzene-d5</i>	52.9			37-125	%REC	1	27-Jun-2020 22:01	
MOISTURE - ASTM D2216		Method:ASTM D2216					Analyst: JAC	
Percent Moisture	14.7		0.0100	0.0100	wt%	1	27-Jun-2020 09:00	

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG26(0.5-1)20200619
 Collection Date: 19-Jun-2020 09:15

ANALYTICAL REPORT

WorkOrder:HS20060975
 Lab ID:HS20060975-09
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260			Analyst: WLR		
Benzene		U	0.00046	0.0046	mg/Kg-dry	1	23-Jun-2020 03:23
Ethylbenzene		U	0.00064	0.0046	mg/Kg-dry	1	23-Jun-2020 03:23
Xylenes, Total		U	0.00092	0.0046	mg/Kg-dry	1	23-Jun-2020 03:23
<i>Surr: 1,2-Dichloroethane-d4</i>	86.1			70-126	%REC	1	23-Jun-2020 03:23
<i>Surr: 4-Bromofluorobenzene</i>	95.2			70-130	%REC	1	23-Jun-2020 03:23
<i>Surr: Dibromofluoromethane</i>	89.8			70-130	%REC	1	23-Jun-2020 03:23
<i>Surr: Toluene-d8</i>	102			70-130	%REC	1	23-Jun-2020 03:23
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270			Prep:SW3541 / 23-Jun-2020		Analyst: GEY
Naphthalene	0.0039		0.00064	0.0035	mg/Kg-dry	1	27-Jun-2020 23:20
<i>Surr: 2-Fluorobiphenyl</i>	63.5			43-125	%REC	1	27-Jun-2020 23:20
<i>Surr: 4-Terphenyl-d14</i>	68.5			32-125	%REC	1	27-Jun-2020 23:20
<i>Surr: Nitrobenzene-d5</i>	58.2			37-125	%REC	1	27-Jun-2020 23:20
MOISTURE - ASTM D2216		Method:ASTM D2216			Analyst: JAC		
Percent Moisture	7.56		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG26(5.5-6)20200619
 Collection Date: 19-Jun-2020 09:52

ANALYTICAL REPORT

WorkOrder:HS20060975
 Lab ID:HS20060975-10
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00039	0.0039	mg/Kg-dry	1	23-Jun-2020 03:48
Ethylbenzene	U		0.00054	0.0039	mg/Kg-dry	1	23-Jun-2020 03:48
Xylenes, Total	U		0.00077	0.0039	mg/Kg-dry	1	23-Jun-2020 03:48
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>84.8</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 03:48</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.7</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 03:48</i>
<i>Surr: Dibromofluoromethane</i>	<i>89.5</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 03:48</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 03:48</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 23-Jun-2020		Analyst: GEY	
Naphthalene	U		0.00069	0.0038	mg/Kg-dry	1	27-Jun-2020 22:21
<i>Surr: 2-Fluorobiphenyl</i>	<i>46.5</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 22:21</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>71.5</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 22:21</i>
<i>Surr: Nitrobenzene-d5</i>	<i>42.5</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 22:21</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: JAC			
Percent Moisture	13.3		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG27(0.5-1)20200619
 Collection Date: 19-Jun-2020 10:10

ANALYTICAL REPORT

WorkOrder:HS20060975
 Lab ID:HS20060975-11
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene		U	0.00069	0.0069	mg/Kg-dry	1	23-Jun-2020 04:13
Ethylbenzene		U	0.00097	0.0069	mg/Kg-dry	1	23-Jun-2020 04:13
Xylenes, Total		U	0.0014	0.0069	mg/Kg-dry	1	23-Jun-2020 04:13
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>81.2</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 04:13</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>95.3</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 04:13</i>
<i>Surr: Dibromofluoromethane</i>	<i>88.0</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 04:13</i>
<i>Surr: Toluene-d8</i>	<i>104</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>23-Jun-2020 04:13</i>
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 23-Jun-2020		Analyst: GEY	
Naphthalene	0.0022	J	0.00064	0.0035	mg/Kg-dry	1	27-Jun-2020 22:40
<i>Surr: 2-Fluorobiphenyl</i>	<i>51.2</i>			<i>43-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 22:40</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>54.1</i>			<i>32-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 22:40</i>
<i>Surr: Nitrobenzene-d5</i>	<i>52.3</i>			<i>37-125</i>	<i>%REC</i>	<i>1</i>	<i>27-Jun-2020 22:40</i>
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: JAC			
Percent Moisture	6.33		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Client: Golder Associates Inc.
 Project: Houston TX-Wood Preserving Works
 Sample ID: SO-1620-SG27(5.5-6)20200618
 Collection Date: 18-Jun-2020 10:30

ANALYTICAL REPORT

WorkOrder:HS20060975
 Lab ID:HS20060975-12
 Matrix:Soil

ANALYSES	RESULT	QUAL	SDL	MLL	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES BY SW8260C		Method:SW8260		Analyst: WLR			
Benzene	U		0.00039	0.0039	mg/Kg-dry	1	23-Jun-2020 04:38
Ethylbenzene	U		0.00054	0.0039	mg/Kg-dry	1	23-Jun-2020 04:38
Xylenes, Total	U		0.00077	0.0039	mg/Kg-dry	1	23-Jun-2020 04:38
<i>Surr: 1,2-Dichloroethane-d4</i>	86.4			70-126	%REC	1	23-Jun-2020 04:38
<i>Surr: 4-Bromofluorobenzene</i>	97.9			70-130	%REC	1	23-Jun-2020 04:38
<i>Surr: Dibromofluoromethane</i>	88.8			70-130	%REC	1	23-Jun-2020 04:38
<i>Surr: Toluene-d8</i>	103			70-130	%REC	1	23-Jun-2020 04:38
LOW-LEVEL SEMIVOLATILES BY 8270D		Method:SW8270		Prep:SW3541 / 23-Jun-2020		Analyst: GEY	
Naphthalene	0.0018	J	0.00070	0.0038	mg/Kg-dry	1	27-Jun-2020 23:00
<i>Surr: 2-Fluorobiphenyl</i>	45.3			43-125	%REC	1	27-Jun-2020 23:00
<i>Surr: 4-Terphenyl-d14</i>	53.8			32-125	%REC	1	27-Jun-2020 23:00
<i>Surr: Nitrobenzene-d5</i>	40.1			37-125	%REC	1	27-Jun-2020 23:00
MOISTURE - ASTM D2216		Method:ASTM D2216		Analyst: JAC			
Percent Moisture	14.8		0.0100	0.0100	wt%	1	27-Jun-2020 09:00

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

Weight / Prep Log

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

Batch ID: 3787 **Start Date:** 22 Jun 2020 06:57 **End Date:** 22 Jun 2020 06:57
Method: VOLATILES BY SW8260C

Sample ID	Container	Sample Wt/Vol	Final Volume	Weight Factor	Container Type
HS20060975-01	1	4.04 (g)	5 (mL)	1.24	TerraCore (5035A)
HS20060975-02	1	9.72 (g)	5 (mL)	0.51	TerraCore (5035A)
HS20060975-03	1	5.805 (g)	5 (mL)	0.86	TerraCore (5035A)
HS20060975-04	1	6.83 (g)	5 (mL)	0.73	TerraCore (5035A)
HS20060975-05	1	9.468 (g)	5 (mL)	0.53	TerraCore (5035A)
HS20060975-06	1	9.428 (g)	5 (mL)	0.53	TerraCore (5035A)
HS20060975-07	1	7.732 (g)	5 (mL)	0.65	TerraCore (5035A)
HS20060975-08	1	9.68 (g)	5 (mL)	0.52	TerraCore (5035A)
HS20060975-09	1	5.886 (g)	5 (mL)	0.85	TerraCore (5035A)
HS20060975-10	1	7.412 (g)	5 (mL)	0.67	TerraCore (5035A)
HS20060975-11	1	3.861 (g)	5 (mL)	1.3	TerraCore (5035A)
HS20060975-12	1	7.61 (g)	5 (mL)	0.66	TerraCore (5035A)

Batch ID: 154767 **Start Date:** 23 Jun 2020 10:30 **End Date:** 23 Jun 2020 18:00
Method: SV SOXHLET EXTRACT-LOWLEVEL-SW3541 **Prep Code:** 3541_B_LOW

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20060975-01		30.15 (g)	1 (mL)	0.03317
HS20060975-02		30.01 (g)	1 (mL)	0.03332
HS20060975-03		30.1 (g)	1 (mL)	0.03322
HS20060975-04		30.09 (g)	1 (mL)	0.03323
HS20060975-05		30.27 (g)	1 (mL)	0.03304
HS20060975-06		30.19 (g)	1 (mL)	0.03312
HS20060975-07		30.3 (g)	1 (mL)	0.033
HS20060975-08		30.49 (g)	1 (mL)	0.0328
HS20060975-09		30.28 (g)	1 (mL)	0.03303
HS20060975-10		30.1 (g)	1 (mL)	0.03322
HS20060975-11		30.09 (g)	1 (mL)	0.03323
HS20060975-12		30.29 (g)	1 (mL)	0.03301

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 154767 (1)		Test Name : LOW-LEVEL SEMIVOLATILES BY 8270D			Matrix: Soil	
HS20060975-01	SO-1620-SG25(0.5-1) 20200618	18 Jun 2020 08:30		23 Jun 2020 10:30	27 Jun 2020 23:39	1
HS20060975-02	SO-1620-SG25(5.5-6) 20200618	18 Jun 2020 08:58		23 Jun 2020 10:30	27 Jun 2020 20:03	1
HS20060975-03	SO-1620-SG13R(0.5-1) 20200618	18 Jun 2020 10:00		23 Jun 2020 10:30	27 Jun 2020 20:23	1
HS20060975-04	SO-1620-SG13R(5.5-6) 20200618	18 Jun 2020 10:30		23 Jun 2020 10:30	27 Jun 2020 20:43	1
HS20060975-05	SO-1620-SG23(0.5-1) 20200618	18 Jun 2020 13:08		23 Jun 2020 10:30	27 Jun 2020 21:02	1
HS20060975-06	SO-1620-SG23(5.5-6) 20200618	18 Jun 2020 13:30		23 Jun 2020 10:30	27 Jun 2020 21:22	1
HS20060975-07	SO-1620-SG24(0.5-1) 20200618	18 Jun 2020 14:49		23 Jun 2020 10:30	27 Jun 2020 21:41	1
HS20060975-08	SO-1620-SG24(5.5-6) 20200618	18 Jun 2020 15:50		23 Jun 2020 10:30	27 Jun 2020 22:01	1
HS20060975-09	SO-1620-SG26(0.5-1) 20200619	19 Jun 2020 09:15		23 Jun 2020 10:30	27 Jun 2020 23:20	1
HS20060975-10	SO-1620-SG26(5.5-6) 20200619	19 Jun 2020 09:52		23 Jun 2020 10:30	27 Jun 2020 22:21	1
HS20060975-11	SO-1620-SG27(0.5-1) 20200619	19 Jun 2020 10:10		23 Jun 2020 10:30	27 Jun 2020 22:40	1
HS20060975-12	SO-1620-SG27(5.5-6) 20200618	18 Jun 2020 10:30		23 Jun 2020 10:30	27 Jun 2020 23:00	1
Batch ID: R363651 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20060975-01	SO-1620-SG25(0.5-1) 20200618	18 Jun 2020 08:30			22 Jun 2020 16:09	1
HS20060975-02	SO-1620-SG25(5.5-6) 20200618	18 Jun 2020 08:58			22 Jun 2020 16:34	1
HS20060975-03	SO-1620-SG13R(0.5-1) 20200618	18 Jun 2020 10:00			22 Jun 2020 16:59	1
HS20060975-04	SO-1620-SG13R(5.5-6) 20200618	18 Jun 2020 10:30			22 Jun 2020 17:24	1
HS20060975-05	SO-1620-SG23(0.5-1) 20200618	18 Jun 2020 13:08			22 Jun 2020 17:49	1
Batch ID: R363717 (0)		Test Name : VOLATILES BY SW8260C			Matrix: Soil	
HS20060975-06	SO-1620-SG23(5.5-6) 20200618	18 Jun 2020 13:30			23 Jun 2020 02:08	1
HS20060975-07	SO-1620-SG24(0.5-1) 20200618	18 Jun 2020 14:49			23 Jun 2020 02:33	1
HS20060975-08	SO-1620-SG24(5.5-6) 20200618	18 Jun 2020 15:50			23 Jun 2020 02:58	1
HS20060975-09	SO-1620-SG26(0.5-1) 20200619	19 Jun 2020 09:15			23 Jun 2020 03:23	1
HS20060975-10	SO-1620-SG26(5.5-6) 20200619	19 Jun 2020 09:52			23 Jun 2020 03:48	1
HS20060975-11	SO-1620-SG27(0.5-1) 20200619	19 Jun 2020 10:10			23 Jun 2020 04:13	1
HS20060975-12	SO-1620-SG27(5.5-6) 20200618	18 Jun 2020 10:30			23 Jun 2020 04:38	1

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: R364091 (0)		Test Name : MOISTURE - ASTM D2216			Matrix: Soil	
HS20060975-01	SO-1620-SG25(0.5-1) 20200618	18 Jun 2020 08:30			27 Jun 2020 09:00	1
HS20060975-02	SO-1620-SG25(5.5-6) 20200618	18 Jun 2020 08:58			27 Jun 2020 09:00	1
HS20060975-03	SO-1620-SG13R(0.5-1) 20200618	18 Jun 2020 10:00			27 Jun 2020 09:00	1
HS20060975-04	SO-1620-SG13R(5.5-6) 20200618	18 Jun 2020 10:30			27 Jun 2020 09:00	1
HS20060975-05	SO-1620-SG23(0.5-1) 20200618	18 Jun 2020 13:08			27 Jun 2020 09:00	1
HS20060975-06	SO-1620-SG23(5.5-6) 20200618	18 Jun 2020 13:30			27 Jun 2020 09:00	1
HS20060975-07	SO-1620-SG24(0.5-1) 20200618	18 Jun 2020 14:49			27 Jun 2020 09:00	1
HS20060975-08	SO-1620-SG24(5.5-6) 20200618	18 Jun 2020 15:50			27 Jun 2020 09:00	1
HS20060975-09	SO-1620-SG26(0.5-1) 20200619	19 Jun 2020 09:15			27 Jun 2020 09:00	1
HS20060975-10	SO-1620-SG26(5.5-6) 20200619	19 Jun 2020 09:52			27 Jun 2020 09:00	1
HS20060975-11	SO-1620-SG27(0.5-1) 20200619	19 Jun 2020 10:10			27 Jun 2020 09:00	1
HS20060975-12	SO-1620-SG27(5.5-6) 20200618	18 Jun 2020 10:30			27 Jun 2020 09:00	1

WorkOrder: HS20060975
 InstrumentID: SV-7
 Test Code: 8270_LOW_S
 Test Number: SW8270
 Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Naphthalene	91-20-3	0.0017	0.0020	0.00060	0.0033
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	4-Terphenyl-d14	1718-51-0	0	0	0	0
S	Nitrobenzene-d5	4165-60-0	0	0	0	0

WorkOrder: HS20060975
 InstrumentID: VOA5
 Test Code: 8260_S
 Test Number: SW8260
 Test Name: Volatiles by SW8260C

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid

Units: mg/Kg

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.0012	0.0012	0.00050	0.0050
A	Ethylbenzene	100-41-4	0.0012	0.0013	0.00070	0.0050
A	Xylenes, Total	1330-20-7	0.0012	0.0016	0.0010	0.0050
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0
S	4-Bromofluorobenzene	460-00-4	0	0	0	0
S	Dibromofluoromethane	1868-53-7	0	0	0	0
S	Toluene-d8	2037-26-5	0	0	0	0

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

QC BATCH REPORT

Batch ID: 154767 (1) **Instrument:** SV-7 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

MBLK		Sample ID: MBLK-154767		Units: ug/Kg		Analysis Date: 25-Jun-2020 11:55			
Client ID:		Run ID: SV-7_363901		SeqNo: 5637804		PrepDate: 23-Jun-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	U	3.3							
Surr: 2-Fluorobiphenyl	111.6	0	167	0	66.8	43 - 125			
Surr: 4-Terphenyl-d14	131.5	0	167	0	78.8	32 - 125			
Surr: Nitrobenzene-d5	126.4	0	167	0	75.7	37 - 125			

LCS		Sample ID: LCS-154767		Units: ug/Kg		Analysis Date: 25-Jun-2020 12:15			
Client ID:		Run ID: SV-7_363901		SeqNo: 5637805		PrepDate: 23-Jun-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	135.9	3.3	167	0	81.4	50 - 125			
Surr: 2-Fluorobiphenyl	156.5	0	167	0	93.7	43 - 125			
Surr: 4-Terphenyl-d14	134.3	0	167	0	80.4	32 - 125			
Surr: Nitrobenzene-d5	110.6	0	167	0	66.3	37 - 125			

MS		Sample ID: HS20061011-02MS		Units: ug/Kg		Analysis Date: 25-Jun-2020 13:53			
Client ID:		Run ID: SV-7_363901		SeqNo: 5637807		PrepDate: 23-Jun-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	180.2	3.3	164.9	66.09	69.2	50 - 125			
Surr: 2-Fluorobiphenyl	111	0	164.9	0	67.3	43 - 125			
Surr: 4-Terphenyl-d14	111.1	0	164.9	0	67.4	32 - 125			
Surr: Nitrobenzene-d5	133.5	0	164.9	0	81.0	37 - 125			

MSD		Sample ID: HS20061011-02MSD		Units: ug/Kg		Analysis Date: 25-Jun-2020 14:13			
Client ID:		Run ID: SV-7_363901		SeqNo: 5637808		PrepDate: 23-Jun-2020		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Naphthalene	186.5	3.3	165.9	66.09	72.6	50 - 125	180.2	3.39	30
Surr: 2-Fluorobiphenyl	98.02	0	165.9	0	59.1	43 - 125	111	12.4	30
Surr: 4-Terphenyl-d14	96.12	0	165.9	0	57.9	32 - 125	111.1	14.5	30
Surr: Nitrobenzene-d5	171.5	0	165.9	0	103	37 - 125	133.5	24.9	30

The following samples were analyzed in this batch:

HS20060975-01	HS20060975-02	HS20060975-03	HS20060975-04
HS20060975-05	HS20060975-06	HS20060975-07	HS20060975-08
HS20060975-09	HS20060975-10	HS20060975-11	HS20060975-12

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

QC BATCH REPORT

Batch ID: R363651 (0) **Instrument:** VOA5 **Method:** VOLATILES BY SW8260C

MBLK		Sample ID: VBLKS1-062220		Units: ug/Kg		Analysis Date: 22-Jun-2020 09:05			
Client ID:		Run ID: VOA5_363651		SeqNo: 5629085		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	42.07	0	50	0	84.1	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	49.24	0	50	0	98.5	80 - 120			
<i>Surr: Dibromofluoromethane</i>	44.44	0	50	0	88.9	80 - 119			
<i>Surr: Toluene-d8</i>	49.12	0	50	0	98.2	81 - 118			

LCS		Sample ID: VLCSS1-062220		Units: ug/Kg		Analysis Date: 22-Jun-2020 08:14			
Client ID:		Run ID: VOA5_363651		SeqNo: 5629084		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	50.67	5.0	50	0	101	75 - 124			
Ethylbenzene	51.23	5.0	50	0	102	70 - 123			
Xylenes, Total	154.1	5.0	150	0	103	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	44.11	0	50	0	88.2	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	50.24	0	50	0	100	80 - 120			
<i>Surr: Dibromofluoromethane</i>	47.24	0	50	0	94.5	80 - 119			
<i>Surr: Toluene-d8</i>	48.96	0	50	0	97.9	81 - 118			

MS		Sample ID: HS20060930-04MS		Units: ug/Kg		Analysis Date: 22-Jun-2020 12:00			
Client ID:		Run ID: VOA5_363651		SeqNo: 5629560		PrepDate:		DF: 1	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	39.11	4.9	49	0	79.8	70 - 130			
Ethylbenzene	39.3	4.9	49	0	80.2	70 - 130			
Xylenes, Total	117.7	4.9	147	0	80.1	70 - 130			
<i>Surr: 1,2-Dichloroethane-d4</i>	43.57	0	49	0	88.9	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	49.22	0	49	0	100	70 - 130			
<i>Surr: Dibromofluoromethane</i>	47.37	0	49	0	96.7	70 - 130			
<i>Surr: Toluene-d8</i>	48.8	0	49	0	99.6	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

QC BATCH REPORT

Batch ID: R363651 (0) **Instrument:** VOA5 **Method:** VOLATILES BY SW8260C

MSD	Sample ID: HS20060930-04MSD	Units: ug/Kg			Analysis Date: 22-Jun-2020 12:25					
Client ID:	Run ID: VOA5_363651	SeqNo: 5629561		PrepDate:		DF: 1				
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	40.6	4.8	48.5	0	83.7	70 - 130	39.11	3.72	30	
Ethylbenzene	40.81	4.8	48.5	0	84.1	70 - 130	39.3	3.76	30	
Xylenes, Total	122.4	4.8	145.5	0	84.1	70 - 130	117.7	3.94	30	
<i>Surr: 1,2-Dichloroethane-d4</i>	43.93	0	48.5	0	90.6	70 - 126	43.57	0.825	30	
<i>Surr: 4-Bromofluorobenzene</i>	48.99	0	48.5	0	101	70 - 130	49.22	0.471	30	
<i>Surr: Dibromofluoromethane</i>	46.85	0	48.5	0	96.6	70 - 130	47.37	1.1	30	
<i>Surr: Toluene-d8</i>	47.88	0	48.5	0	98.7	70 - 130	48.8	1.9	30	

The following samples were analyzed in this batch: HS20060975-01 HS20060975-02 HS20060975-03 HS20060975-04
 HS20060975-05

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

QC BATCH REPORT

Batch ID: R363717 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKS2-062220	Units: ug/Kg			Analysis Date: 22-Jun-2020 21:33				
Client ID:	Run ID: VOA5_363717	SeqNo: 5630483		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	U	5.0							
Ethylbenzene	U	5.0							
Xylenes, Total	U	5.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	42.45	0	50	0	84.9	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	49.52	0	50	0	99.0	80 - 120			
<i>Surr: Dibromofluoromethane</i>	45.44	0	50	0	90.9	80 - 119			
<i>Surr: Toluene-d8</i>	50.86	0	50	0	102	81 - 118			

LCS	Sample ID: VLCSS2-062220	Units: ug/Kg			Analysis Date: 22-Jun-2020 20:43				
Client ID:	Run ID: VOA5_363717	SeqNo: 5630482		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	54.69	5.0	50	0	109	75 - 124			
Ethylbenzene	54.34	5.0	50	0	109	70 - 123			
Xylenes, Total	162	5.0	150	0	108	77 - 128			
<i>Surr: 1,2-Dichloroethane-d4</i>	46.7	0	50	0	93.4	76 - 125			
<i>Surr: 4-Bromofluorobenzene</i>	50.61	0	50	0	101	80 - 120			
<i>Surr: Dibromofluoromethane</i>	49.48	0	50	0	99.0	80 - 119			
<i>Surr: Toluene-d8</i>	49.76	0	50	0	99.5	81 - 118			

MS	Sample ID: HS20060992-02MS	Units: ug/Kg			Analysis Date: 22-Jun-2020 23:13				
Client ID:	Run ID: VOA5_363717	SeqNo: 5630487		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Benzene	43.55	4.9	49	0	88.9	70 - 130			
Ethylbenzene	40.23	4.9	49	0	82.1	70 - 130			
Xylenes, Total	117.4	4.9	147	0	79.9	70 - 130			
<i>Surr: 1,2-Dichloroethane-d4</i>	43.57	0	49	0	88.9	70 - 126			
<i>Surr: 4-Bromofluorobenzene</i>	49.53	0	49	0	101	70 - 130			
<i>Surr: Dibromofluoromethane</i>	46.6	0	49	0	95.1	70 - 130			
<i>Surr: Toluene-d8</i>	49.92	0	49	0	102	70 - 130			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

QC BATCH REPORT

Batch ID: R363717 (0)		Instrument: VOA5		Method: VOLATILES BY SW8260C														
MSD	Sample ID: HS20060992-02MSD	Units: ug/Kg			Analysis Date: 22-Jun-2020 23:38													
Client ID:	Run ID: VOA5_363717	SeqNo: 5630488		PrepDate:			DF: 1											
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual								
Benzene	40.53	4.8	48.5	0	83.6	70 - 130	43.55	7.19	30									
Ethylbenzene	36.69	4.8	48.5	0	75.7	70 - 130	40.23	9.2	30									
Xylenes, Total	107.1	4.8	145.5	0	73.6	70 - 130	117.4	9.19	30									
<i>Surr: 1,2-Dichloroethane-d4</i>	43.1	0	48.5	0	88.9	70 - 126	43.57	1.08	30									
<i>Surr: 4-Bromofluorobenzene</i>	48.7	0	48.5	0	100	70 - 130	49.53	1.68	30									
<i>Surr: Dibromofluoromethane</i>	46.76	0	48.5	0	96.4	70 - 130	46.6	0.336	30									
<i>Surr: Toluene-d8</i>	49.42	0	48.5	0	102	70 - 130	49.92	1	30									
The following samples were analyzed in this batch:																		
<table border="1"> <tr> <td>HS20060975-06</td> <td>HS20060975-07</td> <td>HS20060975-08</td> <td>HS20060975-09</td> </tr> <tr> <td>HS20060975-10</td> <td>HS20060975-11</td> <td>HS20060975-12</td> <td></td> </tr> </table>											HS20060975-06	HS20060975-07	HS20060975-08	HS20060975-09	HS20060975-10	HS20060975-11	HS20060975-12	
HS20060975-06	HS20060975-07	HS20060975-08	HS20060975-09															
HS20060975-10	HS20060975-11	HS20060975-12																

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

QC BATCH REPORT

Batch ID: R364091 (0)		Instrument: Balance1		Method: MOISTURE - ASTM D2216					
DUP	Sample ID: HS20060975-07DUP	Units: wt%		Analysis Date: 27-Jun-2020 09:00					
Client ID: SO-1620-SG24(0.5-1)20200618	Run ID: Balance1_364091	SeqNo: 5640593		PrepDate:		DF: 1			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Percent Moisture	14	0.0100					14.4	2.82	20
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The following samples were analyzed in this batch:

HS20060975-01	HS20060975-02	HS20060975-03	HS20060975-04
HS20060975-05	HS20060975-06	HS20060975-07	HS20060975-08
HS20060975-09	HS20060975-10	HS20060975-11	HS20060975-12

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works
WorkOrder: HS20060975

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/Kg-dry	Milligrams per Kilogram- Dry weight corrected

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	20-030-0	26-Mar-2021
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322020-4	09-May-2021
Kansas	E-10352 2019-2020	31-Jul-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2020	31-Dec-2020
Oklahoma	2019-141	31-Aug-2020
Texas	T104704231-20-26	30-Apr-2021

Sample Receipt Checklist

Work Order ID: HS20060975

Date/Time Received: 19-Jun-2020 13:00

Client Name: PBW

Received by: Patrick Salome

Completed By: /S/ Paresh M. Giga	19-Jun-2020 16:12	Reviewed by: /S/ Dane J. Wacasey	26-Jun-2020 18:28
eSignature	Date/Time	eSignature	Date/Time

Matrices: Soil

Carrier name: ALS Courier

- 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:218812/218809
- 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): 1.5°C; 1.1°C uc/c IR25

Cooler(s)/Kit(s): 45140/46069

Date/Time sample(s) sent to storage: 6/19/2020 16:30

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: Times Differ : SG-24(5.5-6): COC = 15:50 Labels = 15:00; logged per COC. SG25(0.5-1): 5035 VOC methanol vial received empty

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:



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: 218812

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

Customer Information		ALS Project Manager:		ALS Work Order #:	
Purchase Order	UPRR/Kevin Peterburs	Project Name	Houston TX-Wood Preserving Works	Parameter/Method Request for Analysis	
Work Order		Project Number	1620-18-Rev0 SR 9/26/20	A	2260_S (3862832 1503513260 - B, E, X)
Company Name	Golder Associates Inc.	Bill To Company	Union Pacific Railroad- A/P	B	2270_LOW_S (5635942 SVOC - Naphthalene only)
Send Report To	Eric Matzner	Invoice Attn	Accounts Payable	C	MOIST_ASTM (6631931 Gen Chem. MOIST%)
Address	2201 Double Creek Drive Suite 6004	Address	1400 Douglas Street Stop 0780	D	
City/State/Zip	Round Rock, TX 78664	City/State/Zip	Omaha NE 681780750	E	
Phone	(512) 671-3434	Phone		F	
Fax	(512) 671-3446	Fax		G	
e-Mail Address	Eric_Matzner@golder.com	e-Mail Address		H	
				I	
				J	

HS20060975
Golder Associates Inc.
Houston TX-Wood Preserving Works



No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	SO-1820-SG125 (0.5-1) 20200618	6-18-20	0830	Soil	H9	5	X	X	X								
2	SG125 (5.5-6)		0858														
3	SG132 (0.5-1)		1000														
4	SG132 (5.5-6)		1030														
5	SG133 (0.5-1)		1308														
6	SG133 (5.5-6)		1330														
7	SG134 (0.5-1)		1449														
8	SG134 (5.5-6)		1530														
9	SG126 (0.5-1) 20200619	6-19-20	0915														
10	SG126 (5.5-6)		0952														

Sampler(s) Please Print & Sign Anthony Reid		Shipment Method		Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> 24 Hours <input type="checkbox"/> 48 Hours <input type="checkbox"/> 72 Hours <input type="checkbox"/> Other				Results Due Date:			
Relinquished by: Anthony Reid	Date: 6-19-20	Time: 6:215	Received by: Vicki Valone	Notes: UPRR HIAFW 1620-18							
Relinquished by: Vicki Valone	Date: 6-19-20	Time: 1300	Received by (Laboratory): Vicki Valone	Cooler ID 45140	Cooler Temp. 1.5	QC Package: (Check One Box Below)					
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	46269	1.1	<input type="checkbox"/> Low Level	<input checked="" type="checkbox"/> Standard	<input type="checkbox"/> High Level	<input type="checkbox"/> Other	<input type="checkbox"/> Other	

Preservative Key: 1-HCl 2-HNO₃ 3-H₂SO₄ 4-NaOH 5-Na₂S₂O₃ 6-NaHSO₄ 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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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: 218809

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

Customer Information				Project Information				ALS Project Manager:										ALS Work Order #:											
Purchase Order		Project Name		Parameter/Method Request for Analysis		Work Order		Project Number		A		B		C		D		E		F		G		H		I		J	
UPRR/Kevin Peterburs		Houston TX-Wood Preserving Works		3260 S (5652652 1503519260 - B.E.X.)		Golder Associates Inc.		1620-18-RevG BR 92628		0270 LOW S (5535942 SVCC - Naphthalene only)		MOIST ASTM (5631981 Gen Chem. MOIST%)																	
Eric Matzner		Union Pacific Railroad- A/P		MOIST ASTM (5631981 Gen Chem. MOIST%)		Eric Matzner		Accounts Payable																					
2201 Double Creek Drive Suite 4004		1400 Douglas Street Stop 0750				2201 Double Creek Drive Suite 4004		Accounts Payable																					
Round Rock, TX 78684		Omaha NE 68179-750				Round Rock, TX 78684		Accounts Payable																					
(512) 671-3434						(512) 671-3434		Accounts Payable																					
(512) 671-3446						(512) 671-3446		Accounts Payable																					
Eric_Matzner@golder.com						Eric_Matzner@golder.com		Accounts Payable																					

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	30-1820-SG27(05-1)20200619	6-19-20	1010	Soil	8.9	5	X	X	X								
2	1 ↓ SG27(5.5-6)20200619	1	1030	1	1	1	X	X	X								
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign <i>Anthony Rowd</i>				Shipment Method				Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> STD 48 Hrs <input type="checkbox"/> 24 Hrs <input type="checkbox"/> 12 Hrs <input type="checkbox"/> 7 Hrs				Results Due Date:			
Relinquished by: <i>[Signature]</i>				Date: 6-17-20 Time: 12:13				Received by: <i>[Signature]</i>				Notes: UPRR HMA/PV 1620-18			
Relinquished by: <i>[Signature]</i>				Date: 6-17-20 Time: 15:00				Received by (Laboratory): <i>[Signature]</i>				Cooler ID			
Logged by (Laboratory):				Date:				Checked by (Laboratory):				Cooler Temp.			
Preservative Key: 1-HCl 2-HNO ₃ 3-H ₂ SO ₄ 4-NaOH 5-Na ₂ S ₂ O ₃ 6-NaHSO ₄ 7-Other 8-4°C 9-5035												QC Package: (Check One Box Below) <input type="checkbox"/> Cool 100°C <input checked="" type="checkbox"/> Cool 4°C <input type="checkbox"/> Cool 20°C <input type="checkbox"/> Other			

- 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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ATTACHMENT 2

**Soil Gas Samples - Data Usability
Summary and Laboratory Analytical
Reports**



Memorandum

December 8, 2020

To: Eric Matzner Ref. No.: 11183954-1620

From: ^{CK} Chris G. Knight/eew/818-NF Tel: 512-506-8803

cc: Jesse Orth, Jon Lang; Julie Lidstone

**Subject: Data Usability Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston TX-Wood Preserving Works
Houston, Texas
November 2020**

1. Scope of Data Usability Study

This document details a Data Usability Summary (DUS) of analytical results for soil gas samples collected in support of the Soil Gas Sampling Event at the Union Pacific Railroad (UPRR)/Houston TX-Wood Preserving Works site during November 2020. Samples were submitted to Pace Analytical Services, Inc., located in Minneapolis, Minnesota and are reported in data package 10539308. The intended use of the data is to support the Soil Gas Sampling Event at the site by providing current concentration of chemicals of concern.

Data were reviewed and validated by Chris G. Knight of GHD, in accordance with Title 30 of the Texas Administrative Code Section 350.54 (30 TAC 350.54) as described in the Texas Commission on Environmental Quality (TCEQ) Regulatory Guidance document entitled "Review and Reporting of COC Concentration Data under TRRP", (RG-366/TRRP-13), revised May 2010, herein referred to as "TRRP-13 Guidance". Evaluation of the data was based on information obtained from the chain of custody forms, the finished report forms, method blank data, recovery data from laboratory control samples (LCS)/duplicate analyses (DUP), field quality assurance/quality control samples (QA/QC), the laboratory review checklists (LRC), and the laboratory exception report (ER).

A sample collection and analysis summary is presented in Table 1. This summary provides a cross-reference of field sample identification numbers and location identification. Each sample is assigned a unique field identification number.

The validated sample results are presented in Table 2. A summary of the analytical methodology is presented in Table 3.



2. Laboratory Qualifications

The Laboratory's quality assurance program is consistent with the quality standards outlined in the National Environmental Laboratory Accreditation Program (NELAP). This laboratory was accredited under Texas Certification number # TX104704192 at the time the analysis was performed and the certificate is included in Attachment A.

3. Project Objectives

3.1 Sampling/Analytical QA/QC Objectives

The QA/QC program was designed to identify contamination resulting from the sampling, sample transport and analytical process through the analysis of field duplicate sample sets and method blanks. The QA/QC program was designed to evaluate the quality of the resulting data with respect to bias and precision through analysis of LCS and duplicate analyses.

4. Data Review/Validation Results

4.1 Sample Holding Time

Samples were shipped with a chain of custody and the paper work was filled out properly.

The sample chain of custody documents and the analytical report were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

4.2 Sample Containers

All sample canisters were received at the laboratory in good condition and within acceptable canister pressure range of -1 inch of mercury (Hg) to -10 inches of Hg, indicating samples were still under vacuum upon receipt.

4.3 Calibrations

According to the LRC, initial calibration and continuing calibration data met the criteria for the selected method.

4.4 Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures. As these were not discrete samples handled in the field, these blanks are not listed on the sample identification cross-reference list found in the data package.

For this study, laboratory method blanks were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch and results are reported in the laboratory data package.



The method blank results were non-detect or below the method quantitation limit (MQL), indicating that laboratory contamination was not a factor for this investigation.

4.5 Laboratory Control Sample Analysis

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The recovery ranges established by the laboratory are adopted as the acceptance criteria for the project.

For this study, LCS were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch.

The LCS contained all compounds specified in the method. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

4.6 Duplicate Sample Analyses

Analytical precision is evaluated based on the analysis of laboratory duplicate samples. The relative percent differences (RPD) established by the laboratory are adopted as the acceptance criteria for the project.

The laboratory performed a duplicate analysis on a non-site sample. This cannot be used to assess precision for the site samples.

4.7 Field QA/QC Samples

The field QA/QC consisted of one field duplicate sample set.

To assess the analytical and sampling protocol precision, one field duplicate sample set was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than fifty percent for soil gas samples. The RPDs are only used when sample concentrations are above the estimated regions of detection.

Field duplicate summary data are presented in Table 2. All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision.

4.8 Field Procedures

Golder Associates, Inc. collected soil gas samples in accordance with their Standard Operating Procedures (SOP) for sample collection.

4.9 Analyte Reporting

The laboratory reported detected results for each analyte down to the sample detection limit (SDL), which is defined as the method detection limit (MDL) with sample-specific adjustments for dilutions, aliquot size, volumes, etc. Positive analyte detections less than the MQL but greater than the SDL were qualified as estimated (J) in Table 2.

The detectability check standard (DCS) results supported the laboratory MDLs.



5. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are usable for the purpose of supporting the Soil Gas Sampling Event at the site by providing current concentration of chemicals of concern in soil gas samples without qualification.

Table 1

Sample Collection and Analysis Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
November 2020

Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	<u>Analysis/Parameters</u>		Comments
					VOCs		
GS-1620-SG30-20201111	SG-30	Soil Gas	11/11/2020	13:30	X		
GS-1620-AA-1-20201111	AA-4	Soil Gas	11/11/2020	13:40	X		
GS-1620-SG29-20201111	SG-29	Soil Gas	11/11/2020	14:22	X		
GS-1620-DUP-1-20201111	SG-29	Soil Gas	11/11/2020	14:22	X		Field duplicate of SG-29
GS-1620-SG31-20201111	SG-31	Soil Gas	11/11/2020	15:02	X		
GS-1620-SG28-20201111	SG-28	Soil Gas	11/11/2020	15:30	X		

Notes:

VOCs - Volatile Organic Compounds

Table 2

**Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston TX-Wood Preserving Works
Houston, Texas
November 2020**

Location ID:	AA-4	SG-28	SG-29
Sample Name:	GS-1620-AA-1-20201111	GS-1620-SG28-20201111	GS-1620-SG29-20201111
Sample Date:	11/11/2020	11/11/2020	11/11/2020

Parameters	Unit			
Volatile Organic Compounds				
Benzene	µg/m3	0.48 J	1.1	0.88
Ethylbenzene	µg/m3	0.31 J	35.2	88.3
m&p-Xylenes	µg/m3	0.89 J	222	456
Naphthalene	µg/m3	2.6 J	10.9	11.4
o-Xylene	µg/m3	<0.35	56.0	136

Table 2

**Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston TX-Wood Preserving Works
Houston, Texas
November 2020**

Location ID:	SG-29	SG-30	SG-31
Sample Name:	GS-1620-DUP-1-20201111	GS-1620-SG30-20201111	GS-1620-SG31-20201111
Sample Date:	11/11/2020	11/11/2020	11/11/2020
	Duplicate		

Parameters	Unit			
Volatile Organic Compounds				
Benzene	µg/m3	0.82	0.77	1.9
Ethylbenzene	µg/m3	83.9	103	382
m&p-Xylenes	µg/m3	441	768	2730
Naphthalene	µg/m3	9.5	13.2	13.5
o-Xylene	µg/m3	130	154	615

Notes:

- < - Not detected at the associated reporting limit
- J - Estimated concentration

Table 3

Analytical Methods
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
November 2020

Parameter	Method	Matrix	<u>Holding Time</u> Collection to Analysis (Days)
VOCs	TO-15 ⁽¹⁾	Soil Gas	30

Notes:

VOCs - Volatile Organic Compounds

Method References:

⁽¹⁾ - Referenced from "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air", January 1999

Attachment A
Laboratory NELAP Certificate



Texas Commission on Environmental Quality

NELAP-Recognized Laboratory Accreditation is hereby awarded to



Pace Analytical Services, LLC - Minneapolis MN

**1700 Elm Street SE Suite 200
Minneapolis, MN 55414-2485**

in accordance with Texas Water Code Chapter 5, Subchapter R, Title 30 Texas Administrative Code Chapter 25, and the National Environmental Laboratory Accreditation Program.

The laboratory's scope of accreditation includes the fields of accreditation that accompany this certificate. Continued accreditation depends upon successful ongoing participation in the program. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current location(s) and accreditation status for particular methods and analyses (www.tceq.texas.gov/goto/lab). Accreditation does not imply that a product, process, system or person is approved by the Texas Commission on Environmental Quality.

Certificate Number: T104704192-20-15
Effective Date: 3/1/2020
Expiration Date: 2/28/2021


Executive Director Texas Commission on
Environmental Quality



Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

December 03, 2020

Michelle Hermiston
Golder
2201 Double Creek Dr
Suite 4004
Round Rock, TX 78664

RE: Pace Project 10539308
Project ID: 19119232.440 HWPW

Dear Michelle Hermiston:

Enclosed are the analytical results for sample(s) received by the laboratory on November 13, 2020. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

This report was revised on December 3, 2020, to modify the report to the Texas Risk Reduction Program version.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Krista Carlson
krista.carlson@pacelabs.com
(612)607-1700

Laboratory Certifications

Pace Analytical Minnesota : Texas Certification #: T104704192*



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC

12/03/2020 11:48:21



Sample Cross Reference

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10539308

Client: UPRR Golder
Project ID: 19119232.440 HWPW

Client Sample ID	Lab ID	Matrix	Collection Date/Time	Received Date/Time
GS-1620-SG31-20201111	10539308001	Air	11/11/2020 15:02	11/13/2020 10:00
GS-1620-SG31-20201111 Cert2551	10539308002	Air	11/11/2020 15:02	11/13/2020 10:00
GS-1620-SG28-20201111	10539308003	Air	11/11/2020 15:30	11/13/2020 10:00
GS-1620-SG28-20201111Cert2613	10539308004	Air	11/11/2020 15:30	11/13/2020 10:00
GS-1620-SG30-20201111	10539308005	Air	11/11/2020 13:30	11/13/2020 10:00
GS-1620-SG29-20201111	10539308006	Air	11/11/2020 14:22	11/13/2020 10:00
GS-1620-SG30-20201111Cert2480	10539308007	Air	11/11/2020 13:30	11/13/2020 10:00
GS-1620-SG29-20201111Cert3068	10539308008	Air	11/11/2020 14:22	11/13/2020 10:00
GS-1620-DUP-1-20201111	10539308009	Air	11/11/2020 14:22	11/13/2020 10:00
GS-1620-DUP-1-20201111Cert3021	10539308010	Air	11/11/2020 14:22	11/13/2020 10:00
GS-1620-AA-1-20201111	10539308011	Air	11/11/2020 13:40	11/13/2020 10:00
GS-1620-AA-1-20201111Cert3690	10539308012	Air	11/11/2020 13:40	11/13/2020 10:00



Project Narrative

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10539308

Holding Times:

All holding times were met.

Blanks:

All blank results were below reporting limits.

Laboratory Control Samples:

All LCS recoveries were within QC limits.

Matrix Spikes and Duplicates:

All MS or MSD recoveries were within QC limits.

Surrogate:

All surrogate recoveries were within QC limits.

Appendix A
LABORATORY DATA PACKAGE COVER PAGE

This data package is for Job No. 10539308 and consists of:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 - Field chain-of-custody documentation;
- R2 - Sample identification cross-reference;
- R3 - Test reports (analytical data sheets) for each environmental sample that includes:
 - a. Items consistent with NELAC Chapter 5,
 - b. Dilution factors,
 - c. Preparation methods,
 - d. Cleanup methods, and
 - e. If required for the project, tentatively identified compounds (TICs).
- R4 - Surrogate recovery data including:
 - a. Calculated recovery (%R), and
 - b. The laboratory's surrogate QC limits.
- R5 - Test reports/summary forms for blank samples;
- R6 - Test reports/summary forms for laboratory control samples (LCSs) including:
 - a. LCS spiking amounts,
 - b. Calculated %R for each analyte, and
 - c. The laboratory's LCS QC limits.
- R7 - Test reports/summary forms for matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a. Samples associated with the MS/MSD clearly identified,
 - b. MS/MSD spiking amounts,
 - c. Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d. Calculated %Rs and relative percent differences, and
 - e. The laboratory's MS/MSD QC limits.
- R8 - Laboratory analytical duplicate (if applicable) recovery and precision:
 - a. The amount of analyte measured in the duplicate,
 - b. The calculated RPD, and,
 - c. The laboratory's QC limits for analytical duplicated.
- R9 - List of method quantitation limits (MQLs) and detectability check sample results for each analyte and
- R10 - Other problems or anomalies.

The exception Report for each "No" or "Not Reviewed (NR) " item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by [X] MDH on 04/12/2011

Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

<u>Name (Printed)</u>	<u>Signature</u>	<u>Official Title (Printed)</u>	<u>Date</u>
Krista Carlson		Project Manager	12/03/2020



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG31-20201111

Project ID: 19119232.440 HWPW

Lab ID: 10539308001

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 15:02

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
TO15 MSV AIR		Analytical Method: TO-15								
Benzene	1.68	1.9		ug/m3	0.55	0.14	11/25/2020 22:41		713135	10AIRJ
Ethylbenzene	50.4	382		ug/m3	44.5	10.0	11/29/2020 12:25		713135	10AIRJ
Naphthalene	1.68	13.5		ug/m3	4.5	2.1	11/25/2020 22:41		713135	10AIRJ
m&p-Xylene	50.4	2730		ug/m3	89.2	20.9	11/29/2020 12:25		713135	10AIRJ
o-Xylene	50.4	615		ug/m3	44.5	11.8	11/29/2020 12:25		713135	10AIRJ



Sample Results

Pace Analytical Services, LLC
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG31-20201111 Cert2551

Project ID: 19119232.440 HWPW

Lab ID: 10539308002

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 15:02

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.098	U	ug/m3	0.32	0.098	11/03/2020 08:39		712277	10AIRI
Ethylbenzene	1	< 0.15	U	ug/m3	0.88	0.15	11/03/2020 08:39		712277	10AIRI
Naphthalene	1	< 1.9	U	ug/m3	2.7	1.9	11/03/2020 08:39		712277	10AIRI
m&p-Xylene	1	< 0.38	U	ug/m3	1.8	0.38	11/03/2020 08:39		712277	10AIRI
o-Xylene	1	< 0.14	U	ug/m3	0.88	0.14	11/03/2020 08:39		712277	10AIRI



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG28-20201111

Project ID: 19119232.440 HWPW

Lab ID: 10539308003

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 15:30

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
TO15 MSV AIR		Analytical Method: TO-15								
Benzene	1.68	1.1		ug/m3	0.55	0.14	11/25/2020 22:05		713135	10AIRJ
Ethylbenzene	1.68	35.2		ug/m3	1.5	0.33	11/25/2020 22:05		713135	10AIRJ
Naphthalene	1.68	10.9		ug/m3	4.5	2.1	11/25/2020 22:05		713135	10AIRJ
m&p-Xylene	1.68	222		ug/m3	3.0	0.70	11/25/2020 22:05		713135	10AIRJ
o-Xylene	1.68	56.0		ug/m3	1.5	0.39	11/25/2020 22:05		713135	10AIRJ



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG28-20201111Cert2613

Project ID: 19119232.440 HWPW

Lab ID: 10539308004

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 15:30

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.098	U	ug/m3	0.32	0.098	11/04/2020 08:05		712277	10AIRD
Ethylbenzene	1	< 0.15	U	ug/m3	0.88	0.15	11/04/2020 08:05		712277	10AIRD
Naphthalene	1	< 1.9	U	ug/m3	2.7	1.9	11/04/2020 08:05		712277	10AIRD
m&p-Xylene	1	< 0.38	U	ug/m3	1.8	0.38	11/04/2020 08:05		712277	10AIRD
o-Xylene	1	< 0.14	U	ug/m3	0.88	0.14	11/04/2020 08:05		712277	10AIRD



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG30-20201111

Project ID: 19119232.440 HWPW

Lab ID: 10539308005

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 13:30

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
TO15 MSV AIR		Analytical Method: TO-15								
Benzene	1.8	0.77		ug/m3	0.58	0.15	11/25/2020 21:30		713135	10AIRJ
Ethylbenzene	1.8	103		ug/m3	1.6	0.36	11/25/2020 21:30		713135	10AIRJ
Naphthalene	1.8	13.2		ug/m3	4.8	2.2	11/25/2020 21:30		713135	10AIRJ
m&p-Xylene	29.34	768		ug/m3	51.9	12.1	11/29/2020 11:55		713135	10AIRJ
o-Xylene	1.8	154		ug/m3	1.6	0.42	11/25/2020 21:30		713135	10AIRJ



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG29-20201111

Project ID: 19119232.440 HWPW

Lab ID: 10539308006

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 14:22

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.68	0.88		ug/m3	0.55	0.14	11/25/2020 20:55		713135	10AIRJ	
Ethylbenzene	1.68	88.3		ug/m3	1.5	0.33	11/25/2020 20:55		713135	10AIRJ	
Naphthalene	1.68	11.4		ug/m3	4.5	2.1	11/25/2020 20:55		713135	10AIRJ	
m&p-Xylene	1.68	456		ug/m3	3.0	0.70	11/25/2020 20:55		713135	10AIRJ	
o-Xylene	1.68	136		ug/m3	1.5	0.39	11/25/2020 20:55		713135	10AIRJ	



Sample Results

Pace Analytical Services, LLC
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG30-20201111Cert2480

Project ID: 19119232.440 HWPW

Lab ID: 10539308007

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 13:30

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification										
Analytical Method: TO-15										
Benzene	1	< 0.098	U	ug/m3	0.32	0.098	11/03/2020 07:06		712277	10AIR7
Ethylbenzene	1	< 0.15	U	ug/m3	0.88	0.15	11/03/2020 07:06		712277	10AIR7
Naphthalene	1	< 1.9	U	ug/m3	2.7	1.9	11/03/2020 07:06		712277	10AIR7
m&p-Xylene	1	< 0.38	U	ug/m3	1.8	0.38	11/03/2020 07:06		712277	10AIR7
o-Xylene	1	< 0.14	U	ug/m3	0.88	0.14	11/03/2020 07:06		712277	10AIR7



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG29-20201111Cert3068

Project ID: 19119232.440 HWPW

Lab ID: 10539308008

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 14:22

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
Individual Can Certification		Analytical Method: TO-15									
Benzene	1	< 0.098	U	ug/m3	0.32	0.098	11/05/2020 09:11		712277	10AIRO	
Ethylbenzene	1	< 0.15	U	ug/m3	0.88	0.15	11/05/2020 09:11		712277	10AIRO	
Naphthalene	1	< 1.9	U	ug/m3	2.7	1.9	11/05/2020 09:11		712277	10AIRO	
m&p-Xylene	1	< 0.38	U	ug/m3	1.8	0.38	11/05/2020 09:11		712277	10AIRO	
o-Xylene	1	< 0.14	U	ug/m3	0.88	0.14	11/05/2020 09:11		712277	10AIRO	



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-DUP-1-20201111

Project ID: 19119232.440 HWPW

Lab ID: 10539308009

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 14:22

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
TO15 MSV AIR		Analytical Method: TO-15								
Benzene	1.68	0.82		ug/m3	0.55	0.14	11/25/2020 20:19		713135	10AIRJ
Ethylbenzene	1.68	83.9		ug/m3	1.5	0.33	11/25/2020 20:19		713135	10AIRJ
Naphthalene	1.68	9.5		ug/m3	4.5	2.1	11/25/2020 20:19		713135	10AIRJ
m&p-Xylene	1.68	441		ug/m3	3.0	0.70	11/25/2020 20:19		713135	10AIRJ
o-Xylene	1.68	130		ug/m3	1.5	0.39	11/25/2020 20:19		713135	10AIRJ



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-DUP-1-20201111Cert3021

Project ID: 19119232.440 HWPW

Lab ID: 10539308010

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 14:22

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.098	U	ug/m3	0.32	0.098	11/03/2020 04:42		712277	10AIR7
Ethylbenzene	1	< 0.15	U	ug/m3	0.88	0.15	11/03/2020 04:42		712277	10AIR7
Naphthalene	1	< 1.9	U	ug/m3	2.7	1.9	11/03/2020 04:42		712277	10AIR7
m&p-Xylene	1	< 0.38	U	ug/m3	1.8	0.38	11/03/2020 04:42		712277	10AIR7
o-Xylene	1	< 0.14	U	ug/m3	0.88	0.14	11/03/2020 04:42		712277	10AIR7



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-AA-1-20201111

Project ID: 19119232.440 HWPW

Lab ID: 10539308011

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 13:40

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.49	0.48	J	ug/m3	0.48	0.13	11/25/2020 19:44		713135	10AIRJ	
Ethylbenzene	1.49	0.31	J	ug/m3	1.3	0.30	11/25/2020 19:44		713135	10AIRJ	
Naphthalene	1.49	2.6	J	ug/m3	4.0	1.8	11/25/2020 19:44		713135	10AIRJ	
m&p-Xylene	1.49	0.89	J	ug/m3	2.6	0.62	11/25/2020 19:44		713135	10AIRJ	
o-Xylene	1.49	< 0.35	U	ug/m3	1.3	0.35	11/25/2020 19:44		713135	10AIRJ	



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-AA-1-20201111Cert3690

Project ID: 19119232.440 HWPW

Lab ID: 10539308012

Moisture: N/A

Pace Project 10539308

Collected: 11/11/2020 13:40

Received 11/13/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
Individual Can Certification		Analytical Method: TO-15									
Benzene	0.5	< 0.049	U	ug/m3	0.16	0.049	11/04/2020 01:13		712277	10AIR7	
Ethylbenzene	0.5	< 0.074	U	ug/m3	0.44	0.074	11/04/2020 01:13		712277	10AIR7	
Naphthalene	0.5	< 0.94	U	ug/m3	1.3	0.94	11/04/2020 01:13		712277	10AIR7	
m&p-Xylene	0.5	< 0.19	U	ug/m3	0.88	0.19	11/04/2020 01:13		712277	10AIR7	
o-Xylene	0.5	< 0.071	U	ug/m3	0.44	0.071	11/04/2020 01:13		712277	10AIR7	



Quality Control

Pace Analytical Services, LLC
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Batch: 713135
Method: TO-15

Pace Project No.: 10539308
Instrument ID: 10AIRJ

Blank: 3807728

Parameters	Dilutio	Quals	Result	Units	MQL	SDL	Analysis Date	Prep Date
Benzene	0.5	U	<0.043	ug/m3	0.16	0.043	11/25/2020 09:12	
Ethylbenzene	0.5	U	<0.099	ug/m3	0.44	0.099	11/25/2020 09:12	
Naphthalene	0.5	U	<0.62	ug/m3	1.3	0.62	11/25/2020 09:12	
m&p-Xylene	0.5	U	<0.21	ug/m3	0.88	0.21	11/25/2020 09:12	
o-Xylene	0.5	U	<0.12	ug/m3	0.44	0.12	11/25/2020 09:12	

Laboratory Control Sample: 3807729

Parameters	Spk Amt	LCS Result	Units	LCS %Rec	% Rec Limits	LCS Quals
Benzene	33.5	34.6	ug/m3	103	70-133	
Ethylbenzene	45.6	55.1	ug/m3	121	70-142	
Naphthalene	57.7	59.0	ug/m3	102	63-130	
m&p-Xylene	91.2	114	ug/m3	125	70-141	
o-Xylene	45.5	54.1	ug/m3	119	70-135	



Unadjusted MQL

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10539308

Analyte	Method	Unadjusted MQL	Reporting Units
Benzene	TO-15	0.33	ug/m3
Ethylbenzene	TO-15	0.88	ug/m3
Naphthalene	TO-15	2.7	ug/m3
m&p-Xylene	TO-15	1.8	ug/m3
o-Xylene	TO-15	0.88	ug/m3



DEFINITIONS

- DF Dilution Factor
- J Estimated concentration above the adjusted method detection limit and below the adjusted reporting
- U Indicates the compound was analyzed for, but not detected.
- SDL Sample Detection Limit
- MQL Method Quantitation Limit
- LCS(D) Laboratory Control Sample (Duplicate)
- MS(D) Matrix Spike (Duplicate)
- DUP Sample Duplicate
- RPD Relative Percent Difference
- TNI The Nelac Institute

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.



Quality Control Data Cross Reference Table

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10539308

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical
10539308002	GS-1620-SG31-20201111	TO-15	712277	
10539308004	GS-1620-SG28-	TO-15	712277	
10539308007	GS-1620-SG30-	TO-15	712277	
10539308008	GS-1620-SG29-	TO-15	712277	
10539308010	GS-1620-DUP-1-	TO-15	712277	
10539308012	GS-1620-AA-1-	TO-15	712277	
10539308001	GS-1620-SG31-20201111	TO-15	713135	
10539308003	GS-1620-SG28-20201111	TO-15	713135	
10539308005	GS-1620-SG30-20201111	TO-15	713135	
10539308006	GS-1620-SG29-20201111	TO-15	713135	
10539308009	GS-1620-DUP-1-20201111	TO-15	713135	
10539308011	GS-1620-AA-1-20201111	TO-15	713135	

TRRP LABORATORY REVIEW CHECKLIST

Laboratory		Pace Analytical Services, LLC	LRC Date:		12/03/2020		
Project Name:		19119232.440 HWPW	Laboratory Job		10539308		
Reviewer		Krista Carlson	Prep Batch Number		See exception report.		
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER # ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?			X		
		Were % moisture (or solids) reported for all soil and sediment samples?			X		
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
		If required for the project, are TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?			X		
		Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?			X		
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?			X		
		Were MS/MSD analyzed at the appropriate frequency?			X		
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
		Were MS/MSD RPDs within laboratory QC limits?			X		
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?			X		
		Were analytical duplicates analyzed at the appropriate frequency?			X		
		Were RPDs or relative standard deviations within the laboratory QC limits?			X		
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices, and methods associated with this laboratory data package?	X				

TRRP LABORATORY REVIEW CHECKLIST

Laboratory	Pace Analytical Services, LLC	LRC Date:	12/03/2020
Project Name:	19119232.440 HWPW	Laboratory Job	10539308
Reviewer	Krista Carlson	Prep Batch Number	See exception report.
<ol style="list-style-type: none">1. Items identified by the letter "R" must be included in the laboratory in the laboratory data package submitted in the TRRP-required reports(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period;2. O = Organic analyses; I = inorganic analyses (and general chemistry, when applicable);3. NA = Not applicable;4. NR = Not reviewed;5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).			

TRRP LABORATORY REVIEW CHECKLIST

Laboratory		Pace Analytical Services, LLC	LRC Date:		12/03/2020		
Project Name:		19119232.440 HWPW	Laboratory Job		10539308		
Reviewer		Krista Carlson	Prep Batch Number		See exception report.		
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER # ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning					
		Was the appropriate compound for the method used for tuning?			X		
		Were ion abundance data within the method-required QC limits?			X		
S4	O	Internal standards (IS)					
		Were IS area counts and retention times within the method-required QC limits?			X		
S5	OI	Raw data (NELAC Section 5.5.10)					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs)					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chapter 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs)					
		Are laboratory SOPs current and on file for each method performed?	X				

- Items identified by the letter "R" must be included in the laboratory in the laboratory data package submitted in the TRRP-required reports(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period;
- O = Organic analyses; I = inorganic analyses (and general chemistry, when applicable);
- NA = Not applicable;
- NR = Not reviewed;
- ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

TRRP LABORATORY REVIEW CHECKLIST

Laboratory	Pace Analytical Services, LLC	LRC Date:	12/03/2020
Project Name:	19119232.440 HWPW	Laboratory Job	10539308
Reviewer	Krista Carlson	Prep Batch Number	712277,713135
ER #¹	Description		
1. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).			

AIR: CHAIN-OF-CUSTODY /
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant



Section A
Required Client Information:
Company: Goldor Associates
Address: 2201 Double Creek Dr
Suite 4004
Email To: Eric Matzner
Phone: 912 615434 Fax:
Requested Due Date/TAT:

Section B
Required Project Information:
Report To: Eric Matzner
Copy To: Michelle
Heemiston
Purchase Order No.:
Project Name: HWOPW
Project Number: 19119232.440

Section C
Invoice Information:
Attention: Kevin Peterbors UPRR
Company Name: Union Pacific Rail
Address: 1400 Douglas St.
Pace Quote Reference:
Pace Project Manager/Sales Rep.
Pace Profile #: 40991

Program
 UST Superfund Emissions Clean Air Act
 Voluntary Clean Up Dry Clean RCRA Other
Location of Sampling by State _____
Reporting Units
kg/m³ _____
ppbv _____ PPMV _____
Other _____
Report Level II. ___ III. ___ IV. ___ Other _____

ITEM #	*Section D Required Client Information AIR SAMPLE ID Sample IDs MUST BE UNIQUE	Valid Media Codes MEDIA CODE TB Tedlar Bag 1L 1 Liter Summa Can 6L 6 Liter Summa Can 6L Low Volume Puff LVP High Volume Puff HVP Other PM10	MEDIA CODE	PID Reading (Client only)	COLLECTED			Canister Pressure (Initial Field - In Hg)	Canister Pressure (Final Field - In Hg)	Summa Can Number	Flow Control Number	Method:
					COMPOSITE START DATE	COMPOSITE END DATE	TIME					
1	<u>GS 1620 - SG 31-20201111</u>		<u>11C</u>		<u>1448</u>	<u>11-20</u>	<u>1502</u>	<u>30</u>	<u>2</u>	<u>255</u>	<u>1347</u>	<u>PM10</u>
2	<u>SG 28</u>				<u>1518</u>		<u>1530</u>	<u>26</u>	<u>2</u>	<u>261</u>	<u>1287</u>	<u>TO-15 Full List VOCs</u>
3	<u>SG 30</u>				<u>1515</u>		<u>1530</u>	<u>24.5</u>	<u>2</u>	<u>248</u>	<u>01468</u>	<u>TO-15 Short List BTEX</u>
4	<u>SG 29</u>				<u>1355</u>		<u>1422</u>	<u>26</u>	<u>1.5</u>	<u>306</u>	<u>8655</u>	<u>TO-15 Short List Chlordane</u>
5	<u>Dup-1</u>				<u>1355</u>		<u>1422</u>	<u>26</u>	<u>1.5</u>	<u>306</u>	<u>80655</u>	<u>TO-15 Short List BTEX</u>
6	<u>AA-4</u>		<u>6LL</u>		<u>1230</u>		<u>1340</u>	<u>24.5</u>	<u>2</u>	<u>369</u>	<u>01314</u>	<u>TO-15 Short List BTEX</u>
7												<u>TO-15 Short List BTEX</u>
8												<u>TO-15 Short List BTEX</u>
9												<u>TO-15 Short List BTEX</u>
10												<u>TO-15 Short List BTEX</u>
11												<u>TO-15 Short List BTEX</u>
12												<u>TO-15 Short List BTEX</u>

Comments:

RELINQUISHED BY / AFFILIATION: Eric Matzner DATE: 11-20 TIME: 1600

ACCEPTED BY / AFFILIATION: Kevin Peterbors DATE: 11/20/20 TIME: 10:00

SAMPLER NAME AND SIGNATURE: Anthony Reid DATE SIGNED (MM/DD/YY): 11-11-20

PRINT Name of SAMPLER: _____
SIGNATURE OF SAMPLER: _____

Temp in °C: _____
Received on Ice: _____
Custody Sealed Cooler: _____
Samples Intact: _____

ORIGINAL



Document Name:
Sample Condition Upon Receipt (SCUR) - Air
 Document No.:
ENV-FRM-MIN4-0113 Rev. 1

Document Revised: 24Mar2020
Page 1 of 1
 Pace Analytical Services -
 Minneapolis

WO# : 10539308

PM: KAC
 CLIENT: UPRR_Golder
 Due Date: 11/20/20

**Air Sample Condition
 Upon Receipt**

Client Name: Golder

Project #:

Courier: Fed Ex UPS USPS Client
 Pace Speedee Commercial See Exception

Tracking Number: 1723 2547 2931

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Tin Can Other: _____ Temp Blank rec: Yes No

Temp. (TO17 and TO13 samples only) (°C): _____ Corrected Temp (°C): _____ Thermometer Used: G87A9170600254 G87A9155100842

Temp should be above freezing to 6°C Correction Factor: _____ Date & Initials of Person Examining Contents: RG 11/14/20

Type of ice Received Blue Wet None

Comments:

Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	3.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
Correct Containers Used? (Tedlar bags not acceptable container for TO-14, TO-15 or APH) -Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
Containers Intact? (visual inspection/no leaks when pressurized)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Media: <u>Air Can</u> Airbag Filter TDT Passive		11. Individually Certified Cans <u>Y</u> N (list which samples)
Is sufficient information available to reconcile samples to the COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12.
Do cans need to be pressurized? (DO NOT PRESSURIZE 3C or ASTM 1946!!!)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	13.

Gauge # 10AIR26 10AIR34 10AIR35 4097

Canisters					Canisters				
Sample Number	Can ID	Flow Controller	Initial Pressure	Final Pressure	Sample Number	Can ID	Flow Controller	Initial Pressure	Final Pressure
31	2551	1347	0	+10					
28	2613	1287	0						
30	2480	1468	-2						
29	3068	655	0						
Dup	3021		0						
AA	3090	1314	-3	+5					
unusual	2523	1339	-27						

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: K. C. [Signature]

Date: 11/16/2020

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)



Memorandum

March 27, 2020

To: Eric Matzner Ref. No.: 11183954-1620

From: ^{CK} Chris G. Knight/eew/577-NF Tel: 512-506-8803

cc: Jesse Orth, Jon Lang; Julie Lidstone

**Subject: Data Usability Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
February 2020**

1. Scope of Data Usability Study

This document details a Data Usability Summary (DUS) of analytical results for soil gas samples collected in support of the Soil Gas Sampling Event at the Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works site during February 2020. Samples were submitted to Pace Analytical Services, Inc., located in Minneapolis, Minnesota and are reported in data packages 10509381 and 10510405. The intended use of the data is to support the Soil Gas Sampling Event at the site by providing current concentration of chemicals of concern.

Data were reviewed and validated by Chris G. Knight of GHD, in accordance with Title 30 of the Texas Administrative Code Section 350.54 (30 TAC 350.54) as described in the Texas Commission on Environmental Quality (TCEQ) Regulatory Guidance document entitled "Review and Reporting of COC Concentration Data under TRRP", (RG-366/TRRP-13), revised May 2010, herein referred to as "TRRP-13 Guidance". Evaluation of the data was based on information obtained from the chain of custody forms, the finished report forms, method blank data, recovery data from laboratory control samples (LCS)/ duplicate analyses (DUP), field quality assurance/quality control samples (QA/QC), the laboratory review checklists (LRC), and the laboratory exception reports (ER).

A sample collection and analysis summary is presented in Table 1. This summary provides a cross-reference of field sample identification numbers and location identification. Each sample is assigned a unique field identification number.

The validated sample results are presented in Table 2. A summary of the analytical methodology is presented in Table 3.



2. Laboratory Qualifications

The Laboratory's quality assurance program is consistent with the quality standards outlined in the National Environmental Laboratory Accreditation Program (NELAP). This laboratory was accredited under Texas Certification number # TX104704192 at the time the analysis was performed and the certificate is included in Attachment A.

3. Project Objectives

3.1 Sampling/Analytical QA/QC Objectives

The QA/QC program was designed to identify contamination resulting from the sampling, sample transport and analytical process through the analysis of field duplicate sample sets and method blanks. The QA/QC program was designed to evaluate the quality of the resulting data with respect to bias and precision through analysis of LCS and duplicate analyses.

4. Data Review/Validation Results

4.1 Sample Holding Time

Samples were shipped with a chain of custody and the paper work was filled out properly.

The sample chain of custody documents and the analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

4.2 Sample Containers

All sample canisters were received at the laboratory in good condition and within acceptable canister pressure range of -1 inch of mercury (Hg) to -10 inches of Hg, indicating samples were still under vacuum upon receipt.

4.3 Calibrations

According to the LRC, initial calibration and continuing calibration data met the criteria for the selected method.

4.4 Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures. As these were not discrete samples handled in the field, these blanks are not listed on the sample identification cross-reference list found in the data packages.

For this study, laboratory method blanks were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch and results are reported in the laboratory data packages.



The method blank results were non-detect or below the method quantitation limit (MQL), indicating that laboratory contamination was not a factor for this investigation with the following exception (see Table 4):

- i) One method blank yielded a low level detection for naphthalene. Associated non-detect sample results were not affected. No further action was required. Associated sample results with similar detections to the method blank were qualified as non-detect.

4.5 Laboratory Control Sample Analysis

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The recovery ranges established by the laboratory are adopted as the acceptance criteria for the project.

For this study, LCS were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch.

The LCS contained all compounds specified in the method. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

4.6 Duplicate Sample Analyses

Analytical precision is evaluated based on the analysis of laboratory duplicate samples. For this study, a duplicate analysis was prepared and analyzed by the laboratory as specified in Table 1. The relative percent differences (RPD) established by the laboratory are adopted as the acceptance criteria for the project.

The duplicate analysis performed was acceptable, demonstrating acceptable analytical precision.

The laboratory also performed an additional duplicate analysis on a non-site sample. This cannot be used to assess precision for the site samples.

4.7 Field QA/QC Samples

The field QA/QC consisted of two field duplicate sample sets.

To assess the analytical and sampling protocol precision, two field duplicate sample sets were collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than fifty percent for soil samples. The RPDs are only used when sample concentrations are above the estimated regions of detection.

Field duplicate summary data are presented in Table 2. All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision.

4.8 Field Procedures

Golder Associates, Inc. collected soil gas samples in accordance with their Standard Operating Procedures (SOP) for sample collection.



4.9 Analyte Reporting

The laboratory reported detected results for each analyte down to the sample detection limit (SDL), which is defined as the method detection limit (MDL) with sample-specific adjustments for dilutions, aliquot size, volumes, etc. Positive analyte detections less than the MQL but greater than the SDL were qualified as estimated (J) in Table 2 unless qualified elsewhere in this memorandum.

The detectability check standard (DCS) results supported the laboratory MDLs.

5. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are usable for the purpose of supporting the Soil Gas Sampling Event at the site by providing current concentration of chemicals of concern in soil gas samples with the specific qualifications noted herein.

Table 1

Sample Collection and Analysis Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
February 2020

Work Order	Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	<u>Analysis/Parameters</u>		Comments
						VOCs		
10509381	GS-1620-SG-22-20200219	SG22	Soil Gas	02/19/2020	08:24	X		
	GS-1620-SG-22-20200219 CERT#31	SG22	Soil Gas	02/19/2020	08:24	X		
	GS-1620-DUP-1-20200219	SG21	Soil Gas	02/19/2020	08:30	X		Field duplicate of SG-21
	GS-1620-DUP-1-20200219 CERT#24	SG21	Soil Gas	02/19/2020	08:30	X		
	GS-1620-SG-21-20200219	SG21	Soil Gas	02/19/2020	08:40	X		
	GS-1620-SG-21-20200219 CERT#20	SG21	Soil Gas	02/19/2020	08:40	X		
	GS-1620-SG-18-20200219	SG18	Soil Gas	02/19/2020	09:16	X		
	GS-1620-SG-18-20200219 CERT#25	SG18	Soil Gas	02/19/2020	09:16	X		
	GS-1620-AA-1-20200219	AA01	Soil Gas	02/19/2020	09:50	X		
	GS-1620-AA-1-20200219 CERT#008	AA01	Soil Gas	02/19/2020	09:50	X		
	GS-1620-SG-11-20200219	SG11	Soil Gas	02/19/2020	10:07	X		
	GS-1620-SG-11-20200219 CERT#30	SG11	Soil Gas	02/19/2020	10:07	X		
	GS-1620-SG-10-20200219	SG10	Soil Gas	02/19/2020	10:22	X		
	GS-1620-SG-10-20200219 CERT#29	SG10	Soil Gas	02/19/2020	10:22	X		
	GS-1620-SG-8-20200219	SG08	Soil Gas	02/19/2020	10:44	X		
	GS-1620-SG-8-20200219 CERT#328	SG08	Soil Gas	02/19/2020	10:44	X		
GS-1620-HE-1-20200219	HE01	Soil Gas	02/19/2020	11:10	X			
GS-1620-HE-1-20200219 CERT#251	HE01	Soil Gas	02/19/2020	11:10	X			

Table 1

Sample Collection and Analysis Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
February 2020

Work Order	Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	<u>Analysis/Parameters</u>		Comments
						VOCs		
10510405	GS-1620-SG20-20200227	SG20	Soil Gas	02/27/2020	09:23	X		
	GS-1620-SG20-20200227Cert#1329	SG20	Soil Gas	02/27/2020	09:23	X		
	GS-1620-SG19-20200227	SG19	Soil Gas	02/27/2020	09:45	X		
	GS-1620-SG19-20200227Cert#2897	SG19	Soil Gas	02/27/2020	09:45	X		
	AA-1620-AA-2-20200227	AA02	Soil Gas	02/27/2020	09:49	X		DUP
	AA-1620-AA-2-20200227Cert#2829	AA02	Soil Gas	02/27/2020	09:49	X		
	GS-1620-SG17-20200227	SG17	Soil Gas	02/27/2020	10:11	X		
	GS-1620-SG17-20200227Cert#2597	SG17	Soil Gas	02/27/2020	10:11	X		
	GS-1620-SG16-20200227	SG16	Soil Gas	02/27/2020	10:49	X		
	GS-1620-DUP-2-20200227	SG16	Soil Gas	02/27/2020	10:49	X		Field duplicate of SG16
	GS-1620-SG16-20200227Cert#2922	SG16	Soil Gas	02/27/2020	10:49	X		
	GS-1620-DUP2-20200227Cert#0882	SG16	Soil Gas	02/27/2020	10:49	X		
	GS-1620-SG15-20200227	SG15	Soil Gas	02/27/2020	11:20	X		
	GS-1620-SG15-20200227Cert#2937	SG15	Soil Gas	02/27/2020	11:20	X		
	GS-1620-SG14-20200227	SG14	Soil Gas	02/27/2020	11:39	X		
	GS-1620-SG14-20200227Cert#3239	SG14	Soil Gas	02/27/2020	11:39	X		
	GS-1620-SG12-20200227	SG12	Soil Gas	02/27/2020	12:21	X		
GS-1620-SG12-20200227Cert#3264	SG12	Soil Gas	02/27/2020	12:27	X			

Notes:

VOCs - Volatile Organic Compounds
DUP - Laboratory Duplicate

Table 2

**Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
February 2020**

Location ID:	AA01	AA01	AA02	AA02	HE01
Sample Name:	GS-1620-AA-1-20200219	GS-1620-AA-1-20200219 CERT#008	AA-1620-AA-2-20200227	AA-1620-AA-2-20200227 Cert#2829	GS-1620-HE-1-20200219
Sample Date:	02/19/2020	02/19/2020	02/27/2020	02/27/2020	02/19/2020

Parameters	Unit					
Volatile Organic Compounds						
Benzene	µg/m3	0.73	<0.076	1.1	<0.076	5.6
Ethylbenzene	µg/m3	<0.38	<0.15	<0.37	<0.15	3.8
m&p-Xylenes	µg/m3	<0.88	<0.35	0.99 J	<0.35	22.0
Naphthalene	µg/m3	<1.7	<0.66	<1.6	<0.66	<1.3
o-Xylene	µg/m3	<0.43	<0.17	<0.42	<0.17	21.2

Table 2

**Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
February 2020**

	Location ID:	HE01	SG08	SG08	SG10	SG10
	Sample Name:	GS-1620-HE-1-20200219 CERT#251	GS-1620-SG-8-20200219	GS-1620-SG-8-20200219 CERT#328	GS-1620-SG-10-20200219	GS-1620-SG-10-20200219 CERT#29
	Sample Date:	02/19/2020	02/19/2020	02/19/2020	02/19/2020	02/19/2020
Parameters	Unit					
Volatile Organic Compounds						
Benzene	µg/m3	<0.15	0.31 J	<0.15	<0.26	<0.15
Ethylbenzene	µg/m3	<0.30	0.63 J	<0.30	0.54 J	<0.30
m&p-Xylenes	µg/m3	<0.70	2.4 J	<0.70	2.1 J	<0.70
Naphthalene	µg/m3	<1.3	<2.3	<1.3	<2.2	<1.3
o-Xylene	µg/m3	<0.34	0.81 J	<0.34	0.69 J	<0.34

Table 2

**Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
February 2020**

	Location ID:	SG11	SG11	SG12	SG12	SG14
	Sample Name:	GS-1620-SG-11-20200219	GS-1620-SG-11-20200219 CERT#30	GS-1620-SG12-20200227	GS-1620-SG12-20200227Cert#3264	GS-1620-SG14-20200227
	Sample Date:	02/19/2020	02/19/2020	02/27/2020	02/27/2020	02/27/2020
Parameters	Unit					
Volatile Organic Compounds						
Benzene	µg/m3	0.87	<0.15	0.28 J	<0.15	<0.27
Ethylbenzene	µg/m3	5.1	<0.30	<0.54	<0.30	<0.54
m&p-Xylenes	µg/m3	13.1	<0.70	1.3 J	<0.70	<1.2
Naphthalene	µg/m3	3.8 J	<1.3	<3.1	<1.3	<2.3
o-Xylene	µg/m3	7.6	<0.34	<0.61	<0.34	<0.61

Table 2

**Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
February 2020**

	Location ID:	SG14	SG15	SG15	SG16	SG16
	Sample Name:	GS-1620-SG14-20200227Cert#3239	GS-1620-SG15-20200227	GS-1620-SG15-20200227Cert#2937	GS-1620-SG16-20200227	GS-1620-SG16-20200227Cert#2922
	Sample Date:	02/27/2020	02/27/2020	02/27/2020	02/27/2020	02/27/2020
Parameters	Unit					
Volatile Organic Compounds						
Benzene	µg/m3	<0.15	<0.26	<0.15	<0.26	<0.15
Ethylbenzene	µg/m3	<0.30	<0.51	<0.30	13.4	<0.30
m&p-Xylenes	µg/m3	<0.70	<1.2	<0.70	46.9	<0.70
Naphthalene	µg/m3	<1.3	<3.4	<1.3	<3.1	<1.3
o-Xylene	µg/m3	<0.34	<0.58	<0.34	20.9	<0.34

Table 2

**Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
February 2020**

	Location ID:	SG16	SG16	SG17	SG17	SG18
	Sample Name:	GS-1620-DUP-2-20200227	GS-1620-DUP2-20200227Cert#0882	GS-1620-SG17-20200227	GS-1620-SG17-20200227Cert#2597	GS-1620-SG-18-20200219
	Sample Date:	02/27/2020 Duplicate	02/27/2020	02/27/2020	02/27/2020	02/19/2020
Parameters	Unit					
Volatile Organic Compounds						
Benzene	µg/m3	0.58	<0.15	0.25 J	<0.15	1.0
Ethylbenzene	µg/m3	14.0	<0.30	<0.48	<0.30	3.9
m&p-Xylenes	µg/m3	50.6	<0.70	1.1 J	<0.70	8.0
Naphthalene	µg/m3	<3.2	<1.3	<3.0	<1.3	<2.2
o-Xylene	µg/m3	21.5	<0.34	<0.54	<0.34	3.7

Table 2

**Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
February 2020**

Location ID:	SG18	SG19	SG19	SG20
Sample Name:	GS-1620-SG-18-20200219 CERT#25	GS-1620-SG19-20200227	GS-1620-SG19-20200227Cert#2897	GS-1620-SG20-20200227
Sample Date:	02/19/2020	02/27/2020	02/27/2020	02/27/2020

Parameters	Unit				
Volatile Organic Compounds					
Benzene	µg/m3	<0.15	0.46 J	<0.15	0.27 J
Ethylbenzene	µg/m3	<0.30	<0.51	<0.30	<0.53
m&p-Xylenes	µg/m3	<0.70	1.6 J	<0.70	1.7 J
Naphthalene	µg/m3	<1.3	<3.5	<1.3	<3.1
o-Xylene	µg/m3	<0.34	0.91 J	<0.34	<0.60

Table 2
Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
February 2020

	Location ID: Sample Name: Sample Date:	SG20 GS-1620-SG20-20200227Cert#1329 02/27/2020	SG21 GS-1620-SG-21-20200219 02/19/2020	SG21 GS-1620-SG-21-20200219 CERT#20 02/19/2020	SG21 GS-1620-DUP-1-20200219 02/19/2020 Duplicate
Parameters	Unit				
Volatile Organic Compounds					
Benzene	µg/m3	0.21 J	<0.26	<0.15	<0.26
Ethylbenzene	µg/m3	<0.30	<0.51	<0.30	<0.51
m&p-Xylenes	µg/m3	<0.70	<1.2	<0.70	<1.2
Naphthalene	µg/m3	<1.3	<2.2	<1.3	<2.2
o-Xylyne	µg/m3	<0.34	<0.58	<0.34	<0.58

Table 2

**Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
February 2020**

Location ID:	SG21	SG22	SG22
Sample Name:	GS-1620-DUP-1-20200219 CERT#24	GS-1620-SG-22-20200219	GS-1620-SG-22-20200219 CERT#31
Sample Date:	02/19/2020	02/19/2020	02/19/2020

Parameters	Unit			
Volatile Organic Compounds				
Benzene	µg/m3	<0.15	<0.26	<0.15
Ethylbenzene	µg/m3	<0.30	0.82 J	<0.30
m&p-Xylenes	µg/m3	<0.70	2.5 J	<0.70
Naphthalene	µg/m3	<1.3	<2.2	<1.3
o-Xylene	µg/m3	<0.34	0.81 J	<0.34

Notes:

- < - Not detected at the associated reporting limit
- J - Estimated concentration

Table 3

Analytical Methods
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
February 2020

Parameter	Method	Matrix	Holding Time Collection to Analysis (Days)
VOCs	TO-15 ⁽¹⁾	Soil Gas	30

Notes:

VOCs - Volatile Organic Compounds

Method References:

⁽¹⁾ - Referenced from "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air", January 1999

Table 4

**Qualified Sample Results Due to Analyte Concentrations in the Method Blank
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
February 2020**

Parameter	Analyte	Analysis Date (mm/dd/yyyy)	Blank Result	Sample ID	Original Result	Qualified Result	Units
VOCs	Naphthalene	03/08/2020	1.7 J	GS-1620-SG12-20200227	3.1 J	<3.1	µg/m3
				GS-1620-SG15-20200227	3.4 J	<3.4	µg/m3
				GS-1620-SG16-20200227	3.1 J	<3.1	µg/m3
				GS-1620-DUP-2-20200227	3.2 J	<3.2	µg/m3
				GS-1620-SG17-20200227	3.0 J	<3.0	µg/m3
				GS-1620-SG19-20200227	3.5 J	<3.5	µg/m3
				GS-1620-SG20-20200227	3.1 J	<3.1	µg/m3

Notes:

VOCs - Volatile Organic Compounds

J - Estimated concentration

< - Not detected at the associated reporting limit

Attachment A

Laboratory NELAP Certificate



Texas Commission on Environmental Quality

NELAP-Recognized Laboratory Accreditation is hereby awarded to



Pace Analytical Services, LLC - Minneapolis MN

**1700 Elm Street SE Suite 200
Minneapolis, MN 55414-2485**

in accordance with Texas Water Code Chapter 5, Subchapter R, Title 30 Texas Administrative Code Chapter 25, and the National Environmental Laboratory Accreditation Program.

The laboratory's scope of accreditation includes the fields of accreditation that accompany this certificate. Continued accreditation depends upon successful ongoing participation in the program. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current location(s) and accreditation status for particular methods and analyses (www.tceq.texas.gov/goto/lab). Accreditation does not imply that a product, process, system or person is approved by the Texas Commission on Environmental Quality.

Certificate Number: T104704192-20-15
Effective Date: 3/1/2020
Expiration Date: 2/28/2021


Executive Director Texas Commission on
Environmental Quality



Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

March 13, 2020

Michelle Hermiston
Golder
2201 Double Creek Dr
Suite 4004
Round Rock, TX 78664

RE: Pace Project 10509381
Project ID: Houston TX-Wood: 1620-01-Rev1

Dear Michelle Hermiston:

Enclosed are the analytical results for sample(s) received by the laboratory on February 21, 2020. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

This report was revised on March, 13, 2020 to create TRRP report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Nathan Boberg
nathan.boberg@pacelabs.com
(612)360-0728

Laboratory Certifications

Pace Analytical Minnesota : Texas Certification #: T104704192



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

03/13/2020 11:19:06



Sample Cross Reference

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10509381

Client: UPRR Golder
Project ID: Houston TX-Wood: 1620-01-Rev1

Client Sample ID	Lab ID	Matrix	Collection Date/Time	Received Date/Time
GS-1620-SG-8-20200219	10509381001	Air	02/19/2020 10:44	02/21/2020 10:00
GS-1620-SG-8-20200219 CERT#328	10509381002	Air	02/19/2020 10:44	02/21/2020 10:00
GS-1620-SG-10-20200219	10509381003	Air	02/19/2020 10:22	02/21/2020 10:00
GS-1620-SG-10-20200219 CERT#29	10509381004	Air	02/19/2020 10:22	02/21/2020 10:00
GS-1620-SG-11-20200219	10509381005	Air	02/19/2020 10:07	02/21/2020 10:00
GS-1620-SG-11-20200219 CERT#30	10509381006	Air	02/19/2020 10:07	02/21/2020 10:00
GS-1620-SG-18-20200219	10509381007	Air	02/19/2020 09:16	02/21/2020 10:00
GS-1620-SG-18-20200219 CERT#25	10509381008	Air	02/19/2020 09:16	02/21/2020 10:00
GS-1620-SG-21-20200219	10509381009	Air	02/19/2020 08:40	02/21/2020 10:00
GS-1620-SG-21-20200219 CERT#20	10509381010	Air	02/19/2020 08:40	02/21/2020 10:00
GS-1620-SG-22-20200219	10509381011	Air	02/19/2020 08:24	02/21/2020 10:00
GS-1620-SG-22-20200219 CERT#31	10509381012	Air	02/19/2020 08:24	02/21/2020 10:00
GS-1620-AA-1-20200219	10509381013	Air	02/19/2020 09:50	02/21/2020 10:00
GS-1620-AA-1-20200219 CERT#008	10509381014	Air	02/19/2020 09:50	02/21/2020 10:00
GS-1620-HE-1-20200219	10509381015	Air	02/19/2020 11:10	02/21/2020 10:00
GS-1620-HE-1-20200219 CERT#251	10509381016	Air	02/19/2020 11:10	02/21/2020 10:00
GS-1620-DUP-1-20200219	10509381017	Air	02/19/2020 08:30	02/21/2020 10:00
GS-1620-DUP-1-20200219 CERT#24	10509381018	Air	02/19/2020 08:30	02/21/2020 10:00



Project Narrative

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10509381

Holding Times:

All holding times were met.

Blanks:

All blank results were below reporting limits.

Laboratory Control Samples:

All LCS recoveries were within QC limits.

Matrix Spikes and Duplicates:

All MS or MSD recoveries were within QC limits.

Surrogate:

All surrogate recoveries were within QC limits.

Appendix A
LABORATORY DATA PACKAGE COVER PAGE

This data package is for Job No. 10509381 and consists of:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 - Field chain-of-custody documentation;
- R2 - Sample identification cross-reference;
- R3 - Test reports (analytical data sheets) for each environmental sample that includes:
 - a. Items consistent with NELAC Chapter 5,
 - b. Dilution factors,
 - c. Preparation methods,
 - d. Cleanup methods, and
 - e. If required for the project, tentatively identified compounds (TICs).
- R4 - Surrogate recovery data including:
 - a. Calculated recovery (%R), and
 - b. The laboratory's surrogate QC limits.
- R5 - Test reports/summary forms for blank samples;
- R6 - Test reports/summary forms for laboratory control samples (LCSs) including:
 - a. LCS spiking amounts,
 - b. Calculated %R for each analyte, and
 - c. The laboratory's LCS QC limits.
- R7 - Test reports/summary forms for matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a. Samples associated with the MS/MSD clearly identified,
 - b. MS/MSD spiking amounts,
 - c. Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d. Calculated %Rs and relative percent differences, and
 - e. The laboratory's MS/MSD QC limits.
- R8 - Laboratory analytical duplicate (if applicable) recovery and precision:
 - a. The amount of analyte measured in the duplicate,
 - b. The calculated RPD, and,
 - c. The laboratory's QC limits for analytical duplicated.
- R9 - List of method quantitation limits (MQLs) and detectability check sample results for each analyte and
- R10 - Other problems or anomalies.

The exception Report for each "No" or "Not Reviewed (NR) " item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by [X] MDH on 04/12/2011

Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name (Printed)
Nathan Boberg

Signature

Official Title (Printed)
Project Manager

Date
03/13/2020



Sample Results

Pace Analytical Services, Inc.
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-8-20200219

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381001

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 10:44

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.74	0.31	J	ug/m3	0.57	0.27	02/22/2020 02:27		661381	10AIRD	
Ethylbenzene	1.74	0.63	J	ug/m3	1.5	0.53	02/22/2020 02:27		661381	10AIRD	
Naphthalene	1.74 < 2.3		U	ug/m3	4.6	2.3	02/22/2020 02:27		661381	10AIRD	
m&p-Xylene	1.74	2.4	J	ug/m3	3.1	1.2	02/22/2020 02:27		661381	10AIRD	
o-Xylene	1.74	0.81	J	ug/m3	1.5	0.60	02/22/2020 02:27		661381	10AIRD	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-8-20200219 CERT#328

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381002

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 10:44

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/15/2020 17:12		662198	10AIRI
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/15/2020 17:12		662198	10AIRI
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/15/2020 17:12		662198	10AIRI
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/15/2020 17:12		662198	10AIRI
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/15/2020 17:12		662198	10AIRI



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-10-20200219

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381003

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 10:22

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MLL	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.68	< 0.26	U	ug/m3	0.55	0.26	02/22/2020 00:04		661381	10AIRD	
Ethylbenzene	1.68	0.54	J	ug/m3	1.5	0.51	02/22/2020 00:04		661381	10AIRD	
Naphthalene	1.68	< 2.2	U	ug/m3	4.5	2.2	02/22/2020 00:04		661381	10AIRD	
m&p-Xylene	1.68	2.1	J	ug/m3	3.0	1.2	02/22/2020 00:04		661381	10AIRD	
o-Xylene	1.68	0.69	J	ug/m3	1.5	0.58	02/22/2020 00:04		661381	10AIRD	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-10-20200219 CERT#29

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381004

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 10:22

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
Individual Can Certification		Analytical Method: TO-15									
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/15/2020 23:46		662198	10AIRI	
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/15/2020 23:46		662198	10AIRI	
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/15/2020 23:46		662198	10AIRI	
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/15/2020 23:46		662198	10AIRI	
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/15/2020 23:46		662198	10AIRI	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-11-20200219

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381005

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 10:07

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.74	0.87		ug/m3	0.57	0.27	02/22/2020 01:59		661381	10AIRD	
Ethylbenzene	1.74	5.1		ug/m3	1.5	0.53	02/22/2020 01:59		661381	10AIRD	
Naphthalene	1.74	3.8	J	ug/m3	4.6	2.3	02/22/2020 01:59		661381	10AIRD	
m&p-Xylene	1.74	13.1		ug/m3	3.1	1.2	02/22/2020 01:59		661381	10AIRD	
o-Xylene	1.74	7.6		ug/m3	1.5	0.60	02/22/2020 01:59		661381	10AIRD	



Sample Results

Pace Analytical Services, Inc.
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-11-20200219 CERT#30

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381006

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 10:07

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/17/2020 20:50		662198	10AIRO
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/17/2020 20:50		662198	10AIRO
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/17/2020 20:50		662198	10AIRO
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/17/2020 20:50		662198	10AIRO
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/17/2020 20:50		662198	10AIRO



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-18-20200219

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381007

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 09:16

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MLL	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.68	1.0		ug/m3	0.55	0.26	02/22/2020 02:56		661381	10AIRD	
Ethylbenzene	1.68	3.9		ug/m3	1.5	0.51	02/22/2020 02:56		661381	10AIRD	
Naphthalene	1.68 < 2.2		U	ug/m3	4.5	2.2	02/22/2020 02:56		661381	10AIRD	
m&p-Xylene	1.68	8.0		ug/m3	3.0	1.2	02/22/2020 02:56		661381	10AIRD	
o-Xylene	1.68	3.7		ug/m3	1.5	0.58	02/22/2020 02:56		661381	10AIRD	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-18-20200219 CERT#25

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381008

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 09:16

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
Individual Can Certification		Analytical Method: TO-15									
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/17/2020 19:25		662198	10AIRO	
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/17/2020 19:25		662198	10AIRO	
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/17/2020 19:25		662198	10AIRO	
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/17/2020 19:25		662198	10AIRO	
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/17/2020 19:25		662198	10AIRO	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-21-20200219

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381009

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 08:40

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MLL	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.68	< 0.26	U	ug/m3	0.55	0.26	02/22/2020 01:01		661381	10AIRD	
Ethylbenzene	1.68	< 0.51	U	ug/m3	1.5	0.51	02/22/2020 01:01		661381	10AIRD	
Naphthalene	1.68	< 2.2	U	ug/m3	4.5	2.2	02/22/2020 01:01		661381	10AIRD	
m&p-Xylene	1.68	< 1.2	U	ug/m3	3.0	1.2	02/22/2020 01:01		661381	10AIRD	
o-Xylene	1.68	< 0.58	U	ug/m3	1.5	0.58	02/22/2020 01:01		661381	10AIRD	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-21-20200219 CERT#20

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381010

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 08:40

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/18/2020 01:09		662198	10AIRO
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/18/2020 01:09		662198	10AIRO
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/18/2020 01:09		662198	10AIRO
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/18/2020 01:09		662198	10AIRO
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/18/2020 01:09		662198	10AIRO



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-22-20200219

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381011

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 08:24

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
TO15 MSV AIR		Analytical Method: TO-15								
Benzene	1.68	< 0.26	U	ug/m3	0.55	0.26	02/22/2020 01:30		661381	10AIRD
Ethylbenzene	1.68	0.82	J	ug/m3	1.5	0.51	02/22/2020 01:30		661381	10AIRD
Naphthalene	1.68	< 2.2	U	ug/m3	4.5	2.2	02/22/2020 01:30		661381	10AIRD
m&p-Xylene	1.68	2.5	J	ug/m3	3.0	1.2	02/22/2020 01:30		661381	10AIRD
o-Xylene	1.68	0.81	J	ug/m3	1.5	0.58	02/22/2020 01:30		661381	10AIRD



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG-22-20200219 CERT#31

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381012

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 08:24

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/24/2020 01:11		662198	10AIR7
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/24/2020 01:11		662198	10AIR7
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/24/2020 01:11		662198	10AIR7
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/24/2020 01:11		662198	10AIR7
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/24/2020 01:11		662198	10AIR7



Sample Results

Pace Analytical Services, Inc.
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-AA-1-20200219

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381013

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 09:50

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.26	0.73		ug/m3	0.41	0.19	02/21/2020 23:08		661381	10AIRD	
Ethylbenzene	1.26	< 0.38	U	ug/m3	1.1	0.38	02/21/2020 23:08		661381	10AIRD	
Naphthalene	1.26	< 1.7	U	ug/m3	3.4	1.7	02/21/2020 23:08		661381	10AIRD	
m&p-Xylene	1.26	< 0.88	U	ug/m3	2.2	0.88	02/21/2020 23:08		661381	10AIRD	
o-Xylene	1.26	< 0.43	U	ug/m3	1.1	0.43	02/21/2020 23:08		661381	10AIRD	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-AA-1-20200219 CERT#008

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381014

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 09:50

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	0.5	< 0.076	U	ug/m3	0.16	0.076	01/22/2020 09:47		662198	10AIRI
Ethylbenzene	0.5	< 0.15	U	ug/m3	0.44	0.15	01/22/2020 09:47		662198	10AIRI
Naphthalene	0.5	< 0.66	U	ug/m3	1.3	0.66	01/22/2020 09:47		662198	10AIRI
m&p-Xylene	0.5	< 0.35	U	ug/m3	0.88	0.35	01/22/2020 09:47		662198	10AIRI
o-Xylene	0.5	< 0.17	U	ug/m3	0.44	0.17	01/22/2020 09:47		662198	10AIRI



Sample Results

Pace Analytical Services, Inc.
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-HE-1-20200219

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381015

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 11:10

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1	5.6		ug/m3	0.32	0.15	02/21/2020 23:36		661381	10AIRD	
Ethylbenzene	1	3.8		ug/m3	0.88	0.30	02/21/2020 23:36		661381	10AIRD	
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	02/21/2020 23:36		661381	10AIRD	
m&p-Xylene	1	22.0		ug/m3	1.8	0.70	02/21/2020 23:36		661381	10AIRD	
o-Xylene	1	21.2		ug/m3	0.88	0.34	02/21/2020 23:36		661381	10AIRD	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-HE-1-20200219 CERT#251

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381016

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 11:10

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/17/2020 22:45		662198	10AIRO
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/17/2020 22:45		662198	10AIRO
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/17/2020 22:45		662198	10AIRO
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/17/2020 22:45		662198	10AIRO
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/17/2020 22:45		662198	10AIRO



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-DUP-1-20200219

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381017

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 08:30

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	MLL	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.68	< 0.26	U	ug/m3	0.55	0.26	02/22/2020 00:33		661381	10AIRD	
Ethylbenzene	1.68	< 0.51	U	ug/m3	1.5	0.51	02/22/2020 00:33		661381	10AIRD	
Naphthalene	1.68	< 2.2	U	ug/m3	4.5	2.2	02/22/2020 00:33		661381	10AIRD	
m&p-Xylene	1.68	< 1.2	U	ug/m3	3.0	1.2	02/22/2020 00:33		661381	10AIRD	
o-Xylene	1.68	< 0.58	U	ug/m3	1.5	0.58	02/22/2020 00:33		661381	10AIRD	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-DUP-1-20200219 CERT#24

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10509381018

Moisture: N/A

Pace Project 10509381

Collected: 02/19/2020 08:30

Received 02/21/2020 10:00

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/17/2020 18:56		662198	10AIRO
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/17/2020 18:56		662198	10AIRO
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/17/2020 18:56		662198	10AIRO
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/17/2020 18:56		662198	10AIRO
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/17/2020 18:56		662198	10AIRO



Quality Control

Pace Analytical Services, Inc.
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Batch: 661381
Method: TO-15

Pace Project No.: 10509381
Instrument ID: 10AIRD

Blank: 3549644

Parameters	Dilutio	Quals	Result	Units	MQL	SDL	Analysis Date	Prep Date
Benzene	1	U	<0.15	ug/m3	0.32	0.15	02/21/2020 14:01	
Ethylbenzene	1	U	<0.30	ug/m3	0.88	0.30	02/21/2020 14:01	
Naphthalene	1	U	<1.3	ug/m3	2.7	1.3	02/21/2020 14:01	
m&p-Xylene	1	U	<0.70	ug/m3	1.8	0.70	02/21/2020 14:01	
o-Xylene	1	U	<0.34	ug/m3	0.88	0.34	02/21/2020 14:01	

Laboratory Control Sample: 3549645

Parameters	Spk Amt	LCS Result	Units	LCS %Rec	% Rec Limits	LCS Quals
Benzene	34.4	29.9	ug/m3	87	70-133	
Ethylbenzene	46.3	47.6	ug/m3	103	70-142	
Naphthalene	58.3	39.9	ug/m3	68	63-130	
m&p-Xylene	46	47.2	ug/m3	102	70-141	
o-Xylene	46.5	44.4	ug/m3	96	70-135	



Unadjusted MQL

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10509381

Analyte	Method	Unadjusted MQL	Reporting Units
Benzene	TO-15	0.33	ug/m3
Ethylbenzene	TO-15	0.88	ug/m3
Naphthalene	TO-15	2.7	ug/m3
m&p-Xylene	TO-15	1.8	ug/m3
o-Xylene	TO-15	0.88	ug/m3



Definitions/Qualifiers

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10509381

DEFINITIONS

- DF Dilution Factor
- J Estimated concentration above the adjusted method detection limit and below the adjusted reporting
- U Indicates the compound was analyzed for, but not detected.
- SDL Sample Detection Limit
- MQL Method Quantitation Limit
- LCS(D) Laboratory Control Sample (Duplicate)
- MS(D) Matrix Spike (Duplicate)
- DUP Sample Duplicate
- RPD Relative Percent Difference
- TNI The Nelac Institute

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.



Quality Control Data Cross Reference Table

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10509381

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical
10509381001	GS-1620-SG-8-20200219	TO-15	661381	
10509381003	GS-1620-SG-10-20200219	TO-15	661381	
10509381005	GS-1620-SG-11-20200219	TO-15	661381	
10509381007	GS-1620-SG-18-20200219	TO-15	661381	
10509381009	GS-1620-SG-21-20200219	TO-15	661381	
10509381011	GS-1620-SG-22-20200219	TO-15	661381	
10509381013	GS-1620-AA-1-20200219	TO-15	661381	
10509381015	GS-1620-HE-1-20200219	TO-15	661381	
10509381017	GS-1620-DUP-1-20200219	TO-15	661381	
10509381002	GS-1620-SG-8-20200219	TO-15	662198	
10509381004	GS-1620-SG-10-20200219	TO-15	662198	
10509381006	GS-1620-SG-11-20200219	TO-15	662198	
10509381008	GS-1620-SG-18-20200219	TO-15	662198	
10509381010	GS-1620-SG-21-20200219	TO-15	662198	
10509381012	GS-1620-SG-22-20200219	TO-15	662198	
10509381014	GS-1620-AA-1-20200219	TO-15	662198	
10509381016	GS-1620-HE-1-20200219	TO-15	662198	
10509381018	GS-1620-DUP-1-20200219	TO-15	662198	

TRRP LABORATORY REVIEW CHECKLIST

Laboratory		Pace Analytical Services, Inc.	LRC Date:		03/13/2020		
Project Name:		Houston TX-Wood: 1620-01-Rev1	Laboratory Job		10509381		
Reviewer		Nathan Boberg	Prep Batch Number		See exception report.		
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER # ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?			X		
		Were % moisture (or solids) reported for all soil and sediment samples?			X		
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
		If required for the project, are TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?			X		
		Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?			X		
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?			X		
		Were MS/MSD analyzed at the appropriate frequency?			X		
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
		Were MS/MSD RPDs within laboratory QC limits?			X		
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?			X		
		Were analytical duplicates analyzed at the appropriate frequency?			X		
		Were RPDs or relative standard deviations within the laboratory QC limits?			X		
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices, and methods associated with this laboratory data package?	X				

TRRP LABORATORY REVIEW CHECKLIST

Laboratory	Pace Analytical Services, Inc.	LRC Date:	03/13/2020
Project Name:	Houston TX-Wood: 1620-01-Rev1	Laboratory Job	10509381
Reviewer	Nathan Boberg	Prep Batch Number	See exception report.
<ol style="list-style-type: none">1. Items identified by the letter "R" must be included in the laboratory in the laboratory data package submitted in the TRRP-required reports(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period;2. O = Organic analyses; I = inorganic analyses (and general chemistry, when applicable);3. NA = Not applicable;4. NR = Not reviewed;5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).			

TRRP LABORATORY REVIEW CHECKLIST

Laboratory		Pace Analytical Services, Inc.	LRC Date:		03/13/2020		
Project Name:		Houston TX-Wood: 1620-01-Rev1	Laboratory Job		10509381		
Reviewer		Nathan Boberg	Prep Batch Number		See exception report.		
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER # ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning					
		Was the appropriate compound for the method used for tuning?			X		
		Were ion abundance data within the method-required QC limits?			X		
S4	O	Internal standards (IS)					
		Were IS area counts and retention times within the method-required QC limits?			X		
S5	OI	Raw data (NELAC Section 5.5.10)					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs)					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chapter 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs)					
		Are laboratory SOPs current and on file for each method performed?	X				

- Items identified by the letter "R" must be included in the laboratory in the laboratory data package submitted in the TRRP-required reports(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period;
- O = Organic analyses; I = inorganic analyses (and general chemistry, when applicable);
- NA = Not applicable;
- NR = Not reviewed;
- ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

TRRP LABORATORY REVIEW CHECKLIST

Laboratory	Pace Analytical Services, Inc.	LRC Date:	03/13/2020
Project Name:	Houston TX-Wood: 1620-01-Rev1	Laboratory Job	10509381
Reviewer	Nathan Boberg	Prep Batch Number	661381,662198
ER #¹	Description		
1. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).			



Document Name:
Air Sample Condition Upon Receipt

Document No.:
F-MN-A-106-rev.20

Document Revised: 19Nov2019
Page 1 of 1

Pace Analytical Services -
Minneapolis

Air Sample Condition Upon Receipt

Client Name:
GOLDER-TX

Project #: **WO# : 10509381**

Courier: Fed Ex UPS USPS Client
 Pace Speedee Commercial See Exception

PM: NB3 Due Date: 02/28/20
CLIENT: UPRR_Golder

Tracking Number: 4934 3737 1155, 4934 3737 1166

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Tin Can Other: _____ Temp Blank rec: Yes No

Temp. (TO17 and TO13 samples only) (°C): _____ Corrected Temp (°C): _____ Thermometer Used: G87A9170600254 G87A9155100842

Temp should be above freezing to 6°C Correction Factor: _____ Date & Initials of Person Examining Contents: 2/21/20 MI

Type of ice Received Blue Wet None

Comments:

Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	3.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
Correct Containers Used? (Tedlar bags not acceptable container for TO-14, TO-15 or APH)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Containers Intact? (visual inspection/no leaks when pressurized)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Media: <u>Air Can</u> Airbag Filter TDT Passive		11. Individually Certified Cans <u>Y</u> <u>N</u> (list which samples)
Is sufficient information available to reconcile samples to the COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12. <u>Sample SG-8 on COC has SG-9 on can tag</u>
Do cans need to be pressurized? (DO NOT PRESSURIZE 3C or ASTM 1946!!!)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	13.

Gauge # 10AIR26 10AIR34 10AIR35 4097

Canisters					Canisters				
Sample Number	Can ID	Flow Controller	Initial Pressure	Final Pressure	Sample Number	Can ID	Flow Controller	Initial Pressure	Final Pressure
SG-8	2285	1655	-1	+10	DUP-1	2466	696	0	+10
SG-10	2912	2807	0	+10	Unused 3092	3092	2192	-23	-
SG-11	3030	1003	-1	+10	Unused 2452	2452	668	-	-
SG-18	2567	2230	0	+10					
SG-21	2009	696	0	+10					
SG-22	3179	804	0	+10					
AA-1	88	2302	+19	-					
HE-1	2519	1818	+19	+10					

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review:

Nathan Boberg

Date: 2/21/20



Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

March 13, 2020

Michelle Hermiston
Golder
2201 Double Creek Dr
Suite 4004
Round Rock, TX 78664

RE: Pace Project 10510405
Project ID: Houston TX-Wood: 1620-01-Rev1

Dear Michelle Hermiston:

Enclosed are the analytical results for sample(s) received by the laboratory on March 03, 2020. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

This report was revised on March, 13, 2020 to create TRRP report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Nathan Boberg
nathan.boberg@pacelabs.com
(612)360-0728

Laboratory Certifications

Pace Analytical Minnesota : Texas Certification #: T104704192



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

03/13/2020 10:40:03



Sample Cross Reference

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10510405

Client: UPRR Golder
Project ID: Houston TX-Wood: 1620-01-Rev1

Client Sample ID	Lab ID	Matrix	Collection Date/Time	Received Date/Time
GS-1620-SG20-20200227	10510405001	Air	02/27/2020 09:23	03/03/2020 09:45
GS-1620-SG19-20200227	10510405002	Air	02/27/2020 09:45	03/03/2020 09:45
GS-1620-SG17-20200227	10510405003	Air	02/27/2020 10:11	03/03/2020 09:45
GS-1620-SG16-20200227	10510405004	Air	02/27/2020 10:49	03/03/2020 09:45
GS-1620-SG15-20200227	10510405005	Air	02/27/2020 11:20	03/03/2020 09:45
GS-1620-SG14-20200227	10510405006	Air	02/27/2020 11:39	03/03/2020 09:45
GS-1620-SG12-20200227	10510405007	Air	02/27/2020 12:21	03/03/2020 09:45
AA-1620-AA-2-20200227	10510405008	Air	02/27/2020 09:49	03/03/2020 09:45
GS-1620-DUP-2-20200227	10510405009	Air	02/27/2020 10:49	03/03/2020 09:45
GS-1620-SG20-20200227Cert#1329	10510405012	Air	02/27/2020 09:23	03/03/2020 09:45
GS-1620-SG19-20200227Cert#2897	10510405013	Air	02/27/2020 09:45	03/03/2020 09:45
GS-1620-SG17-20200227Cert#2597	10510405014	Air	02/27/2020 10:11	03/03/2020 09:45
GS-1620-SG16-20200227Cert#2922	10510405015	Air	02/27/2020 10:49	03/03/2020 09:45
GS-1620-SG15-20200227Cert#2937	10510405016	Air	02/27/2020 11:20	03/03/2020 09:45
GS-1620-SG14-20200227Cert#3239	10510405017	Air	02/27/2020 11:39	03/03/2020 09:45
GS-1620-SG12-20200227Cert#3264	10510405018	Air	02/27/2020 12:27	03/03/2020 09:45
AA-1620-AA-2-20200227Cert#2829	10510405019	Air	02/27/2020 09:49	03/03/2020 09:45
GS-1620-DUP2-20200227Cert#0882	10510405020	Air	02/27/2020 10:49	03/03/2020 09:45



Project Narrative

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10510405

Holding Times:

All holding times were met.

Blanks:

All blank results were below reporting limits.

Laboratory Control Samples:

All LCS recoveries were within QC limits.

Matrix Spikes and Duplicates:

All MS or MSD recoveries were within QC limits.

Surrogate:

All surrogate recoveries were within QC limits.

Appendix A
LABORATORY DATA PACKAGE COVER PAGE

This data package is for Job No. 10510405 and consists of:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 - Field chain-of-custody documentation;
- R2 - Sample identification cross-reference;
- R3 - Test reports (analytical data sheets) for each environmental sample that includes:
 - a. Items consistent with NELAC Chapter 5,
 - b. Dilution factors,
 - c. Preparation methods,
 - d. Cleanup methods, and
 - e. If required for the project, tentatively identified compounds (TICs).
- R4 - Surrogate recovery data including:
 - a. Calculated recovery (%R), and
 - b. The laboratory's surrogate QC limits.
- R5 - Test reports/summary forms for blank samples;
- R6 - Test reports/summary forms for laboratory control samples (LCSs) including:
 - a. LCS spiking amounts,
 - b. Calculated %R for each analyte, and
 - c. The laboratory's LCS QC limits.
- R7 - Test reports/summary forms for matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a. Samples associated with the MS/MSD clearly identified,
 - b. MS/MSD spiking amounts,
 - c. Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d. Calculated %Rs and relative percent differences, and
 - e. The laboratory's MS/MSD QC limits.
- R8 - Laboratory analytical duplicate (if applicable) recovery and precision:
 - a. The amount of analyte measured in the duplicate,
 - b. The calculated RPD, and,
 - c. The laboratory's QC limits for analytical duplicated.
- R9 - List of method quantitation limits (MQLs) and detectability check sample results for each analyte and
- R10 - Other problems or anomalies.

The exception Report for each "No" or "Not Reviewed (NR) " item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by [X] MDH on 04/12/2011

Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

<u>Name (Printed)</u>	<u>Signature</u>	<u>Official Title (Printed)</u>	<u>Date</u>
Nathan Boberg		Project Manager	03/13/2020



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG20-20200227

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405001

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 09:23

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.74	0.27	J	ug/m3	0.57	0.27	03/08/2020 20:49		663855	10AIRJ	
Ethylbenzene	1.74	< 0.53	U	ug/m3	1.5	0.53	03/08/2020 20:49		663855	10AIRJ	
Naphthalene	1.74	3.1	J	ug/m3	4.6	2.3	03/08/2020 20:49		663855	10AIRJ	
m&p-Xylene	1.74	1.7	J	ug/m3	3.1	1.2	03/08/2020 20:49		663855	10AIRJ	
o-Xylene	1.74	< 0.60	U	ug/m3	1.5	0.60	03/08/2020 20:49		663855	10AIRJ	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG19-20200227

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405002

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 09:45

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
TO15 MSV AIR		Analytical Method: TO-15								
Benzene	1.68	0.46	J	ug/m3	0.55	0.26	03/08/2020 20:14		663855	10AIRJ
Ethylbenzene	1.68	< 0.51	U	ug/m3	1.5	0.51	03/08/2020 20:14		663855	10AIRJ
Naphthalene	1.68	3.5	J	ug/m3	4.5	2.2	03/08/2020 20:14		663855	10AIRJ
m&p-Xylene	1.68	1.6	J	ug/m3	3.0	1.2	03/08/2020 20:14		663855	10AIRJ
o-Xylene	1.68	0.91	J	ug/m3	1.5	0.58	03/08/2020 20:14		663855	10AIRJ



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG17-20200227

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405003

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 10:11

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.57	0.25	J	ug/m3	0.51	0.24	03/08/2020 19:39		663855	10AIRJ	
Ethylbenzene	1.57	< 0.48	U	ug/m3	1.4	0.48	03/08/2020 19:39		663855	10AIRJ	
Naphthalene	1.57	3.0	J	ug/m3	4.2	2.1	03/08/2020 19:39		663855	10AIRJ	
m&p-Xylene	1.57	1.1	J	ug/m3	2.8	1.1	03/08/2020 19:39		663855	10AIRJ	
o-Xylene	1.57	< 0.54	U	ug/m3	1.4	0.54	03/08/2020 19:39		663855	10AIRJ	



Sample Results

Pace Analytical Services, Inc.
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG16-20200227

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405004

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 10:49

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
TO15 MSV AIR										
Analytical Method: TO-15										
Benzene	1.68	< 0.26	U	ug/m3	0.55	0.26	03/08/2020 19:03		663855	10AIRJ
Ethylbenzene	1.68	13.4		ug/m3	1.5	0.51	03/08/2020 19:03		663855	10AIRJ
Naphthalene	1.68	3.1	J	ug/m3	4.5	2.2	03/08/2020 19:03		663855	10AIRJ
m&p-Xylene	1.68	46.9		ug/m3	3.0	1.2	03/08/2020 19:03		663855	10AIRJ
o-Xylene	1.68	20.9		ug/m3	1.5	0.58	03/08/2020 19:03		663855	10AIRJ



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG15-20200227

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405005

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 11:20

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.68	< 0.26	U	ug/m3	0.55	0.26	03/08/2020 18:28		663855	10AIRJ	
Ethylbenzene	1.68	< 0.51	U	ug/m3	1.5	0.51	03/08/2020 18:28		663855	10AIRJ	
Naphthalene	1.68	3.4	J	ug/m3	4.5	2.2	03/08/2020 18:28		663855	10AIRJ	
m&p-Xylene	1.68	< 1.2	U	ug/m3	3.0	1.2	03/08/2020 18:28		663855	10AIRJ	
o-Xylene	1.68	< 0.58	U	ug/m3	1.5	0.58	03/08/2020 18:28		663855	10AIRJ	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG14-20200227

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405006

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 11:39

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.77	< 0.27	U	ug/m3	0.58	0.27	03/08/2020 17:53		663855	10AIRJ	
Ethylbenzene	1.77	< 0.54	U	ug/m3	1.6	0.54	03/08/2020 17:53		663855	10AIRJ	
Naphthalene	1.77	< 2.3	U	ug/m3	4.7	2.3	03/08/2020 17:53		663855	10AIRJ	
m&p-Xylene	1.77	< 1.2	U	ug/m3	3.1	1.2	03/08/2020 17:53		663855	10AIRJ	
o-Xylene	1.77	< 0.61	U	ug/m3	1.6	0.61	03/08/2020 17:53		663855	10AIRJ	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG12-20200227

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405007

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 12:21

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
TO15 MSV AIR		Analytical Method: TO-15								
Benzene	1.77	0.28	J	ug/m3	0.58	0.27	03/08/2020 17:18		663855	10AIRJ
Ethylbenzene	1.77	< 0.54	U	ug/m3	1.6	0.54	03/08/2020 17:18		663855	10AIRJ
Naphthalene	1.77	3.1	J	ug/m3	4.7	2.3	03/08/2020 17:18		663855	10AIRJ
m&p-Xylene	1.77	1.3	J	ug/m3	3.1	1.2	03/08/2020 17:18		663855	10AIRJ
o-Xylene	1.77	< 0.61	U	ug/m3	1.6	0.61	03/08/2020 17:18		663855	10AIRJ



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: AA-1620-AA-2-20200227

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405008

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 09:49

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	MLL	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.22	1.1		ug/m3	0.40	0.19	03/08/2020 16:07		663855	10AIRJ	
Ethylbenzene	1.22	< 0.37	U	ug/m3	1.1	0.37	03/08/2020 16:07		663855	10AIRJ	
Naphthalene	1.22	< 1.6	U	ug/m3	3.2	1.6	03/08/2020 16:07		663855	10AIRJ	
m&p-Xylene	1.22	0.99	J	ug/m3	2.2	0.85	03/08/2020 16:07		663855	10AIRJ	
o-Xylene	1.22	< 0.42	U	ug/m3	1.1	0.42	03/08/2020 16:07		663855	10AIRJ	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-DUP-2-20200227

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405009

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 10:49

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.71	0.58		ug/m3	0.56	0.26	03/08/2020 21:24		663855	10AIRJ	
Ethylbenzene	1.71	14.0		ug/m3	1.5	0.52	03/08/2020 21:24		663855	10AIRJ	
Naphthalene	1.71	3.2	J	ug/m3	4.5	2.2	03/08/2020 21:24		663855	10AIRJ	
m&p-Xylene	1.71	50.6		ug/m3	3.0	1.2	03/08/2020 21:24		663855	10AIRJ	
o-Xylene	1.71	21.5		ug/m3	1.5	0.59	03/08/2020 21:24		663855	10AIRJ	



Sample Results

Pace Analytical Services, Inc.
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG20-20200227Cert#1329

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405012

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 09:23

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
Individual Can Certification		Analytical Method: TO-15									
Benzene	1	0.21	J	ug/m3	0.32	0.15	01/24/2020 01:41		663943	10AIR7	
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/24/2020 01:41		663943	10AIR7	
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/24/2020 01:41		663943	10AIR7	
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/24/2020 01:41		663943	10AIR7	
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/24/2020 01:41		663943	10AIR7	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG19-20200227Cert#2897

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405013

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 09:45

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
Individual Can Certification		Analytical Method: TO-15									
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/23/2020 11:08		663943	10AIRD	
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/23/2020 11:08		663943	10AIRD	
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/23/2020 11:08		663943	10AIRD	
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/23/2020 11:08		663943	10AIRD	
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/23/2020 11:08		663943	10AIRD	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG17-20200227Cert#2597

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405014

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 10:11

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification										
Analytical Method: TO-15										
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/18/2020 01:38		663943	10AIRO
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/18/2020 01:38		663943	10AIRO
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/18/2020 01:38		663943	10AIRO
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/18/2020 01:38		663943	10AIRO
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/18/2020 01:38		663943	10AIRO



Sample Results

Pace Analytical Services, Inc.
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG16-20200227Cert#2922

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405015

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 10:49

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification										
Analytical Method: TO-15										
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/15/2020 22:50		663943	10AIRI
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/15/2020 22:50		663943	10AIRI
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/15/2020 22:50		663943	10AIRI
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/15/2020 22:50		663943	10AIRI
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/15/2020 22:50		663943	10AIRI



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG15-20200227Cert#2937

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405016

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 11:20

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification										
Analytical Method: TO-15										
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/24/2020 00:12		663943	10AIR7
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/24/2020 00:12		663943	10AIR7
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/24/2020 00:12		663943	10AIR7
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/24/2020 00:12		663943	10AIR7
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/24/2020 00:12		663943	10AIR7



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG14-20200227Cert#3239

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405017

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 11:39

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
Individual Can Certification		Analytical Method: TO-15									
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/25/2020 03:58		663943	10AIR7	
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/25/2020 03:58		663943	10AIR7	
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/25/2020 03:58		663943	10AIR7	
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/25/2020 03:58		663943	10AIR7	
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/25/2020 03:58		663943	10AIR7	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG12-20200227Cert#3264

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405018

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 12:27

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
Individual Can Certification		Analytical Method: TO-15									
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/15/2020 12:24		663943	10AIR7	
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/15/2020 12:24		663943	10AIR7	
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/15/2020 12:24		663943	10AIR7	
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/15/2020 12:24		663943	10AIR7	
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/15/2020 12:24		663943	10AIR7	



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: AA-1620-AA-2-20200227Cert#2829

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405019

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 09:49

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	0.5	< 0.076	U	ug/m3	0.16	0.076	01/16/2020 04:45		663943	10AIRI
Ethylbenzene	0.5	< 0.15	U	ug/m3	0.44	0.15	01/16/2020 04:45		663943	10AIRI
Naphthalene	0.5	< 0.66	U	ug/m3	1.3	0.66	01/16/2020 04:45		663943	10AIRI
m&p-Xylene	0.5	< 0.35	U	ug/m3	0.88	0.35	01/16/2020 04:45		663943	10AIRI
o-Xylene	0.5	< 0.17	U	ug/m3	0.44	0.17	01/16/2020 04:45		663943	10AIRI



Sample Results

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-DUP2-20200227Cert#0882

Project ID: Houston TX-Wood: 1620-01-

Lab ID: 10510405020

Moisture: N/A

Pace Project 10510405

Collected: 02/27/2020 10:49

Received 03/03/2020 09:45

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification										
Analytical Method: TO-15										
Benzene	1	< 0.15	U	ug/m3	0.32	0.15	01/18/2020 12:34		663943	10AIRI
Ethylbenzene	1	< 0.30	U	ug/m3	0.88	0.30	01/18/2020 12:34		663943	10AIRI
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	01/18/2020 12:34		663943	10AIRI
m&p-Xylene	1	< 0.70	U	ug/m3	1.8	0.70	01/18/2020 12:34		663943	10AIRI
o-Xylene	1	< 0.34	U	ug/m3	0.88	0.34	01/18/2020 12:34		663943	10AIRI



Quality Control

Pace Analytical Services, Inc.
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Batch: 663855

Pace Project No.: 10510405

Method: TO-15

Instrument ID: 10AIRJ

Blank: 3561585

Parameters	Dilutio	Quals	Result	Units	MQL	SDL	Analysis Date	Prep Date
Benzene	1	U	<0.15	ug/m3	0.32	0.15	03/08/2020 09:37	
Ethylbenzene	1	U	<0.30	ug/m3	0.88	0.30	03/08/2020 09:37	
Naphthalene	1	J	1.7	ug/m3	2.7	1.3	03/08/2020 09:37	
m&p-Xylene	1	U	<0.70	ug/m3	1.8	0.70	03/08/2020 09:37	
o-Xylene	1	U	<0.34	ug/m3	0.88	0.34	03/08/2020 09:37	

Laboratory Control Sample: 3561586

Parameters	Spk Amt	LCS Result	Units	LCS %Rec	% Rec Limits	LCS Quals
Benzene	33.5	33.2	ug/m3	99	70-133	
Ethylbenzene	45.6	50.5	ug/m3	111	70-142	
Naphthalene	57.7	62.8	ug/m3	109	63-130	
m&p-Xylene	91.2	108	ug/m3	119	70-141	
o-Xylene	45.5	51.2	ug/m3	113	70-135	

Duplicate: 3561843

Original for Sample: Project sample AA-1620-AA-2-20200227

Parameters	Original Result	Dup Result	Units	RPD	Max RPD	Quals
Benzene	1.1	1.1	ug/m3	1	25	
Ethylbenzene	<0.37	<0.37	ug/m3		25	
Naphthalene	<1.6	<1.6	ug/m3		25	
m&p-Xylene	0.99J	0.97	ug/m3		25	
o-Xylene	<0.42	<0.42	ug/m3		25	



Unadjusted MQL

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10510405

Analyte	Method	Unadjusted MQL	Reporting Units
Benzene	TO-15	0.33	ug/m3
Ethylbenzene	TO-15	0.88	ug/m3
Naphthalene	TO-15	2.7	ug/m3
m&p-Xylene	TO-15	1.8	ug/m3
o-Xylene	TO-15	0.88	ug/m3



DEFINITIONS

- DF Dilution Factor
- J Estimated concentration above the adjusted method detection limit and below the adjusted reporting
- U Indicates the compound was analyzed for, but not detected.
- SDL Sample Detection Limit
- MQL Method Quantitation Limit
- LCS(D) Laboratory Control Sample (Duplicate)
- MS(D) Matrix Spike (Duplicate)
- DUP Sample Duplicate
- RPD Relative Percent Difference
- TNI The Nelac Institute

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.



Quality Control Data Cross Reference Table

Pace Analytical Services, Inc.
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10510405

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical
10510405001	GS-1620-SG20-20200227	TO-15	663855	
10510405002	GS-1620-SG19-20200227	TO-15	663855	
10510405003	GS-1620-SG17-20200227	TO-15	663855	
10510405004	GS-1620-SG16-20200227	TO-15	663855	
10510405005	GS-1620-SG15-20200227	TO-15	663855	
10510405006	GS-1620-SG14-20200227	TO-15	663855	
10510405007	GS-1620-SG12-20200227	TO-15	663855	
10510405008	AA-1620-AA-2-20200227	TO-15	663855	
10510405009	GS-1620-DUP-2-20200227	TO-15	663855	
10510405012	GS-1620-SG20-	TO-15	663943	
10510405013	GS-1620-SG19-	TO-15	663943	
10510405014	GS-1620-SG17-	TO-15	663943	
10510405015	GS-1620-SG16-	TO-15	663943	
10510405016	GS-1620-SG15-	TO-15	663943	
10510405017	GS-1620-SG14-	TO-15	663943	
10510405018	GS-1620-SG12-	TO-15	663943	
10510405019	AA-1620-AA-2-	TO-15	663943	
10510405020	GS-1620-DUP2-	TO-15	663943	

TRRP LABORATORY REVIEW CHECKLIST

Laboratory		Pace Analytical Services, Inc.	LRC Date:		03/13/2020		
Project Name:		Houston TX-Wood: 1620-01-Rev1	Laboratory Job		10510405		
Reviewer		Nathan Boberg	Prep Batch Number		See exception report.		
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER # ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?			X		
		Were % moisture (or solids) reported for all soil and sediment samples?			X		
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
		If required for the project, are TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?			X		
		Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?			X		
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?			X		
		Were MS/MSD analyzed at the appropriate frequency?			X		
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
		Were MS/MSD RPDs within laboratory QC limits?			X		
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices, and methods associated with this laboratory data package?	X				

TRRP LABORATORY REVIEW CHECKLIST

Laboratory	Pace Analytical Services, Inc.	LRC Date:	03/13/2020
Project Name:	Houston TX-Wood: 1620-01-Rev1	Laboratory Job	10510405
Reviewer	Nathan Boberg	Prep Batch Number	See exception report.
<ol style="list-style-type: none">1. Items identified by the letter "R" must be included in the laboratory in the laboratory data package submitted in the TRRP-required reports(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period;2. O = Organic analyses; I = inorganic analyses (and general chemistry, when applicable);3. NA = Not applicable;4. NR = Not reviewed;5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).			

TRRP LABORATORY REVIEW CHECKLIST

Laboratory		Pace Analytical Services, Inc.	LRC Date:		03/13/2020		
Project Name:		Houston TX-Wood: 1620-01-Rev1	Laboratory Job		10510405		
Reviewer		Nathan Boberg	Prep Batch Number		See exception report.		
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER # ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	Mass spectral tuning					
		Was the appropriate compound for the method used for tuning?			X		
		Were ion abundance data within the method-required QC limits?			X		
S4	O	Internal standards (IS)					
		Were IS area counts and retention times within the method-required QC limits?			X		
S5	OI	Raw data (NELAC Section 5.5.10)					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs)					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chapter 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs)					
		Are laboratory SOPs current and on file for each method performed?	X				

- Items identified by the letter "R" must be included in the laboratory in the laboratory data package submitted in the TRRP-required reports(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period;
- O = Organic analyses; I = inorganic analyses (and general chemistry, when applicable);
- NA = Not applicable;
- NR = Not reviewed;
- ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

TRRP LABORATORY REVIEW CHECKLIST

Laboratory	Pace Analytical Services, Inc.	LRC Date:	03/13/2020
Project Name:	Houston TX-Wood: 1620-01-Rev1	Laboratory Job	10510405
Reviewer	Nathan Boberg	Prep Batch Number	663855,663943
ER #¹	Description		
1. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).			

WO#: 10510405

AIR: CHAIN-OF-CUSTODY

The Chain-of-Custody is a LEGAL DOCUMENT. All relev



10510405



Section A Required Client Information: Company: Golden Associate Inc. Address: 2201 Double Creek Dr. Suite 1404 Round Rock TX 78665 Email To: Eric - Martinez@baldor.com Phone: 512 671 3434 Fax: Requested Due Date/TAT: 5 days		Section B Required Project Information: Report To: Anthony Reid@baldor.com Copy To: Company Name: Union Pacific Railroad-AP Address: 1400 Douglas Street Ste 0750 Pace Quote Reference: Omaha PE 6817089 Pace Project Manager/Sales Rep. Pace Profile #:		Section C Invoice Information: Attention: UPRR/Ken Patebors Company Name: Union Pacific Railroad-AP Address: 1400 Douglas Street Ste 0750 Pace Quote Reference: Omaha PE 6817089 Pace Project Manager/Sales Rep. Pace Profile #:		Page: 1 of 1 43633		
Section D Required Client Information AIR SAMPLE ID Sample IDs MUST BE UNIQUE		Valid Media Codes MEDIA CODE TB Tedlar Bag 1 Liter Summa Can 1LC 6 Liter Summa Can 6LC Low Volume Puff LVP High Volume Puff HVP PM10		PID Reading (Client only) MEDIA CODE COMPOSITE START DATE TIME COMPOSITE END DATE TIME		Method: PM10 30 - Fixed Gas (%) TO-3 BTEX TO-3M (Methane) TO-14 TO-15 Full List VOCs TO-15 Short List BTEX TO-15 Short List Chlorinated TO-15 Short List (Other)		
ITEM #	Flow Control Number	Summa Can Number	Canister Pressure (Initial Field - In Hg)	Canister Pressure (Final Field - In Hg)	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
1		1329	28	1	<i>Trayled</i>	2-28-20	1050	Temp In °C Received on ice Custody Sealed Cooler Samples Intact
2		2897	30	1	<i>Ken Pace</i>	3/13/20	0945	
3		2597	30	2				
4		2922	29	1				
5		2937	30	2				
6		3239	30	2				
7		3264	30	2				
8		2829	29.5	0				
9		0882	29	1				
10								
11								
12								

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: **Anthony Reid**
 SIGNATURE of SAMPLER: *[Signature]*
 DATE Signed (MM/DD/YY) **02/28/20**

ORIGINAL



Document Name:
Air Sample Condition Upon Receipt

Document No.:
F-MN-A-106-rev.20

Document Revised: 19Nov2019
Page 1 of 1

Pace Analytical Services -
Minneapolis

Air Sample Condition Upon Receipt Client Name: Golder Assoc. Project #: **WO#: 10510405**

Courier: Fed Ex UPS USPS Client
 Pace Speedee Commercial See Exception

PM: NB3 Due Date: 03/10/20
 CLIENT: UPRR_Golder

Tracking Number: 1083 0284 3954/3944

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Tin Can Other: _____ Temp Blank rec: Yes No

Temp. (TO17 and TO13 samples only) (°C): _____ Corrected Temp (°C): _____ Thermometer Used: G87A9170600254 G87A9155100842

Temp should be above freezing to 6°C Correction Factor: _____ Date & Initials of Person Examining Contents: _____

Type of ice Received Blue Wet None

Comments:

Chain of Custody Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Filled Out?	<input type="checkbox"/> Yes <input type="checkbox"/> No	2.
Chain of Custody Relinquished?	<input type="checkbox"/> Yes <input type="checkbox"/> No	3.
Sampler Name and/or Signature on COC?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time?	<input type="checkbox"/> Yes <input type="checkbox"/> No	5.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input type="checkbox"/> No	6.
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input type="checkbox"/> No	7.
Sufficient Volume?	<input type="checkbox"/> Yes <input type="checkbox"/> No	8.
Correct Containers Used? (Tedlar bags not acceptable container for TO-14, TO-15 or APH) -Pace Containers Used?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	9.
Containers Intact? (visual inspection/no leaks when pressurized)	<input type="checkbox"/> Yes <input type="checkbox"/> No	10.
Media: Air Can Airbag Filter TDT Passive		11. Individually Certified Cans Y N (list which samples)
Is sufficient information available to reconcile samples to the COC?	<input type="checkbox"/> Yes <input type="checkbox"/> No	12.
Do cans need to be pressurized? (DO NOT PRESSURIZE 3C or ASTM 1946!!!)	<input type="checkbox"/> Yes <input type="checkbox"/> No	13.

Gauge # 10AIR26 10AIR34 10AIR35 4097

Canisters					Canisters				
Sample Number	Can ID	Flow Controller	Initial Pressure	Final Pressure	Sample Number	Can ID	Flow Controller	Initial Pressure	Final Pressure
SG-20	1329	2833	-1	10	Dup-2	0882	0793	-0.5	10
SG 19	2897	2304	0	10	Unused	2492	1630	-27	-
SG 17	2597	2441	1	10	Unused	2906	1762	-27.5	-
SG 16	2922	0793	0	10					
SG 15	2937	1982	0	10					
SG 14	3239	2368	-1.5	10					
SG 12	3264	1508	-1.5	10					
AA-2	2829	1503	1.5	10					

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____

Nathan Poberg

Date: 3/4/20



Memorandum

July 27, 2020

To: Eric Matzner Ref. No.: 11183954-1620

From: ^{CK} Chris G. Knight/eew/694-NF Tel: 512-506-8803

CC: Jesse Orth, Jon Lang; Julie Lidstone

**Subject: Data Usability Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
June 2020**

1. Scope of Data Usability Study

This document details a Data Usability Summary (DUS) of analytical results for soil gas samples collected in support of the Soil Gas Sampling Event at the Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works site during June 2020. Samples were submitted to Pace Analytical Services, Inc., located in Minneapolis, Minnesota and are reported in data package 10523718. The intended use of the data is to support the Soil Gas Sampling Event at the site by providing current concentration of chemicals of concern.

Data were reviewed and validated by Chris G. Knight of GHD, in accordance with Title 30 of the Texas Administrative Code Section 350.54 (30 TAC 350.54) as described in the Texas Commission on Environmental Quality (TCEQ) Regulatory Guidance document entitled "Review and Reporting of COC Concentration Data under TRRP", (RG-366/TRRP-13), revised May 2010, herein referred to as "TRRP-13 Guidance". Evaluation of the data was based on information obtained from the chain of custody forms, the finished report forms, method blank data, recovery data from laboratory control samples (LCS)/ duplicate analyses (DUP), field quality assurance/quality control samples (QA/QC), the laboratory review checklists (LRC), and the laboratory exception report (ER).

A sample collection and analysis summary is presented in Table 1. This summary provides a cross-reference of field sample identification numbers and location identification. Each sample is assigned a unique field identification number.

The validated sample results are presented in Table 2. A summary of the analytical methodology is presented in Table 3.



2. Laboratory Qualifications

The Laboratory's quality assurance program is consistent with the quality standards outlined in the National Environmental Laboratory Accreditation Program (NELAP). This laboratory was accredited under Texas Certification number # TX104704192 at the time the analysis was performed and the certificate is included in Attachment A.

3. Project Objectives

3.1 Sampling/Analytical QA/QC Objectives

The QA/QC program was designed to identify contamination resulting from the sampling, sample transport and analytical process through the analysis of field duplicate sample sets and method blanks. The QA/QC program was designed to evaluate the quality of the resulting data with respect to bias and precision through analysis of LCS and duplicate analyses.

4. Data Review/Validation Results

4.1 Sample Holding Time

Samples were shipped with a chain of custody and the paper work was filled out properly.

The sample chain of custody documents and the analytical report were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

4.2 Sample Containers

All sample canisters were received at the laboratory in good condition and within acceptable canister pressure range of -1 inch of mercury (Hg) to -10 inches of Hg, indicating samples were still under vacuum upon receipt.

4.3 Calibrations

According to the LRC, initial calibration and continuing calibration data met the criteria for the selected method.

4.4 Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures. As these were not discrete samples handled in the field, these blanks are not listed on the sample identification cross-reference list found in the data package.

For this study, laboratory method blanks were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch and results are reported in the laboratory data package.



The method blank results were non-detect or below the method quantitation limit (MQL), indicating that laboratory contamination was not a factor for this investigation.

4.5 Laboratory Control Sample Analysis

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The recovery ranges established by the laboratory are adopted as the acceptance criteria for the project.

For this study, LCS were analyzed at a minimum frequency of one per twenty investigative samples and/or one per analytical batch.

The LCS contained all compounds specified in the method. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

4.6 Duplicate Sample Analyses

Analytical precision is evaluated based on the analysis of laboratory duplicate samples. The relative percent differences (RPD) established by the laboratory are adopted as the acceptance criteria for the project.

The laboratory performed a duplicate analysis on a non-site sample. This cannot be used to assess precision for the site samples.

4.7 Field QA/QC Samples

The field QA/QC consisted of one field duplicate sample set.

To assess the analytical and sampling protocol precision, one field duplicate sample set was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than fifty percent for soil samples. The RPDs are only used when sample concentrations are above the estimated regions of detection.

Field duplicate summary data are presented in Table 2. All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision with the following exceptions (see Table 4):

- i) GS-1620-SG27-20200630 and GS-1620-Dup-3-20200630 did show variability in the following compounds: benzene, ethylbenzene, m&p-xylenes, and o-xylene. All associated sample results were qualified as estimated.

4.8 Field Procedures

Golder Associates, Inc. collected soil gas samples in accordance with their Standard Operating Procedures (SOP) for sample collection.

4.9 Analyte Reporting

The laboratory reported detected results for each analyte down to the sample detection limit (SDL), which is defined as the method detection limit (MDL) with sample-specific adjustments for dilutions, aliquot size,



volumes, etc. Positive analyte detections less than the MQL but greater than the SDL were qualified as estimated (J) in Table 2 unless qualified elsewhere in this memorandum.

The detectability check standard (DCS) results supported the laboratory MDLs.

5. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are usable for the purpose of supporting the Soil Gas Sampling Event at the site by providing current concentration of chemicals of concern in soil gas samples with the specific qualifications noted herein.

Table 1

Sample Collection and Analysis Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
June 2020

Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	<u>Analysis/Parameters</u>		Comments
					VOCs		
GS-1620-SG25-20200630	SG-25	Soil Gas	06/30/2020	10:52	X		
GS-1620-SG25-20200630 CERT 306	SG-25	Soil Gas	06/30/2020	10:52	X		
AA-1620-AA-3-20200630	AA-3	Soil Gas	06/30/2020	11:07	X		
AA-1620-AA-3-20200630 CERT 351	AA-3	Soil Gas	06/30/2020	11:07	X		
GS-1620-SG27-20200630	SG-27	Soil Gas	06/30/2020	11:50	X		
GS-1620-SG27-20200630 CERT 362	SG-27	Soil Gas	06/30/2020	11:50	X		
GS-1620-Dup-3-20200630	SG-27	Soil Gas	06/30/2020	11:50	X		Field duplicate of GS-1620-SG27-20200630
GS-1620-Dup-3-20200630 CERT 28	SG-27	Soil Gas	06/30/2020	11:50	X		

Notes:

VOCs - Volatile Organic Compounds

Table 2
Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
June 2020

Location ID:	AA-3	AA-3	SG-25	SG-25
Sample Name:	AA-1620-AA-3-20200630	AA-1620-AA-3-20200630 CERT 351	GS-1620-SG25-20200630	GS-1620-SG25-20200630 CERT 306
Sample Date:	06/30/2020	06/30/2020	06/30/2020	06/30/2020

Parameters	Unit				
Volatile Organic Compounds					
Benzene	µg/m3	<0.18	<0.065	<0.25	<0.13
Ethylbenzene	µg/m3	<0.23	<0.069	<0.32	<0.14
m&p-Xylenes	µg/m3	<0.53	<0.17	<0.74	<0.34
Naphthalene	µg/m3	<1.7	<0.64	<2.4	<1.3
o-Xylene	µg/m3	<0.24	<0.074	<0.34	<0.15

Table 2
Analytical Results Summary
Soil Gas Sampling Event
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works
Houston, Texas
June 2020

Location ID:	SG-27	SG-27	SG-27	SG-27
Sample Name:	GS-1620-SG27-20200630	GS-1620-SG27-20200630 CERT 362	GS-1620-Dup-3-20200630	GS-1620-Dup-3-20200630 CERT 28
Sample Date:	06/30/2020	06/30/2020	06/30/2020	06/30/2020
			Duplicate	

Parameters	Unit				
Volatile Organic Compounds					
Benzene	µg/m3	12.4 J	0.18 J	1.5 J	<0.13
Ethylbenzene	µg/m3	7.9 J	<0.14	2.2 J	<0.14
m&p-Xylenes	µg/m3	21.2 J	<0.34	7.7 J	<0.34
Naphthalene	µg/m3	<2.3	<1.3	<2.3	<1.3
o-Xylene	µg/m3	6.2 J	<0.15	3.1 J	<0.15

Notes:

- < - Not detected at the associated reporting
- J - Estimated concentration

Table 3

Analytical Methods
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
June 2020

Parameter	Method	Matrix	Holding Time
			Collection to Analysis (Days)
VOCs	TO-15 ⁽¹⁾	Soil Gas	30

Notes:

VOCs - Volatile Organic Compounds

Method References:

⁽¹⁾ - Referenced from "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air", January 1999

Table 4

Qualified Sample Data Due to Variability in Field Duplicate Results
Soil Gas Sampling Event
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works
Houston, Texas
June 2020

Parameter	Analyte	RPD	Sample ID	Qualified Result	Field Duplicate Sample ID	Qualified Result	Units
VOCs	Benzene	156	GS-1620-SG27-20200630	12.4 J	GS-1620-Dup-3-20200630	1.5 J	µg/m ³
	Ethylbenzene	112		7.9 J		2.2 J	µg/m ³
	m&p-Xylenes	93.4		21.2 J		7.7 J	µg/m ³
	o-Xylene	66.7		6.2 J		3.1 J	µg/m ³

Notes:

- RPD - Relative Percent Difference
VOCs - Volatile Organic Compounds
J - Estimated concentration

Attachment A

Laboratory NELAP Certificate



Texas Commission on Environmental Quality

NELAP-Recognized Laboratory Accreditation is hereby awarded to



Pace Analytical Services, LLC - Minneapolis MN

**1700 Elm Street SE Suite 200
Minneapolis, MN 55414-2485**

in accordance with Texas Water Code Chapter 5, Subchapter R, Title 30 Texas Administrative Code Chapter 25, and the National Environmental Laboratory Accreditation Program.

The laboratory's scope of accreditation includes the fields of accreditation that accompany this certificate. Continued accreditation depends upon successful ongoing participation in the program. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current location(s) and accreditation status for particular methods and analyses (www.tceq.texas.gov/goto/lab). Accreditation does not imply that a product, process, system or person is approved by the Texas Commission on Environmental Quality.

Certificate Number: T104704192-20-15
Effective Date: 3/1/2020
Expiration Date: 2/28/2021


Executive Director Texas Commission on
Environmental Quality



Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

July 10, 2020

Michelle Hermiston
Golder
2201 Double Creek Dr
Suite 4004
Round Rock, TX 78664

RE: Pace Project 10523718
Project ID: 19119232.440 HWPW

Dear Michelle Hermiston:

Enclosed are the analytical results for sample(s) received by the laboratory on July 03, 2020. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script that reads "Joanne Richardson".

Joanne Richardson
joanne.richardson@pacelabs.com
1(612)607-6453

Laboratory Certifications

Pace Analytical Minnesota : Texas Certification #: T104704192



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC

07/10/2020 12:53:11



Sample Cross Reference

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10523718

Client: UPRR Golder
Project ID: 19119232.440 HWPW

Client Sample ID	Lab ID	Matrix	Collection Date/Time	Received Date/Time
AA-1620-AA-3-20200630	10523718001	Air	06/30/2020 11:07	07/03/2020 09:30
AA-1620-AA-3-20200630 CERT 351	10523718002	Air	06/30/2020 11:07	07/03/2020 09:30
GS-1620-SG25-20200630	10523718003	Air	06/30/2020 10:52	07/03/2020 09:30
GS-1620-SG25-20200630 CERT 306	10523718004	Air	06/30/2020 10:52	07/03/2020 09:30
GS-1620-SG27-20200630	10523718005	Air	06/30/2020 11:50	07/03/2020 09:30
GS-1620-SG27-20200630 CERT 362	10523718006	Air	06/30/2020 11:50	07/03/2020 09:30
GS-1620-Dup-3-20200630	10523718007	Air	06/30/2020 11:50	07/03/2020 09:30
GS-1620-Dup-3-20200630 CERT 28	10523718008	Air	06/30/2020 11:50	07/03/2020 09:30



Project Narrative

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10523718

Holding Times:

All holding times were met.

Blanks:

All blank results were below reporting limits.

Laboratory Control Samples:

All LCS recoveries were within QC limits.

Matrix Spikes and Duplicates:

All MS or MSD recoveries were within QC limits.

Surrogate:

All surrogate recoveries were within QC limits.

Appendix A
LABORATORY DATA PACKAGE COVER PAGE

This data package is for Job No. 10523718 and consists of:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 - Field chain-of-custody documentation;
- R2 - Sample identification cross-reference;
- R3 - Test reports (analytical data sheets) for each environmental sample that includes:
 - a. Items consistent with NELAC Chapter 5,
 - b. Dilution factors,
 - c. Preparation methods,
 - d. Cleanup methods, and
 - e. If required for the project, tentatively identified compounds (TICs).
- R4 - Surrogate recovery data including:
 - a. Calculated recovery (%R), and
 - b. The laboratory's surrogate QC limits.
- R5 - Test reports/summary forms for blank samples;
- R6 - Test reports/summary forms for laboratory control samples (LCSs) including:
 - a. LCS spiking amounts,
 - b. Calculated %R for each analyte, and
 - c. The laboratory's LCS QC limits.
- R7 - Test reports/summary forms for matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a. Samples associated with the MS/MSD clearly identified,
 - b. MS/MSD spiking amounts,
 - c. Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d. Calculated %Rs and relative percent differences, and
 - e. The laboratory's MS/MSD QC limits.
- R8 - Laboratory analytical duplicate (if applicable) recovery and precision:
 - a. The amount of analyte measured in the duplicate,
 - b. The calculated RPD, and,
 - c. The laboratory's QC limits for analytical duplicated.
- R9 - List of method quantitation limits (MQLs) and detectability check sample results for each analyte and
- R10 - Other problems or anomalies.

The exception Report for each "No" or "Not Reviewed (NR) " item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by [X] MDH on 04/12/2011

Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name (Printed)
Joanne Richardson

Signature


Official Title (Printed)
Project Manager

Date
07/10/2020



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: AA-1620-AA-3-20200630

Project ID: 19119232.440 HWPW

Lab ID: 10523718001

Moisture: N/A

Pace Project 10523718

Collected: 06/30/2020 11:07

Received 07/03/2020 09:30

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.39	< 0.18	U	ug/m3	0.45	0.18	07/09/2020 19:59		685781	10AIRJ	
Ethylbenzene	1.39	< 0.23	U	ug/m3	1.2	0.23	07/09/2020 19:59		685781	10AIRJ	
Naphthalene	1.39	< 1.7	U	ug/m3	3.7	1.7	07/09/2020 19:59		685781	10AIRJ	
m&p-Xylene	1.39	< 0.53	U	ug/m3	2.5	0.53	07/09/2020 19:59		685781	10AIRJ	
o-Xylene	1.39	< 0.24	U	ug/m3	1.2	0.24	07/09/2020 19:59		685781	10AIRJ	



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: AA-1620-AA-3-20200630 CERT 351

Project ID: 19119232.440 HWPW

Lab ID: 10523718002

Moisture: N/A

Pace Project 10523718

Collected: 06/30/2020 11:07

Received 07/03/2020 09:30

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
Individual Can Certification		Analytical Method: TO-15									
Benzene	0.5	< 0.065	U	ug/m3	0.16	0.065	06/19/2020 08:25		685050	10AIRJ	
Ethylbenzene	0.5	< 0.069	U	ug/m3	0.44	0.069	06/19/2020 08:25		685050	10AIRJ	
Naphthalene	0.5	< 0.64	U	ug/m3	1.3	0.64	06/19/2020 08:25		685050	10AIRJ	
m&p-Xylene	0.5	< 0.17	U	ug/m3	0.88	0.17	06/19/2020 08:25		685050	10AIRJ	
o-Xylene	0.5	< 0.074	U	ug/m3	0.44	0.074	06/19/2020 08:25		685050	10AIRJ	



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG25-20200630

Project ID: 19119232.440 HWPW

Lab ID: 10523718003

Moisture: N/A

Pace Project 10523718

Collected: 06/30/2020 10:52

Received 07/03/2020 09:30

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.94	< 0.25	U	ug/m3	0.63	0.25	07/09/2020 20:34		685781	10AIRJ	
Ethylbenzene	1.94	< 0.32	U	ug/m3	1.7	0.32	07/09/2020 20:34		685781	10AIRJ	
Naphthalene	1.94	< 2.4	U	ug/m3	5.2	2.4	07/09/2020 20:34		685781	10AIRJ	
m&p-Xylene	1.94	< 0.74	U	ug/m3	3.4	0.74	07/09/2020 20:34		685781	10AIRJ	
o-Xylene	1.94	< 0.34	U	ug/m3	1.7	0.34	07/09/2020 20:34		685781	10AIRJ	



Sample Results

Pace Analytical Services, LLC
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG25-20200630 CERT 306

Project ID: 19119232.440 HWPW

Lab ID: 10523718004

Moisture: N/A

Pace Project 10523718

Collected: 06/30/2020 10:52

Received 07/03/2020 09:30

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.13	U	ug/m3	0.32	0.13	06/18/2020 08:56		685050	10AIRJ
Ethylbenzene	1	< 0.14	U	ug/m3	0.88	0.14	06/18/2020 08:56		685050	10AIRJ
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	06/18/2020 08:56		685050	10AIRJ
m&p-Xylene	1	< 0.34	U	ug/m3	1.8	0.34	06/18/2020 08:56		685050	10AIRJ
o-Xylene	1	< 0.15	U	ug/m3	0.88	0.15	06/18/2020 08:56		685050	10AIRJ



Sample Results

Pace Analytical Services, LLC
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG27-20200630

Project ID: 19119232.440 HWPW

Lab ID: 10523718005

Moisture: N/A

Pace Project 10523718

Collected: 06/30/2020 11:50

Received 07/03/2020 09:30

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
TO15 MSV AIR		Analytical Method: TO-15								
Benzene	1.87	12.4		ug/m3	0.61	0.24	07/09/2020 21:09		685781	10AIRJ
Ethylbenzene	1.87	7.9		ug/m3	1.7	0.30	07/09/2020 21:09		685781	10AIRJ
Naphthalene	1.87	< 2.3	U	ug/m3	5.0	2.3	07/09/2020 21:09		685781	10AIRJ
m&p-Xylene	1.87	21.2		ug/m3	3.3	0.72	07/09/2020 21:09		685781	10AIRJ
o-Xylene	1.87	6.2		ug/m3	1.7	0.33	07/09/2020 21:09		685781	10AIRJ



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-SG27-20200630 CERT 362

Project ID: 19119232.440 HWPW

Lab ID: 10523718006

Moisture: N/A

Pace Project 10523718

Collected: 06/30/2020 11:50

Received 07/03/2020 09:30

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	0.18	J	ug/m3	0.32	0.13	06/17/2020 16:09		685050	10AIRH
Ethylbenzene	1	< 0.14	U	ug/m3	0.88	0.14	06/17/2020 16:09		685050	10AIRH
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	06/17/2020 16:09		685050	10AIRH
m&p-Xylene	1	< 0.34	U	ug/m3	1.8	0.34	06/17/2020 16:09		685050	10AIRH
o-Xylene	1	< 0.15	U	ug/m3	0.88	0.15	06/17/2020 16:09		685050	10AIRH



Sample Results

Pace Analytical Services, LLC
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-Dup-3-20200630

Project ID: 19119232.440 HWPW

Lab ID: 10523718007

Moisture: N/A

Pace Project 10523718

Collected: 06/30/2020 11:50

Received 07/03/2020 09:30

Matrix: Air

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.	
TO15 MSV AIR		Analytical Method: TO-15									
Benzene	1.83	1.5		ug/m3	0.59	0.23	07/09/2020 21:45		685781	10AIRJ	
Ethylbenzene	1.83	2.2		ug/m3	1.6	0.30	07/09/2020 21:45		685781	10AIRJ	
Naphthalene	1.83	< 2.3	U	ug/m3	4.9	2.3	07/09/2020 21:45		685781	10AIRJ	
m&p-Xylene	1.83	7.7		ug/m3	3.2	0.70	07/09/2020 21:45		685781	10AIRJ	
o-Xylene	1.83	3.1		ug/m3	1.6	0.32	07/09/2020 21:45		685781	10AIRJ	



Sample Results

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Client: UPRR_Golder

Client ID: GS-1620-Dup-3-20200630 CERT 28

Project ID: 19119232.440 HWPW

Lab ID: 10523718008

Moisture: N/A

Pace Project 10523718

Collected: 06/30/2020 11:50

Received 07/03/2020 09:30

Matrix: Air

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
Individual Can Certification		Analytical Method: TO-15								
Benzene	1	< 0.13	U	ug/m3	0.32	0.13	06/19/2020 09:09		685050	10AIRD
Ethylbenzene	1	< 0.14	U	ug/m3	0.88	0.14	06/19/2020 09:09		685050	10AIRD
Naphthalene	1	< 1.3	U	ug/m3	2.7	1.3	06/19/2020 09:09		685050	10AIRD
m&p-Xylene	1	< 0.34	U	ug/m3	1.8	0.34	06/19/2020 09:09		685050	10AIRD
o-Xylene	1	< 0.15	U	ug/m3	0.88	0.15	06/19/2020 09:09		685050	10AIRD



Quality Control

Pace Analytical Services, LLC
 1700 Elm St SE, Suite 200
 Minneapolis, MN 55414
 (612) 607-1700

Batch: 685781
Method: TO-15

Pace Project No.: 10523718
Instrument ID: 10AIRJ

Blank: 3667712

Parameters	Dilutio	Quals	Result	Units	MQL	SDL	Analysis Date	Prep Date
Benzene	0.5	U	<0.064	ug/m3	0.16	0.064	07/09/2020 13:15	
Ethylbenzene	0.5	U	<0.082	ug/m3	0.44	0.082	07/09/2020 13:15	
Naphthalene	0.5	U	<0.62	ug/m3	1.3	0.62	07/09/2020 13:15	
m&p-Xylene	0.5	U	<0.19	ug/m3	0.88	0.19	07/09/2020 13:15	
o-Xylene	0.5	U	<0.088	ug/m3	0.44	0.088	07/09/2020 13:15	

Laboratory Control Sample: 3667713

Parameters	Spk Amt	LCS Result	Units	LCS %Rec	% Rec Limits	LCS Quals
Benzene	33.5	27.0	ug/m3	80	70-133	
Ethylbenzene	45.6	36.3	ug/m3	80	70-142	
Naphthalene	57.7	54.0	ug/m3	94	63-130	
m&p-Xylene	91.2	72.6	ug/m3	80	70-141	
o-Xylene	45.5	34.9	ug/m3	77	70-135	



Unadjusted MQL

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10523718

Analyte	Method	Unadjusted MQL	Reporting Units
Benzene	TO-15	0.33	ug/m3
Ethylbenzene	TO-15	0.88	ug/m3
Naphthalene	TO-15	2.7	ug/m3
m&p-Xylene	TO-15	1.8	ug/m3
o-Xylene	TO-15	0.88	ug/m3



Pace Project 10523718

DEFINITIONS

- DF Dilution Factor
- J Estimated concentration above the adjusted method detection limit and below the adjusted reporting
- U Indicates the compound was analyzed for, but not detected.
- SDL Sample Detection Limit
- MQL Method Quantitation Limit
- LCS(D) Laboratory Control Sample (Duplicate)
- MS(D) Matrix Spike (Duplicate)
- DUP Sample Duplicate
- RPD Relative Percent Difference
- TNI The Nelac Institute

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

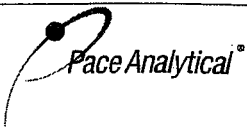


Quality Control Data Cross Reference Table

Pace Analytical Services, LLC
1700 Elm St SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Pace Project 10523718

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical	Analytical
10523718002	AA-1620-AA-3-20200630 CERT	TO-15	685050		
10523718004	GS-1620-SG25-20200630 CERT	TO-15	685050		
10523718006	GS-1620-SG27-20200630 CERT	TO-15	685050		
10523718008	GS-1620-Dup-3-20200630 CERT	TO-15	685050		
10523718001	AA-1620-AA-3-20200630	TO-15	685781		
10523718003	GS-1620-SG25-20200630	TO-15	685781		
10523718005	GS-1620-SG27-20200630	TO-15	685781		
10523718007	GS-1620-Dup-3-20200630	TO-15	685781		



Document Name:
Sample Condition Upon Receipt (SCUR) - Air

Document Revised: 24Mar2020
Page 1 of 1

Document No.:
ENV-FRM-MIN4-0113 Rev.00

Pace Analytical Services --
Minneapolis

Air Sample Condition
Upon Receipt

Client Name:

Project #:

WO#: 10523718

PM: NB3

Due Date: 07/10/20

CLIENT: UPRR_Golder

Courier: Fed Ex UPS USPS Client
 Pace Speedee Commercial See Exception

Tracking Number: 1723 2543 5477/5458

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Tin Can Other: _____ Temp Blank rec: Yes No

Temp. (TO17 and TO13 samples only) (°C): _____ Corrected Temp (°C): _____

Thermometer Used: G87A9170600254
 G87A9155100842

Temp should be above freezing to 6°C Correction Factor: _____

Date & Initials of Person Examining Contents: CEG 7/3/20

Type of ice Received Blue Wet None

Comments:

Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	3.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
Correct Containers Used? (Tedlar bags not acceptable container for TO-14, TO-15 or APH)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Containers Intact? (visual inspection/no leaks when pressurized)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Media: <u>Air Can</u> Airbag Filter TDT Passive		11. Individually Certified Cans <u>Y</u> N (list which samples)
Is sufficient information available to reconcile samples to the COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12.
Do cans need to be pressurized? (DO NOT PRESSURIZE 3C or ASTM 1946!!!)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	13.

Gauge # 10AIR26 10AIR34 10AIR35 4097

Canisters

Canisters

Sample Number	Can ID	Flow Controller	Initial Pressure	Final Pressure	Sample Number	Can ID	Flow Controller	Initial Pressure	Final Pressure
AA3	3518	1130	-1	5	Unused	2731	1136	-27.5	-
SG-25	3067	0634	-4	10	"	3213	0779	-26	-
SG-27	3625	0775	-3	10					
Dup 3	2887	0775	-2.5	10					
Unused	2908	-	-28	-					
"	2864	1732	-24	-					
"	3127	1161	-28	-					
"	0949	0735	-27	-					

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted: _____

Date/Time: _____

Comments/Resolution: _____

Project Manager Review:

Joanne Richardson

Date: 7-7-20

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)