

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 <span style="margin-left: 150px;">No</span>	
Address 1:		Program Area:	
Address 2:		Mail Code:	
City:	State: <b>Texas</b>	Is This A New Site To This Program Area? Yes <span style="margin-left: 150px;">No</span>	
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.			



March 31, 2020

Project No. 19119232

**Ms. Maureen Hatfield**

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

**RE: POST-RESPONSE ACTION COMPLETION REPORT – 2019  
UNION PACIFIC RAILROAD HOUSTON WOOD PRESERVING WORKS, HOUSTON, TEXAS  
4910 LIBERTY ROAD, HOUSTON, HARRIS COUNTY, TEXAS  
TCEQ SWR NO. 31547; TCEQ PERMIT/COMPLIANCE PLAN NO. 50343EPA ID NO. TXD000820266  
CUSTOMER NO. CN600131098; REGULATED ENTITY NO. RN100674613**

**Dear Ms. Hatfield:**

Golder Associates, Inc. (Golder), on behalf of Union Pacific Railroad Company (UPRR), is pleased to provide the attached electronic version of the Post-Response Action Completion Report (PRACR) for 2019 the above referenced site your review. If you have any questions or need additional information, please feel free to call me at (512) 671-3434 or email [Eric\\_Matzner@golder.com](mailto:Eric_Matzner@golder.com); or Mr. Kevin Peterburs of UPRR at (414) 267-4164 and email [KJPETERB@UP.COM](mailto:KJPETERB@UP.COM).

Sincerely,

**Golder Associates Inc.**

A handwritten signature in black ink, appearing to read 'Eric Matzner', written over a light blue horizontal line.

Eric C. Matzner, P.G.  
*Program Leader/ Associate*

ECM

CC: Mr. Kevin Peterburs, UPRR – Milwaukee, WI  
Ms. Alma Jefferson, Waste Section Manager, TCEQ Region 12 Office,  
Houston

**Attachment**

<https://golderassociates.sharepoint.com/sites/116841/project/files/6/deliverables/pracr/2019/pracr/houston,tx-woodpreservingworks2019pracrcoverletter20200331.docm>

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**Golder Associates Inc.**  
2201 Double Creek Dr, Suite 4004, Round Rock, Texas, USA 78664

T: +1 512 671-3434 F: +1 512 671-3446

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY Post-Response Action Care Report (PRACR)

## Cover Page

Submittal date: March 31, 2020 Regulatory ID No.: SWR 31547 TCEQ Region No.: 12

### TCEQ Program (check one)

<input checked="" type="checkbox"/>	Corrective Action (Mail Code 127)	<input type="checkbox"/>	Superfund PRP Lead (Mail Code 143)
<input type="checkbox"/>	Voluntary Cleanup Program (Mail Code 221)	<input type="checkbox"/>	Municipal Solid Waste Permits (Mail Code 124)
<input type="checkbox"/>	Petroleum Storage Tank Program (Mail Code 137)		

### On-Site Property Information

On-Site Property Name: Union Pacific Railroad Houston Wood Preserving Works Site  
Physical Address:  
Street no. 4910 Pre dir:  Street name Liberty Street type: Rd Post dir:   
City: Houston County: Harris County Code: 101 Zip: 77007  
Nearest street intersection or location description: Site is located south of Liberty Rd. between Kashmere and Lockwood St., and north of Lee St.  
Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North 29.787413  
Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West 95.321062

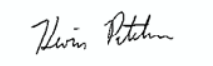
### Off-Site Affected Property Information

Off-Site Affected Property Name:   
Physical Address:  
Street no.  Pre dir:  Street name:  Street type:  Post dir:   
City:  County:  County Code:  Zip:   
 Check if no off-site properties affected

### Contact Person Information and Acknowledgement

Person (or company) Name: Union Pacific Railroad  
Contact Person: Kevin Peterburs Title: Manager, Site Remediation  
Mailing Address: 4823 N 119th Street  
City: Milwaukee State: WI Zip: 53225 E-mail address [kjpeterb@up.com](mailto:kjpeterb@up.com)  
Phone: 414-267-4164 Fax: 402-659-1496

By my signature below, I acknowledge the requirement of 30 TAC §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person  Name, print: Kevin Peterburs Date: 3/31/20

<b>PRACR Executive Summary</b>	ID No: SWR No. 31547
	Report Date: March 30, 2020

Affected Property Name/Number: UPRR Houston Wood Preserving Works Site

Date of RAP approval: Not Approved, currently preparing response to TCEQ TNOD No. 4 (RAP Rev 5 to be submitted August 31, 2020)

Date of RACR approval: Not Approved, currently preparing response to TCEQ TNOD No. 4 (RAP Rev 5 to be submitted August 31, 2020)

Length of approved PRAC period (default 30 yrs.): Not Approved, currently under revision (Rap Rev 5)

Check if this is the final report

If this is the final report, provide documentation in Worksheet 4.0 that the applicable provisions of §350.33(i) have been met.

This reporting period: Start date: January 1, 2019 End date: December 31, 2019

On-site land use for basis of RACR approval  Residential  Commercial/industrial  
 Current on-site land use classification:  Residential  Commercial/industrial

During this reporting period, have there been any unexpected events or new conditions at the affected property that required an additional response action?  Yes  No

If yes, provide a brief explanation:

During the July 2017 quarterly inspection of the capped areas (see Figure 1), a tar-like substance was observed surfacing through the joints and cracks in the concrete and asphalt surfaces primarily in the area of parking slots B100 to B109 within the Englewood Intermodal Yard shown on the attached Figure 2. Since the initial observation of the tar-like substance at the surface, weekly inspections of the affected area were conducted. In 2018, Golder conducted test pits to evaluate the non-aqueous phase liquids (NAPL) in the areas where the seeps were observed and proposed to install a NAPL collection system as a response action to address the seeps. A proposed NAPL Collection System design as an interim measure was detailed in the Monthly Status Update dated October 31, 2018 submitted to the TCEQ. The TCEQ approved UPRR to proceed with the interim measure in a letter dated December 6, 2018. The NAPL collection system with three NAPL collection sumps was installed in January 2019 (Figure 2). Details of the installation were provided in the Response Action Completion Report (RACR) dated March 26, 2019 (Golder, 2019) with the 2018 Post-Response Action Completion Report (PRACR) dated March 29, 2019.

Since the installation of the NAPL Collection System, weekly inspections of the affected area have continued along with inspections of the NAPL Collection System. In early March 2019, water was noted within each of the NAPL collections sumps, with a slight sheen on the water. The source of the water is likely from storm water. The water in the sumps was first pumped down in May where some NAPL was recovered and transferred to a frac tank during the May 24, 2019 pump down. Details regarding this event and response were provided in the Monthly Status Updates for May and June 2019. In August, another frac tank was set up near Slot B109 to allow more frequent pump downs of the sumps as they fill with water. In response to the TCEQ comment letter dated August 9, 2019, a notation on the presence of NAPL in each sump, tabulation of depth and thickness of NAPL if detected, and a tabulation of total contaminant mass of NAPL recovered from each sump is provided in the monthly status update reports. After the NAPL recovered during the May 2019 pump down, only small volumes of dense NAPL (DNAPL) appearing as a tar-like substance have been recovered from



## PRACR Executive Summary

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Sump 3 (B107/108 slots) and no NAPL has been detected in the sumps using the interface probe. Varying amounts of the tar-like NAPL continued to surface in historical pavement seep areas throughout 2019. UPRR is evaluating possible response actions to the continued NAPL seeps.

Beginning in late May 2019, during weekly inspections of the affected area, areas of brown stains on the concrete pavement and evidence of seeps of a dark brown to black water were observed along cracks in the pavement and low-lying areas. The staining and seeps were observed throughout the B-Row (predominately in the B090 – B098 area) but were also observed within the A-Row and C-Row (Figure 2). On May 23, 2019, UPRR contractor United States Environmental Services (USES) was called to the Site to pressure wash the areas and collect the fluids, which were placed in a tote on site. USES returned to the site about weekly or every other week through July 2, 2019, when most of the water seeps had dried up or were too small to be recovered with a vacuum truck. Samples of the recovered water were collected, and details of the analysis were provided in the July 2019 monthly update. Little to no water has been observed during weekly inspections since July of 2019. UPRR is continuing to evaluate possible sources of the seep water and potential responses to address surfacing of the water.

On August 9, 2019, a contractor opened a valve to an abandoned water line that is located beneath the Soil Cap at the Site. This led to water emanating from the location of a former fire hydrant that was present prior to the construction of the Soil Cap. Water flowed through the capped soils, up through the Soil Cap, and over the Soil Cap to the south-southeast, across an asphalt road, and then to a ditch along the railroad tracks. The water flowed down the ditch approximately 200 yards to the northeast to Liberty Road and under the Lockwood Drive Bridge. The flowing water extended beyond the intersection of Liberty Road and Lockwood Drive approximately 300 yards northeast on Liberty Road. UPRR was notified of the water leak on the morning of August 10, 2019 and emergency response activities were initiated. Once the source of the water was identified, the valve was closed at approximately 10:36 am on August 10, 2019. Because the water may have come into contact with contaminated soils, UPRR promptly reported the incident and subsequent release to the Texas Commission on Environmental Quality (TCEQ) (Spill Report No. 20192773 and NRC Report No. 1254765) upon discovery and began the initial spill response actions on August 10, 2019. Remediation contractor NRC arrived onsite to capture the flowing water using a vacuum truck and remove the water that was leaving the Site and ponding at the intersection of Liberty Road and Lockwood Drive. An absorbent boom was placed in the ditch as a preventative measure in case there were any hydrocarbons present in the flowing water. No observations of hydrocarbon sheens or odors were noted during the response activities. Approximately 15,000 gallons of water was recovered with the vacuum truck was transferred to a frac tank and staged on-site. Water samples were collected adjacent to the Soil Cap, in the ditch adjacent to the railroad tracks, and from the frac tank and analyzed for TPH, BTEX, and PAHs. None of the TPH, BTEX, or PAH concentrations on the two runoff samples exceeded the TRRP <sup>GW</sup>GW<sub>ing</sub> PCLs or TCEQ ecological surface water (freshwater) acute values. Ethylbenzene, toluene, total xylenes, PAHs, and TPH were detected in the frac tank sample, but the concentrations were likely a result of urban run-off from Liberty Road and not as a result of the water leak from the Site. Upon inspection of where the leak occurred, there did not appear to be significant damage to the Soil Cap. The water valves were covered with concrete to eliminate the risk of turning the abandoned line on in the future. Full details of the incident and response actions were provided in a letter report dated September 18, 2019 to the TCEQ. (copy of the letter is provided in Appendix 4).

## PRACR Executive Summary

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Report Date: March 30, 2020

If physical control inspection occurred during this reporting period, what is the status of the physical control?

Quarterly inspections were conducted of the five main cap areas on January 11, April 25, July 10, and October 30, 2019. The following observations were made of the five capped areas:

- **Soil Cap** –The soil cap area continues to function as designed with minor areas of erosion rills (1<sup>st</sup> Quarterly Inspection only) and bare spots (noted during each Quarterly Inspection). Pollinator plants that were seeded into the soil cap had good coverage across the soil cap area. Repairs conducted in 2018 (including filling in with topsoil, re-seeding minor erosion rills, and revegetating a few bare spots along the slopes of the soil cap) appear to have improved overall conditions on the soil cap. UPRR will continue to monitor these areas.
- **Concrete Sidewalk Cap** – The sidewalk cap area appeared to be in good condition during the quarterly inspections and is functioning as intended. The only maintenance that occurred in this area throughout 2019 was routine removal and mowing of vegetation.
- **Asphalt Road Cap** – The asphalt road cap appeared to be in good condition and functioning as designed. A small hole was noticed during the 4<sup>th</sup> Quarterly Inspection between the concrete barriers and the asphalt roadway. UPRR will continue to monitor this, and ensure no impact is made to the asphalt roadway. A small oil stain, which was noted during the 2017 and 2018 inspections, did not appear to expand in size based compared to the previous inspections.
- **Railroad Ballast Cap** – The railroad ballast cap area appeared to be in good condition, with some vegetation growth within the ballast area. UPRR will continue to remove and control the vegetation within the railroad ballast cap area as needed.
- **Concrete Cap (Englewood Intermodal Yard)** – The concrete cap area in the Englewood Intermodal Yard continues to function as intended. Response actions (i.e., NAPL Collection System installed in February 2019) for the areas where the tar-like substance has seeped to the surface and the brown water surfacing (spring/summer only) are currently being evaluated as described in Worksheet 2.0. Weekly inspections of the affected area continue to be conducted.

Have any changes occurred in the person's status during this reporting period to warrant changes in the financial assurance for this affected property? (For example, a change in "small business" status as defined in §350.33(n)(2).) Yes  No

If yes, describe the changes that occurred and the changes in financial assurance that have been or will be taken.

# Checklist for Report Completeness

ID No. SWR No. 31547

Report Date: March 30, 2020

## Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes, include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (\*) are not included in the blank form and are to be provided by the person.

Report Contents

		Required	<b>Cover Page</b>	<input checked="" type="checkbox"/>
		Required	<b>Executive Summary</b>	<input checked="" type="checkbox"/>
		Required	<b>Checklist for Report Completeness</b>	<input checked="" type="checkbox"/>
No <input checked="" type="checkbox"/>	Has COC concentration monitoring been conducted?	<input type="checkbox"/> Yes	<b>Worksheet 1.0</b> Monitoring Activities	<input type="checkbox"/>
			<b>Attachment 1A*</b> Monitoring Locations Map	<input type="checkbox"/>
No <input checked="" type="checkbox"/>	Have groundwater elevation measurements been taken?	<input type="checkbox"/> Yes	<b>Attachment 1B*</b> Groundwater Gradient Maps	<input type="checkbox"/>
No <input type="checkbox"/>	Is a physical control present?	<input checked="" type="checkbox"/> Yes	<b>Worksheet 2.0</b> Physical Control Inspection, Operation, and Maintenance	<input checked="" type="checkbox"/>
No <input checked="" type="checkbox"/>	Is monitoring being performed?	<input type="checkbox"/> Yes	<b>Worksheet 3.0</b> COC Status	<input type="checkbox"/>
			<b>Attachment 3A*</b> Time Series Graphs	<input type="checkbox"/>
			<b>Attachment 3B*</b> Concentration versus Distance Graphs	<input type="checkbox"/>
			<b>Attachment 3C*</b> PCLE Zone Maps and Cross Sections	<input type="checkbox"/>
			<b>Attachment 3D*</b> Data Summary	<input type="checkbox"/>
No <input checked="" type="checkbox"/>	Is this the final report? <sup>1</sup>	<input type="checkbox"/> Yes	<b>Worksheet 4.0</b> Response Action Objectives	<input type="checkbox"/>
No <input checked="" type="checkbox"/>	Is monitoring being performed?	<input type="checkbox"/> Yes	<b>Appendix 1*</b> Analytical Data	<input type="checkbox"/>
			<b>Appendix 2*</b> Disposition of Derived Waste	<input type="checkbox"/>
		Required	<b>Appendix 3*</b> Chronology	<input checked="" type="checkbox"/>

<sup>1</sup> See §350.33(i) to see if conditions are met to justify termination of post-response action care.  
TCEQ-10329/PRACR February 2005

Complete this worksheet if a physical control is used as part of the response action.

Provide a detailed description of post-response action care activities during this reporting period related to the inspection, operation, and maintenance of physical controls during this reporting period. Specifically note any differences from the plan documented in the approved RAP and the justification for the variances.

As detailed in the RAP Worksheet 5.0 (pending TCEQ approval), visual inspections will be performed on a quarterly basis and after all major storms of the capped areas shown on Figure 1. The inspections will focus on the following major issues:

- 1) Erosion of the cap (gullies, rills, or other erosional features on the cap surface or in drainages)
- 2) Sideslope sloughing (slippage)
- 3) Settling/subsidence
- 4) Vegetation deterioration
- 5) Damage from animals (i.e., rodents)
- 6) Groundwater monitoring equipment (wells) (semi-annual basis)

Locations where deficiencies are found shall be marked and repaired as soon as practicable.

**Quarterly Site Inspections (January 11, April 25, July 10, and October 30, 2019)**

Quarterly site inspections of the four cap areas were conducted during the four quarters of 2019. Inspection logs and photographic logs for the quarterly inspections are provided in Attachment A. Results of the site inspections are provided below.

**1st Quarter, 2019 – Inspection Date: 01/11/19**

- Soil Cap -The soil cap area did not appear to have any significant erosion, sloughing, or subsidence. Some minor erosion rills (see Photo No. 2 (Lat: 29.787391, Long: -95.318693)) and a few bare spots (Photo No. 4 (Lat: 29.787434, Long: -95.318457)) were noted along the slopes of the soil cap, but the cap appeared to be functioning as designed. Since the inspection occurred in January, most of the vegetation was dormant.
- Asphalt Road Cap – Asphalt road cap appeared to be in good condition, with minor cracks observed. Additionally, weeds, minor ant hills, and other vegetation was noticed along the edge of the concrete cap under the barriers (see Photo Nos. 5 (Lat: 29.786351, Long: -95.319323) and 6 (Lat: 29.785820, Long: -95.320512)). A small oil stain (see Photo No. 11 (Lat: 29.785356, Long: -95.321646)), which was noted during the 2017 and 2018 inspections, did not appear to expand in size based compared to the previous inspections.
- Railroad Ballast Cap – The railroad ballast cap area appeared to be in good condition, with some vegetation growth within the ballast area (Photo No. 10 (Lat: 29.785911, Long: -95.320318) and Photo No. 11 (Lat: 29.785356, Long: -95.321646)).
- Concrete Cap (Englewood Intermodal Yard) – Cracks in the pavement were noted, but no soil appeared to be exposed (Photo Nos. 15, 18, 20 through 22). In the area of parking slots B096 to B109, a tar-like substance had previously been observed in the joints and cracks in the concrete and asphalt surfaces in the area shown on the attached Figure 2. However, it was not observed during this quarterly inspection. A very small amount of tar seep was noted at Slot B106 (Photo No. 24 (Lat: 29.784202, Long: -95.320957)). Weekly inspections and recovery of the tar-like substance (upon reappearance) continue to be conducted.

• Concrete Sidewalk Cap – The sidewalk cap area appeared to be in good condition and functioning as intended.

**2<sup>nd</sup> Quarter 2019 – Inspection Date: 04/25/19**

• Soil Cap -The soil cap area did not appear to have any significant erosion, sloughing, or subsidence. Pollinator plants were observed across the soil cap area. A few bare spots (Photo No. 4 (Lat: 29.787346, Long: -95.318356) and 6 (Lat: 29.787568, Long: -95.316656)) were noted on top and along the slopes of the soil cap, but the cap appeared to be functioning as designed.

• Asphalt Road Cap – Asphalt road cap appeared to be in good condition, with minor cracks observed. Additionally, weeds and other vegetation was noticed along the edge of the concrete cap under the barriers (see Photo Nos. 8 (Lat: 29.787014, Long: -95.317797) and 11 (Lat: 29.785365, Long: -95.321646)). The small oil stains (see Photo No. 11 (Lat: 29.785356, Long: -95.321646)), which was noted during the previous inspections, did not appear to expand in size.

• Railroad Ballast Cap – The railroad ballast cap area appeared to be in good condition, with some vegetation growth within the ballast area (Photo No. 7 (Lat: 29.787302, Long: -95.317003) and Photo No. 12 (Lat: 29.784483, Long: -95.323572)). Some railroad lumber was noted in the ballast area (Photo No. 10 (Lat: 29.786595, Long: -95.318702)).

• Concrete Cap (Englewood Intermodal Yard) – Cracks in the pavement were noted, but no soil appeared to be exposed (Photo No. 21 (Lat: 29.784884, Long: -95.319337)). Small amounts of the tar-like substance was observed during the inspection surfacing through the joints and cracks in some of the B row slots (B096-B110) (B096 Photo No. 23 (Lat: 29.784252, Long: -95.320655) and B101 Photo No. 24 (Lat: 29.784249, Long: -95.320838)) and at B013, B054, and B057 (Photo No. 22 (Lat: 29.784762, Long: -95.319596) in the concrete and asphalt surfaces in the area shown in the attached Figure 2. Weekly inspections and recovery of the tar-like substance continue to be conducted. The newly installed NAPL Collection System (February 2019) is being inspected weekly. Water was noted in each of the sumps at B099/B100 Slot (Photo No. 20 (Lat: 29.784238, Long: -95.320778), B103/B104, and B107/B108 (Photo No. 27 (Lat: 29.784144, Long: -95.321016)). Beginning in April, areas of brown stains on the concrete pavement and evidence of seeps of a dark brown to black water were observed along cracks in the pavement and low-lying areas, specifically in Slots B097 (Photo No. 29 (Lat: 29.784267, Long: -95.320706)) and B096 (Photo No. 30 (Lat: 29.784300, Long: -95.320677)). As noted in the Monthly Status Update dated May 31, 2019 for the NAPL Collection System, UPRR contractor United States Environmental Services (USES) was called to the Site on May 23, 2019 to pressure wash the areas where the brown water was collecting and collect the fluids in a tote on site. The general area where the brown water seeps were noted in May through June is shown on Figure 2. USES returned to the site about weekly or every other week through July 2, 2019, when most of the water seeps had dried up or were too small to be recovered with a vacuum truck.

• Concrete Sidewalk Cap – The sidewalk cap area appeared to be in good condition (though with heavy vegetation in some areas along joints in the concrete, vegetation was removed from sidewalk cap on April 25, 2019) and functioning as intended (see Photo Nos. 13 (Lat: 29.787589, Long: -95.317726) and 14 (Lat: 29.787582, Long: -95.318447)).

**3<sup>rd</sup> Quarter 2019 – Inspection Date: 07/10/19**

• Soil Cap -The soil cap area (see Photo Nos. 1 through 6 (Lat: 29.787228, Long: -95.319395)) did not appear to have any significant erosion, sloughing, or subsidence. Soil cap with good vegetative coverage including pollinator plants (Photo No. 2 (Lat: 29.787222, Long: -95.317869)). A few bare spots were noted along the slopes of the soil cap and in the northeast portion of the soil cap ((Photo No. 5 (Lat: 29.787559, Long: -95.316746))), but the cap appeared to be functioning as designed.

• Asphalt Road Cap – Asphalt road cap appeared to be in good condition, with minor cracks observed. Additionally, weeds and other vegetation was noticed along the edge of the concrete cap under the barriers (see Photo Nos. 7 through 12 (Lat: 29.785242, Long: -95.321913)).

• Railroad Ballast Cap – The railroad ballast cap area appeared to be in good condition, with some vegetation growth within the ballast area (see Photo Nos. 7, 8, 10, 11, and 12 (Lat: 29.784417, Long: -95.323802)). Some various debris was also observed (see Photo No. 11 (Lat: 29.784531, Long: -95.323501)) in the ballast cap.

• Concrete Cap (Englewood Intermodal Yard) – Cracks in the pavement were noted, but no soil appeared to be exposed (Photo Nos. 15, 17, 18, 29, and 30 (Lat: 29.784765, Long: -95.319569)). Small amounts of the tar-like substance was observed during the inspection surfacing through the joints and cracks in some of the A row slots ((A010), see Photo Nos. 13 and 14 (Lat: 29.785519, Long: -95.318334)) and B row slots (B096, B101, and B105) in the concrete and asphalt surfaces in the area shown in the attached Figure 2. Weekly inspections and recovery of the tar-like substance continue to be conducted. The newly installed NAPL Collection System is being inspected weekly. Water was noted in each of the sumps at B099/B100 Slot (Photo Nos. 21 and 22 (Lat: 29.784267, Long: -95.320773)), B103/B104 (Photo Nos. 23 and 24 (Lat: 29.784217, Long: -95.320885)), and B107/B108 (Photo Nos. 25 and 26 (Lat: 29.784173, Long: -95.320999)). The brown water staining (in July no seep water observed along cracks in the pavement and low-lying areas) was observed specifically in Slots B096 (Photo No. 28 (Lat: 29.784371, Long: -95.320708)) and B098 (Photo No. 29 (Lat: 29.784328, Long: -95.320763)). As discussed for the April 2019 inspection, most of the water seeps had dried up by early July or were too small to be recovered with a vacuum truck.

• Concrete Sidewalk Cap – The sidewalk cap area appeared to be in good condition (though with heavy vegetation growing within the joints of the concrete sidewalk in some areas) and functioning as intended (see Photo Nos. 31 through 33 (Lat: 29.787619, Long: -95.317971)).

**4<sup>th</sup> Quarter 2019 – Inspection Date: 10/30/19**

• Soil Cap -The soil cap area (see Photo Nos. 1 through 4 (Lat: 29.787397, Long: -95.318630)) did not appear to have any significant erosion, sloughing, or subsidence. Minor erosion rills were difficult to find due to the heavy vegetation. A few bare spots (Photo No. 2 (Lat: 29.787222, Long: -95.317869)) were noted along the slopes of the soil cap, but the cap appeared to be functioning as designed.

• Asphalt Road Cap – Asphalt road cap appeared to be in good condition, with minor cracks observed. Additionally, weeds and other vegetation was noticed along the edge of the concrete cap under the barriers (see Photo Nos. 8 (Lat: 29.784531, Long: -95.323501) and 10 (Lat: 29.785480, Long: -95.321342)). A minor gap settlement under the concrete barrier was



- **Soil Cap** –The soil cap area continues to function as designed with minor areas of erosion rills (1<sup>st</sup> Quarterly Inspection only) and bare spots (noted during each Quarterly Inspection). Pollinator plants that were seeded into the soil cap had good coverage across the soil cap area. Repairs conducted in 2018 (including filling in with topsoil, re-seeding minor erosion rills, and revegetating a few bare spots along the slopes of the soil cap) appear to have improved overall conditions on the soil cap. UPRR will continue to monitor these areas.
- **Concrete Sidewalk Cap** – The sidewalk cap area appeared to be in good condition during the quarterly inspections and is functioning as intended. The only maintenance that occurred in this area throughout 2019 was routine removal and mowing of vegetation.
- **Asphalt Road Cap** – The asphalt road cap appeared to be in good condition and functioning as designed. A small hole was noticed during the 4<sup>th</sup> Quarterly Inspection between the concrete barriers and the asphalt roadway. UPRR will continue to monitor this, and ensure no impact is made to the asphalt roadway. A small oil stain, which was noted during the 2017 and 2018 inspections, did not appear to expand in size based compared to the previous inspections.
- **Railroad Ballast Cap** – The railroad ballast cap area appeared to be in good condition, with some vegetation growth within the ballast area. UPRR will continue to remove and control the vegetation within the railroad ballast cap area as needed.
- **Concrete Cap (Englewood Intermodal Yard)** – The concrete cap area in the Englewood Intermodal Yard continues to function as intended. Response actions (i.e., NAPL Collection System installed in February 2019) for the areas where the tar-like substance has seeped to the surface and the brown water surfacing (spring/summer only) are currently being evaluated. Weekly inspections of the affected area continue to be conducted.

Discuss any unexpected events or new conditions that developed on-site (and off-site, if applicable) during this reporting period and the resulting responses or modifications made to the monitoring plan. Indicate the date the event or condition occurred, the date discovered, the actions taken, and the dates of those actions. Include this information in the chronology in Appendix 3.

During the July 2017 quarterly inspection of the capped areas (see Figure 1), a tar-like substance was observed surfacing through the joints and cracks in the concrete and asphalt surfaces primarily in the area of parking slots B100 to B109 within the Englewood Intermodal Yard shown on the attached Figure 2. Since the initial observation of the tar-like substance at the surface, weekly inspections of the affected area were conducted. In 2018, Golder conducted test pits to evaluate the NAPL in the areas where the seeps were observed and proposed to install a NAPL collection system as a response action to address the seeps. A proposed NAPL Collection System design as an interim measure was detailed in the Monthly Status Update dated October 31, 2018 submitted to the TCEQ. The TCEQ approved UPRR to proceed with the interim measure in a letter dated December 6, 2018. The NAPL collection system with three NAPL collection sumps was installed in January 2019 (Figure 2). Details of the installation were provided in the Response Action Completion Report (RACR) dated March 26, 2019 (Golder, 2019) with the 2018 Post-Response Action Completion Report (PRACR) dated March 29, 2019.



Since the installation of the NAPL Collection System, weekly inspections of the affected area have continued along with inspections of the NAPL Collection System. In early March, water was noted within each of the NAPL collections sumps, with a slight sheen on the water. The source of the water is likely from storm water. The water in the sumps was first pumped down in May where some NAPL was recovered and transferred to a frac tank during the May 24, 2019 pump down. The recovered fluids were recycled at the Intergulf Corp. Facility in Pasadena, TX. Details regarding this event and response were provided in the Monthly Status Updates for May and June 2019. In August, another frac tank was set up near Slot B109 to allow more frequent pump downs of the sumps as they fill with water. In response to the TCEQ comment letter dated August 9, 2019, a notation on the presence of NAPL in each sump, tabulation of depth and thickness of NAPL if detected, and a tabulation of total contaminant mass of NAPL recovered from each sump is provided in the monthly status update reports. After the NAPL recovered during the May 2019 pump down, only small volumes of dense NAPL (DNAPL) appearing as a tar-like substance have been recovered from Sump 3 (B107/108 slots) and no NAPL has been detected in the sumps using the interface probe. Varying amounts of the tar-like NAPL continued to surface in historical pavement seep areas throughout 2019. UPRR is evaluating possible response actions to the continued NAPL seeps.

Beginning in late May 2019, during weekly inspections of the affected area, areas of brown stains on the concrete pavement and evidence of seeps of a dark brown to black water were observed along cracks in the pavement and low-lying areas. The staining and seeps were observed throughout the B-Row (predominately in the B090 – B098 area) but were also observed within the A-Row and C-Row (Figure 2). On May 23, 2019, UPRR contractor United States Environmental Services (USES) was called to the Site to pressure wash the areas and collect the fluids, which were placed in a tote on site. USES returned to the site about weekly or every other week through July 2, 2019, when most of the water seeps had dried up or were too small to be recovered with a vacuum truck. Samples of the recovered water were collected, and details of the analysis were provided in the July 2019 monthly update. Little to no water has been observed during weekly inspections since July of 2019. UPRR is continuing to evaluate possible sources of the seep water and potential responses to address surfacing of the water.

On August 9, 2019, a contractor opened a valve to an abandoned water line that is located beneath the Soil Cap at the Site. This led to water emanating from the location of a former fire hydrant that was present prior to the construction of the Soil Cap. Water flowed through the capped soils, up through the Soil Cap, and over the Soil Cap to the south-southeast, across an asphalt road, and then to a ditch along the railroad tracks. The water flowed down the ditch approximately 200 yards to the northeast to Liberty Road and under the Lockwood Drive Bridge. The flowing water extended beyond the intersection of Liberty Road and Lockwood Drive approximately 300 yards northeast on Liberty Road. UPRR was notified of the water leak on the morning of August 10, 2019 and emergency response activities were initiated. Once the source of the water was identified, the valve was closed at approximately 10:36 am on August 10, 2019. Because the water may have come into contact with contaminated soils, UPRR promptly reported the incident and subsequent release to the Texas Commission on Environmental Quality (TCEQ) (Spill Report No. 20192773 and NRC Report No. 1254765) upon discovery and began the initial spill response actions on August 10, 2019. Remediation contractor NRC arrived onsite to capture the flowing water using a

vacuum truck and remove the water that was leaving the Site and ponding at the intersection of Liberty Road and Lockwood Drive. An absorbent boom was placed in the ditch as a preventative measure in case there were any hydrocarbons present in the flowing water. No observations of hydrocarbon sheens or odors were noted during the response activities. Approximately 15,000 gallons of water was recovered with the vacuum truck was transferred to a frac tank and staged on-site. Water samples were collected adjacent to the Soil Cap, in the ditch adjacent to the railroad tracks, and from the frac tank and analyzed for TPH, BTEX, and PAHs. None of the TPH, BTEX, or PAH concentrations on the two runoff samples exceeded the TRRP <sup>GW</sup>GW<sub>ing</sub> PCLs or TCEQ ecological surface water (freshwater) acute values. Ethylbenzene, toluene, total xylenes, PAHs, and TPH were detected in the frac tank sample, but the concentrations were likely a result of urban run-off from Liberty Road and not as a result of the water leak from the Site. Upon inspection of where the leak occurred, there did not appear to be significant damage to the Soil Cap. Full details of the incident and response actions were provided in a letter report dated September 18, 2019 to the TCEQ (copy of the letter is provided in Appendix 4).

If the physical control is a containment system (e.g., hydraulic containment), what percentage of the time was the system effectively operational?

--









HWPW

Englewood  
Intermodal Yard

**LEGEND**

- UPRR PROPERTY BOUNDARY
-  RAILROAD BALLAST CAP AREA
-  ASPHALT CAP AREA
-  SOIL CAP
-  CONCRETE CAP AREA

**REFERENCE(S)**

PARCEL BOUNDARIES: CITY OF HOUSTON GEOGRAPHIC INFORMATION & MANAGEMENT SYSTEM (GIMS).  
 AERIAL: GOOGLE EARTH, PHOTOGRAPHY DATED 10/28/17.



CLIENT  
 UNION PACIFIC RAILROAD CO.

PROJECT  
 HOUSTON WOOD PRESERVING WORKS

TITLE  
 CAPPED AREAS

CONSULTANT	YYYY-MM-DD	2019-03-29
	DESIGNED	AJD
	PREPARED	AJD
	REVIEWED	ECM
	APPROVED	ECM

Path: C:\Users\jtemp\Desktop\30401358 - Capped Areas.dwg | Last Edited By: jtemp | Date: 2019-03-29 Time: 9:10:10 AM | Printed By: jtemp | Date: 2019-03-29 Time: 9:21:30 AM

1" = 320'      IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB





**ATTACHMENT A**

**2019 QUARTERLY INSPECTION RECORDS AND PHOTOGRAPHIC LOGS**

**ATTACHMENT A1**

**FIRST QUARTER 2019 (JANUARY 11<sup>TH</sup>) INSPECTION RECORD AND PHOTOGRAPHIC  
LOG**



**UPRR HWPW - Quarterly Site Inspection Record**

Date: 1/11/2019

Time Started: 10:51 am

Time Ended: 12:30 pm

Weather Conditions: Clear, Cool

Observations/Comments: Fence needs a lot of work and highly recommend that action is taken so the site is fully secured. As of now there are areas where animals, and humans can easily access the site.

CAPPED AREA	ITEM	Evidence Observed?		Improvements Necessary		COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
		Yes	No	Yes	No	
Soil Cap	Erosion (gullies, rills)	X			X	Start of minor rills beginning to form, can become issue with continuing heavy rains. No action required yet.
	Settlement		X		X	None observed.
	Animal Damage	X			X	Minor ant hills
	Intrusive Shrubs/Trees		X		X	None observed.
	Vegetation Coverage	X			X	Good vegetative cover across cap.
	Stressed Vegetation		X		X	None observed.
	Monitoring Wells Condition	X			X	Wells in the capped area were well mowed and clear.
Asphalt Roadway	Surface Damage		X		X	Some minor cracking observed in one location along concrete barriers.
	Signs of ExposedSoils		X		X	None observed. Small oily stains on asphalt roadway cap noted.
	Settlement		X		X	None observed.
Ballast Cap	Surface Damage		X		X	None observed.
	Signs of ExposedSoils		X		X	None observed.
	Intrusive Vegetation	X		X		Heavy vegetation present in several locations.
Concrete Cap (Englewood Intermodal Yard)	Surface Damage	X		X*	X	Localized cracking along parking stall rows. Joint sealant missing in several locations. Evidence of NAPL seepage in some parking row B stalls ( B57& B106 ). * UPRR has a concrete pavement maintenance inspection/maintenance program.
	Signs of Exposed Soils		X		X	None observed.
	Intrusive Vegetation		X		X	None observed.
Concrete Cap (Sidewalk)	Surface Damage		X		X	None observed.
	Signs of Exposed Soils		X		X	None observed.
	Intrusive Vegetation		X		X	None observed.
<b>Other Areas</b>						
Container Storage Area	Valve Position (Closed)	X			X	Valve in closed position.
	Holding Water	X			X	Minor amount of ponding water, algae growing on water, about a 1/4" depth of ponding water from past heavy rainfall events.
	Sheen/Floating Solids	X			X	
Security Fence	Damaged Posts or Wire	X		X		Main Entrance - Loose Barbed Wire; 150' west of Main; 400' west of Main Entrance - Missing posts damaged chain link; 500' west of main entrance - Missing posts and damaged chain link; NW corner along Liberty Road Bend cross bar; West Fence along Kashmere St - fence has been breached; West fence along Amboy Street - fallen cross bar and heavy vegetation growing around fence
	Functioning Properly	X		X		The fence is still functioning as intended, but requires attention at the areas noted above.

**Additional Comments or Observations:**

Storm drains are covered by branches and overgrown vegetation.

Inspector: Carlos Castro, Everardo Suarez



**Golder Associates, Inc.**

2201 Double Creek Dr., Suite 4004

Round Rock, Texas 78664

Phone: 512-671-3434 Fax: 512-671-3446

Inspectors Signature:



# PHOTOGRAPHIC LOG

<b>Client Name:</b> <b>Union Pacific Railroad</b>	<b>Site Location:</b> Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	<b>Project No.</b> 1358-603
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<b>Photo No.</b> <b>1</b>	<b>Date:</b> 01/11/19	
<b>Description:</b>  <b><u>Soil Cap Vegetative Cover:</u></b> Good vegetative cover growing, grass has not grown much since last mowing. Facing west.  Lat: 29.787331 Long: -95.317902		

<b>Photo No.</b> <b>2</b>	<b>Date:</b> 1/11/19	
<b>Description:</b>  <b><u>Soil Cap:</u></b> Minor rills early formation. Facing north.  Lat: 29.787391 Long: -95.318693		





# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
1358-603

**Photo No.**  
**3**

**Date:**  
1/11/19

**Description:**

**HWPW Yard Area and Soil Cap:**

Soil cap well-vegetated in most areas with a low risk of erosion. No major rills observed during inspection. Facing east.

Lat: 29.787434  
Long: -95.318457



**Photo No.**  
**4**

**Date:**  
1/11/19

**Description:**

**HWPW Yard Area and Soil Cap:**

Soil cap well-vegetated in most areas with a low risk of erosion. No major rills observed during inspection. Facing east.

Lat: 29.787434  
Long: -95.318457







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
1358-603

**Photo No.**  
**5**

**Date:**  
1/11/19

**Description:**

**Asphalt Road, Ballast Cap, and Concrete Barrier:**

Heavy vegetative growth along concrete barrier and asphalt road. Facing West.

Lat: 29.786351  
Long: -95.319323



**Photo No.**  
**6**

**Date:**  
1/11/19

**Description:**

**Asphalt Road and Concrete Barrier:**

Minor ant hills and some eroded soil along concrete barrier. Facing southwest.

Lat: 29.785820  
Long: -95.320512







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
1358-603

**Photo No.**  
**7**

**Date:**  
1/11/19

**Description:**

**Asphalt Road and Concrete Barrier:**

Minor ant hills and some exposed soil along concrete barrier. Facing northwest.

Lat: 29.787482

Long: -95.316662



**Photo No.**  
**8**

**Date:**  
1/11/19

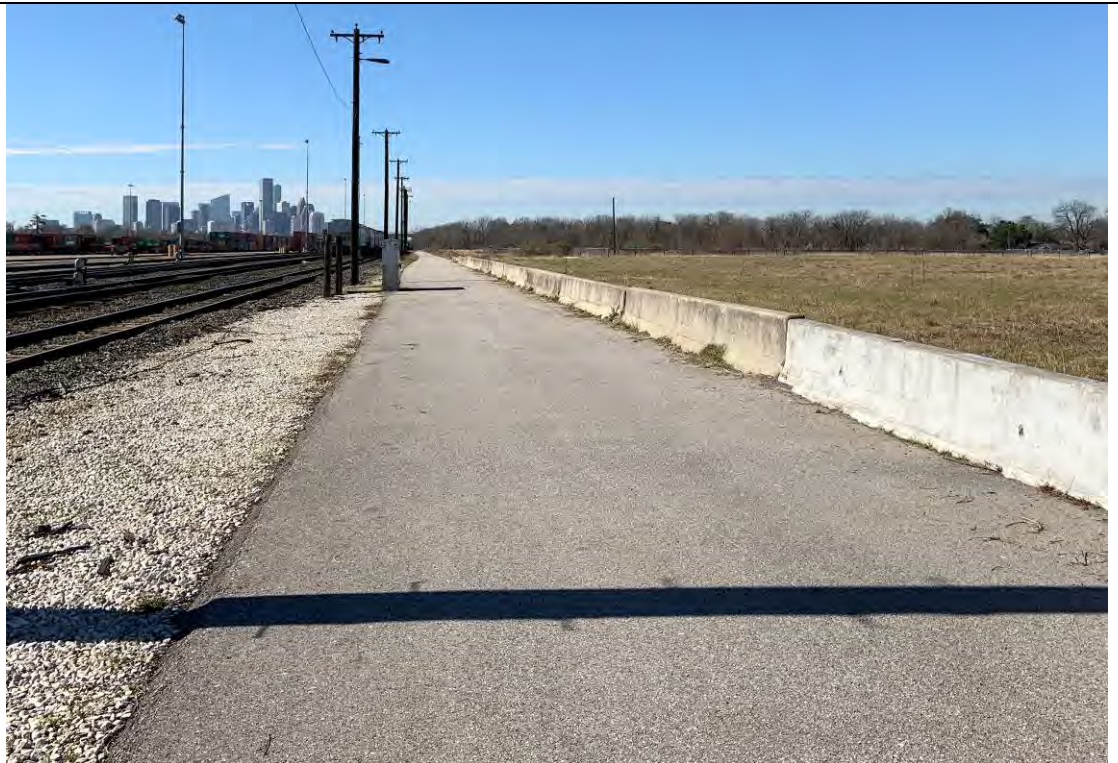
**Description:**

**Asphalt Road, Ballast Cap, and Concrete Barrier:**

Some vegetative growth along concrete barrier and asphalt road. Facing West .

Lat: 29.787228

Long: -95.317273







# PHOTOGRAPHIC LOG

<b>Client Name:</b> <b>Union Pacific Railroad</b>	<b>Site Location:</b> Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	<b>Project No.</b> 1358-603
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<b>Photo No.</b> <b>9</b>	<b>Date:</b> 1/11/19
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**Description:**

**Asphalt Road and Ballast Cap:**  
View of warning sign within ballast cap area. Facing south.

Lat: 29.787535  
Long: -95.316459

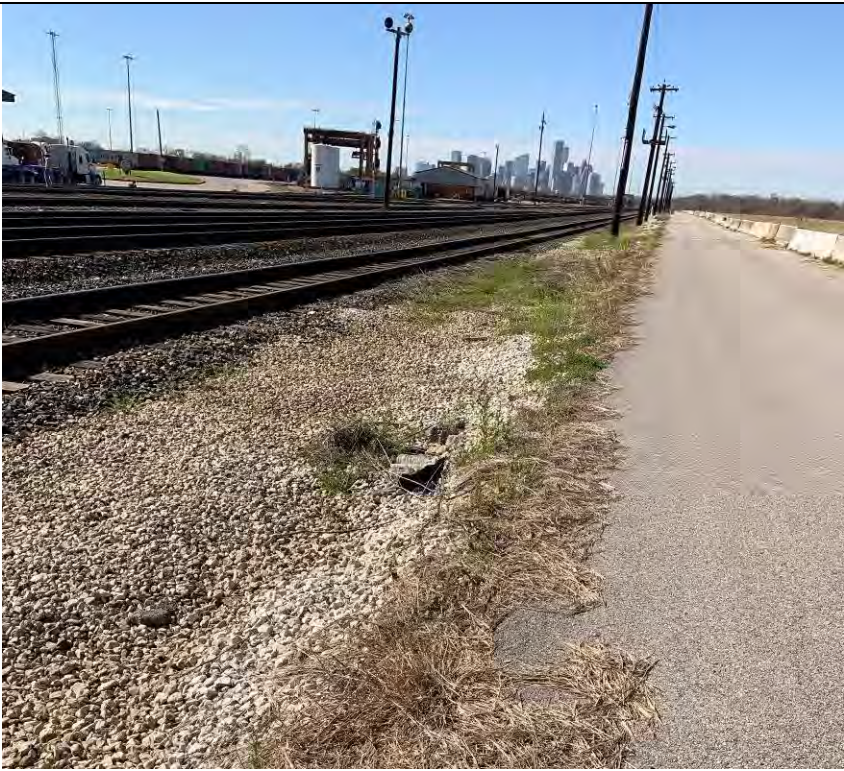


<b>Photo No.</b> <b>10</b>	<b>Date:</b> 1/11/19
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**Description:**

**Asphalt Road and Ballast Cap:**  
Vegetation growth in ballast cap area. Facing west.



Lat: 29.785911  
Long: -95.320318







# PHOTOGRAPHIC LOG

<b>Client Name:</b> <b>Union Pacific Railroad</b>		<b>Site Location:</b> Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	<b>Project No.</b> 1358-603
<b>Photo No.</b> <b>11</b>	<b>Date:</b> 1/11/19		
<b>Description:</b>  <b><u>Asphalt Road and Ballast Cap:</u></b> Vegetation growth in ballast cap area. Note small oily stains on pavement, appear the same compared to previous inspections. Facing west.  Lat: 29.785356 Long: -95.321646			
<b>Photo No.</b> <b>12</b>	<b>Date:</b> 1/11/19		
<b>Description:</b>  <b><u>Soil Cap/Security Fence/Concrete Sidewalk Cap:</u></b> View of north side of Soil Cap,(right) and concrete sidewalk cap (left), security fence in good shape Facing east.  Lat: 29.787614 Long: -95.317642			





# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
1358-603

**Photo No.**  
**13**

**Date:**  
12/11/18

**Description:**

**Perimeter Security Fence**

Fence mesh breached along Kashmere St.  
Facing east.

Lat: 29.785521  
Long: -95.321261



**Photo No.**  
**14**

**Date:**  
1/11/19

**Description:**

**Security Fence:**

View of main entrance gate. Trash and broken glass in front of photo (out of view). Facing South.

Lat: 29.787441  
Long: -95.320990







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
1358-603

**Photo No.**  
**15**

**Date:**  
1/11/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**  
Slot B54 Heavy  
cracking. Facing west.

Lat: 29.784851  
Long: -95.319468



**Photo No.**  
**16**

**Date:**  
1/11/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**  
Slot B057. Evidence of  
recent NAPL seepage.  
Facing east.

Lat: 29.784784  
Long: -95.319589







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
1358-603

**Photo No.**  
**17**

**Date:**  
1/11/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B100. Some  
cracking along joint.  
Facing northeast.

Lat: 29.784240  
Long: -95.320782



**Photo No.**  
**18**

**Date:**  
1/11/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B100. Some  
cracking along joint.  
Facing northeast.

Lat: 29.784240  
Long: -95.320782







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
1358-603

**Photo No.**  
**19**

**Date:**  
1/11/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B102. No observed  
seeps. Facing  
northwest.

Lat: 29.784191  
Long: -95.320836



**Photo No.**  
**20**

**Date:**  
1/11/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B102, noted  
cracking in pavement.  
Facing west.

Lat: 29.784239  
Long: -95.320829







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
1358-603

**Photo No.**  
**21**

**Date:**  
1/11/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**  
Slot B103. Cracks in  
pavement along joint.  
Facing west.

Lat: 29.784227  
Long: -95.320852



**Photo No.**  
**22**

**Date:**  
1/11/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**  
Slot B105 Cracks along  
joint. Facing northwest.

Lat: 29.784150  
Long: -95.320901







# PHOTOGRAPHIC LOG

<b>Client Name:</b> <b>Union Pacific Railroad</b>	<b>Site Location:</b> Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	<b>Project No.</b> 1358-603
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<b>Photo No.</b> <b>23</b>	<b>Date:</b> 1/11/19
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**Description:**

**Concrete Cap Area (Englewood Yard):**  
Slot B106. Evidence of recent NAPL seepage. Facing west.

Lat: 29.784202  
Long: -95.320957



<b>Photo No.</b> <b>24</b>	<b>Date:</b> 1/11/19
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**Description:**

**Concrete Cap Area (Englewood Yard):**  
Slot B106 Evidence of recent NAPL seepage. Facing south.

Lat: 29.784202  
Long: -95.320957







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
1358-603

**Photo No.**  
**25**

**Date:**  
1/11/18

**Description:**

**Container Storage Area:**  
Facing south.

Lat: 29.786797  
Long: -95.320609



**Photo No.**  
**26**

**Date:**  
1/11/19

**Description:**

**Container Storage Area:**  
Shallow ponding rainwater inside shed,  
with algae growing.  
Facing south.

Lat: 29.786797  
Long: -95.320609



**ATTACHMENT A2**

**SECOND QUARTER 2019 (APRIL 25<sup>TH</sup>) INSPECTION RECORD AND PHOTOGRAPHIC LOG**

**UPRR HWPW - Quarterly Site Inspection Record**

Date: 04/25/19

Time Started: 9:45 AM

Time Ended: 12:30 PM

Weather Conditions: warm, sunny

Observations/Comments: Contractor in process of mowing sidewalk while performing inspection.

CAPPED AREA	ITEM	Evidence Observed?		Improvements Necessary		COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
		Yes	No	Yes	No	
Soil Cap	Erosion (gullies, rills)		X		X	No major rills observed.
	Settlement		X		X	None visible.
	Animal Damage		X		X	None visible,
	Intrusive Shrubs/Trees		X		X	None observed.
	Vegetation Coverage	X			X	Dense, lots of wildflower vegetation.
	Stressed Vegetation		X		X	None observed.
	Monitoring Wells Condition	X		X		In use wells generally in good condition. Some surrounded by shrubbery.
Asphalt Roadway	Surface Damage	X			X	Minor cracks observed.
	Signs of ExposedSoils		X		X	None observed.
	Settlement		X		X	None observed.
Ballast Cap	Surface Damage		X		X	None observed.
	Signs of ExposedSoils		X		X	None observed.
	Intrusive Vegetation	X			X	Heavy vegetation observed in some areas.
Concrete Cap (Englewood Intermodal Yard)	Surface Damage	X		X		Localized cracking along parking stall rows. Joint sealant missing in several locations. Evidence of NAPL seepage in some parking row B stalls (B096-B110, B57, B54, & B013). * UPRR has a concrete pavement maintenance inspection/maintenance program. Lowlying areas or small depressions with brown water puddled observed (Slots B096/B097).
	Signs of Exposed Soils		X		X	None observed.
	Intrusive Vegetation		X		X	None observed.
Concrete Cap (Sidewalk)	Surface Damage		X		X	None observed.
	Signs of Exposed Soils		X		X	None observed.
	Intrusive Vegetation		X		X	None observed.
<b>Other Areas</b>						
Container Storage Area	Valve Position (Closed)	X			X	Valve in closed position.
	Holding Water		X		X	None observed at time of inspection.
	Sheen/Floating Solids		X		X	None observed.
Security Fence	Damaged Posts or Wire	X		X		Main Entrance Gate: barbed wire damaged/tacked down along sides; NW Corner: Hole in fence; ~400' east of main entrance gate: hole in fence; NE corner of impoundment area: Hole in corner.
	Functioning Properly	X		X		Fence is still functioning as intended, but requires attentions at the above noted areas.

**Additional Comments or Observations:**

Inspector: Blake Sokora

Inspectors Signature: *Blake Sokora*

**Golder Associates, Inc.**

14950 Heathrow Forest Pkwy, Suite 280

Houston, Texas 77032

Phone: 281-821-6868 Fax: 281-821-6870




**GOLDER**





# PHOTOGRAPHIC LOG

<b>Client Name:</b> <b>Union Pacific Railroad</b>		<b>Site Location:</b> Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	<b>Project No.</b> 19119232
<b>Photo No.</b> <b>1</b>	<b>Date:</b> 04/25/19		
<b>Description:</b>  <b>Soil Cap Area:</b> Soil cap well-vegetated in most areas with a low risk of erosion. No major rills observed during inspection. Facing east.  Lat: 29.786821 Long: -95.320108			
<b>Photo No.</b> <b>2</b>	<b>Date:</b> 04/25/19		
<b>Description:</b>  <b>Soil Cap Area:</b> Vegetative growth (pollinators) can be observed along the length of the soil cap. Facing north.  Lat: 29.785959 Long: -95.320891			





# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**3**

**Date:**  
04/25/19

**Description:**

**Soil Cap Area:**

Signage on north side of soil cap. The majority of signage is comparably unobstructed by vegetation and can be easily read. Pollinator plants Facing south.

Lat: 29.786918  
Long: -95.320086



**Photo No.**  
**4**

**Date:**  
04/25/19

**Description:**

**Soil Cap Area:**

Vegetative growth (pollinators) can be observed along the length of the soil cap, view of monitoring well MW-23C. Facing south.

Lat: 29.787346  
Long: -95.318356







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**5**

**Date:**  
04/25/19

**Description:**

**Soil Cap Area:**

Signage on east side of soil cap.  
Pollinator plants present on soil  
cap area. Facing southwest.

Lat: 29.787521  
Long: -95.316588



**Photo No.**  
**6**

**Date:**  
04/25/19

**Description:**

**Soil Cap Area:**

View of monitoring wells MW-  
18A and MW-18C within soil cap  
area, vegetative growth  
(pollinators) can be observed.  
Small bare spots in foreground  
of photo. Facing west.

Lat: 29.787568  
Long: -95.316656







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**7**

**Date:**  
04/25/19

**Description:**

**Ballast Cap and Asphalt Roadway:**

Asphalt roadway in good condition, free of major cracking/damage. Some areas of vegetation growth in ballast cap. Facing west.

Lat: 29.787302  
Long: -95.317003



**Photo No.**  
**8**

**Date:**  
04/25/19

**Description:**

**Ballast Cap, Asphalt Road, and Soil Cap Vegetative Cover:**

Weeds growing under the concrete barriers and along the edge of the ballast cap in some areas. Soil cap's vegetative cover in good shape. Facing north.

Lat: 29.787014  
Long: -95.317797







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**9**

**Date:**  
04/25/19

**Description:**

**Ballast Cap and Asphalt Roadway:**

Ballast cap area in good condition with some areas of vegetation growth. Asphalt roadway in good condition. Note pollinators on soil cap on right of photo. Facing west.

Lat: 29.786239  
Long: -95.319441



**Photo No.**  
**10**

**Date:**  
04/25/19

**Description:**

**Ballast Cap and Asphalt Road:**

Some lumber can be found in the ballast area. Facing south.

Lat: 29.786595  
Long: -95.318702







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**11**

**Date:**  
04/25/19

**Description:**

**Asphalt Road:**

Weeds growing under the concrete barriers. Small oil stains noted, and appear similar to previous inspections. Facing east.

Lat: 29.785356,  
Long: -95.321646



**Photo No.**  
**12**

**Date:**  
04/25/19

**Description:**

**Asphalt Road/Ballast Cap Areas:**

Some weeds noted on the ballast cap area. Low water crossing within asphalt cap in good shape. Facing west.

Lat: 29.784483  
Long: -95.323572







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**13**

**Date:**  
04/25/19

**Description:**

**Concrete Sidewalk Cap Area:**

Sidewalk and security fence in good condition. Some areas of vegetation along joints in the sidewalk, damage/silt fencing ripped can be seen. Facing west.

Lat: 29.787589  
Long: -95.317726



**Photo No.**  
**14**

**Date:**  
04/25/19

**Description:**

**Concrete Sidewalk Cap Area:**

Sidewalk and security fence in good condition. Areas of vegetation along joints in the sidewalk, Signage in good shape along fence. Facing west.

Lat: 29.787582  
Long: -95.318447







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**15**

**Date:**  
04/25/19

**Description:**

**Security Fence:**  
Security fence in good shape  
along north side of the Site.  
Facing west.

Lat: 29.787532  
Long: -95.319635



**Photo No.**  
**16**

**Date:**  
04/25/19

**Description:**

**Security Fence (Entrance Gate):**  
Gate in good shape, some  
barbed wire atop security fence  
tacked down on west side of  
entrance area. Facing south.

Lat: 29.787393  
Long: -95.321006







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**17**

**Date:**  
04/25/19

**Description:**

**Security Fence:**  
Hole in security fence in northwest corner of yard at intersection of Liberty Rd and Kashmere St. Facing west.

Lat: 29.786889  
Long: -95.323864



**Photo No.**  
**18**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**  
No evidence of tar seeps in Slot B013. Facing north.

Lat: 29.785254  
Long: -95.318311







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**19**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area  
(Englewood Yard):**  
View of the manhole at NAPL  
Collection Sump B099/B100.

Lat: 29.784238  
Long: -95.320778



**Photo No.**  
**20**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area  
(Englewood Yard):**  
View of the sump water in NAPL  
Collection Sump B099/B100.

Lat: 29.784238  
Long: -95.320778







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**21**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Some cracking/craters in the pavement can be observed in the B Row of the Englewood Yard area. Facing north.

Lat: 29.784884  
Long: -95.319337



**Photo No.**  
**22**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B057. Evidence of recent NAPL seepage and minor cracking. Facing north.

Lat: 29.784762  
Long: -95.319596







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**23**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B096,. Evidence of recent NAPL seepage along front of stall. Evidence of missing joint sealant can be observed in the Yard Area along the front of some stalls. Facing north.

Lat: 29.784252  
Long: -95.320655



**Photo No.**  
**24**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B101. Evidence of recent NAPL seepage. Facing west.

Lat: 29.784249  
Long: -95.320838







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**25**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B105. Recently installed  
NAPL Collection System with  
little evidence of cracking, stains,  
etc. Facing north.

Lat: 29.784139  
Long: -95.320913



**Photo No.**  
**26**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B108. Some evidence of  
staining in depressions in stall  
surfaces. Facing west.

Lat: 29.784165  
Long: -95.321068







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**27**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

View of the manhole at NAPL  
Collection Sump B107/B108.

Lat: 29.784144

Long: -95.321016



**Photo No.**  
**28**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

View of the manhole at NAPL  
Collection Sump B107/B108,  
sump filled with water.

Lat: 29.784144



Long: -95.321016







# PHOTOGRAPHIC LOG

<b>Client Name:</b> <b>Union Pacific Railroad</b>		<b>Site Location:</b> Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	<b>Project No.</b> 19119232
<b>Photo No.</b> <b>29</b>	<b>Date:</b> 04/25/19		
<b>Description:</b>  <b>Concrete Cap Area (Englewood Yard):</b> Slot B097. Puddles of brown water in low-lying area. Facing north.  Lat: 29.784267 Long: -95.320706			
<b>Photo No.</b> <b>30</b>	<b>Date:</b> 04/25/19		
<b>Description:</b>  <b>Concrete Cap Area (Englewood Yard):</b> Slot B096. Puddles of brown water in low-lying area. Facing north.  Lat: 29.784300 Long: -95.320677			





# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**31**

**Date:**  
04/25/19

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

View of the manhole at NAPL  
Collection Sump B103/B104.

Lat: 29.784199

Long: -95.320895



**Photo No.**  
**32**

**Date:**  
04/25/19

**Description:**

**Container Storage Area:**

Valve in closed position and  
functioning within the container  
storage area. CSA in good  
condition, free of major dents  
and other damage.

Lat: 29.786740

Long: -95.320636





**ATTACHMENT A3**

**THIRD QUARTER 2019 (JULY 10<sup>TH</sup>) INSPECTION RECORD AND PHOTOGRAPHIC LOGS**

**UPRR HWPW - Quarterly Site Inspection Record**

Date: 07/10/19

Time Started: 11:30 AM

Time Ended: 1:00 PM

Weather Conditions: warm, sunny

Observations/Comments:

CAPPED AREA	ITEM	Evidence Observed?		Improvements Necessary		COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
		Yes	No	Yes	No	
Soil Cap	Erosion (gullies, rills)		X		X	No major rills observed.
	Settlement		X		X	None visible.
	Animal Damage		X		X	None visible.
	Intrusive Shrubs/Trees		X		X	None observed.
	Vegetation Coverage	X			X	Dense, lots of wildflower vegetation.
	Stressed Vegetation		X		X	None observed.
	Monitoring Wells Condition	X		X		In use wells generally in good condition. Some surrounded by shrubbery.
Asphalt Roadway	Surface Damage	X			X	Minor cracks observed.
	Signs of ExposedSoils		X		X	None observed.
	Settlement		X		X	None observed.
Ballast Cap	Surface Damage		X		X	None observed.
	Signs of ExposedSoils		X		X	None observed.
	Intrusive Vegetation	X			X	Heavy vegetation observed in some areas.
Concrete Cap (Englewood Intermodal Yard)	Surface Damage	X		X		Localized cracking along parking stall rows. Joint sealant missing in several locations. Evidence of NAPL seepage in some parking row B stalls (B096-B110, B57, B54, & B013). * UPRR has a concrete pavement maintenance inspection/maintenance program.
	Signs of Exposed Soils		X		X	None observed.
	Intrusive Vegetation		X		X	None observed.
Concrete Cap (Sidewalk)	Surface Damage		X		X	Minor cracks observed.
	Signs of Exposed Soils		X		X	None observed.
	Intrusive Vegetation	X		X		Needs mowing.
<b>Other Areas</b>						
Container Storage Area	Valve Position (Closed)	X			X	Valve in closed position.
	Holding Water		X		X	None observed at time of inspection.
	Sheen/Floating Solids		X		X	None observed.
Security Fence	Damaged Posts or Wire	X		X		Main Entrance Gate: barbed wire damaged/tacked down along sides; NW Corner: Hole in fence; ~400' east of main entrance gate: hole in fence; NE corner of impoundment area: Posts separated.
	Functioning Properly	X		X		Fence is still functioning as intended, but requires attentions at the above noted areas.

Additional Comments or Observations: Mowing for site suggested, repairs to fence suggested in listed areas

Inspector: Blake Sokora

Inspectors Signature: *Blake Sokora*

Golder Associates, Inc.

14950 Heathrow Forest Pkwy, Suite 280

Houston, Texas 77032

Phone: 281-821-6868 Fax: 281-821-6870



**GOLDER**





# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**1**

**Date:**  
07/10/2019

**Description:**

**Soil Cap Area:**

Soil cap well-vegetated in most areas with a low risk of erosion. No major rills observed during inspection. Facing northeast.

Lat: 29.787228

Long: -95.319395



**Photo No.**  
**2**

**Date:**  
07/10/2019

**Description:**

**Soil Cap Area:**

Vegetative growth (pollinator plants and grasses) can be observed along the length of the soil cap, preventing future erosion. Facing west.

Lat: 29.787222

Long: -95.317869







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**3**

**Date:**  
07/10/2019

**Description:**

**Soil Cap Area:**

Soil cap well-vegetated (pollinators/grasses) in most areas with a low risk of erosion. No major rills observed during inspection. View of monitoring well MW-72B in center of photo. Facing south.

Lat: 29.787511  
Long: -95.318042



**Photo No.**  
**4**

**Date:**  
07/10/2019

**Description:**

**Soil Cap Area:**

View on northeast area of soil cap, heavy vegetative growth (grasses). View of Lockwood Bridge in background. Facing east.

Lat: 29.787590  
Long: -95.317129







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**5**

**Date:**  
07/10/2019

**Description:**

**Soil Cap Area:**

View of northeast corner of the soil cap some pollinators plant present. No major rills observed during inspection. A few bare spots in foreground of photo. View of monitoring wells MW-18A and MW-18C. Facing southeast.

Lat: 29.787559  
Long: -95.316750



**Photo No.**  
**6**

**Date:**  
07/10/2019

**Description:**

**Soil Cap Area:**

View on northeast corner of soil cap, heavy vegetative growth (pollinators/grasses) can be observed along the length of the soil cap. View of security fence along northern boundary. Facing east.

Lat: 29.787616  
Long: -95.316855







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**7**

**Date:**  
07/10/2019

**Description:**

**Ballast Cap and Asphalt Roadway:**

Asphalt roadway in good condition, free of major cracking/damage. Some weeds observed along concrete barrier and within the ballast cap area. Signage visible and in good condition. Facing southwest.

Lat: 29.787007  
Long: -95.317733



**Photo No.**  
**8**

**Date:**  
07/10/2019

**Description:**

**Ballast Cap and Asphalt Roadway:**

Weeds growing along the ballast cap in some areas. Ballast material in good condition. Facing southwest.

Lat: 29.787328  
Long: -95.327003







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**9**

**Date:**  
07/10/2019

**Description:**

**Asphalt Roadway Cap and Soil Cap:**

Asphalt roadway in good condition, with some weeds growing along concrete barriers. Soil cap in good condition, some pollinator plants observed. Facing southwest.

Lat: 29.787334  
Long: -95.317045



**Photo No.**  
**10**

**Date:**  
07/10/2019

**Description:**

**Ballast Cap, Asphalt Roadway:**

Weeds growing under the concrete barriers and along the edge of the ballast cap in some areas. Facing southwest.

Lat: 29.785242  
Long: -95.321913







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**11**

**Date:**  
07/10/2019

**Description:**

**Ballast Cap and Asphalt Roadway:**

Some vegetation and debris including trash and lumber was observed in the ballast area. Facing southwest.

Lat: 29.784531  
Long: -95.323501



**Photo No.**  
**12**

**Date:**  
07/10/2019

**Description:**

**Ballast Cap and Asphalt Roadway:**

View of southern end of asphalt roadway cap, vegetation along concrete barrier. Ballast cap has some grasses/weeds observed. Facing southwest.

Lat: 29.784406  
Long: -95.323862







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**13**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Small amount of tar seep in concrete joint, Slot A010, Englewood Yard area. Facing southeast.

Lat: 29.785539  
Long: -95.318350



**Photo No.**  
**14**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Small amount of tar seep in concrete joint, Slot A010. Facing southeast.

Lat: 29.785529  
Long: -95.318337







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**15**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Some cracking/cratering in the pavement can be observed in the B Row of the Englewood Yard area, no soil exposed Facing east.

Lat: 29.784765  
Long: -95.319569



**Photo No.**  
**16**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B105. Evidence of recent NAPL seepage and minor cracking. Facing southwest.

Lat: 29.784150  
Long: -95.320901







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**17**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Some cracking/cratering in the pavement can be observed in the B Row (Slot B098) of the Englewood Yard area, no soil exposed Facing north.

Lat: 29.784283  
Long: -95.320729



**Photo No.**  
**18**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B099. Evidence of recent brown water seepage and staining along cracking in asphalt. Facing north.

Lat: 29.784330  
Long: -95.320789







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**19**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B096. Evidence of recent NAPL seepage along front of stall. Evidence of missing joint sealant can be observed in the Yard Area along the front of some stalls. Facing northwest.

Lat: 29.784266  
Long: -95.320643



**Photo No.**  
**20**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B101. Evidence of recent NAPL seepage. Facing southwest.

Lat: 29.784267  
Long: -95.320809







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**21**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard)/NAPL**  
**Collection System:**

Sump B099/B100. Recently installed NAPL Collection System in stalls B099-B110 in good condition with little evidence of cracking, stains, etc. Facing north.

Lat: 29.784275  
Long: -95.320762



**Photo No.**  
**22**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard)/NAPL**  
**Collection System:**

Sump B099/B100. Sump filled with water. Facing north.

Lat: 29.784267  
Long: -95.320773







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**23**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard)/NAPL**  
**Collection System:**

Sump B103/B104. Recently installed NAPL Collection System in stalls B103/B104 in good condition with little evidence of cracking, stains, etc. Facing north.

Lat: 29.784232  
Long: -95.320879



**Photo No.**  
**24**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard)/NAPL**  
**Collection System:**

Sump B103/B104. Sump half-filled with water. Facing north.

Lat: 29.784220  
Long: -95.320886







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**25**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard)/NAPL**  
**Collection System:**

Sump B107/B108. Recently installed NAPL Collection System in stalls B107/B108 in good condition with little evidence of cracking, stains, etc. Facing north.

Lat: 29.784163  
Long: -95.320998



**Photo No.**  
**26**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard)/NAPL**  
**Collection System:**

Sump B107/B108. Sump half-filled with water. Facing north.

Lat: 29.784171  
Long: -95.320985







# PHOTOGRAPHIC LOG

<b>Client Name:</b> Union Pacific Railroad	<b>Site Location:</b> Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	<b>Project No.</b> 19119232
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<b>Photo No.</b> <b>27</b>	<b>Date:</b> 07/10/2019
<b>Description:</b>  <b><u>Concrete Cap Area</u></b> <b><u>(Englewood Yard):</u></b> Stall B108. Recently installed concrete/asphalt area in stalls B099-B110 in good condition with little evidence of cracking, stains, etc. Facing northwest.  Lat: 29.784173 Long: -95.321042	



<b>Photo No.</b> <b>28</b>	<b>Date:</b> 07/10/2019
<b>Description:</b>  <b><u>Concrete Cap Area</u></b> <b><u>(Englewood Yard):</u></b> Slot B096. Some evidence of staining from brown water near monitoring well MW-85C. Facing northwest.  Lat: 29.784371 Long: -95.320708	







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**29**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Some residual staining from brown water seeps in the cracks in the pavement can be observed in the B Row (Slot B098) of the Englewood Yard area, no soil exposed Facing north.

Lat: 29.784330  
Long: -95.320760



**Photo No.**  
**30**

**Date:**  
07/10/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Some residual staining from brown water seeps in the cracks in the pavement can be observed in the B Row (Slot B102) of the Englewood Yard area, no soil exposed Facing north.


Lat: 29.784289  
Long: -95.320872








# PHOTOGRAPHIC LOG

<b>Client Name:</b> Union Pacific Railroad		<b>Site Location:</b> Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	<b>Project No.</b> 19119232
<b>Photo No.</b> <b>31</b>	<b>Date:</b> 07/10/2019		
<b>Description:</b>  <b>Concrete Sidewalk Cap:</b> Concrete sidewalk cap in good condition, some weeds/grass growing up within joints. Facing west.  Lat: 29.787641 Long: -95.317236			

<b>Photo No.</b> <b>32</b>	<b>Date:</b> 07/10/2019		
<b>Description:</b>  <b>Concrete Sidewalk Cap:</b> Sidewalk outside security fence in good condition. Some areas have significant vegetative growth and require mowing event. Some areas of damage/silt fencing ripped can be seen. Facing west.  Lat: 29.787621 Long: -95.317774			





# PHOTOGRAPHIC LOG

<b>Client Name:</b> <b>Union Pacific Railroad</b>	<b>Site Location:</b> Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	<b>Project No.</b> 19119232
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<b>Photo No.</b> <b>33</b>	<b>Date:</b> 07/10/2019
<b>Description:</b>  <b>Concrete Sidewalk Cap:</b> Weeds growing under the concrete barriers. Soil Cap's vegetative cover in good shape. Facing southwest.  Lat: 29.787619 Long: -95.317971	



<b>Photo No.</b> <b>34</b>	<b>Date:</b> 07/10/2019
<b>Description:</b>  <b>Security Fence:</b> Security fence along Liberty Road, in good condition. Facing west.  Lat: 29.787526 Long: -95.320386	







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**35**

**Date:**  
07/10/2019

**Description:**

**Security Fence (Entrance Gate):**

Front gate and signage in good condition. Facing south.

Lat: 29.787358

Long: -95.320976



**Photo No.**  
**36**

**Date:**  
07/10/2019

**Description:**

**Security Fence (Entrance Gate):**

Barbed wire atop security fence broken on east side of entrance area. Facing northwest.

Lat: 29.787412

Long: -95.320913







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**37**

**Date:**  
07/10/2019

**Description:**

**Security Fence:**  
Hole in security fence in northwest corner of yard at intersection of Liberty Rd and Kashmere St. Facing west.

Lat: 29.787489  
Long: -95.323850



**Photo No.**  
**38**

**Date:**  
07/10/2019

**Description:**

**Container Storage Area:**  
Valve in closed position and functioning within the container storage area. CSA in good condition, free of major dents and other damage. Facing south.

Lat: 29.786797  
Long: -95.320609



**ATTACHMENT A4**

**FOURTH QUARTER 2019 (OCTOBER 30<sup>TH</sup>) INSPECTION RECORD AND PHOTOGRAPHIC  
LOG**



**UPRR HWPW - Quarterly Site Inspection Record**

Date: October 30, 2019

Time Started: 10:05

Time Ended: 14:45

Weather Conditions: cloudy, mild

Observations/Comments:

CAPPED AREA	ITEM	Evidence Observed?		Improvements Necessary		COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
		Yes	No	Yes	No	
Soil Cap	Erosion (gullies, rills)		X		X	No major rills observed.
	Settlement		X		X	None visible.
	Animal Damage		X		X	None visible.
	Intrusive Shrubs/Trees		X		X	None observed.
	Vegetation Coverage	X			X	Dense, lots of wildflower and brush vegetation.
	Stressed Vegetation		X		X	None observed.
	Monitoring Wells Condition	X		X		In use wells generally in good condition. Most surrounded by shrubbery.
Asphalt Roadway	Surface Damage	X			X	Minor cracks observed.
	Signs of Exposed Soils		X		X	None observed.
	Settlement		X		X	Some cracks/low spots where water/soil could make its way through the concrete divider onto the roadway.
Ballast Cap	Surface Damage		X		X	None observed.
	Signs of ExposedSoils		X		X	None observed.
	Intrusive Vegetation	X			X	Heavy vegetation observed in some areas.
Concrete Cap (Englewood Intermodal Yard)	Surface Damage	X		X		Localized cracking along parking stall rows. Joint sealant missing in several locations. Evidence of NAPL seepage in some parking row B stalls. * UPRR has a concrete pavement inspection/maintenance program.
	Signs of Exposed Soils		X		X	None observed.
	Intrusive Vegetation		X		X	None observed.
Concrete Cap (Sidewalk)	Surface Damage		X		X	Minor cracks observed.
	Signs of Exposed Soils		X		X	None observed.
	Intrusive Vegetation	X		X		Needs mowing.

**Other Areas**

Container Storage Area	Valve Position (Closed)	X			X	Valve in closed position.
	Holding Water	X			X	Minor amount of water at time of inspection.
	Sheen/Floating Solids		X		X	None observed.
Security Fence	Damaged Posts or Wire	X		X		Main Entrance Gate: barbed wire damaged/tacked down along sides; NW Corner: Hole in fence; ~400' east of main entrance gate
	Functioning Properly	X		X		Fence is still functioning as intended, but requires attentions at the above noted areas.

Additional Comments or Observations: Mowing for site and sidewalk suggested, repairs to fence suggested in listed areas

Inspector: Blake Sokora

Inspectors Signature:

Golder Associates, Inc.

14950 Heathrow Forest Pkwy, Suite 280

Houston, Texas 77032

Phone: 281-821-6868 Fax: 281-821-6870



**GOLDER**



# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**1**

**Date:**  
10/30/2019

**Description:**

**Soil Cap Area:**

Soil cap well-vegetated in most areas with a low risk of erosion. No major rills observed during inspection. Facing east.

Lat: 29.787397

Long: -95.318630



**Photo No.**  
**2**

**Date:**  
10/30/2019

**Description:**

**Soil Cap Area:**

Vegetative growth (brushes and grasses in particular) can be observed along the length of the soil cap, preventing future erosion. Facing west.

Lat: 29.787222

Long: -95.317869







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**3**

**Date:**  
10/30/2019

**Description:**

**Soil Cap Area:**

Vegetative growth (brushes and grasses in particular) can be observed along the length of the soil cap, preventing future erosion. Facing west.

Lat: 29.787322

Long: -95.317958



**Photo No.**  
**4**

**Date:**  
10/30/2019

**Description:**

**Soil Cap Area:**

Vegetative growth (brushes and grasses in particular) can be observed along the length of the soil cap, preventing future erosion. Facing west.

Lat: 29.787590

Long: -95.317129







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**5**

**Date:**  
10/30/2019

**Description:**

**Soil Cap Area:**

Sign in yard area. The majority of signage is comparably unobstructed by vegetation and can be easily read. Facing south.

Lat: 29.786768  
Long: -95.320364



**Photo No.**  
**6**

**Date:**  
10/30/2019

**Description:**

**Soil Cap Area:**

Some weeds growing under the concrete barriers. Soil Cap's vegetative cover in good shape. Facing east.

Lat: 29.786428  
Long: -95.319183







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**7**

**Date:**  
10/30/2019

**Description:**

**Ballast Cap, Asphalt Roadway,  
and Soil Cap Vegetative  
Cover:**

Weeds growing under the concrete barriers and along the edge of the ballast cap in some areas. Soil cap's vegetative cover in good shape. Facing west.

Lat: 29.787207  
Long: -95.317339



**Photo No.**  
**8**

**Date:**  
10/30/2019

**Description:**

**Ballast Cap, Asphalt Roadway,  
and Soil Cap Vegetative  
Cover:**

Weeds growing under the concrete barriers and along the edge of the ballast cap in some areas. Soil cap's vegetative cover in good shape. Residual water from recent rain event noted. Facing west.

Lat: 29.784531  
Long: -95.323501







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**9**

**Date:**  
10/30/2019

**Description:**

**Ballast Cap and Asphalt Roadway:**

Asphalt roadway in good condition, free of major cracking/damage. Facing southwest.

Lat: 29.786203  
Long: -95.319614



**Photo No.**  
**10**

**Date:**  
10/30/2019

**Description:**

**Ballast Cap and Asphalt Roadway:**

Weeds growing under the concrete barriers and along the edge of the ballast cap in some areas. Residual water from recent rain event noted. Facing west.

Lat: 29.785480  
Long: -95.321342







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**11**

**Date:**  
10/30/2019

**Description:**

**Ballast Cap and Asphalt Roadway:**

Ballast cap area in good condition with some areas of vegetative growth. Asphalt roadway in good condition. Facing southwest.

Lat: 29.787328  
Long: -95.327003



**Photo No.**  
**12**

**Date:**  
10/30/2019

**Description:**

**Asphalt Roadway and Soil Cap Vegetative Cover:**

Some minor gaps noted between soil cap and roadway. Facing west.

Lat: 29.786716  
Long: -95.318473







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**13**

**Date:**  
10/30/2019

**Description:**

**Concrete Sidewalk Cap Area:**

Sidewalk outside security fence in good condition. Some areas have significant vegetative growth and require mowing event. Some areas of damage/silt fencing ripped can be seen. Facing west.

Lat: 29.787621  
Long: -95.317774



**Photo No.**  
**14**

**Date:**  
10/30/2019

**Description:**

**Concrete Sidewalk Cap Area:**

Sidewalk outside security fence in good condition. Some areas have significant vegetative growth and require mowing event. Some areas of damage/silt fencing ripped can be seen. Residual water from recent rain event noted. Facing west.

Lat: 29.787621  
Long: -95.317774







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**15**

**Date:**  
10/30/2019

**Description:**

**Security Fence:**  
Hole in security fence in northwest corner of yard at intersection of Liberty Rd and Kashmere St. Facing west.

Lat: 29.787489  
Long: -95.323850



**Photo No.**  
**16**

**Date:**  
10/30/2019

**Description:**

**Security Fence (Entrance Gate):**  
Barbed wire atop security fence broken on east side of entrance area. Facing northwest.

Lat: 29.787412  
Long: -95.320913







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**17**

**Date:**  
10/30/2019

**Description:**

**Concrete Sidewalk Cap Area:**

Sidewalk outside security fence in good condition. Some areas have significant vegetative growth and require mowing event. Some areas of damage/silt fencing ripped can be seen. Water from recent rain event. Facing west.

Lat: 29.787593  
Long: -95.318414



**Photo No.**  
**18**

**Date:**  
10/30/2019

**Description:**

**Security Fence:**

Security fence in good shape along north side of the Site. Residual water from recent rain event noted. Facing west.

Lat: 29.787533  
Long: -95.320279







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**19**

**Date:**  
10/30/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Some cracking/cratering in the pavement can be observed in the B Row of the Englewood Yard area. Residual water from recent rain event noted. Facing west.

Lat: 29.784266  
Long: -95.320643



**Photo No.**  
**20**

**Date:**  
10/30/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

B108 slot. NAPL seep remediation system in good condition. No major cracks/stains issues with concrete, sumps, or asphalt area. Residual water from recent rain event noted. Facing northwest.

Lat: 29.784173  
Long: -95.321042







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**21**

**Date:**  
10/30/2019

**Description:**

**Concrete Cap Area  
(Englewood Yard):**

View of the manhole at NAPL  
Collection Sump B103/B104.

Lat: 29.784199

Long: -95.320895



**Photo No.**  
**22**

**Date:**  
10/30/2019

**Description:**

**Concrete Cap Area  
(Englewood Yard):**

Slot B102. No evidence of recent  
NAPL seepage. Evidence of  
missing joint sealant can be  
observed in the Yard Area along  
the front of some stalls. Residual  
water from recent rain event  
noted. Facing north.

Lat: 29.784209

Long: -95.320791







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**23**

**Date:**  
10/30/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot A010. No evidence of recent NAPL seepage. Residual water from recent rain event noted. Facing west.

Lat: 29.7855833,  
Long: -95.318375



**Photo No.**  
**24**

**Date:**  
10/30/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

View of the sump water in manhole at NAPL Collection Sump B107/B108.

Lat: 29.784144  
Long: -95.321016







# PHOTOGRAPHIC LOG

**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Houston Wood Preserving Works, 4910 Liberty Road,  
Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**25**

**Date:**  
10/30/2019

**Description:**

**Concrete Cap Area**  
**(Englewood Yard):**

Slot B057. No evidence of recent NAPL seepage. Some cracking in the pavement. Residual water from recent rain event noted. Facing north.

Lat: 29.784762  
Long: -95.319596



**Photo No.**  
**26**

**Date:**  
10/30/2019

**Description:**

**Container Storage Area:**

Valve in closed position and functioning within the container storage area. CSA in good condition, free of major dents and other damage. Minor water on floor. Facing southeast.

Lat: 29.786797  
Long: -95.320609





**APPENDIX 3**  
**CHRONOLOGY**



### APPENDIX 3 CHRONOLOGY

Below is a summary of the site investigation and regulatory chronology at the UPRR Former Houston Wood Preserving Works facility (listed in reverse order).

Date	Description
January 2020	Golder Associates (Golder) (formerly Pastor, Behling & Wheeler, LLC (PBW)) submits the Post-Response Action Completion Report (PRACR) Monthly Update to the Texas Commission on Environmental Quality (TCEQ) for December 2019 (January 15, 2020).
December 2019	Golder submits the PRACR Monthly Update to the Texas Commission on Environmental Quality (TCEQ) (December 6, 2019); TCEQ issues a comment letter dated December 13, 2019 in response to UPRR Response to TCEQ Additional Comment Letter dated October 23, 2019 and to request a meeting on December 19, 2019; Golder submits the bi-monthly status update of sampling activities to the TCEQ in a letter dated December 13, 2019. Meeting with Union Pacific Railroad (UPRR), Golder, and TCEQ to discuss TCEQ Additional Comment Letter on December 19, 2019. Based on that meeting, Golder on behalf of UPRR, submitted the Proposed Vapor Intrusion Assessment Work Plan (VI 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. A revised VI Work Plan was submitted to the TCEQ on January 2, 2020 and was approved by the TCEQ in a letter dated January 3, 2020.
November 2019	Golder submits the PRACR Monthly Update to the TCEQ (November 5, 2019).
October 2019	Golder submits the PRACR Monthly Update to the TCEQ (October 3, 2019); UPRR submits a response letter dated October 23, 2019 to the TCEQ's letter dated September 6, 2019 providing additional comments for the 4 <sup>th</sup> Technical NOD.
September 2019	Golder submits the PRACR Monthly Update to the TCEQ (September 4, 2019); UPRR receives additional comments on the 4th Technical NOD dated September 6, 2019 from the TCEQ; Meeting with UPRR, Golder, and TCEQ to discuss additional comments on the 4th Technical NOD on September 23, 2019. Golder on behalf of UPRR submits the Waterline Leak Release Response Report for the water leak discussed below dated September 18, 2019 to the TCEQ Region 12.
August 2019	TCEQ issues a comment letter dated August 9, 2019 on the PRACR Monthly Update dated July 31, 2019. On August 9, 2019, a contractor opened a valve to an abandoned water line that is located beneath the Soil Cap at the Site. This led to water emanating from the location of a former fire hydrant that was present prior to the construction of the soil cap. Water flowed through the capped soils, up through the soil cap, and over the soil cap to the south-southeast, across an asphalt road, and then to a ditch along the railroad tracks. The water flowed down the ditch approximately 200 yards to the northeast to Liberty Road and under the Lockwood Drive Bridge. UPRR was notified of the water leak on the morning of August 10, 2019 and emergency response activities were initiated. Once the source of the water was identified, the valve was closed at approximately 10:36 am on August 10, 2019. Because the water may have come into contact with contaminated soils, UPRR promptly reported the incident and subsequent release to the Texas Commission on Environmental Quality



### APPENDIX 3 CHRONOLOGY

Date	Description
	(TCEQ) (Spill Report No. 20192773 and NRC Report No. 1254765) upon discovery and began the initial spill response actions on August 10, 2019.
July 2019	Union Pacific Railroad (UPRR) submits the RCRA Part A and B Permit Renewal Application (Revision No. 5) with RAP (Revision No. 4) the TCEQ dated July 10, 2019 in response to the Technical NOD Letter dated April 11, 2019; Golder submits the PRACR Monthly Update to the TCEQ (July 31, 2019). Golder submits to the TCEQ the Corrective Action Monitoring Report: 2019 First Semi-Annual Event dated July 11, 2019; Golder conducts 2019 second semi-annual groundwater monitoring event for the SWMU No. 1 and site-wide groundwater sampling event.
June 2019	Union Pacific Railroad (UPRR) receives letter granting extension to July 10, 2019 for submittal of response to 4th Technical Notice of Deficiency (NOD) Letter dated April 11, 2019 from the Texas Commission on Environmental Quality (TCEQ); Meeting with UPRR, Golder Associates (Golder), and TCEQ to discuss 4th Technical NOD on June 12, 2019; Golder submits the 1st Quarter 2019 Dense Non-Aqueous Phase Liquid (DNAPL) Recovery Activities Quarterly Report to the TCEQ; and Golder submits the Post-Response Action Completion Report (PRACR) Monthly Update to the TCEQ (June 28, 2019).
May 2019	UPRR submits an Extension Request for response to 4th Technical NOD Letter dated April 11, 2019 to TCEQ; UPRR installs additional well as requested in 4th Technical NOD letter; and Golder submits the PRACR Monthly Update to the TCEQ (May 31, 2019).
April 2019	UPRR receives 4th Technical NOD dated April 11, 2019 from the TCEQ; Meeting with UPRR, Golder and TCEQ to discuss 4th Technical NOD on April 24, 2019; and Golder submits the PRACR Monthly Update to the TCEQ (April 30, 2019).
March 2019	UPRR submits Response Action Completion Report (RACR) summarizing the NAPL Collection System installation in the Englewood Intermodal Yard with the HWPW Site; and Golder submits the PRACR Monthly Update to the TCEQ (March 29, 2019).
February 2019	Texas Commission on Environmental Quality (TCEQ) issues a comment letter dated February 6, 2019 on the Response to Comments dated January 9, 2019; Golder completes the interim remedial activities by installing the non-aqueous phase liquid (NAPL) collection system; and Golder submits the Post-Response Action Completion Report (PRACR) Monthly Update to the TCEQ (February 28, 2019) that includes a response to TCEQ comment letter dated February 6, 2019. The response includes details on the proposed additional total petroleum hydrocarbon (TPH) assessment in soils at the UPRR Englewood Intermodal Yard within the Houston Wood Preserving Works (HWPW) Site.
January 2019	Golder begins the interim remedial excavation activities for the installation of the NAPL collection system at the Englewood Intermodal Yard; Golder submits to the TCEQ the response to comments dated January 9, 2019 responding to TCEQ comment letter dated December 6, 2018 on the October 2018 PRACR Monthly Update; and Golder submits the PRACR Monthly Update to the TCEQ (February 4, 2019). Golder submits to the TCEQ the Corrective Action Monitoring Report: 2018 Second Semi-Annual Event dated January 4, 2019; Golder conducts 2019 first semi-annual groundwater monitoring event for the SWMU No. 1.



**APPENDIX 3  
CHRONOLOGY**

Date	Description
December 2018	TCEQ issues a comment letter dated December 6, 2018 on the October 2018 PRACR Monthly Update; and Golder submits the PRACR Monthly Update to the TCEQ (December 31, 2018).
November 2018	Golder submits the PRACR Monthly Update to the TCEQ (November 30, 2018).
October 2018	Golder conducts test pits in the Englewood Intermodal Yard to evaluate the NAPL seeps observed in the primary area (slots B100-B109) and other areas (parking slots B13 and B54). Golder submits the PRACR Monthly Update to the TCEQ (October 31, 2018) detailing the results of the test pit evaluation.
September 2018	Golder submits the PRACR Monthly Update to the TCEQ (September 28, 2018).
August 2018	UPRR submits the response to TCEQ comment and request for groundwater information letter dated November 29, 2017 – UPRR Groundwater Monitoring Data (included groundwater data from the three site-wide sampling events conducted from January – July 2018) , August 13, 2018; TCEQ issues a comment letter dated August 22, 2018 on the June 2018 PRACR Monthly Update; and Golder submits the PRACR Monthly Update to the TCEQ (August 31, 2018), including a response to the TCEQ August 22, 2018 comment letter. Response includes preliminary design for the NAPL collection system.
July 2018	Golder submits to the TCEQ the Corrective Action Monitoring Report: 2018 First Semi-Annual Event dated July 20, 2018; Golder conducts 2018 second semi-annual groundwater monitoring event for the SWMU No. 1.; Golder submits the PRACR Monthly Update to the TCEQ (July 20, 2018).
June 2018	Golder conducts a site-wide groundwater sampling event (May-June 2018) in response to TCEQ letter dated November 27, 2017; and conducts repairs to the soil cap (June 12-13, 2018). Golder submits the PRACR Monthly Update to the TCEQ (June 21, 2018).
May 2018	Pastor, Behling & Wheeler, LLC (PBW) (now Golder) submits the PRACR Monthly Update to the TCEQ (May 21, 2018).
April 2018	PBW conducts a site-wide groundwater sampling event (March - April 2018) in response to TCEQ letter dated November 27, 2017; and submits the PRACR Monthly Update to the TCEQ (April 20, 2018).
March 2018	TCEQ issues comment letter on the Updated PRACR requesting monthly updates on the soil and concrete cap repairs (March 20, 2018).
January 2018	PBW submits to the TCEQ the Corrective Action Monitoring Report: 2017 Second Semi-Annual Event dated January 18, 2018; PBW conducts 2018 first semi-annual groundwater monitoring event for the SWMU No. 1. PBW also submits the Updated PRACR (post-Hurricane Harvey) and response to TCEQ comment letter dated October 20, 2017 on January 17, 2018.
	PBW begins installing the additional alternate point of exposure (APOE) wells and monitoring/replacement wells (MW-22A, MW-22B, MW-82B, MW-83B, MW-83C, MW-84B, MW-85C, MW-86C, MW-87C, and MW-89C) as requested by the

**APPENDIX 3  
CHRONOLOGY**

Date	Description
	TCEQ in the letter dated November 28, 2017. The site-wide groundwater sampling event was also conducted (through February 2018).
November 2017	Meeting with UPRR, PBW, Baker-Wotring and the TCEQ (Corrective Action and Law Division) at the TCEQ offices in Austin on November 29, 2017. TCEQ issues letter dated November 28, 2017 requesting UPRR to install additional APOE wells and conduct additional groundwater sampling of the site-wide wells.
October 2017	TCEQ issues a comment letter dated October 20, 2017 on the post- Hurricane Harvey assessment of the capped areas PRACR.
September 2017	PBW submits the PRACR as part of the post- Hurricane Harvey assessment of the capped areas. The soil cap area did not appear to have any significant damage (a few minor erosion rills were noted) as a result of the tropical storm and associated flooding.
August 2017	PBW conducts a site inspection of the soil cap following the major storm event associated with Hurricane Harvey (Aug 25 – 29, 2017).
July 2017	PBW submits to the Texas Commission on Environmental Quality (TCEQ) the Corrective Action Monitoring Report: 2017 First Semi-Annual Event dated July 12, 2017; PBW conducts 2017 second semi-annual groundwater monitoring event for the SWMU No. 1
June 2017	Union Pacific Railroad (UPRR) submits the RCRA Part A and B Permit Renewal Application (Revision No. 4) with RAP (Revision No. 3) to the TCEQ dated July 2016 in response to the Technical NOD Letter dated June 2, 2016. This includes submitting the Response Action Completion Report (RACR) (Revision No. 1).
May 2017	Meeting with UPRR, PBW, Baker-Wotring and the TCEQ (Corrective Action and Law Division) on May 31, 2017 discussing the 3 <sup>rd</sup> Technical Notice of Deficiency (NOD) Letter dated April 10, 2017 on the RCRA Part A and B Permit Renewal Application and Response Action Plan (RAP), specifically for issues regarding the restrictive covenants/deed notices for the off-site properties.
April 2017	UPRR receives the 3 <sup>rd</sup> Technical NOD Letter dated April 10, 2017 on the RCRA Part A and B Permit Renewal Application (Revision No. 3) and RAP (Revision 2) from the TCEQ.
February 2017	Meeting with UPRR, PBW, Baker-Wotring and the TCEQ (Corrective Action and Law Division) on February 16, 2017 discussing the draft comments on the RAP (Revision 2) and restrictive covenants for the off-site properties.
January 2017	PBW submits to the TCEQ the Corrective Action Monitoring Report: 2016 Second Semi-Annual Event dated January 17, 2017; PBW conducts 2017 first semi-annual groundwater monitoring event for the SWMU No. 1
July 2016	UPRR submits the RCRA Part A and B Permit Renewal Application (Revision No. 3) with RAP (Revision No. 2) to the TCEQ dated July 2016 in response to the Technical NOD Letter dated June 2, 2016. This includes submitting the Response Action Completion Report (RACR). PBW submits to the TCEQ the Corrective Action Monitoring Report: 2016 First Semi-Annual Event dated July



**APPENDIX 3  
CHRONOLOGY**

Date	Description
	12, 2016; PBW conducts 2016 second semi-annual groundwater monitoring event for the SWMU No. 1
June 2016	UPRR receives Technical NOD Letter dated June 2, 2016 on the RCRA Part A and B Permit Renewal Application and Response Action Plan from the TCEQ.
May 2016	UPRR completes the response actions authorized under the Area of Contamination to address the surface and subsurface soil Protective Concentration Level Exceedance (PCLE) Zones as detailed in the updated Response Action Plan (RAP) dated December 7, 2015.
February 2016	TCEQ approves the request to extend the termination date for the Area of Contamination from February 15, 2016 to March 7, 2016 in a letter dated February 22, 2016
January 2016	Begin response actions (excavation/placement and cap construction) activities to address surface soil PCLE Zones. PBW conducts 2016 first semi-annual groundwater monitoring event for the Solid Waste Management Unit (SWMU) 1. PBW submits on behalf of UPRR a request to extend the termination date from February 15, 2015 to March 7, 2016 for the Area of Contamination set by the TCEQ.
December 2015	Union Pacific Railroad (UPRR) submits the RCRA Part A and B Permit Renewal Application (Revision No. 2) with Response Action Plan (RAP) (Revision No. 1) to the TCEQ dated December 7, 2015. Remediation contractor begins site preparation for response actions under the Area of Contamination.
November 2015	Union Pacific Railroad (UPRR) receives the Texas Commission on Environmental Quality (TCEQ) letter dated November 5, 2015 detailing the agency's review of the September 18, 2015 submittal titled Additional Information for Clean Closure Equivalence Demonstration. The TCEQ Industrial and Hazardous Waste (I&HW) Permits Section was unable to accept the request for discontinuing post-closure care of the former surface impoundment, Solid Waste Management Unit (SWMU) 1.
November 2015	Meeting with UPRR, Pastor, Behling & Wheeler (PBW), and the TCEQ on November 4, 2015 discussing the October 23, 2015 technical comment letter from the TCEQ.
October 2015	UPRR receives additional technical comments from the TCEQ in a letter dated October 23, 2015 on the Response Action Plan (RAP) regarding the Plume Management Zones and Technical Impracticability Demonstration provided in the Response Action Plan.
September 2015	PBW submits to the TCEQ the Additional Information for Clean Closure Equivalence Demonstration dated September 18, 2015 that included historical data and letters from 1983, 1984, and 1991 to demonstrate clean closure of the soils under the former surface impoundment (SWMU 1). The letter also included a request to cease the post-closure care for SWMU 1.

**APPENDIX 3  
CHRONOLOGY**

Date	Description
August 2015	UPRR receives Technical Notice of Deficiency (NOD) Letter dated August 5, 2015 on the RCRA Part A and B Permit Renewal Application and Response Action Plan from the TCEQ.
July 2015	PBW submits to the TCEQ the Corrective Action Monitoring Report: 2015 First Semi-Annual Event dated July 16, 2015; PBW conducts 2015 second semi-annual groundwater monitoring event for the SWMU No. 1.
April 2015	PBW submits to the TCEQ newspaper tear sheets and affidavits that public notice was published in English and Spanish in the <i>Houston Chronicle</i> on April 2 and <i>La Subasta</i> on March 31, respectively as required once the RCRA Permit Renewal/Compliance Plan with Major Amendment was administratively complete.
March 2015	TCEQ issues a letter dated March 13, 2015 declaring the RCRA Permit Renewal/Compliance Plan with Major Amendment was administratively complete on March 13, 2015.
February 2015	PBW submits a response letter to the TCEQ dated February 13, 2015 for the TCEQ Administrative NOD on the RCRA Part A and B Permit Renewal Application.
January 2015	PBW submits to the TCEQ the Corrective Action Monitoring Report: 2014 Second Semi-Annual Event dated January 15, 2015; PBW conducts 2015 first semi-annual groundwater monitoring event for the SWMU No. 1.
December 2014	UPRR submits the RCRA Part A and B Permit Renewal Application with Response Action Plan (RAP) to the TCEQ dated December 10, 2014. UPRR receives the TCEQ Administrative NOD Letter dated December 17, 2014.
November 2014	RCRA Permit Pre-Application Meeting with UPRR, PBW, and TCEQ dated November 6, 2014.
September 2014	UPRR holds public meeting with residents near the Site to detail institutional controls for off-site groundwater Plume Management Zone (PMZ).
July/August 2014	PBW conducts site-wide groundwater sampling event.
May 2014	PBW oversees installation of seven new monitoring wells (MW-51C, MW-76C, MW-77A, MW-78A, MW-79A, MW-80B, and MW-81B) in the Englewood Intermodal Yard to evaluate DNAPL extent and extent of chemicals of concern (COCs) in the B-CZ unit to the southeast, and one replacement well MW-34CR to replace MW-34C. Soil samples also collected from City of Houston right of way (ROW) along north perimeter of the Site.
January 2014	PBW conducts site-wide groundwater sampling event.
July 2013	PBW conducts site-wide groundwater sampling event.



**APPENDIX 3  
CHRONOLOGY**

Date	Description
February/March 2013	PBW conducts cone penetrometer testing (CPT)/rapid optical screening tool (ROST) and soil investigation at the Englewood Intermodal Yard adjacent to the UPRR Houston Wood Preserving Works (HWPW) site.
January/February 2013	PBW conducts site-wide groundwater sampling event (95 wells). PBW submits Proposed DNAPL Recovery Pilot Test letter to TCEQ dated February 5, 2013, and initiates monthly DNAPL recovery from on-site and off-site wells (10-12 wells) (planned for 24 months).
November 2012	Meet with TCEQ regarding proposed CPT/ROST investigation of Englewood Intermodal Yard based on DNAPL detected from the December 2011 investigation.
July 2012	PBW conducts site-wide groundwater sampling event.
January 2012	PBW conducts site-wide groundwater sampling event.
July 2012	PBW conducts site-wide groundwater sampling event.
December 2011	PBW installs additional monitoring wells in the cohesive zone B-CZ to evaluate extent of DNAPL in the B-CZ.
July 2011	PBW conducts site-wide groundwater sampling event.
April 2011	TCEQ approves the Affected Property Assessment Report (APAR) (including updates and addendums).
March 2011	PBW submits the Revised Updated APAR Addendum to the TCEQ. UPRR repairs fence around site.
January 2011	PBW conducts site-wide groundwater sampling event.
December 2010/ January 2011	UPRR/PBW submits Off-Site Notification Letters to off-site properties indicating Notice of Information Availability for the site, as required with the submittal of the Updated APAR Addendum (Oct 2012) .
October 22, 2010	PBW submits the Updated APAR Addendum to the TCEQ.
June/July 2010	PBW conducts additional soil (along northeast portion of Site) and groundwater investigation (A-TZ, B-CZ, C-TZ and D-TZ wells); including site-wide groundwater monitoring event.
February 16, 2010	UPRR Response to TCEQ Comment Letter dated November 18, 2009.
January 2010	PBW conducts site-wide groundwater sampling event; selected wells are analyzed for Volatile Organic Compounds (VOCs) by EPA Method 8620.
November 18, 2009	TCEQ Comment Letter on Revised APAR.
July 2009	PBW submits APAR Addendum to TCEQ.

**APPENDIX 3**  
**CHRONOLOGY**

Date	Description
January 2009	PBW conducts additional soil and groundwater investigation.
July 2008	PBW conducts additional CPT-ROST and groundwater investigation
January 2007	PBW conducts additional soil and groundwater investigation
August 2006	ERM-Southwest, Inc. (ERM) conducted additional soil and groundwater investigation
April 2006	ERM conducted additional soil and groundwater investigation
September 6, 2005	UPRR Response to TCEQ Response Letter dated August 1, 2005
August 2005	TCEQ Response to UPRR Response Letter dated June 9, 2005
June 9, 2005	UPRR Response to TCEQ Letter dated April 15, 2005
April 15, 2005	TCEQ Response to UPRR Response Letter dated November 19, 2004
November 19, 2004	UPRR Response to October 8, 2004 TCEQ Letter
October 8, 2004	TCEQ Comment Letter on Revised APAR
June 10, 2004	Revised APAR submitted to the TCEQ by ERM, Inc. on behalf of UPRR
November 7, 2001	Texas Natural Resources Conservation Commission (TNRCC) provides comments to July 5, 2001 response letter.
July 5, 2001	Follow-up response to November 6, 2000 TNRCC comment letter on the On-Site APAR submitted to TNRCC on behalf of UPRR.
January 9, 2001	Initial response to November 6, 2000 TNRCC comments.
November 6, 2000	TNRCC provides comments to On-Site APAR.
July 10, 2000	Affected Property Assessment Report for On-Site Property (On-Site APAR) submitted to TNRCC on behalf of UPRR by ERM.
February 20, 2000	Letter submitted to the TNRCC regarding proposed Phase 2-C investigation for further delineation of off-site areas
September 10, 1999	Phase 2-B RFI/EOC Investigation Report submitted to TNRCC on behalf of UPRR by ERM
April 27, 1998	Interim Stabilization Measures Report – Southern Drainage Ditch, submitted to TNRCC on behalf of UPRR by ERM.
February 13, 1998	Phase 2-A RFI/EOC Investigation Report submitted to TNRCC on behalf of UPRR by ERM.
January 13, 1997	RFI portion of the Phase 1 RFI/EOC Investigation Report approved by TNRCC
November 26, 1996	EOC portion of the Phase 1 RFI/EOC Investigation Report approved by TNRCC
May 23, 1996	Phase 1 RFI/EOC Report submitted on behalf of Southern Pacific Transportation Company (SPTCo) by Terranext
October 16, 1995	RFI Work Plan approved by TNRCC
September 29, 1995	EOC Work Plan approved by TNRCC
January 10, 1995	Operation and Maintenance Plan approved by TNRCC
November 3, 1994	Revised Compliance Schedule approved by TNRCC
October 14, 1994	RCRA Facility Investigation (RFI) Work Plan submitted on behalf of SPTCo
September 16, 1994	Extent of Contamination (EOC) Work Plan submitted on behalf of SPTCo
September 7, 1994	Revised Compliance Schedule submitted on behalf of SPTCo
August 19, 1994	Operation and Maintenance Plan and Compliance Schedule submitted on behalf of SPTCo



**APPENDIX 3  
CHRONOLOGY**

Date	Description
June 20, 1994	Permit No. HW-50343-000 and Compliance Plan CP-50343-000 issued by TNRCC.
October 1993	RCRA Facility Assessment completed on behalf of U.S. EPA by PRC Environmental Management, Inc.
May 13, 1991	RCRA Permit Application submitted by SPTCo

Note: Not all groundwater sampling events are listed in the chronology

**APPENDIX 4**

**WATERLINE LEAK RELEASE RESPONSE, SEPTEMBER 18, 2019**





September 18, 2019

Project No. 19119232

**Ms. Kendra Bernhagen, Work Leader**

Emergency Response Team  
Texas Commission on Environmental Quality Houston Region  
5425 Polk St, Suite H  
Houston, Texas 77023

**WATER LINE LEAK RELEASE RESPONSE  
HOUSTON WOOD PRESERVING WORKS, HOUSTON, TEXAS  
TCEQ SWR NO. 31547; HAZARDOUS SOLID WASTE PERMIT NO. 50343**

Dear Ms. Bernhagen:

Golder Associates, Inc. (Golder) on behalf of the Union Pacific Railroad (UPRR) prepared this summary of the water line leak release and spill response activities that occurred at UPRR Former Houston Wood Preserving Works (HWPW) Site (the Site) located at 4910 Liberty Road in Houston, Texas in Harris County (the Site; Figure 1) on August 10, 2019. The water release occurred due to the opening of a valve to an abandoned water line by a contractor that was working in the Englewood Intermodal Yard. The water line leak occurred underneath the soil cap area at the Site. The soil cap was constructed as part of response actions undertaken in accordance with the Texas Risk Reduction Program (TRRP) to address surface and subsurface soil protective concentration levels exceedance (PCLE) zone at the Site. Soils under the soil cap are impacted with contaminants associated with the former wood preserving operations that occurred at Site. The abandoned water line likely serviced a former fire hydrant that was removed in 2016 during the construction of a soil cap at the Site.

Because the water may have come into contact with contaminated soils, UPRR promptly reported the incident and subsequent release to the Texas Commission on Environmental Quality (TCEQ) (Spill Report No. 20192773 and NRC Report No. 1254765) upon discovery and began the initial spill response actions on August 10, 2019. UPRR personnel, emergency response contractor National Response Corporation (NRC), remediation contractor United States Environmental Services (USES), and Golder personnel mobilized to the Site to respond to the incident. This report briefly summarizes the incident and the response activities conducted to address the release in accordance with the reporting requirements of 30 Texas Administrative Code §327.5(c). Details regarding the release of water and response actions are provided in the following sections. A detailed photographic log and the sample analytical results are provided as Attachments 1 and 2.

**Release Information**

On August 9, 2019, a contractor opened a valve to an abandoned water line that is located beneath the soil cap at the Site. This led to water emanating from the location of a former fire hydrant prior to the construction of the soil cap (Photo 1). Water flowed through the capped soils, up through the soil cap, and over the soil cap (Photographs 2 and 3) to the south-southeast (Photographs 4 and 5), across an asphalt road (that serves as a cap between the

soil cap and railroad tracks) (Photographs 4 and 5), and then to a ditch along the railroad tracks (Photographs 6 and 7). The water flowed down the ditch approximately 200 yards to the northeast to Liberty Road and under the Lockwood Drive Bridge (Photographs 8 and 9). The flowing water extended beyond the intersection of Liberty Road and Lockwood Drive approximately 300 yards northeast on Liberty Road (Photograph 10). Photograph 11 shows the valve to an abandoned water line that was inadvertently opened by a contractor.

The runoff flow direction is illustrated in Figure 1.

### **Initial Response**

UPRR was notified of the water leak on the morning of August 10, 2019 and emergency response activities were initiated. At approximately 9:45 am on August 10, 2019, Golder was on site to evaluate potential environmental concerns related to the water leak. Once the source of the water was identified, the valve was closed at approximately 10:36 am on August 10, 2019. NRC arrived onsite to capture the flowing water using a vacuum truck and remove the water that was leaving the Site and ponding at the intersection of Liberty Road and Lockwood Drive. An absorbent boom was placed in the ditch as a preventative measure in case there were any hydrocarbons present in the flowing water (Photograph 7). No observations of hydrocarbon sheens or odors were noted during the response activities. Approximately 15,000 gallons of water was recovered with the vacuum truck was transferred to a frac tank and staged on-site.

### **Sample Collection**

Golder collected surface water samples from the following locations (shown on Figure 1):

- W-1620-RO-20190810 – surface water run off sample collected where the water runoff was leaving the capped area.
- W-1620-RO-Ditch-20190810 – surface water run off sample collected from the ditch between the asphalt road and railroad tracks; and
- W-1620-Fractank-20190810 - a combination of all the water that was removed from Liberty Road and the drainage ditch, sample collected for waste characterization.
- One surface water sample was collected (labeled W-1620-RO-LibertyRd-20190810 collected from Liberty Road under the Lockwood Bridge overpass (see Photograph 10)) but put on hold pending the analysis of the three other samples.
- One sample of floating solids (see Photograph 7) was collected with a sheen net (labeled W-1620-Sheen-20190810) in the ditch near the absorbent boom. Even though sample W-1620-Sheen-20190810 was labeled “Sheen”, no hydrocarbon sheen was observed in the sampled area (noted as floating debris shown on Photograph 7).

The three water samples were analyzed for the following chemicals of concern (COCs):

- Total petroleum hydrocarbons (TPH) by TCEQ Method TX1005;
- Benzene, ethylbenzene, toluene, and total xylenes (BTEX) by EPA Method 8260; and
- Polycyclic aromatic hydrocarbons (PAHs) and phenol by EPA 8270.

Water samples were collected with dip bottles and placed in laboratory-provided sample containers. The sheen net was provided by General Oceanics and the sample was collected by pulling the net through the solids floating on the surface water. Samples were submitted to ALS Environmental (ALS) located in Houston, Texas for the analyses



listed above. Analytical data collected from the Site surface water samples are summarized on Table 1. Analytical data for the waste characterization sample are summarized on Table 2. Laboratory reports are provided in Attachment 2.

## **Sample Results**

### **Surface Water**

Surface water sample results were compared to TCEQ Texas Risk Reduction Program (TRRP) Groundwater Residential (<sup>GW</sup>GW<sub>Ing</sub>) Protective Concentration Levels (PCLs) and the TCEQ ecological benchmarks (freshwater surface water acute and chronic values, <https://www.tceq.texas.gov/remediation/eco/eco.html>) to evaluate potential impacts to surface water bodies. The nearest downstream surface water segment in this area is Hunting Bayou above Tidal (1007R), which is a freshwater segment. Table 1 provided the PCLs, benchmarks, and surface water data.

TPH was not detected above the sample detection limits (SDLs) in the two runoff samples (RO and RO-Ditch) collected on the Site. The TPH SDLs are below the <sup>GW</sup>GW<sub>Ing</sub> PCLs. The TCEQ does not have ecological benchmarks for TPH. BTEX parameters were not detected above their respective SDLs in any of the runoff water samples collected from the Site. The SDLs were below the ecological benchmark and groundwater protection values for BTEX. PAH concentrations in runoff sample W-1620-RO-20190810 were below the freshwater benchmark and residential groundwater values. Benzo(a)pyrene is the only PAH that was detected above the freshwater chronic benchmark value (0.000014 milligrams per liter [mg/L]) in the W-1620-RO-Ditch-20190810 sample at a concentration of 0.000068 J mg/L. The J-flag indicates that the concentration is an estimate below the laboratory method quantitation limit. The concentration is below the freshwater acute benchmark value (0.00024 mg/L).

### **Waste Characterization**

TPH concentrations were detected in the sample collected from the frac tank in the Aromatic C<sub>6</sub>-C<sub>12</sub> and >C<sub>12</sub>-C<sub>28</sub> ranges at reported concentrations of 0.91 mg/L and 0.31 J mg/L, respectively. Ethylbenzene, toluene, and xylenes were detected in the frac tank sample above their respective SDLs at 0.0018 mg/L, 0.045 mg/L, and 0.02 mg/L, respectively. PAHs were detected above their respective SDLs in the frac tank sample, but all concentrations were below the Class 1 toxic constituents' maximum leachable concentrations.

The concentrations of constituents in the frac tank sample are all below the limits for a Class 1 waste.

## **Conclusions**

The findings from the response actions conducted at the Site include:

- The water leak occurred on August 9, 2019 due to the opening of a valve to an abandoned water line that likely lead to a fire hydrant removed in 2016 during the construction of a soil cap at the Site. Water flowed through the capped soils, up through the soil cap, over the soil cap to the south-southeast, to a ditch along the railroad tracks within the Site, and then flowed along the ditch approximately 200 yards northeast to Liberty Road under the Lockwood Drive Bridge. The water flowed from the intersection of Liberty Road and Lockwood Drive to approximately 300 yards northeast on Liberty Road.
- UPRR was notified of the water leak the morning of August 10, 2019. The valve was identified and closed at approximately 10:36 am on August 10, 2019. The water in Liberty Road and the drainage ditch on site

was recovered using a vacuum truck. The water was transferred to a frac tank and staged on-site for off-Site disposal.

- Water samples were collected adjacent to the soil cap, in the ditch adjacent to the railroad tracks, and from the frac tank and analyzed for TPH, BTEX, and PAHs. None of the TPH, BTEX, or PAH concentrations on the two runoff samples exceeded the TRRP <sup>GW</sup>GW<sub>ing</sub> PCLs. Since the two surface water run off samples collected from the Site did not have concentrations detected above the TRRP <sup>GW</sup>GW<sub>ing</sub> PCLs or TCEQ ecological surface water (freshwater) acute values, the two additional samples held were not analyzed. The detections of ethylbenzene, toluene, total xylenes, PAHs, and TPH in the frac tank sample are likely a result of urban run-off from Liberty Road and not as a result of the water leak from the Site.

Based on these findings no further action is necessary at the Site. A follow up submittal documenting the disposition of the waste generated during the response activities will be provided following waste disposal.

If you have any questions or comments, please feel free to contact Kevin Peterburs, UPRR Manager Site Remediation at (414) 267-4164 or us at (512) 671-3434.

Sincerely,

**Golder Associates Inc.**



Eric C. Matzner, P.G.  
*Principal Hydrogeologist*

CC: Mr. Kevin Peterburs, Manager Environmental Site Remediation, UPRR

Attachments: Table 1 – Summary of Surface Water Run-Off Sample Analytical Results  
Table 2 – Summary of Frac Tank Analytical Results  
Figure 1 – Water Leak and Sample Location Map  
Attachment 1 – Photographic Log  
Attachment 2 – Laboratory Report



## Tables

**TABLE 1**  
**SUMMARY OF SURFACE WATER RUN-OFF SAMPLE ANALYTICAL RESULTS**  
**AUGUST 10, 2019 WATER LEAK**  
**UPRR HOUSTON WOOD PRESERVING WORKS, HOUSTON, TEXAS**

Sample ID Sample Collection Date	Freshwater Acute Benchmark (mg/L)	Freshwater Chronic Benchmark (mg/L)	Residential GW <sup>GW</sup> GW <sub>Ing</sub> (mg/L)	W-1620-RO- 20190810	W-1620-RO-Ditch- 20190810
				8/10/2019	8/10/2019
<b>Volatile Organic Compounds (SW8260) (mg/L)</b>					
Benzene	2.3	0.13	0.005	0.002 U	0.002 U
Ethylbenzene	3	1	0.7	0.0003 U	0.0003 U
Toluene	10.21	3.4	1	0.0002 U	0.0002 U
Xylenes, Total	4.02	1.34	10	0.0003 U	0.0003 U
<b>Semi-Volatile Organic Compounds (SW8270) (mg/L)</b>					
Acenaphthene	0.08	0.023	1.5	0.0001	0.00033
Acenaphthylene	--	--	1.5	0.000015 U	0.000015 U
Anthracene	0.0018	0.0003	7.3	0.000016 J	0.000088 J
Benz(a)anthracene	0.2076	0.0346	0.0091	0.000051 U	0.00011
Benzo(a)pyrene	0.00024	0.000014	0.0002	0.00002 U	0.000068 J
Benzo(b)fluoranthene	--	--	0.0091	0.000023 U	0.00014
Benzo(g,h,i)perylene	--	--	0.73	0.000014 U	0.000066 J
Benzo(k)fluoranthene	--	--	0.091	0.000019 U	0.000074 J
Chrysene	0.207	0.007	0.91	0.000021 U	0.00023
Dibenz(a,h)anthracene	0.149	0.005	0.0002	0.000024 U	0.000034 J
Dibenzofuran	--	--	0.098	0.000055 J	0.00014
Fluoranthene	0.0336	0.00616	0.98	0.000046 J	0.0009
Fluorene	0.064	0.011	0.98	0.000085 J	0.00021
Indeno(1,2,3-cd)pyrene	--	--	0.0091	0.000022 U	0.00004 J
Naphthalene	1.48	0.25	0.49	0.00008 J	0.00019
Phenanthrene	0.03	0.03	0.73	0.00013	0.00021
Pyrene	0.206	0.007	0.73	0.000027 J	0.00053
<b>Total Petroleum Hydrocarbons (TX1005) (mg/L)</b>					
nC6 to nC12	--	--	0.98	0.2 U	0.2 U
>nC12 to nC28	--	--	0.98	0.2 U	0.2 U
>nC28 to nC35	--	--	0.98	0.2 U	0.2 U
Total Petroleum Hydrocarbons	--	--	--	0.2 U	0.2 U

Notes:

Nearest downstream surface water segment is Hunting Bayou above Tidal (1007R), which is a freshwater segment.

U - indicates analyte was not detected above the detection limit

J - estimate; concentration is below the quantitation limit but above the detection limit



**TABLE 2**  
**SUMMARY OF WASTE CHARACTERIZATION SAMPLE ANALYTICAL RESULTS**  
**AUGUST 10, 2019 WATER LEAK**  
**UPRR HOUSTON WOOD PRESERVING WORKS, HOUSTON, TEXAS**

Sample ID Sample Collection Date	Class 1 Toxic Constituents' Maximum Leachable Concentrations <sup>1</sup>	W-1620-Fractank- 20190810 8/10/2019
	<b>Volatile Organic Compounds (SW8260) (mg/L)</b>	
Benzene	0.5	0.002 U
Ethylbenzene	400	0.0018
Toluene	1000	0.045
Xylenes, Total	7000	0.02
<b>Semi-Volatile Organic Compounds (SW8270) (mg/L)</b>		
Acenaphthene	210	0.00039
Acenaphthylene	--	0.000035 J
Anthracene	1050	0.0002
Benz(a)anthracene	--	0.00017
Benzo(a)pyrene	--	0.000091 J
Benzo(b)fluoranthene	--	0.00017
Benzo(g,h,i)perylene	--	0.000074 J
Benzo(k)fluoranthene	--	0.000074 J
Chrysene	--	0.00027
Dibenz(a,h)anthracene	--	0.000038 J
Dibenzofuran	--	0.00019
Fluoranthene	140	0.00092
Fluorene	140	0.00037
Indeno(1,2,3-cd)pyrene	--	0.000058 J
Naphthalene	--	0.007
Phenanthrene	--	0.00079
Pyrene	5.9	0.00065
<b>Total Petroleum Hydrocarbons (TX1005) (mg/L)</b>		
nC6 to nC12	--	0.91
>nC12 to nC28	--	0.31 J
>nC28 to nC35	--	0.2 U
Total Petroleum Hydrocarbons	--	1.22
<b>RCI Characteristics</b>		
Reactive cyanide (mg/kg)	≥250	100 U
Reactive sulfide (mg/kg)	≥500	100 U
Corrosivity (pH units)	≤2 or ≥12.5	7.78 H
Ignitability (degrees Fahrenheit)	<140	>212

Notes:

U - indicates analyte was not detected above the detection limit

J - estimate; concentration below the quantitation limit but above the detection limit

H - analyzed outside of holding time

<sup>1</sup> Class 1 Toxic Constituents' Maximum Leachable Concentrations from 30 TAC Chapter 335 Subchapter R Appendix 1 Table 1.

## Figures



Path: \\usnarr\usnarr\Projects - Round Rock\1919232 - HWPW\2019-09-Aug\1 - File Name: FIG 1 - Water Leak Location Map.dwg | Last Edited By: adiamond | Date: 2019-09-13 | Time: 3:35:32 PM | Printed By: adiamond | Date: 2019-09-05 | Time: 5:19:30 PM

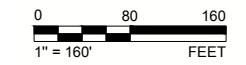


**LEGEND**

- UPRR PROPERTY BOUNDARY
- X WATER LEAK LOCATION
- SAMPLE LOCATION
- WATER RUN-OFF FLOW

**REFERENCE(S)**

PARCEL BOUNDARIES: CITY OF HOUSTON GEOGRAPHIC INFORMATION & MANAGEMENT SYSTEM (GIMS).  
 AERIAL: GOOGLE EARTH, PHOTOGRAPHY DATED 10/28/17.



CLIENT  
 UNION PACIFIC RAILROAD CO.

PROJECT  
 HOUSTON WOOD PRESERVING WORKS

TITLE  
**WATER LEAK AND SAMPLE LOCATION MAP**  
 AUGUST 10, 2019

CONSULTANT	YYYY-MM-DD	2019-09-05
DESIGNED	AJD	
PREPARED	AJD	
REVIEWED	ECM	
APPROVED	ECM	

PROJECT NO. 19119232      REV. 0      FIGURE 1

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



**ATTACHMENT 1**

# Photographic Log





<b>Client Name:</b> Union Pacific Railroad	<b>Site Location:</b> Water Line Leak Release Response, Houston, Texas	<b>Project No.:</b> 19119232
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<b>Photo No.</b> 1	<b>Date:</b> 08/10/19
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**Description:**

Location of the source of water emanating from the soil cap.



<b>Photo No.</b> 2	<b>Date:</b> 08/10/19
-----------------------	--------------------------

**Description:**

Source area of water line leak at soil cap, looking east.







**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
 Water Line Leak Release Response, Houston, Texas

**Project No.**  
 19119232

**Photo No.**  
**3**

**Date:**  
 08/10/19

**Description:**

Runoff from soil cap toward asphalt road and railroad tracks, looking south.

Location of water runoff sample W-1620-RO-20190810.



**Photo No.**  
**4**

**Date:**  
 08/10/19

**Description:**

Runoff from soil cap toward asphalt road and railroad tracks, looking southeast.

Location of water runoff sample W-1620-RO-20190810.







<b>Client Name:</b> Union Pacific Railroad	<b>Site Location:</b> Water Line Leak Release Response, Houston, Texas	<b>Project No.:</b> 19119232
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<b>Photo No.</b> 5	<b>Date:</b> 08/10/19
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**Description:**

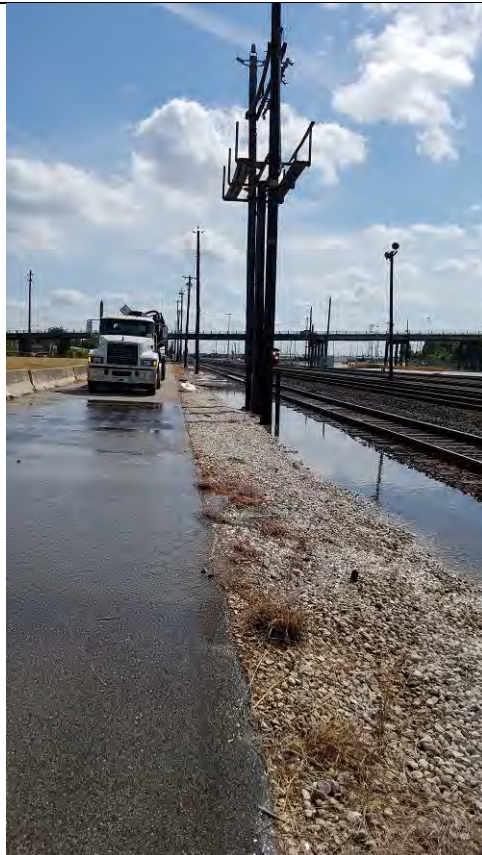
Water flowing across asphalt road toward railroad tracks from soil cap, looking northeast.



<b>Photo No.</b> 6	<b>Date:</b> 08/10/19
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**Description:**

Water flowing across asphalt road toward railroad tracks from soil cap, looking northeast.







**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Water Line Leak Release Response, Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**7**

**Date:**  
08/10/19

**Description:**

Absorbent boom placed in the ditch adjacent to railroad tracks, looking south. Note floating debris, no sheen observed.

Location of water run off sample W-1620-RO-Ditch-20190810.



**Photo No.**  
**8**

**Date:**  
08/10/19

**Description:**

Runoff reaching Liberty Road, looking East toward Lockwood Drive Bridge.







<b>Client Name:</b> Union Pacific Railroad	<b>Site Location:</b> Water Line Leak Release Response, Houston, Texas	<b>Project No.</b> 19119232
---	---	--------------------------------

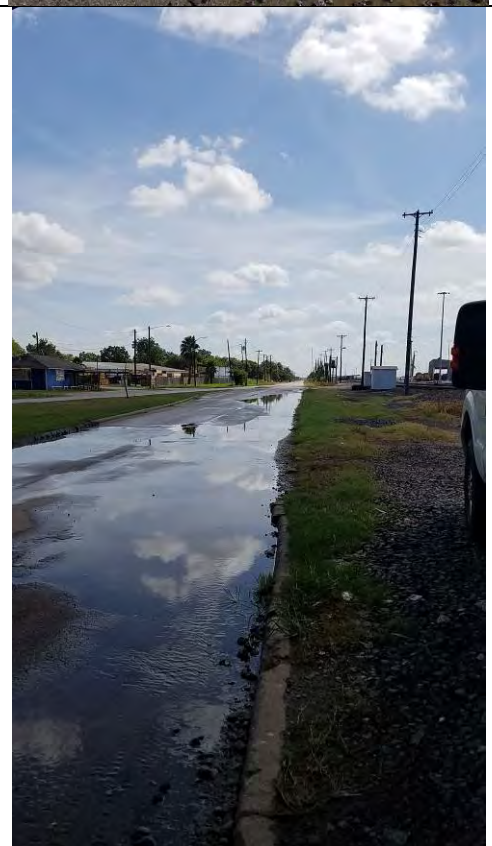
<b>Photo No.</b> 9	<b>Date:</b> 08/10/19
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**Description:**  
Runoff under Lockwood Drive Bridge on Liberty Road, looking east.



<b>Photo No.</b> 10	<b>Date:</b> 08/10/19
------------------------	--------------------------

**Description:**  
Liberty Road past Lockwood Drive Bridge, looking east.





**Client Name:**  
**Union Pacific Railroad**

**Site Location:**  
Water Line Leak Release Response, Houston, Texas

**Project No.**  
19119232

**Photo No.**  
**11**

**Date:**  
08/10/19

**Description:**

Location of water valve that was turned on at northeast corner of the property, looking west.





**ATTACHMENT 2**

# Data Usability Summary and Laboratory Report



# Memorandum

August 27, 2019

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

From: <sup>CK</sup> Chris G. Knight/eew/357-NF Tel: 512-506-8803

cc: Jesse Orth, Jon Lang; Julie Lidstone

**Subject: Data Usability Summary  
Water Line Leak Sampling Event  
Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works  
Houston, Texas  
August 2019**

## 1. Scope of Data Usability Study

This document details a Data Usability Summary (DUS) of analytical results for surface water samples collected in support of the Water Line Leak Sampling Event at the Union Pacific Railroad (UPRR) / Houston TX-Wood Preserving Works site during August 2019. Samples were submitted to ALS Environmental (ALS), located in Houston, Texas and are reported in data package HS19080556. The intended use of the data is to support the Water Line Leak Sampling Event at the site by providing current concentrations 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), duplicate data, field quality assurance/quality control (QA/QC) sample, the laboratory review checklist (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.

- i) With the exception of reactive cyanide and reactive sulfide, ALS is NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package. Because TCEQ does not offer accreditation for these compounds, the results are flagged with "n" in the analytical report. No further action was.

## 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 a trip blank sample 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, MS, and laboratory duplicate analyses.

## 4. Data Review/Validation Results

### 4.1 Sample Holding Time and Preservation

Sample were shipped with a chain of custody and the paper work was filled out properly. Samples were properly preserved, 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. Samples were prepared and analyzed within the required holding times with the following exception (see Table 4):

- i) W-1620-Fractank-20190810 was analyzed outside of the established holding time for pH analysis and was qualified as estimated; biased low.

### 4.2 Sample Containers

Sample containers used were certified pre-cleaned glass and plastic 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), semi-volatile organic compounds (SVOCs) and total petroleum hydrocarbons (TPH) are spiked with surrogate compounds prior to sample extraction and/or 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 or LCS/laboratory control sample duplicate (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision. The recovery ranges established by the laboratory are adopted as the acceptance criteria for the project.

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

The LCS or LCS/LCSD contained all analytes specified in the methods. All LCS recoveries and/or RPDs were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision (where applicable).





#### **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.

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

#### **4.8 Duplicate Sample Analyses**

Analytical precision is evaluated based on the analysis of laboratory duplicate samples. For this study, duplicate samples were prepared and analyzed by the laboratory as specified in Table 1 for ignitability and pH analyses. The RPDs 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 additional duplicate analyses on non-site samples. These cannot be used to assess precision for the site samples.

#### **4.9 Field QA/QC Sample**

The field QA/QC consisted of one trip blank sample.

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank sample was submitted to the laboratory for VOCs analysis. All results were non-detect for the compounds of interest.

#### **4.10 Field Procedures**

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

#### **4.11 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 otherwise in this memorandum.

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

## **5. Conclusion**

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are usable for the purpose of supporting the Water Line Leak Sampling Event at the site by providing current concentrations of chemicals of concern with the specific qualification noted herein.

**Table 1**

**Sample Collection and Analysis Summary  
Water Line Leak Sampling Event  
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works  
Houston, Texas  
August 2019**

Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters							Comments	
					VOCs	SVOCs	TPH	Ignitability	pH	Reactive Cyanide	Reactive Sulfide		
W-1620-RO-20190810	RO	Water	08/10/2019	10:50	X	X	X						
W-1620-RO-Ditch-20190810	RO-Ditch	Water	08/10/2019	11:15	X	X	X						
W-1620-Fractank-20190810	Frac Tank	Water	08/10/2019	14:00	X	X	X	X	X	X	X		DUP-P
WQ-1620-TB-20190810	-	Water	08/10/2019	-	X								Trip Blank

Notes:

- VOCs - Volatile Organic Compounds
- SVOCs - Semi-volatile Organic Compounds
- DUP-P - Laboratory Duplicate (partial parameters)
- "-" - Not Applicable



Table 2

**Water Line Leak Sampling Event**  
**Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works**  
**Houston, Texas**  
**August 2019**

	Location ID:	Frac Tank	RO	RO-Ditch
	Sample Name:	W-1620-Fractank-20190810	W-1620-RO-20190810	W-1620-RO-Ditch-20190810
	Sample Date:	08/10/2019	08/10/2019	08/10/2019
Parameters	Unit			
<b>Volatile Organic Compounds</b>				
Benzene	mg/L	<0.00020	<0.00020	<0.00020
Ethylbenzene	mg/L	0.0018	<0.00030	<0.00030
Toluene	mg/L	0.045	<0.00020	<0.00020
Xylenes (total)	mg/L	0.020	<0.00030	<0.00030
<b>Semivolatile Organic Compounds</b>				
Acenaphthene	mg/L	0.00039	0.00010	0.00033
Acenaphthylene	mg/L	0.000035 J	<0.000015	<0.000015
Anthracene	mg/L	0.00020	0.000016 J	0.000088 J
Benzo(a)anthracene	mg/L	0.00017	<0.000051	0.00011
Benzo(a)pyrene	mg/L	0.000091 J	<0.000020	0.000068 J
Benzo(b)fluoranthene	mg/L	0.00017	<0.000023	0.00014
Benzo(g,h,i)perylene	mg/L	0.000074 J	<0.000014	0.000066 J
Benzo(k)fluoranthene	mg/L	0.000074 J	<0.000019	0.000074 J
Chrysene	mg/L	0.00027	<0.000021	0.00023
Dibenz(a,h)anthracene	mg/L	0.000038 J	<0.000024	0.000034 J
Dibenzofuran	mg/L	0.00019	0.000055 J	0.00014
Fluoranthene	mg/L	0.00092	0.000046 J	0.00090
Fluorene	mg/L	0.00037	0.000085 J	0.00021
Indeno(1,2,3-cd)pyrene	mg/L	0.000058 J	<0.000022	0.000040 J
Naphthalene	mg/L	0.0070	0.000080 J	0.00019
Phenanthrene	mg/L	0.00079	0.00013	0.00021
Pyrene	mg/L	0.00065	0.000027 J	0.00053
<b>Total Petroleum Hydrocarbons</b>				
Total Petroleum Hydrocarbons	mg/L	1.22	<0.20	<0.20
Total Petroleum Hydrocarbons (>C12-C28)	mg/L	0.31 J	<0.20	<0.20
Total Petroleum Hydrocarbons (>C28-C35)	mg/L	<0.20	<0.20	<0.20
Total Petroleum Hydrocarbons (C6-C12)	mg/L	0.91	<0.20	<0.20
<b>General Chemistry</b>				
Ignitability	Deg F	212	--	--
pH	s.u.	7.78 JL	--	--
Reactive cyanide	mg/kg	<100	--	--
Reactive sulfide	mg/kg	<100	--	--

## Notes:

- < - Not detected at the associated reporting limit
- J - Estimated concentration
- JL - Estimated concentration; biased low
- "--" - Not applicable

Table 3

**Analytical Methods**  
**Water Line Leak Sampling Event**  
**Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works**  
**Houston, Texas**  
**August 2019**

Parameter	Method	Matrix	Holding Time	Holding Time
			Collection to Extraction (Days)	Extraction to Analysis (Days)
VOCs	SW-846 8260C	Water	-	14
SVOCs	SW-846 8270D	Water	7	40
TPH	TX1005	Water	14	40
Ignitability	SW-846 1010	Water	-	28
pH	SW-846 9040C	Water	-	immediate
Reactive Cyanide	SW-846 7.3.3.2	Water	-	14
Reactive Sulfide	SW-846 7.3.4.2	Water	-	28

## Notes:

- VOCs - Volatile Organic Compounds  
SVOCs - Semi-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



Table 4

**Qualified Sample Results Due to Holding Time Exceedance  
Water Line Leak Sampling Event  
Union Pacific Railroad (UPRR)/Houston, TX-Wood Preserving Works  
Houston, Texas  
August 2019**

<b>Parameter</b>	<b>Sample ID</b>	<b>Holding Time (days)</b>	<b>Holding Time Criteria</b>	<b>Analyte</b>	<b>Qualified Sample Results</b>	<b>Units</b>
General Chemistry	W-1620-Fractank-20190810	5	immediate	pH	7.78 JL	s.u.

## Notes:

JL - Estimated concentration; biased low

# 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

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



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

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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
<b>Method EPA 1664</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
n-Hexane Extractable Material (HEM) (O&G)	TX	1803	10127807
<b>Method EPA 180.1</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Turbidity	TX	2055	10011606
<b>Method EPA 200.8</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
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
<b>Method</b> EPA 335.1			
<b>Analyte</b> Amenable cyanide	<b>AB</b> TX	<b>Analyte ID</b> 1510	<b>Method ID</b> 10060001
<b>Method</b> EPA 335.2			
<b>Analyte</b> Total cyanide	<b>AB</b> TX	<b>Analyte ID</b> 1645	<b>Method ID</b> 10278203
<b>Method</b> EPA 335.4			
<b>Analyte</b> Total cyanide	<b>AB</b> TX	<b>Analyte ID</b> 1645	<b>Method ID</b> 10061402
<b>Method</b> EPA 350.3			
<b>Analyte</b> Ammonia as N	<b>AB</b> TX	<b>Analyte ID</b> 1515	<b>Method ID</b> 10064401
<b>Method</b> EPA 365.3			
<b>Analyte</b> Orthophosphate as P	<b>AB</b> TX	<b>Analyte ID</b> 1870	<b>Method ID</b> 10070801
Phosphorus	TX	1910	10070801
<b>Method</b> EPA 375.4			
<b>Analyte</b> Sulfate	<b>AB</b> TX	<b>Analyte ID</b> 2000	<b>Method ID</b> 10073800
<b>Method</b> EPA 376.1			
<b>Analyte</b> Sulfide	<b>AB</b> TX	<b>Analyte ID</b> 2005	<b>Method ID</b> 10074201
<b>Method</b> EPA 410.4			
<b>Analyte</b> Chemical oxygen demand (COD)	<b>AB</b> TX	<b>Analyte ID</b> 1565	<b>Method ID</b> 10077404
<b>Method</b> EPA 415.1			
<b>Analyte</b> Total Organic Carbon (TOC)	<b>AB</b> TX	<b>Analyte ID</b> 2040	<b>Method ID</b> 10078407
<b>Method</b> EPA 420.1			
<b>Analyte</b> Total phenolics	<b>AB</b> TX	<b>Analyte ID</b> 1905	<b>Method ID</b> 10079400



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

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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





# Texas Commission on Environmental Quality



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

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

Certificate: T104704231-19-23  
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Issue Date: 5/1/2019

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**Matrix: Non-Potable Water**

Vanadium	TX	1185	10156419
Zinc	TX	1190	10156419
<b>Method EPA 608</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
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
<b>Method EPA 7196</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Chromium (VI)	TX	1045	10162206
<b>Method EPA 7470</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
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



# Texas Commission on Environmental Quality



## NELAP - Recognized Laboratory Fields of Accreditation

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Issue Date: 5/1/2019

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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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**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
<b>Method EPA 9014</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Amenable cyanide	TX	1510	10193803
Total cyanide	TX	1645	10193803
<b>Method EPA 9038</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Sulfate	TX	2000	10196608
<b>Method EPA 9040</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
pH	TX	1900	10196802
<b>Method EPA 9050</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Conductivity	TX	1610	10198604
<b>Method EPA 9056</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
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
<b>Method EPA 9060</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Total Organic Carbon (TOC)	TX	2040	10200201



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**Matrix: Non-Potable Water**

Method	Analyte	AB	Analyte ID	Method ID
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
	Ethane	TX	4747	10212905
	Ethene	TX	4752	10212905
	Methane	TX	4926	10212905
	n-Butane	TX	5007	10212905
	n-Propane	TX	5029	10212905
HACH 8000	Chemical oxygen demand (COD)	TX	1565	60003001
SM 2120 B	Color	TX	1605	20223807
SM 2310 B (4a)	Acidity, as CaCO <sub>3</sub>	TX	1500	20002806
SM 2320 B	Alkalinity as CaCO <sub>3</sub>	TX	1505	20045005
SM 2340 B		AB	Analyte ID	Method ID





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**Matrix: Non-Potable Water**

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



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**Matrix: Non-Potable Water**

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





# Texas Commission on Environmental Quality



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Houston, TX 77099-4338

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Issue Date: 5/1/2019

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**Matrix: Non-Potable Water**

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



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**Matrix: Solid & Chemical Materials**

Method	Analyte	AB	Analyte ID	Method ID
ASTM D2216	Moisture	TX	10337	ASTM D2216-05
EPA 1010	Ignitability	TX	1780	10116606
EPA 1030	Ignitability	TX	1780	10117201
EPA 1311	TCLP	TX	849	10118806
EPA 1312	SPLP	TX	850	10119003
EPA 1668	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
EPA 200.8	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
<b>Method EPA 7196</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Chromium (VI)	TX	1045	10162206
<b>Method EPA 7470</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Mercury	TX	1095	10165603
<b>Method EPA 7471</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Mercury	TX	1095	10166004
<b>Method EPA 8015</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
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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**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
<b>Method EPA 8270</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
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



# 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**

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
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
<b>Method EPA 8316</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Acrylamide	TX	4330	10188202
<b>Method EPA 8330</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
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
<b>Method EPA 9014</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Amenable cyanide	TX	1510	10193803
Total cyanide	TX	1645	10193803
<b>Method EPA 9038</b>			
<b>Analyte</b>	<b>AB</b>	<b>Analyte ID</b>	<b>Method ID</b>
Sulfate	TX	2000	10196608





# Texas Commission on Environmental Quality

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**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



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**Matrix: Solid & Chemical Materials**

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





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

August 22, 2019

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

Work Order: **HS19080556**

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

Dear Eric,

ALS Environmental received 6 sample(s) on Aug 10, 2019 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:** HS19080556

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**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.



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**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

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**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: 08/22/2019					
Project Name: Houston TX-Wood Preserving Works		Laboratory Job Number: HS19080556					
Reviewer Name: Dane Wacasey		Prep Batch Number(s): 144039,144041,R344125,R344268,R344271,R344272,R344324					
# <sup>1</sup>	A <sup>2</sup>	Description	Yes	No	NA <sup>3</sup>	NR <sup>4</sup>	ER <sup>5</sup>
<b>R1</b>	OI	<b>Chain-of-custody (C-O-C)</b>					
		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				
<b>R2</b>	OI	<b>Sample and quality control (QC) identification</b>					
		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				
<b>R3</b>	OI	<b>Test reports</b>					
		Were all samples prepared and analyzed within holding times?		X			1
		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		
<b>R4</b>	O	<b>Surrogate recovery data</b>					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
<b>R5</b>	OI	<b>Test reports/summary forms for blank samples</b>					
		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				
<b>R6</b>	OI	<b>Laboratory control samples (LCS):</b>					
		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				
<b>R7</b>	OI	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?		X			2
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
		Were MS/MSD RPDs within laboratory QC limits?	X				
<b>R8</b>	OI	<b>Analytical duplicate data</b>					
		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				
<b>R9</b>	OI	<b>Method quantitation limits (MQLs):</b>					
		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				
<b>R10</b>	OI	<b>Other problems/anomalies</b>					
		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				3



Laboratory Review Checklist: Supporting Data							
Laboratory Name: ALS Laboratory Group				LRC Date: 08/22/2019			
Project Name: Houston TX-Wood Preserving Works				Laboratory Job Number: HS19080556			
Reviewer Name: Dane Wacasey				Prep Batch Number(s): 144039,144041,R344125,R344268,R344271,R344272,R344324			
# <sup>1</sup>	A <sup>2</sup>	Description	Yes	No	NA <sup>3</sup>	NR <sup>4</sup>	ER# <sup>5</sup>
<b>S1</b>	OI	<b>Initial calibration (ICAL)</b>					
		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				
<b>S2</b>	OI	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)</b>					
		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		
<b>S3</b>	O	<b>Mass spectral tuning:</b>					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
<b>S4</b>	O	<b>Internal standards (IS):</b>					
		Were IS area counts and retention times within the method-required QC limits?	X				
<b>S5</b>	OI	<b>Raw data</b> (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				
<b>S6</b>	O	<b>Dual column confirmation</b>					
		Did dual column confirmation results meet the method-required QC?			X		
<b>S7</b>	O	<b>Tentatively identified compounds (TICs):</b>					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
<b>S8</b>	I	<b>Interference Check Sample (ICS) results:</b>					
		Were percent recoveries within method QC limits?			X		
<b>S9</b>	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
<b>S10</b>	OI	<b>Method detection limit (MDL) studies</b>					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
<b>S11</b>	OI	<b>Proficiency test reports:</b>					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
<b>S12</b>	OI	<b>Standards documentation</b>					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
<b>S13</b>	OI	<b>Compound/analyte identification procedures</b>					
		Are the procedures for compound/analyte identification documented?	X				
<b>S14</b>	OI	<b>Demonstration of analyst competency (DOC)</b>					
		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				
<b>S15</b>	OI	<b>Verification/validation documentation for methods</b> (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				
<b>S16</b>	OI	<b>Laboratory standard operating procedures (SOPs):</b>					
		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: 08/22/2019
Project Name: Houston TX-Wood Preserving Works	Laboratory Job Number: HS19080556
Reviewer Name: Dane Wacasey	Prep Batch Number(s): 144039,144041,R344125,R344268,R344271,R344272,R344324

ER# <sup>5</sup>	Description
1	Sample received outside method holding time for pH. pH is an immediate test. Sample results are flagged with an "H" qualifier. The temperature at the time of pH is reported.  Please note that all pH results are already normalized to a temperature of 25 degrees C.
2	Batch 144041, Semivolatile Organics Method SW8270, LCS/LCSD were analyzed and reported in lieu of an MS/MSD for this batch.
3	Reactive Cyanide by Method SW7.3.3.2; TCEQ does not offer accreditation for Reactive Cyanide, the results are flagged with n.  Reactive Sulfide by Method SW7.3.4.2; TCEQ does not offer accreditation for Reactive Sulfide, the results are flagged with n.

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:** HS19080556

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19080556-01	W-1620-RO-20190810	Water		10-Aug-2019 10:50	10-Aug-2019 14:55	<input type="checkbox"/>
HS19080556-02	W-1620-RO-LibertyRd-20190810	Water		10-Aug-2019 11:15	10-Aug-2019 14:55	<input checked="" type="checkbox"/>
HS19080556-03	W-1620-RO-Ditch-20190810	Water		10-Aug-2019 11:15	10-Aug-2019 14:55	<input type="checkbox"/>
HS19080556-04	WQ-1620-TB-20190810	Water	CG 080519 -68	10-Aug-2019 10:30	10-Aug-2019 14:55	<input type="checkbox"/>
HS19080556-05	S-1620-Sheen-20190810	Solid		10-Aug-2019 12:00	10-Aug-2019 14:55	<input checked="" type="checkbox"/>
HS19080556-06	W-1620-Fractank-20190810	Water		10-Aug-2019 14:00	10-Aug-2019 14:55	<input type="checkbox"/>

Client: Golder Associates Inc.  
 Project: Houston TX-Wood Preserving Works  
 Sample ID: W-1620-RO-20190810  
 Collection Date: 10-Aug-2019 10:50

**ANALYTICAL REPORT**  
 WorkOrder:HS19080556  
 Lab ID:HS19080556-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: PC			
Benzene	U		0.00020	0.0010	mg/L	1	12-Aug-2019 19:15
Ethylbenzene	U		0.00030	0.0010	mg/L	1	12-Aug-2019 19:15
Toluene	U		0.00020	0.0010	mg/L	1	12-Aug-2019 19:15
Xylenes, Total	U		0.00030	0.0010	mg/L	1	12-Aug-2019 19:15
Surr: 1,2-Dichloroethane-d4	89.5			70-126	%REC	1	12-Aug-2019 19:15
Surr: 4-Bromofluorobenzene	103			81-113	%REC	1	12-Aug-2019 19:15
Surr: Dibromofluoromethane	93.0			77-123	%REC	1	12-Aug-2019 19:15
Surr: Toluene-d8	99.6			82-127	%REC	1	12-Aug-2019 19:15
<b>LOW-LEVEL SEMIVOLATILES BY 8270D</b>		<b>Method:SW8270</b>		Prep:SW3510 / 12-Aug-2019		Analyst: GEY	
<b>Acenaphthene</b>	<b>0.00010</b>		<b>0.000027</b>	<b>0.00010</b>	<b>mg/L</b>	1	12-Aug-2019 18:46
Acenaphthylene	U		0.000015	0.00010	mg/L	1	12-Aug-2019 18:46
<b>Anthracene</b>	<b>0.000016</b>	J	<b>0.000014</b>	<b>0.00010</b>	<b>mg/L</b>	1	12-Aug-2019 18:46
Benz(a)anthracene	U		0.000051	0.00010	mg/L	1	12-Aug-2019 18:46
Benzo(a)pyrene	U		0.000020	0.00010	mg/L	1	12-Aug-2019 18:46
Benzo(b)fluoranthene	U		0.000023	0.00010	mg/L	1	12-Aug-2019 18:46
Benzo(g,h,i)perylene	U		0.000014	0.00010	mg/L	1	12-Aug-2019 18:46
Benzo(k)fluoranthene	U		0.000019	0.00010	mg/L	1	12-Aug-2019 18:46
Chrysene	U		0.000021	0.00010	mg/L	1	12-Aug-2019 18:46
Dibenz(a,h)anthracene	U		0.000024	0.00010	mg/L	1	12-Aug-2019 18:46
<b>Dibenzofuran</b>	<b>0.000055</b>	J	<b>0.000020</b>	<b>0.00010</b>	<b>mg/L</b>	1	12-Aug-2019 18:46
<b>Fluoranthene</b>	<b>0.000046</b>	J	<b>0.000010</b>	<b>0.00010</b>	<b>mg/L</b>	1	12-Aug-2019 18:46
<b>Fluorene</b>	<b>0.000085</b>	J	<b>0.000030</b>	<b>0.00010</b>	<b>mg/L</b>	1	12-Aug-2019 18:46
Indeno(1,2,3-cd)pyrene	U		0.000022	0.00010	mg/L	1	12-Aug-2019 18:46
<b>Naphthalene</b>	<b>0.000080</b>	J	<b>0.000020</b>	<b>0.00010</b>	<b>mg/L</b>	1	12-Aug-2019 18:46
<b>Phenanthrene</b>	<b>0.00013</b>		<b>0.000021</b>	<b>0.00010</b>	<b>mg/L</b>	1	12-Aug-2019 18:46
<b>Pyrene</b>	<b>0.000027</b>	J	<b>0.000019</b>	<b>0.00010</b>	<b>mg/L</b>	1	12-Aug-2019 18:46
Surr: 2-Fluorobiphenyl	84.2			40-125	%REC	1	12-Aug-2019 18:46
Surr: 4-Terphenyl-d14	85.8			40-135	%REC	1	12-Aug-2019 18:46
Surr: Nitrobenzene-d5	74.6			41-120	%REC	1	12-Aug-2019 18:46
<b>LOW-LEVEL TEXAS TPH BY TX1005</b>		<b>Method:TX1005</b>		Prep:TX1005PR / 12-Aug-2019		Analyst: MBG	
nC6 to nC12	U		0.20	0.50	mg/L	1	14-Aug-2019 00:53
>nC12 to nC28	U		0.20	0.50	mg/L	1	14-Aug-2019 00:53
>nC28 to nC35	U		0.20	0.50	mg/L	1	14-Aug-2019 00:53
Total Petroleum Hydrocarbon	U		0.20	0.50	mg/L	1	14-Aug-2019 00:53
Surr: 2-Fluorobiphenyl	106			70-130	%REC	1	14-Aug-2019 00:53
Surr: Trifluoromethyl benzene	113			70-130	%REC	1	14-Aug-2019 00:53

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



Client: Golder Associates Inc.  
 Project: Houston TX-Wood Preserving Works  
 Sample ID: W-1620-RO-Ditch-20190810  
 Collection Date: 10-Aug-2019 11:15

**ANALYTICAL REPORT**  
 WorkOrder:HS19080556  
 Lab ID:HS19080556-03  
 Matrix:Water

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: PC			
Benzene	U		0.00020	0.0010	mg/L	1	12-Aug-2019 19:39
Ethylbenzene	U		0.00030	0.0010	mg/L	1	12-Aug-2019 19:39
Toluene	U		0.00020	0.0010	mg/L	1	12-Aug-2019 19:39
Xylenes, Total	U		0.00030	0.0010	mg/L	1	12-Aug-2019 19:39
Surr: 1,2-Dichloroethane-d4	90.4			70-126	%REC	1	12-Aug-2019 19:39
Surr: 4-Bromofluorobenzene	100			81-113	%REC	1	12-Aug-2019 19:39
Surr: Dibromofluoromethane	93.5			77-123	%REC	1	12-Aug-2019 19:39
Surr: Toluene-d8	102			82-127	%REC	1	12-Aug-2019 19:39
<b>LOW-LEVEL SEMIVOLATILES BY 8270D</b>		<b>Method:SW8270</b>		Prep:SW3510 / 12-Aug-2019		Analyst: GEY	
Acenaphthene	0.00033		0.00027	0.00010	mg/L	1	12-Aug-2019 19:05
Acenaphthylene	U		0.000015	0.00010	mg/L	1	12-Aug-2019 19:05
Anthracene	0.000088	J	0.000014	0.00010	mg/L	1	12-Aug-2019 19:05
Benz(a)anthracene	0.00011		0.000050	0.00010	mg/L	1	12-Aug-2019 19:05
Benzo(a)pyrene	0.000068	J	0.000020	0.00010	mg/L	1	12-Aug-2019 19:05
Benzo(b)fluoranthene	0.00014		0.000023	0.00010	mg/L	1	12-Aug-2019 19:05
Benzo(g,h,i)perylene	0.000066	J	0.000014	0.00010	mg/L	1	12-Aug-2019 19:05
Benzo(k)fluoranthene	0.000074	J	0.000019	0.00010	mg/L	1	12-Aug-2019 19:05
Chrysene	0.00023		0.000021	0.00010	mg/L	1	12-Aug-2019 19:05
Dibenz(a,h)anthracene	0.000034	J	0.000024	0.00010	mg/L	1	12-Aug-2019 19:05
Dibenzofuran	0.00014		0.000020	0.00010	mg/L	1	12-Aug-2019 19:05
Fluoranthene	0.00090		0.000010	0.00010	mg/L	1	12-Aug-2019 19:05
Fluorene	0.00021		0.000030	0.00010	mg/L	1	12-Aug-2019 19:05
Indeno(1,2,3-cd)pyrene	0.000040	J	0.000022	0.00010	mg/L	1	12-Aug-2019 19:05
Naphthalene	0.00019		0.000020	0.00010	mg/L	1	12-Aug-2019 19:05
Phenanthrene	0.00021		0.000021	0.00010	mg/L	1	12-Aug-2019 19:05
Pyrene	0.00053		0.000019	0.00010	mg/L	1	12-Aug-2019 19:05
Surr: 2-Fluorobiphenyl	78.6			40-125	%REC	1	12-Aug-2019 19:05
Surr: 4-Terphenyl-d14	85.9			40-135	%REC	1	12-Aug-2019 19:05
Surr: Nitrobenzene-d5	71.7			41-120	%REC	1	12-Aug-2019 19:05
<b>LOW-LEVEL TEXAS TPH BY TX1005</b>		<b>Method:TX1005</b>		Prep:TX1005PR / 12-Aug-2019		Analyst: MBG	
nC6 to nC12	U		0.20	0.50	mg/L	1	14-Aug-2019 01:22
>nC12 to nC28	U		0.20	0.50	mg/L	1	14-Aug-2019 01:22
>nC28 to nC35	U		0.20	0.50	mg/L	1	14-Aug-2019 01:22
Total Petroleum Hydrocarbon	U		0.20	0.50	mg/L	1	14-Aug-2019 01:22
Surr: 2-Fluorobiphenyl	95.9			70-130	%REC	1	14-Aug-2019 01:22
Surr: Trifluoromethyl benzene	103			70-130	%REC	1	14-Aug-2019 01:22

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

Client: Golder Associates Inc.  
 Project: Houston TX-Wood Preserving Works  
 Sample ID: WQ-1620-TB-20190810  
 Collection Date: 10-Aug-2019 10:30

**ANALYTICAL REPORT**

WorkOrder:HS19080556  
 Lab ID:HS19080556-04  
 Matrix:Water

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: PC			
Benzene	U		0.00020	0.0010	mg/L	1	12-Aug-2019 18:51
Ethylbenzene	U		0.00030	0.0010	mg/L	1	12-Aug-2019 18:51
Toluene	U		0.00020	0.0010	mg/L	1	12-Aug-2019 18:51
Xylenes, Total	U		0.00030	0.0010	mg/L	1	12-Aug-2019 18:51
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>89.2</i>			<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>12-Aug-2019 18:51</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>101</i>			<i>81-113</i>	<i>%REC</i>	<i>1</i>	<i>12-Aug-2019 18:51</i>
<i>Surr: Dibromofluoromethane</i>	<i>92.0</i>			<i>77-123</i>	<i>%REC</i>	<i>1</i>	<i>12-Aug-2019 18:51</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<i>82-127</i>	<i>%REC</i>	<i>1</i>	<i>12-Aug-2019 18:51</i>

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

Client: Golder Associates Inc.  
 Project: Houston TX-Wood Preserving Works  
 Sample ID: W-1620-Fractank-20190810  
 Collection Date: 10-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19080556  
 Lab ID:HS19080556-06  
 Matrix:Water

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>			<b>Method:SW8260</b>			Analyst: PC	
Benzene		U	0.00020	0.0010	mg/L	1	12-Aug-2019 20:03
Ethylbenzene	<b>0.0018</b>		<b>0.00030</b>	<b>0.0010</b>	mg/L	1	12-Aug-2019 20:03
Toluene	<b>0.045</b>		<b>0.00020</b>	<b>0.0010</b>	mg/L	1	12-Aug-2019 20:03
Xylenes, Total	<b>0.020</b>		<b>0.00030</b>	<b>0.0010</b>	mg/L	1	12-Aug-2019 20:03
Surr: 1,2-Dichloroethane-d4	89.8			70-126	%REC	1	12-Aug-2019 20:03
Surr: 4-Bromofluorobenzene	102			81-113	%REC	1	12-Aug-2019 20:03
Surr: Dibromofluoromethane	91.8			77-123	%REC	1	12-Aug-2019 20:03
Surr: Toluene-d8	102			82-127	%REC	1	12-Aug-2019 20:03
<b>LOW-LEVEL SEMIVOLATILES BY 8270D</b>			<b>Method:SW8270</b>			Prep:SW3510 / 12-Aug-2019 Analyst: GEY	
Acenaphthene	<b>0.00039</b>		<b>0.000028</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Acenaphthylene	<b>0.000035</b>	J	<b>0.000015</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Anthracene	<b>0.00020</b>		<b>0.000014</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Benz(a)anthracene	<b>0.00017</b>		<b>0.000051</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Benzo(a)pyrene	<b>0.000091</b>	J	<b>0.000020</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Benzo(b)fluoranthene	<b>0.00017</b>		<b>0.000023</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Benzo(g,h,i)perylene	<b>0.000074</b>	J	<b>0.000014</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Benzo(k)fluoranthene	<b>0.000074</b>	J	<b>0.000019</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Chrysene	<b>0.00027</b>		<b>0.000021</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Dibenz(a,h)anthracene	<b>0.000038</b>	J	<b>0.000024</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Dibenzofuran	<b>0.00019</b>		<b>0.000020</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Fluoranthene	<b>0.00092</b>		<b>0.000010</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Fluorene	<b>0.00037</b>		<b>0.000031</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Indeno(1,2,3-cd)pyrene	<b>0.000058</b>	J	<b>0.000022</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Naphthalene	<b>0.0070</b>		<b>0.000020</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Phenanthrene	<b>0.00079</b>		<b>0.000021</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Pyrene	<b>0.00065</b>		<b>0.000019</b>	<b>0.00010</b>	mg/L	1	12-Aug-2019 19:25
Surr: 2-Fluorobiphenyl	77.6			40-125	%REC	1	12-Aug-2019 19:25
Surr: 4-Terphenyl-d14	80.9			40-135	%REC	1	12-Aug-2019 19:25
Surr: Nitrobenzene-d5	70.2			41-120	%REC	1	12-Aug-2019 19:25
<b>LOW-LEVEL TEXAS TPH BY TX1005</b>			<b>Method:TX1005</b>			Prep:TX1005PR / 12-Aug-2019 Analyst: MBG	
nC6 to nC12	<b>0.91</b>		<b>0.20</b>	<b>0.49</b>	mg/L	1	14-Aug-2019 01:51
>nC12 to nC28	<b>0.31</b>	J	<b>0.20</b>	<b>0.49</b>	mg/L	1	14-Aug-2019 01:51
>nC28 to nC35		U	0.20	0.49	mg/L	1	14-Aug-2019 01:51
Total Petroleum Hydrocarbon	<b>1.22</b>		<b>0.20</b>	<b>0.49</b>	mg/L	1	14-Aug-2019 01:51
Surr: 2-Fluorobiphenyl	95.6			70-130	%REC	1	14-Aug-2019 01:51
Surr: Trifluoromethyl benzene	102			70-130	%REC	1	14-Aug-2019 01:51
<b>FLASH POINT BY PENSKY-MARTENS SW1010A</b>			<b>Method:SW1010</b>			Analyst: KAH	
Ignitability	> 212		70.0	70.0	°F	1	14-Aug-2019 15:00

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



Client: Golder Associates Inc.  
 Project: Houston TX-Wood Preserving Works  
 Sample ID: W-1620-Fractank-20190810  
 Collection Date: 10-Aug-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19080556  
 Lab ID:HS19080556-06  
 Matrix:Water

ANALYSES	RESULT	QUAL	SDL	MQL	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>REACTIVE CYANIDE</b>			<b>Method:SW7.3.3.2</b>		Prep:SW7.3.3.2		Analyst: MZD
Reactive Cyanide	U	n	100	100	mg/Kg	1	14-Aug-2019 16:26
<b>REACTIVE SULFIDE</b>			<b>Method:SW7.3.4.2</b>				Analyst: MZD
Reactive Sulfide	U	n	100	100	mg/Kg	1	14-Aug-2019 16:17
<b>PH BY SW9040C</b>			<b>Method:SW9040C</b>				Analyst: MWG
pH	7.78	H	0.100	0.100	pH Units	1	15-Aug-2019 12:00
Temp Deg C @pH	21.3	H	0	0	DEG C	1	15-Aug-2019 12:00

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

## WEIGHT LOG

**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**Batch ID:** 144039      **Method:** LOW-LEVEL TEXAS TPH BY TX1005      **Prep:** TX 1005\_W PR

SampleID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19080556-01	1	30.23	3 (mL)	0.09924
HS19080556-03	1	30.13	3 (mL)	0.09957
HS19080556-06	1	30.69	3 (mL)	0.09775

**Batch ID:** 144041      **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D      **Prep:** 3510\_B\_LOW

SampleID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19080556-01	1	990	1 (mL)	0.00101
HS19080556-03	1	1000	1 (mL)	0.001
HS19080556-06	1	980	1 (mL)	0.00102

**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 144039 ( 0 )		<b>Test Name :</b> LOW-LEVEL TEXAS TPH BY TX1005			<b>Matrix:</b> Water	
HS19080556-01	W-1620-RO-20190810	10 Aug 2019 10:50		12 Aug 2019 11:30	14 Aug 2019 00:53	1
HS19080556-03	W-1620-RO-Ditch-20190810	10 Aug 2019 11:15		12 Aug 2019 11:30	14 Aug 2019 01:22	1
HS19080556-06	W-1620-Fractank-20190810	10 Aug 2019 14:00		12 Aug 2019 11:30	14 Aug 2019 01:51	1
<b>Batch ID:</b> 144041 ( 0 )		<b>Test Name :</b> LOW-LEVEL SEMIVOLATILES BY 8270D			<b>Matrix:</b> Water	
HS19080556-01	W-1620-RO-20190810	10 Aug 2019 10:50		12 Aug 2019 13:04	12 Aug 2019 18:46	1
HS19080556-03	W-1620-RO-Ditch-20190810	10 Aug 2019 11:15		12 Aug 2019 13:04	12 Aug 2019 19:05	1
HS19080556-06	W-1620-Fractank-20190810	10 Aug 2019 14:00		12 Aug 2019 13:04	12 Aug 2019 19:25	1
<b>Batch ID:</b> R344125 ( 0 )		<b>Test Name :</b> LOW LEVEL VOLATILES BY SW8260C			<b>Matrix:</b> Water	
HS19080556-01	W-1620-RO-20190810	10 Aug 2019 10:50			12 Aug 2019 19:15	1
HS19080556-03	W-1620-RO-Ditch-20190810	10 Aug 2019 11:15			12 Aug 2019 19:39	1
HS19080556-04	WQ-1620-TB-20190810	10 Aug 2019 10:30			12 Aug 2019 18:51	1
HS19080556-06	W-1620-Fractank-20190810	10 Aug 2019 14:00			12 Aug 2019 20:03	1
<b>Batch ID:</b> R344268 ( 0 )		<b>Test Name :</b> REACTIVE SULFIDE			<b>Matrix:</b> Water	
HS19080556-06	W-1620-Fractank-20190810	10 Aug 2019 14:00			14 Aug 2019 16:17	1
<b>Batch ID:</b> R344271 ( 0 )		<b>Test Name :</b> REACTIVE CYANIDE			<b>Matrix:</b> Water	
HS19080556-06	W-1620-Fractank-20190810	10 Aug 2019 14:00			14 Aug 2019 16:26	1
<b>Batch ID:</b> R344272 ( 0 )		<b>Test Name :</b> FLASH POINT BY PENSKY-MARTENS SW1010A			<b>Matrix:</b> Water	
HS19080556-06	W-1620-Fractank-20190810	10 Aug 2019 14:00			14 Aug 2019 15:00	1
<b>Batch ID:</b> R344324 ( 0 )		<b>Test Name :</b> PH BY SW9040C			<b>Matrix:</b> Water	
HS19080556-06	W-1620-Fractank-20190810	10 Aug 2019 14:00			15 Aug 2019 12:00	1



WorkOrder: HS19080556  
 InstrumentID: FID-13  
 Test Code: TX1005\_W\_Low  
 Test Number: TX1005  
 Test Name: Low-level Texas TPH by TX1005

**METHOD DETECTION /  
 REPORTING LIMITS**

**Matrix:** Aqueous

**Units:** mg/L

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	nC6 to nC12	TPH-1005-1	0.25	0.28	0.20	0.50
A	>nC12 to nC28	TPH-1005-2	0.25	0.29	0.20	0.50
A	>nC28 to nC35	TPH-1005-4	0.25	0.28	0.20	0.50
A	Total Petroleum Hydrocarbon	TPH	0.25	0.28	0.20	0.50
S	2-Fluorobiphenyl	321-60-8	0	0	0	0
S	Trifluoromethyl benzene	98-08-8	0	0	0	0

WorkOrder: HS19080556  
 InstrumentID: SV-7  
 Test Code: 8270\_LOW\_W  
 Test Number: SW8270  
 Test Name: Low-Level Semivolatiles by 8270D

**METHOD DETECTION /  
 REPORTING LIMITS**

Matrix: Aqueous

Units: mg/L

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Acenaphthene	83-32-9	0.00010	0.00011	0.000027	0.00010
A	Acenaphthylene	208-96-8	0.000050	0.000050	0.000015	0.00010
A	Anthracene	120-12-7	0.00010	0.00011	0.000014	0.00010
A	Anthracene	120-12-7	0.000050	0.000055	0.000014	0.00010
A	Benz(a)anthracene	56-55-3	0.000050	0.000068	0.000050	0.00010
A	Benz(a)anthracene	56-55-3	0.00010	0.000099	0.000050	0.00010
A	Benzo(a)pyrene	50-32-8	0.00010	0.000076	0.000020	0.00010
A	Benzo(a)pyrene	50-32-8	0.000050	0.000053	0.000020	0.00010
A	Benzo(b)fluoranthene	205-99-2	0.000050	0.000067	0.000023	0.00010
A	Benzo(b)fluoranthene	205-99-2	0.00010	0.000093	0.000023	0.00010
A	Benzo(g,h,i)perylene	191-24-2	0.00010	0.000091	0.000014	0.00010
A	Benzo(g,h,i)perylene	191-24-2	0.000050	0.000061	0.000014	0.00010
A	Benzo(k)fluoranthene	207-08-9	0.000050	0.000060	0.000019	0.00010
A	Benzo(k)fluoranthene	207-08-9	0.00010	0.00011	0.000019	0.00010
A	Chrysene	218-01-9	0.000050	0.000066	0.000021	0.00010
A	Chrysene	218-01-9	0.00010	0.00011	0.000021	0.00010
A	Dibenz(a,h)anthracene	53-70-3	0.000050	0.000059	0.000024	0.00010
A	Dibenz(a,h)anthracene	53-70-3	0.00010	0.000083	0.000024	0.00010
A	Dibenzofuran	132-64-9	0.00010	0.000094	0.000020	0.00010
A	Dibenzofuran	132-64-9	0.000050	0.000052	0.000020	0.00010
A	Fluoranthene	206-44-0	0.000050	0.000053	0.000010	0.00010
A	Fluoranthene	206-44-0	0.00010	0.00012	0.000010	0.00010
A	Fluorene	86-73-7	0.00010	0.00012	0.000030	0.00010
A	Fluorene	86-73-7	0.000050	0.000052	0.000030	0.00010
A	Indeno(1,2,3-cd)pyrene	193-39-5	0.000050	0.000066	0.000022	0.00010
A	Indeno(1,2,3-cd)pyrene	193-39-5	0.00010	0.000066	0.000022	0.00010
A	Naphthalene	91-20-3	0.00010	0.00010	0.000020	0.00010
A	Naphthalene	91-20-3	0.000050	0.000061	0.000020	0.00010
A	Phenanthrene	85-01-8	0.000050	0.000055	0.000021	0.00010
A	Phenanthrene	85-01-8	0.00010	0.00011	0.000021	0.00010
A	Pyrene	129-00-0	0.000050	0.000061	0.000019	0.00010
A	Pyrene	129-00-0	0.00010	0.00011	0.000019	0.00010
S	2-Fluorobiphenyl	321-60-8	0	0	0	0.00020
S	4-Terphenyl-d14	1718-51-0	0	0	0	0.00020
S	Nitrobenzene-d5	4165-60-0	0	0	0	0.00020

WorkOrder: HS19080556  
 InstrumentID: VOA6  
 Test Code: 8260\_LL\_W  
 Test Number: SW8260  
 Test Name: Low Level Volatiles by SW8260C

**METHOD DETECTION /  
 REPORTING LIMITS**

**Matrix:** Aqueous

**Units:** mg/L

Type	Analyte	CAS	DCS Spike	DCS	MDL	PQL
A	Benzene	71-43-2	0.00050	0.00062	0.00020	0.0010
A	Ethylbenzene	100-41-4	0.00050	0.00062	0.00030	0.0010
A	Toluene	108-88-3	0.00050	0.00060	0.00020	0.0010
A	Xylenes, Total	1330-20-7	0.00050	0.0019	0.00030	0.0010
S	1,2-Dichloroethane-d4	17060-07-0	0	0	0	0.0010
S	4-Bromofluorobenzene	460-00-4	0	0	0	0.0010
S	Dibromofluoromethane	1868-53-7	0	0	0	0.0010
S	Toluene-d8	2037-26-5	0	0	0	0.0010



**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

**Batch ID:** 144039 ( 0 )      **Instrument:** FID-13      **Method:** LOW-LEVEL TEXAS TPH BY TX1005

<b>MBLK</b>		Sample ID: <b>MBLK-144039</b>		Units: <b>mg/L</b>		Analysis Date: <b>13-Aug-2019 21:59</b>				
Client ID:		Run ID: <b>FID-13_344222</b>		SeqNo: <b>5209078</b>		PrepDate: <b>12-Aug-2019</b>		DF: <b>1</b>		
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
nC6 to nC12	U	0.50								
>nC12 to nC28	U	0.50								
>nC28 to nC35	U	0.50								
Total Petroleum Hydrocarbon	U	0.50								
<i>Surr: 2-Fluorobiphenyl</i>	2.242	0	2.5	0	89.7	70 - 130				
<i>Surr: Trifluoromethyl benzene</i>	2.422	0	2.5	0	96.9	70 - 130				

<b>LCS</b>		Sample ID: <b>LCS-144039</b>		Units: <b>mg/L</b>		Analysis Date: <b>13-Aug-2019 22:28</b>				
Client ID:		Run ID: <b>FID-13_344222</b>		SeqNo: <b>5209079</b>		PrepDate: <b>12-Aug-2019</b>		DF: <b>1</b>		
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
nC6 to nC12	22.75	0.50	25	0	91.0	75 - 125				
>nC12 to nC28	22.3	0.50	25	0	89.2	75 - 125				
<i>Surr: 2-Fluorobiphenyl</i>	2.403	0	2.5	0	96.1	70 - 130				
<i>Surr: Trifluoromethyl benzene</i>	2.515	0	2.5	0	101	70 - 130				

<b>LCSD</b>		Sample ID: <b>LCSD-144039</b>		Units: <b>mg/L</b>		Analysis Date: <b>13-Aug-2019 22:57</b>				
Client ID:		Run ID: <b>FID-13_344222</b>		SeqNo: <b>5209080</b>		PrepDate: <b>12-Aug-2019</b>		DF: <b>1</b>		
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
nC6 to nC12	23.73	0.50	25	0	94.9	75 - 125	22.75	4.23	20	
>nC12 to nC28	23.92	0.50	25	0	95.7	75 - 125	22.3	7	20	
<i>Surr: 2-Fluorobiphenyl</i>	2.546	0	2.5	0	102	70 - 130	2.403	5.79	20	
<i>Surr: Trifluoromethyl benzene</i>	2.57	0	2.5	0	103	70 - 130	2.515	2.17	20	

<b>MS</b>		Sample ID: <b>HS19080562-01MS</b>		Units: <b>mg/L</b>		Analysis Date: <b>13-Aug-2019 23:55</b>				
Client ID:		Run ID: <b>FID-13_344222</b>		SeqNo: <b>5209082</b>		PrepDate: <b>12-Aug-2019</b>		DF: <b>1</b>		
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
nC6 to nC12	24.62	0.49	24.65	2.446	89.9	75 - 125				
>nC12 to nC28	21.94	0.49	24.65	0.7123	86.1	75 - 125				
<i>Surr: 2-Fluorobiphenyl</i>	2.41	0	2.465	0	97.7	70 - 130				
<i>Surr: Trifluoromethyl benzene</i>	2.457	0	2.465	0	99.7	70 - 130				

**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

**Batch ID:** 144039 ( 0 )      **Instrument:** FID-13      **Method:** LOW-LEVEL TEXAS TPH BY TX1005

<b>MSD</b>		Sample ID: <b>HS19080562-01MSD</b>			Units: <b>mg/L</b>		Analysis Date: <b>14-Aug-2019 00:24</b>			
Client ID:		Run ID: <b>FID-13_344222</b>			SeqNo: <b>5209083</b>		PrepDate: <b>12-Aug-2019</b>		DF: <b>1</b>	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
nC6 to nC12	25.44	0.49	24.55	2.446	93.7	75 - 125	24.62	3.29	20	
>nC12 to nC28	23.78	0.49	24.55	0.7123	94.0	75 - 125	21.94	8.03	20	
<i>Surr: 2-Fluorobiphenyl</i>	2.452	0	2.455	0	99.9	70 - 130	2.41	1.75	20	
<i>Surr: Trifluoromethyl benzene</i>	2.462	0	2.455	0	100	70 - 130	2.457	0.182	20	

The following samples were analyzed in this batch: HS19080556-01      HS19080556-03      HS19080556-06

**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

Batch ID: 144041 ( 0 )		Instrument: SV-7		Method: LOW-LEVEL SEMIVOLATILES BY 8270D						
MBLK	Sample ID: MBLK-144041	Units: ug/L			Analysis Date: 12-Aug-2019 17:26					
Client ID:	Run ID: SV-7_344099	SeqNo: 5207387		PrepDate: 12-Aug-2019		DF: 1				
Analyte	Result	MLQ	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Acenaphthene	U	0.10								
Acenaphthylene	U	0.10								
Anthracene	U	0.10								
Benz(a)anthracene	U	0.10								
Benzo(a)pyrene	U	0.10								
Benzo(b)fluoranthene	U	0.10								
Benzo(g,h,i)perylene	U	0.10								
Benzo(k)fluoranthene	U	0.10								
Chrysene	U	0.10								
Dibenz(a,h)anthracene	U	0.10								
Dibenzofuran	U	0.10								
Fluoranthene	U	0.10								
Fluorene	U	0.10								
Indeno(1,2,3-cd)pyrene	U	0.10								
Naphthalene	U	0.10								
Phenanthrene	U	0.10								
Pyrene	U	0.10								
<i>Surr: 2-Fluorobiphenyl</i>	3.217	0.20	5	0	64.3	40 - 125				
<i>Surr: 4-Terphenyl-d14</i>	3.118	0.20	5	0	62.4	40 - 135				
<i>Surr: Nitrobenzene-d5</i>	2.947	0.20	5	0	58.9	41 - 120				



**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

Batch ID: 144041 ( 0 )		Instrument: SV-7		Method: LOW-LEVEL SEMIVOLATILES BY 8270D						
LCS	Sample ID: LCS-144041	Units: ug/L			Analysis Date: 12-Aug-2019 17:46					
Client ID:	Run ID: SV-7_344099	SeqNo: 5207388		PrepDate: 12-Aug-2019		DF: 1				
Analyte	Result	MLQ	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	3.146	0.10	5	0	62.9	45 - 120				
Acenaphthylene	3.109	0.10	5	0	62.2	47 - 120				
Anthracene	3.194	0.10	5	0	63.9	45 - 120				
Benz(a)anthracene	2.995	0.10	5	0	59.9	40 - 120				
Benzo(a)pyrene	2.637	0.10	5	0	52.7	45 - 120				
Benzo(b)fluoranthene	2.672	0.10	5	0	53.4	50 - 120				
Benzo(g,h,i)perylene	2.554	0.10	5	0	51.1	42 - 127				
Benzo(k)fluoranthene	2.514	0.10	5	0	50.3	45 - 127				
Chrysene	3.229	0.10	5	0	64.6	43 - 120				
Dibenz(a,h)anthracene	2.582	0.10	5	0	51.6	45 - 125				
Dibenzofuran	3.256	0.10	5	0	65.1	50 - 120				
Fluoranthene	3.506	0.10	5	0	70.1	45 - 125				
Fluorene	3.387	0.10	5	0	67.7	49 - 120				
Indeno(1,2,3-cd)pyrene	3.066	0.10	5	0	61.3	41 - 128				
Naphthalene	3.515	0.10	5	0	70.3	45 - 120				
Phenanthrene	3.279	0.10	5	0	65.6	45 - 121				
Pyrene	3.089	0.10	5	0	61.8	40 - 130				
Surr: 2-Fluorobiphenyl	3.28	0.20	5	0	65.6	40 - 125				
Surr: 4-Terphenyl-d14	3.154	0.20	5	0	63.1	40 - 135				
Surr: Nitrobenzene-d5	2.753	0.20	5	0	55.1	41 - 120				

**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

**Batch ID:** 144041 ( 0 )      **Instrument:** SV-7      **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D

LCSD	Sample ID: LCSD-144041	Units: ug/L			Analysis Date: 12-Aug-2019 18:06					
Client ID:	Run ID: SV-7_344099	SeqNo: 5207389	PrepDate: 12-Aug-2019	DF: 1						
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	3.102	0.10	5	0	62.0	45 - 120	3.146	1.43	20	
Acenaphthylene	3.056	0.10	5	0	61.1	47 - 120	3.109	1.74	20	
Anthracene	3.234	0.10	5	0	64.7	45 - 120	3.194	1.24	20	
Benz(a)anthracene	3.075	0.10	5	0	61.5	40 - 120	2.995	2.63	20	
Benzo(a)pyrene	2.691	0.10	5	0	53.8	45 - 120	2.637	2.02	20	
Benzo(b)fluoranthene	3.021	0.10	5	0	60.4	50 - 120	2.672	12.3	20	
Benzo(g,h,i)perylene	2.633	0.10	5	0	52.7	42 - 127	2.554	3.03	20	
Benzo(k)fluoranthene	2.63	0.10	5	0	52.6	45 - 127	2.514	4.5	20	
Chrysene	3.052	0.10	5	0	61.0	43 - 120	3.229	5.62	20	
Dibenz(a,h)anthracene	2.767	0.10	5	0	55.3	45 - 125	2.582	6.9	20	
Dibenzofuran	3.179	0.10	5	0	63.6	50 - 120	3.256	2.38	20	
Fluoranthene	3.53	0.10	5	0	70.6	45 - 125	3.506	0.701	20	
Fluorene	3.288	0.10	5	0	65.8	49 - 120	3.387	2.96	20	
Indeno(1,2,3-cd)pyrene	3.206	0.10	5	0	64.1	41 - 128	3.066	4.44	20	
Naphthalene	3.508	0.10	5	0	70.2	45 - 120	3.515	0.179	20	
Phenanthrene	3.307	0.10	5	0	66.1	45 - 121	3.279	0.855	20	
Pyrene	3.176	0.10	5	0	63.5	40 - 130	3.089	2.77	20	
Surr: 2-Fluorobiphenyl	3.185	0.20	5	0	63.7	40 - 125	3.28	2.92	20	
Surr: 4-Terphenyl-d14	3.099	0.20	5	0	62.0	40 - 135	3.154	1.75	20	
Surr: Nitrobenzene-d5	2.804	0.20	5	0	56.1	41 - 120	2.753	1.84	20	

The following samples were analyzed in this batch: HS19080556-01      HS19080556-03      HS19080556-06

**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

Batch ID: R344125 ( 0 )		Instrument: VOA6		Method: LOW LEVEL VOLATILES BY SW8260C						
<b>MBLK</b>	Sample ID: <b>VBLKW-190812</b>	Units: <b>ug/L</b>			Analysis Date: <b>12-Aug-2019 12:26</b>					
Client ID:	Run ID: <b>VOA6_344125</b>	SeqNo: <b>5206800</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	MLQ	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Benzene	U	1.0								
Ethylbenzene	U	1.0								
Toluene	U	1.0								
Xylenes, Total	U	1.0								
<i>Surr: 1,2-Dichloroethane-d4</i>	44.97	1.0	50	0	89.9	70 - 123				
<i>Surr: 4-Bromofluorobenzene</i>	50.49	1.0	50	0	101	82 - 115				
<i>Surr: Dibromofluoromethane</i>	46.1	1.0	50	0	92.2	73 - 126				
<i>Surr: Toluene-d8</i>	51.42	1.0	50	0	103	81 - 120				
<b>LCS</b>	Sample ID: <b>VLCSW-190812</b>	Units: <b>ug/L</b>			Analysis Date: <b>12-Aug-2019 11:38</b>					
Client ID:	Run ID: <b>VOA6_344125</b>	SeqNo: <b>5206799</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	MLQ	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Benzene	19.19	1.0	20	0	96.0	74 - 120				
Ethylbenzene	18.52	1.0	20	0	92.6	77 - 117				
Toluene	18.96	1.0	20	0	94.8	77 - 118				
Xylenes, Total	56.46	1.0	60	0	94.1	75 - 122				
<i>Surr: 1,2-Dichloroethane-d4</i>	50.82	1.0	50	0	102	70 - 130				
<i>Surr: 4-Bromofluorobenzene</i>	51.45	1.0	50	0	103	82 - 115				
<i>Surr: Dibromofluoromethane</i>	50.86	1.0	50	0	102	73 - 126				
<i>Surr: Toluene-d8</i>	47.64	1.0	50	0	95.3	81 - 120				
<b>MS</b>	Sample ID: <b>HS19080444-02MS</b>	Units: <b>ug/L</b>			Analysis Date: <b>12-Aug-2019 17:15</b>					
Client ID:	Run ID: <b>VOA6_344125</b>	SeqNo: <b>5206802</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	MLQ	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Benzene	19.89	1.0	20	1.975	89.6	70 - 127				
Ethylbenzene	19.22	1.0	20	0	96.1	70 - 124				
Toluene	18.92	1.0	20	0	94.6	70 - 123				
Xylenes, Total	56.84	1.0	60	0	94.7	70 - 130				
<i>Surr: 1,2-Dichloroethane-d4</i>	46.77	1.0	50	0	93.5	70 - 126				
<i>Surr: 4-Bromofluorobenzene</i>	52.77	1.0	50	0	106	81 - 113				
<i>Surr: Dibromofluoromethane</i>	46.71	1.0	50	0	93.4	77 - 123				
<i>Surr: Toluene-d8</i>	49.81	1.0	50	0	99.6	82 - 127				



**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

**Batch ID:** R344125 ( 0 )      **Instrument:** VOA6      **Method:** LOW LEVEL VOLATILES BY SW8260C

<b>MSD</b>		Sample ID: <b>HS19080444-02MSD</b>			Units: <b>ug/L</b>		Analysis Date: <b>12-Aug-2019 17:39</b>			
Client ID:		Run ID: <b>VOA6_344125</b>			SeqNo: <b>5206803</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	20.64	1.0	20	1.975	93.3	70 - 127	19.89	3.66	20	
Ethylbenzene	19.8	1.0	20	0	99.0	70 - 124	19.22	3.02	20	
Toluene	19.61	1.0	20	0	98.1	70 - 123	18.92	3.59	20	
Xylenes, Total	59.22	1.0	60	0	98.7	70 - 130	56.84	4.1	20	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>44.97</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>89.9</i>	<i>70 - 126</i>	<i>46.77</i>	<i>3.92</i>	<i>20</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>52.86</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>106</i>	<i>81 - 113</i>	<i>52.77</i>	<i>0.171</i>	<i>20</i>	
<i>Surr: Dibromofluoromethane</i>	<i>46.88</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>93.8</i>	<i>77 - 123</i>	<i>46.71</i>	<i>0.376</i>	<i>20</i>	
<i>Surr: Toluene-d8</i>	<i>50.85</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>102</i>	<i>82 - 127</i>	<i>49.81</i>	<i>2.07</i>	<i>20</i>	

The following samples were analyzed in this batch: HS19080556-01      HS19080556-03      HS19080556-04      HS19080556-06

**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

<b>Batch ID:</b> R344268 ( 0 )	<b>Instrument:</b> WetChem_HS	<b>Method:</b> REACTIVE SULFIDE
--------------------------------	-------------------------------	---------------------------------

<b>MBLK</b>	Sample ID: <b>MBLK-344268</b>	Units: <b>mg/Kg</b>	Analysis Date: <b>14-Aug-2019 16:17</b>							
Client ID:	Run ID: <b>WetChem_HS_344268</b>	SeqNo: <b>5209980</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Reactive Sulfide U 100

<b>LCS</b>	Sample ID: <b>LCS-344268</b>	Units: <b>mg/Kg</b>	Analysis Date: <b>14-Aug-2019 16:17</b>							
Client ID:	Run ID: <b>WetChem_HS_344268</b>	SeqNo: <b>5209981</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Reactive Sulfide 72 10.0 100 0 72.0 20 - 120

<b>MS</b>	Sample ID: <b>HS19080655-03MS</b>	Units: <b>mg/Kg</b>	Analysis Date: <b>14-Aug-2019 16:17</b>							
Client ID:	Run ID: <b>WetChem_HS_344268</b>	SeqNo: <b>5209983</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Reactive Sulfide 68 10.0 100 0 68.0 20 - 120

The following samples were analyzed in this batch: HS19080556-06

**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

<b>Batch ID:</b> R344271 ( 0 )		<b>Instrument:</b> UV-2450		<b>Method:</b> REACTIVE CYANIDE					
<b>MBLK</b>	Sample ID: <b>MBLK-R344271</b>	Units: <b>mg/Kg</b>		Analysis Date: <b>14-Aug-2019 16:26</b>					
Client ID:	Run ID: <b>UV-2450_344271</b>	SeqNo: <b>5210022</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Reactive Cyanide	U	100							
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<b>LCS</b>	Sample ID: <b>LCS-R344271</b>	Units: <b>mg/Kg</b>		Analysis Date: <b>14-Aug-2019 16:26</b>					
Client ID:	Run ID: <b>UV-2450_344271</b>	SeqNo: <b>5210021</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Reactive Cyanide	0.77	10.0	10	0	7.70	5 - 100			J
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<b>MS</b>	Sample ID: <b>HS19080655-03MS</b>	Units: <b>mg/Kg</b>		Analysis Date: <b>14-Aug-2019 16:26</b>					
Client ID:	Run ID: <b>UV-2450_344271</b>	SeqNo: <b>5210023</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Reactive Cyanide	0.83	10.0	10	0	8.30	5 - 100			J
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The following samples were analyzed in this batch:



**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

**Batch ID:** R344272 ( 0 )      **Instrument:** WetChem\_HS      **Method:** FLASH POINT BY PENSKY-MARTENS SW1010A

**LCS**      Sample ID: **LCS-R344272**      Units: °F      Analysis Date: **14-Aug-2019 15:00**  
 Client ID:      Run ID: **WetChem\_HS\_344272** SeqNo: **5210060** PrepDate:      DF: **1**  
 Analyte      Result      MQL      SPK Val      SPK Ref Value      %REC      Control Limit      RPD Ref Value      %RPD      RPD Limit Qual

Ignitability      83.57      70.0      81      0      103      95 - 105

**DUP**      Sample ID: **HS19080556-06DUP**      Units: °F      Analysis Date: **14-Aug-2019 15:00**  
 Client ID: **W-1620-Fractank-20190810**      Run ID: **WetChem\_HS\_344272** SeqNo: **5210061** PrepDate:      DF: **1**  
 Analyte      Result      MQL      SPK Val      SPK Ref Value      %REC      Control Limit      RPD Ref Value      %RPD      RPD Limit Qual

Ignitability      > 212      70.0                          0      0 20

The following samples were analyzed in this batch:

**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QC BATCH REPORT**

<b>Batch ID:</b> R344324 ( 0 )		<b>Instrument:</b> WetChem_HS		<b>Method:</b> PH BY SW9040C					
<b>DUP</b>	Sample ID: <b>HS19080734-01DUP</b>	Units: <b>pH Units</b>			Analysis Date: <b>15-Aug-2019 12:00</b>				
Client ID:	Run ID: <b>WetChem_HS_344324</b>	SeqNo: <b>5211140</b>		PrepDate:			DF: <b>1</b>		
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

pH	7.28	0.100					7.27	0.137	10
Temp Deg C @pH	20.8	0					20.8	0	10

The following samples were analyzed in this batch:

**Client:** Golder Associates Inc.  
**Project:** Houston TX-Wood Preserving Works  
**WorkOrder:** HS19080556

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	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

<b>Acronym</b>	<b>Description</b>
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

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter



**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
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	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

Sample Receipt Checklist

Client Name: PBW
Work Order: HS19080556

Date/Time Received: 10-Aug-2019 14:55
Received by: AC

Checklist completed by: Jared R. Makan
eSignature
Date: 12-Aug-2019

Reviewed by: Dane J. Wacasey
eSignature
Date: 12-Aug-2019

Matrices: Water, Solid

Carrier name: FedEx Priority Overnight

- 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 [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:144945

Temperature(s)/Thermometer(s): 0.8c/0.8 UC/C IR25
Cooler(s)/Kit(s): 44623
Date/Time sample(s) sent to storage: 08/12/2019 11:55

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

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

10



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: 144945

Houston, TX  
+1 281 530 5656


Spring City, PA  
+1 610 948 4903

Middletown, PA  
+1 717 944 5541

Salt Lake City, UT  
+1 801 266 7700

South Charleston, WV  
+1 304 356 3168

York, PA  
+1 717 505 5280

Customer Information		Project Information		ALS Project Manager:		ALS Work Order #:	
Purchase Order		Project Name	UPRR	A	BTEX		
Work Order		Project Number		B	TPH		
Company Name	Golder Associates	Bill To Company	UPRR	C	PAHS		
Send Report To	Eric Matzner	Invoice Attn		D	Hold		
Address	2201 Double Creek R	Address		E	<p style="text-align: center;"><b>HS19080556</b></p> <p style="text-align: center;">Golder Associates inc. Houston TX-Wood Preserving Works</p> 		
City/State/Zip	Round Rock TX 78664	City/State/Zip		F			
Phone		Phone		G			
Fax		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	W-1620-RO-20190810	8/10/19	1050	SW	1.8	8	X	X	X								
2	W-1620-RO-Liberty Rd-20190810	8/10/19	1115	SW	1.8	8	X			X							
3	W-1620-RO-Ditch-20190810	8/10/19	1115	SW	1.8	8	X	X	X								
4	TB-20190810	8/10/19	1030	GC	1.8	3	X										
5	W-1620-Sheen-20190810	8/10/19	1200	net	1.8	1				X							
6	W-1620-Fractank-20190810	8/10/19	1400	W	1.8	8	X	X	X								
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign Brenda Basile / Frances Devore / Jacqueline Lybrand		Shipment Method Hand delivery		Required Turnaround Time: (Check Box) <input type="checkbox"/> Other _____ <input 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: 48 hrs	
Relinquished by: Brenda Basile	Date: 8/10/19	Time: 14:55	Received by: AC	Notes:				
Relinquished by:	Date:	Time:	Received by (Laboratory):	Cooler ID 44623	Cooler Temp 0.8	QC Package: (Check One Box Below)		
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	IR#25	CFO	<input type="checkbox"/> Level II Std QC	<input checked="" type="checkbox"/> TRRP Checklist	
Preservative Key: 1-HCl 2-HNO <sub>3</sub> 3-H <sub>2</sub> SO <sub>4</sub> 4-NaOH 5-Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> 6-NaHSO <sub>4</sub> 7-Other 8-4°C 9-5035				<input type="checkbox"/> Level III Std QC/Raw 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.

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