November 4, 2019 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: MONTHLY STATUS UPDATE – ENGLEWOOD INTERMODAL YARD – NAPL COLLECTION SYSTEM/CONCRETE CAP REPAIRS
UNION PACIFIC RAILROAD HOUSTON WOOD PRESERVING WORKS FACILITY
4910 LIBERTY ROAD FACILITY, HOUSTON, TEXAS
POST-CLOSURE CARE PERMIT NO. HW-50343; INDUSTRIAL SWR NO. 31547

Dear Ms. Hatfield:

Golder Associates, Inc. (Golder), on behalf of Union Pacific Railroad Company (UPRR), is pleased to provide this monthly status update for October 2019 for the implementation of the cap repairs identified in the Updated Post-Response Action Care Report (PRACR) dated January 16, 2018 for the UPRR Houston Wood Preserving Works Facility (the Site). Monthly status updates were requested by the Texas Commission on Environmental Quality (TCEQ) in a letter dated March 20, 2018. A brief description of the current status of the repairs is provided below:

The non-aqueous phase liquid (NAPL) Collection System was installed in the Englewood Intermodal Yard to address the tar-like substance seeps within parking slots B100 to B109 (for container trailers). The following is a summary of the observations from the weekly inspections of the NAPL Collection System for August (photographs of from the weekly inspections are provided in Attachment A):

- No significant amount of NAPL has been visually observed within NAPL collection Sump 1 (B099/B100 slots) or Sump 2 (B103/B104 slots). A small amount of dense NAPL (DNAPL) appearing as a tar-like substance was recovered from Sump 3 (B107/B108 slots) on October 2, 9, 16, and 24, 2019. Less than 0.1 gallons were recovered over those four days.
- Water continues to collect in the NAPL collection sumps. Water tends to collect more rapidly in Sump 1 compared to Sumps 2 or 3 following pump down events. NRC conducted a pump down of the sumps on September 25, 2019. By October 2, 2019, the water in Sump 1 had recovered to within 2.5 inches of the top of the sump, whereas Sumps 2 and 3 had only recovered to within 23 inches to the top of the sump (approximately 25 inches of water in the sump) by October 30, 2019. The water in Sumps 1 and 2 was observed as being brown in color with no odor or sheen. A sheen was noted in the water in Sump 3. A frac tank was set up near Slot B109 on August 21, 2019 to allow storage of

Golder Associates Inc.
2201 Double Creek Dr, Suite 4004, Round Rock, Texas, USA 78664 T: +1 512 671-3434 F: +1 512 671-3446

the recovered water from pump downs of the sumps. NRC pumped approximately 19,000 gallons of fluid from the sumps and stored in the on-site frac tank by September 30, 2019. A sample of the frac tank water was collected on September 30, 2019 to characterize the liquids for disposal (analytical report provided in Attachment B). Once profiled, NRC pumped the fluids from the frac tank on October 24 and 29, 2019 and transported the fluids for disposal at Liquid Environmental Solutions. The waste manifest for the disposal of the fluids will be provided in the November 2019 monthly update. On October 29, 2019, NRC pumped approximately 6,250 gallons of water from the three sumps into the frac tank.

- For areas outside the NAPL Collection System, very small amounts of tar-like material were noted near or within stalls A021, A022, B096, B101, B102, B103, B105, and B108 where previous seeps have been observed. The amount of the tar-like material seeping has decreased over the past month. Less than 0.5 gallons of the tar-like material was recovered during September.

- As discussed in the June 2019 update, areas of brown stains on the concrete pavement and evidence of seeps of a dark brown to black oily looking 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. Beginning in late May, 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. Similar to the August and September 2019 Monthly Updates, no water was observed during the October weekly inspections except after rain events.

Weekly site inspections of the NAPL Collection System and Englewood Intermodal Yard concrete pavement near the collection system will continue to be conducted. In response to the TCEQ letter dated August 9, 2019, a notation on the presence of NAPL in each sump and tabulation of depth and thickness of NAPL if detected, and a tabulation of total contaminant mass of NAPL recovered from each sump will be provided. Even though a small amount of NAPL was recovered from Sump 3 in October, no measurable NAPL has been detected in the sumps using the interface probe. Golder will continue using an interface probe weekly to check the sumps for the accumulation of NAPL.

If you have any questions or need additional information, please feel free to call me at (512) 671-3434 or Mr. Kevin Peterburs of UPRR at (414) 267-4164.

Sincerely,

Golder Associates Inc.

Eric C. Matzner, P.G.
Principal / Program Leader

ECM

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

Attachment Weekly Inspection Photolog
Laboratory Analytical Report – Recovered Fluids from Sumps, sampled September 30, 2019

https://golderassociates.sharepoint.com/sites/116841/project files/6 deliverables/pracr/tceq comment letter/2019-10 october monthly update/houston, tx-wpw - monthly status update - cap repairs 20191104 - copy (2).docx

ATTACHMENT A

Weekly Inspection Photolog

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
1	10/02/19

Description:

NAPL Collection Sump at B100:
View of B099/B100 NAPL Collection Sump, looking southwest.

Photo No.	Date:
2	10/02/19

Description:

Slot A021:
View of slot A021 looking south, very little tar-like material observed in asphalt crack.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
3	10/02/19

Description:

Slot B057:
View of slot B057, no tar-like material observed in cracks in the asphalt.

Photo No.	Date:
4	10/02/19

Description:

Slots B097:
View of Slot B097, looking North, some brown staining along asphalt cracks, no standing water observed.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
5	10/02/19

Description:

Slot B099:
View of Slot B099, looking north, brown staining along cracks in the asphalt, no standing water observed.

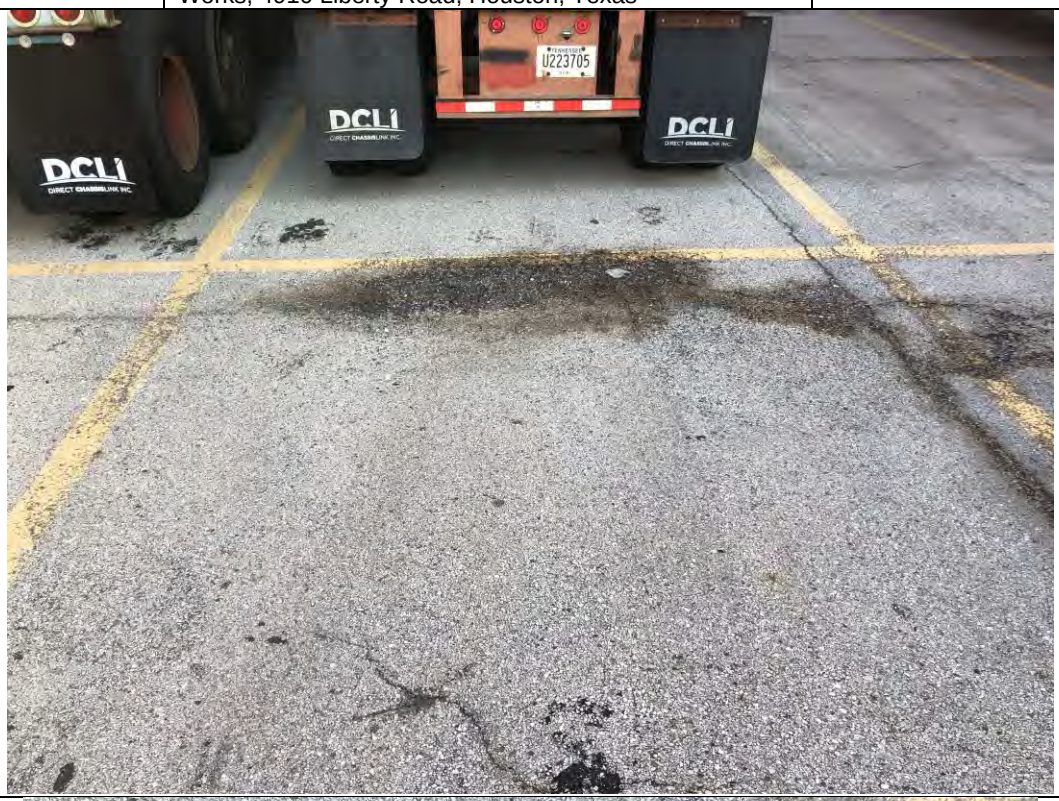


Photo No.	Date:
6	10/02/19

Description:

Slot B101:
View of slot B101 looking southwest, no tar-like material observed in cracks in the asphalt.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
7	10/02/19

Description:

Slot B105:
View of slot B105 looking north, very little tar-like material observed in asphalt crack.

Photo No.	Date:
8	10/02/19

Description:

Slot B108:
View of slot B108, very little tar-like material observed in asphalt cracks.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
9	10/02/19

Description:

B099 NAPL Collection Sump:
View of B099 Sump note brown stained water in the sump.

Photo No.	Date:
10	10/02/19

Description:

B107/B108 NAPL Collection Sump:
View of tar-like material removed from B107/B108 NAPL Collection Sump.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
11	10/09/19

Description:

Slot A022:
View of slot A022 looking south, very little tar-like material observed in joint.

Photo No.	Date:
12	10/09/19

Description:

Slot B013:
View of slot B013 looking north, no tar-like material observed in asphalt crack.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
13	10/09/19

Description:

Slot B110:
View of slots B096-B110, looking northeast,brown staining along asphalt cracks, no standing water observed.

Photo No.	Date:
14	10/09/19

Description:

NAPL Collection Sump at B103:
View of B103/B104 NAPL Collection Sump area, looking north. Note very little tar-like material observed in asphalt crack in B103 near the sump pavement.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
15	10/09/19

Description:

Slot B096:
View of slot B096, little amount of tar-like material observed in asphalt joint.

Photo No.	Date:
16	10/09/19

Description:

B107/B108 NAPL Collection Sump:
View of tar-like material removed from B107/B108 NAPL Collection Sump.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
17	10/09/19

Description:

Slot B102:
View of slot B102, very little tar-like material observed in asphalt joint.

Photo No.	Date:
18	10/09/19

Description:

B103/B104 NAPL Collection Sump:
View of B103/B104 Sump, no sheen or odor noted in the water collected in the sump.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
19	10/09/19

Description:

Slot B105:
View of slot B105, very little tar-like material seep from crack in asphalt.

Photo No.	Date:
20	10/09/19

Description:

Slot B108:
View of slot B108, very little tar-like material along crack in asphalt crack.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
21	10/16/19

Description:

Slot B096:
View of slot B096, little tar-like material observed in asphalt joint.

Photo No.	Date:
22	10/16/19

Description:

B099/B100 NAPL Collection Sump:
View of B099/B100 Sump, dark brown water, no sheen or odor noted in the water collected in the sump.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
23	10/16/19

Description:

Slot B099:
View of slot and NAPL Collection Sump at B099, looking north, some brown staining along asphalt cracks, standing water from rainfall observed without sheen or discoloration.

Photo No.	Date:
24	10/16/19

Description:

Slot B102:
View of slot B102, no tar-like material observed in asphalt joint. Standing water from rainfall observed without sheen or discoloration.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
25	10/16/19

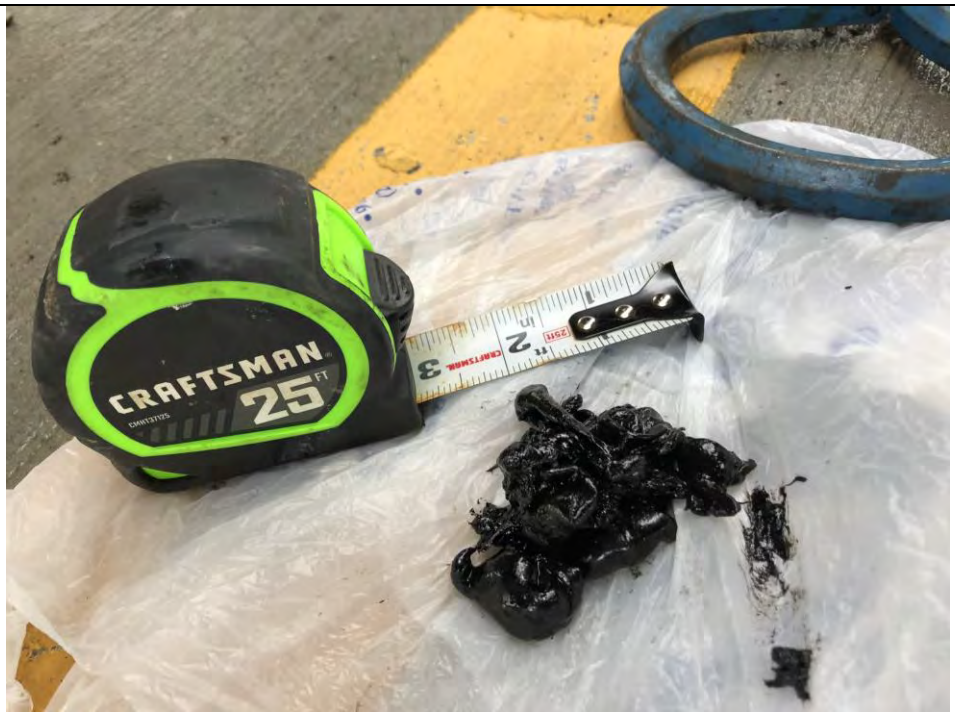
Description:

B107/B108 NAPL Collection Sump: View of B107/B108 NAPL Collection Sump, tar-like material removed from the sump, no odor or sheen noted in the water collected in the sump.

Photo No.	Date:
26	10/16/19

Description:

B107/B108 NAPL Collection Sump: View of tar-like material removed from B107/B108 NAPL Collection Sump.



GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
27	10/24/19

Description:

Slot B057:
View of slot B057, little tar-like material observed in asphalt joint.

Photo No.	Date:
28	10/24/19

Description:

Slot B105:
View of slot B105, no tar-like material observed in asphalt cracks.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
29	10/24/19

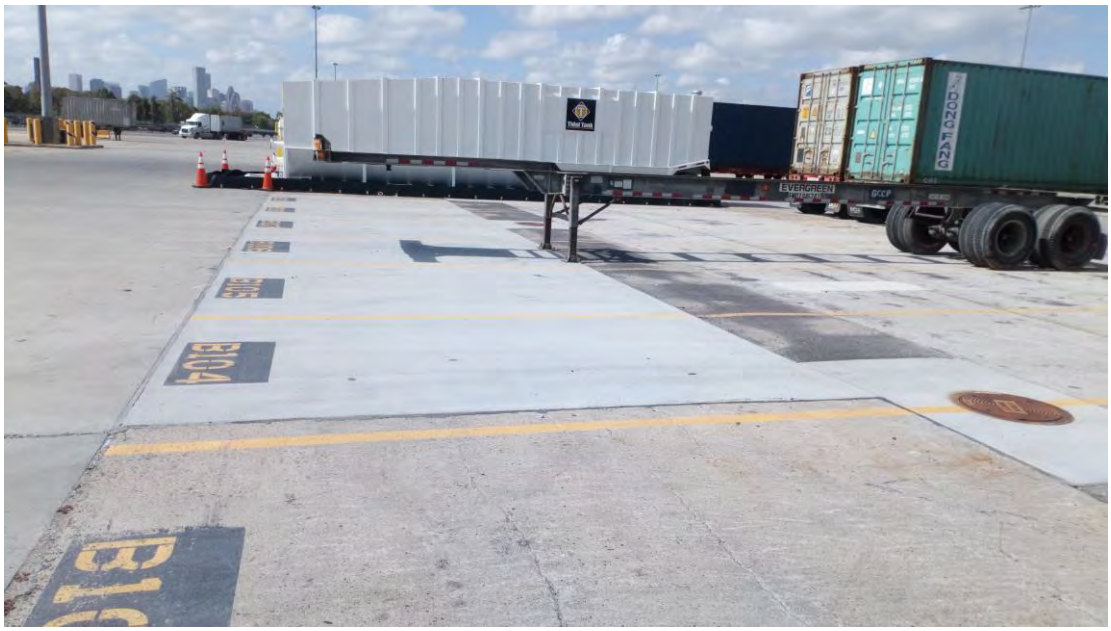
Description:

Slot B101:
View of slot B101, very little tar-like material in asphalt cracks.

Photo No.	Date:
30	10/24/19

Description:

Slot B103:
View of slots B103-B110, looking southwest at NAPL Collection System area.



GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
31	10/24/19

Description:

Slot A010:
View of slot A010 looking south, no tar-like material observed in joint.

Photo No.	Date:
32	10/24/19

Description:

B107/B108 NAPL Collection Sump:
View of little tar-like material removed from B107/B108 NAPL Collection Sump.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
33	10/29/19

Description:

B107/B108 NAPL Collection Sump: View of B107/B108 NAPL Collection Sump during a pump down. Note little tar-like material at the bottom north side of the sump. Very slight sheen and no odor noted on water recharge collected in the sump.

Photo No.	Date:
34	10/29/19

Description:

B103/B104 NAPL Collection Sump: View of B103/B104 NAPL Collection Sump during a pump down. No NAPL noted in the sump. No sheen or odor noted in water recharge the sump.

GOLDER

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Union Pacific Railroad	Englewood Intermodal Yard/Houston Wood Preserving Works, 4910 Liberty Road, Houston, Texas	19119232

Photo No.	Date:
35	10/24/19

Description:

B099/B100 NAPL Collection Sump: View of B099/B100 NAPL Collection Sump during a pump down. No NAPL noted in the sump. Slight sheen and no odor noted on water recharge collected in the sump.

ATTACHMENT B

Laboratory Analytical Report – Recovered Fluids from Sumps, sampled September 30, 2019

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

October 03, 2019

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

Work Order: **HS19091463**

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

Dear Eric,

ALS Environmental received 1 sample(s) on Sep 30, 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,

Generated By: JUMOKE.LAWAL
Dane J. Wacasey

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
Work Order: HS19091463

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19091463-01	WG-1620-IDW01-20190930	Liquid		30-Sep-2019 09:45	30-Sep-2019 11:26	☐

Client: Golder Associates Inc. **CASE NARRATIVE**
Project: Houston TX-Wood Preserving Works IDWW
Work Order: HS19091463

Work Order Comments

• 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 °C.

GC Semivolatiles by Method TX1005

Batch ID: 145893

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

GCMS Semivolatiles by Method SW8270

Batch ID: 145857

Sample ID: LCSD-145857

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

GCMS Volatiles by Method SW8260

Batch ID: R347514

Sample ID: HS19091453-03MS

• MS and MSD were performed on unrelated sample

Metals by Method SW7470

Batch ID: 145884

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

Metals by Method SW6020

Batch ID: 145860

Sample ID: HS19091325-02MS

• MS and MSD are for an unrelated sample

WetChemistry by Method SW1010

Batch ID: R347490

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

WetChemistry by Method SM4500 S2-F

Batch ID: R347476

Sample ID: LCSD-R347476

• LCSD was below the lower control limits

WetChemistry by Method SW9040C

Batch ID: R347391

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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
Work Order: HS19091463

CASE NARRATIVE

WetChemistry by Method SW9014

Batch ID: 145873

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

Client: Golder Associates Inc.
ANALYTICAL REPORT
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder:HS19091463
Sample ID: WG-1620-IDW01-20190930
Lab ID:HS19091463-01
Collection Date: 30-Sep-2019 09:45
Matrix:Liquid

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
1,1,1-Trichloroethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
1,1,2,2-Tetrachloroethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
1,1,2-Trichloroethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
1,1-Dichloroethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
1,1-Dichloroethene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
1,2-Dichlorobenzene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
1,2-Dichloroethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
1,2-Dichloropropane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
1,3-Dichlorobenzene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
1,4-Dichlorobenzene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
2-Butanone	< 0.0020		0.0020	mg/L	1	02-Oct-2019 20:28
2-Hexanone	< 0.0020		0.0020	mg/L	1	02-Oct-2019 20:28
4-Methyl-2-pentanone	< 0.0020		0.0020	mg/L	1	02-Oct-2019 20:28
Acetone	< 0.0020		0.0020	mg/L	1	02-Oct-2019 20:28
Benzene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Bromochloromethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Bromodichloromethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Bromoform	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Bromomethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Carbon disulfide	< 0.0020		0.0020	mg/L	1	02-Oct-2019 20:28
Carbon tetrachloride	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Chlorobenzene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Chloroethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Chloroform	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Chloromethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
cis-1,2-Dichloroethene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
cis-1,3-Dichloropropene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Dibromochloromethane	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Ethylbenzene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
m,p-Xylene	< 0.0020		0.0020	mg/L	1	02-Oct-2019 20:28
Methylene chloride	< 0.0020		0.0020	mg/L	1	02-Oct-2019 20:28
o-Xylene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Styrene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Tetrachloroethene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Toluene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
trans-1,2-Dichloroethene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
trans-1,3-Dichloropropene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Trichloroethene	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Vinyl acetate	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28

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

Client: Golder Associates Inc.
ANALYTICAL REPORT
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder:HS19091463
Sample ID: WG-1620-IDW01-20190930
Lab ID:HS19091463-01
Collection Date: 30-Sep-2019 09:45
Matrix:Liquid

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C	**Method:SW8260**					Analyst: AKP
Vinyl chloride	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Xylenes, Total	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
1,2-Dichloroethene, Total	< 0.0010		0.0010	mg/L	1	02-Oct-2019 20:28
Surr: 1,2-Dichloroethane-d4	*99.7*		*70-126*	*%REC*	*1*	*02-Oct-2019 20:28*
Surr: 4-Bromofluorobenzene	*100*		*81-113*	*%REC*	*1*	*02-Oct-2019 20:28*
Surr: Dibromofluoromethane	*106*		*77-123*	*%REC*	*1*	*02-Oct-2019 20:28*
Surr: Toluene-d8	*99.8*		*82-127*	*%REC*	*1*	*02-Oct-2019 20:28*

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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
Sample ID: WG-1620-IDW01-20190930
Collection Date: 30-Sep-2019 09:45

ANALYTICAL REPORT
WorkOrder:HS19091463
Lab ID:HS19091463-01
Matrix:Liquid

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL SEMIVOLATILES BY 8270D	**Method:SW8270**			Prep:SW3510 / 01-Oct-2019		Analyst: GEY
1,2,4-Trichlorobenzene	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2,4,5-Trichlorophenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2,4,6-Trichlorophenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2,4-Dichlorophenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2,4-Dimethylphenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2,4-Dinitrophenol	< 0.0010		0.0010	mg/L	1	02-Oct-2019 13:51
2,4-Dinitrotoluene	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2,6-Dinitrotoluene	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2-Chloronaphthalene	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2-Chlorophenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2-Methylnaphthalene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
2-Methylphenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2-Nitroaniline	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
2-Nitrophenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
3&4-Methylphenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
3,3´-Dichlorobenzidine	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
3-Nitroaniline	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
4,6-Dinitro-2-methylphenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
4-Bromophenyl phenyl ether	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
4-Chloro-3-methylphenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
4-Chloroaniline	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
4-Chlorophenyl phenyl ether	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
4-Nitroaniline	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
4-Nitrophenol	< 0.0010		0.0010	mg/L	1	02-Oct-2019 13:51
Acenaphthene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Acenaphthylene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Anthracene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Benz(a)anthracene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Benzidine	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Benzo(a)pyrene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Benzo(b)fluoranthene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Benzo(g,h,i)perylene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Benzo(k)fluoranthene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Benzyl alcohol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Bis(2-chloroethoxy)methane	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Bis(2-chloroethyl)ether	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Bis(2-chloroisopropyl)ether	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Bis(2-ethylhexyl)phthalate	**0.00035**		**0.00020**	**mg/L**	1	02-Oct-2019 13:51
Butyl benzyl phthalate	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51

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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
Sample ID: WG-1620-IDW01-20190930
Collection Date: 30-Sep-2019 09:45

ANALYTICAL REPORT
WorkOrder:HS19091463
Lab ID:HS19091463-01
Matrix:Liquid

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW-LEVEL SEMIVOLATILES BY 8270D	**Method:SW8270**			Prep:SW3510 / 01-Oct-2019		Analyst: GEY
Carbazole	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Chrysene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Di-n-butyl phthalate	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Di-n-octyl phthalate	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Dibenz(a,h)anthracene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Dibenzofuran	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Diethyl phthalate	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Dimethyl phthalate	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Fluoranthene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Fluorene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Hexachlorobenzene	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Hexachlorobutadiene	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Hexachlorocyclopentadiene	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Hexachloroethane	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Indeno(1,2,3-cd)pyrene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Isophorone	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
N-Nitrosodi-n-propylamine	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
N-Nitrosodimethylamine	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
N-Nitrosodiphenylamine	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Naphthalene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Nitrobenzene	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Pentachlorophenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Phenanthrene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Phenol	< 0.00020		0.00020	mg/L	1	02-Oct-2019 13:51
Pyrene	< 0.00010		0.00010	mg/L	1	02-Oct-2019 13:51
Pyridine	< 0.0010		0.0010	mg/L	1	02-Oct-2019 13:51
Surr: 2,4,6-Tribromophenol	*88.9*		*34-129*	*%REC*	*1*	*02-Oct-2019 13:51*
Surr: 2-Fluorobiphenyl	*86.0*		*40-125*	*%REC*	*1*	*02-Oct-2019 13:51*
Surr: 2-Fluorophenol	*77.8*		*20-120*	*%REC*	*1*	*02-Oct-2019 13:51*
Surr: 4-Terphenyl-d14	*92.1*		*40-135*	*%REC*	*1*	*02-Oct-2019 13:51*
Surr: Nitrobenzene-d5	*87.6*		*41-120*	*%REC*	*1*	*02-Oct-2019 13:51*
Surr: Phenol-d6	*82.0*		*20-120*	*%REC*	*1*	*02-Oct-2019 13:51*
LOW-LEVEL TEXAS TPH BY TX1005	**Method:TX1005**			Prep:TX1005PR / 01-Oct-2019		Analyst: MBG
nC6 to nC12	< 0.48		0.48	mg/L	1	02-Oct-2019 08:26
>nC12 to nC28	< 0.48		0.48	mg/L	1	02-Oct-2019 08:26
>nC28 to nC35	< 0.48		0.48	mg/L	1	02-Oct-2019 08:26
Total Petroleum Hydrocarbon	< 0.48		0.48	mg/L	1	02-Oct-2019 08:26
Surr: 2-Fluorobiphenyl	*105*		*70-130*	*%REC*	*1*	*02-Oct-2019 08:26*
Surr: Trifluoromethyl benzene	*120*		*70-130*	*%REC*	*1*	*02-Oct-2019 08:26*

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

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
Sample ID: WG-1620-IDW01-20190930
Collection Date: 30-Sep-2019 09:45

ANALYTICAL REPORT
WorkOrder:HS19091463
Lab ID:HS19091463-01
Matrix:Liquid

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP-MS METALS BY SW6020A		**Method:SW6020**		Prep:SW3010A / 01-Oct-2019		Analyst: JC
Arsenic	**0.00746**		**0.00200**	**mg/L**	1	02-Oct-2019 01:34
Barium	**0.115**		**0.00400**	**mg/L**	1	02-Oct-2019 01:34
Cadmium	< 0.00200		0.00200	mg/L	1	02-Oct-2019 01:34
Chromium	**0.00488**		**0.00400**	**mg/L**	1	02-Oct-2019 01:34
Lead	**0.0182**		**0.00200**	**mg/L**	1	02-Oct-2019 01:34
Selenium	< 0.00200		0.00200	mg/L	1	02-Oct-2019 01:34
Silver	< 0.00200		0.00200	mg/L	1	02-Oct-2019 01:34
MERCURY BY SW7470A		**Method:SW7470**		Prep:SW7470 / 01-Oct-2019		Analyst: FO
Mercury	< 0.000200		0.000200	mg/L	1	01-Oct-2019 17:27
SULFIDE BY SM4500 S2-F		**Method:SM4500 S2-F**				Analyst: RG
Sulfide	**1.36**		**1.00**	**mg/L**	1	02-Oct-2019 11:00
FLASH POINT BY PENSKY-MARTENS SW1010A		**Method:SW1010**				Analyst: TH
Ignitability	> 212		70.0	°F	1	02-Oct-2019 09:00
CYANIDE - SW9014		**Method:SW9014**		Prep:SW9010C / 01-Oct-2019		Analyst: KVL
Cyanide	< 0.0200		0.0200	mg/L	1	01-Oct-2019 17:00
PH BY SW9040C		**Method:SW9040C**				Analyst: MWG
pH	**7.31**	H	**0.100**	**pH Units**	1	01-Oct-2019 16:30
Temp Deg C @pH	**20.6**	H	**0**	**DEG C**	1	01-Oct-2019 16:30

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

WEIGHT LOG

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

Batch ID: 145857 **Method:** LOW-LEVEL SEMIVOLATILES BY 8270D **Prep:** 3510_B_LOW

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19091463-01	1	1000	1 (mL)	0.001

Batch ID: 145860 **Method:** ICP-MS METALS BY SW6020A **Prep:** 3010A

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19091463-01	1	10	10 (mL)	1

Batch ID: 145873 **Method:** CYANIDE - SW9014 **Prep:** CN_TW_PR

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19091463-01	1	50	50 (mL)	1

Batch ID: 145884 **Method:** MERCURY BY SW7470A **Prep:** HG_WPR

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19091463-01	1	10 (mL)	10 (mL)	1

Batch ID: 145893 **Method:** LOW-LEVEL TEXAS TPH BY TX1005 **Prep:** TX 1005_W PR

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19091463-01	1	31.25	3 (mL)	0.096

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID: 145857 (0)	**Test Name :** LOW-LEVEL SEMIVOLATILES BY 8270D				**Matrix:** Liquid	
HS19091463-01	WG-1620-IDW01-20190930	30 Sep 2019 09:45		01 Oct 2019 08:49	02 Oct 2019 13:51	1
Batch ID: 145860 (0)	**Test Name :** ICP-MS METALS BY SW6020A				**Matrix:** Liquid	
HS19091463-01	WG-1620-IDW01-20190930	30 Sep 2019 09:45		01 Oct 2019 08:30	02 Oct 2019 01:34	1
Batch ID: 145873 (0)	**Test Name :** CYANIDE - SW9014				**Matrix:** Liquid	
HS19091463-01	WG-1620-IDW01-20190930	30 Sep 2019 09:45		01 Oct 2019 11:30	01 Oct 2019 17:00	1
Batch ID: 145884 (0)	**Test Name :** MERCURY BY SW7470A				**Matrix:** Liquid	
HS19091463-01	WG-1620-IDW01-20190930	30 Sep 2019 09:45		01 Oct 2019 10:00	01 Oct 2019 17:27	1
Batch ID: 145893 (0)	**Test Name :** LOW-LEVEL TEXAS TPH BY TX1005				**Matrix:** Liquid	
HS19091463-01	WG-1620-IDW01-20190930	30 Sep 2019 09:45		01 Oct 2019 13:30	02 Oct 2019 08:26	1
Batch ID: R347391 (0)	**Test Name :** PH BY SW9040C				**Matrix:** Liquid	
HS19091463-01	WG-1620-IDW01-20190930	30 Sep 2019 09:45			01 Oct 2019 16:30	1
Batch ID: R347476 (0)	**Test Name :** SULFIDE BY SM4500 S2-F				**Matrix:** Liquid	
HS19091463-01	WG-1620-IDW01-20190930	30 Sep 2019 09:45			02 Oct 2019 11:00	1
Batch ID: R347490 (0)	**Test Name :** FLASH POINT BY PENSKY-MARTENS SW1010A				**Matrix:** Liquid	
HS19091463-01	WG-1620-IDW01-20190930	30 Sep 2019 09:45			02 Oct 2019 09:00	1
Batch ID: R347514 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Liquid	
HS19091463-01	WG-1620-IDW01-20190930	30 Sep 2019 09:45			02 Oct 2019 20:28	1

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145893 (0) **Instrument: FID-12** **Method: LOW-LEVEL TEXAS TPH BY TX1005**

MBLK Sample ID: **MBLK-145893** Units: **mg/L** Analysis Date: **02-Oct-2019 05:31**
Client ID: Run ID: **FID-12_347445** SeqNo: **5278957** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
nC6 to nC12	< 0.50	0.50								
>nC12 to nC28	< 0.50	0.50								
>nC28 to nC35	< 0.50	0.50								
Total Petroleum Hydrocarbon	< 0.50	0.50								
Surr: 2-Fluorobiphenyl	*2.252*	*0*	*2.5*	*0*	*90.1*	*70 - 130*				
Surr: Trifluoromethyl benzene	*2.335*	*0*	*2.5*	*0*	*93.4*	*70 - 130*				

LCS Sample ID: **LCS-145893** Units: **mg/L** Analysis Date: **02-Oct-2019 06:00**
Client ID: Run ID: **FID-12_347445** SeqNo: **5278958** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
nC6 to nC12	26.04	0.50	25	0	104	75 - 125				
>nC12 to nC28	21.63	0.50	25	0	86.5	75 - 125				
Surr: 2-Fluorobiphenyl	*2.814*	*0*	*2.5*	*0*	*113*	*70 - 130*				
Surr: Trifluoromethyl benzene	*2.66*	*0*	*2.5*	*0*	*106*	*70 - 130*				

LCSD Sample ID: **LCSD-145893** Units: **mg/L** Analysis Date: **02-Oct-2019 06:29**
Client ID: Run ID: **FID-12_347445** SeqNo: **5278959** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
nC6 to nC12	24.87	0.50	25	0	99.5	75 - 125	26.04	4.59	20	
>nC12 to nC28	20.96	0.50	25	0	83.8	75 - 125	21.63	3.18	20	
Surr: 2-Fluorobiphenyl	*2.794*	*0*	*2.5*	*0*	*112*	*70 - 130*	*2.814*	*0.69*	*20*	
Surr: Trifluoromethyl benzene	*2.555*	*0*	*2.5*	*0*	*102*	*70 - 130*	*2.66*	*4.01*	*20*	

MS Sample ID: **HS19091413-16MS** Units: **mg/L** Analysis Date: **02-Oct-2019 07:28**
Client ID: Run ID: **FID-12_347445** SeqNo: **5278961** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
nC6 to nC12	23.67	0.48	23.77	0	99.6	75 - 125				
>nC12 to nC28	20.22	0.48	23.77	0	85.1	75 - 125				
Surr: 2-Fluorobiphenyl	*2.676*	*0*	*2.377*	*0*	*113*	*70 - 130*				
Surr: Trifluoromethyl benzene	*2.448*	*0*	*2.377*	*0*	*103*	*70 - 130*				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145893 (0) **Instrument: FID-12** **Method: LOW-LEVEL TEXAS TPH BY TX1005**

MSD Sample ID: **HS19091413-16MSD** Units: **mg/L** Analysis Date: **02-Oct-2019 07:57**
Client ID: Run ID: **FID-12_347445** SeqNo: **5278962** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
nC6 to nC12	24.1	0.48	24.02	0	100	75 - 125	23.67	1.8	20	
>nC12 to nC28	20.86	0.48	24.02	0	86.8	75 - 125	20.22	3.11	20	
Surr: 2-Fluorobiphenyl	*2.71*	*0*	*2.402*	*0*	*113*	*70 - 130*	*2.676*	*1.27*	*20*	
Surr: Trifluoromethyl benzene	*2.526*	*0*	*2.402*	*0*	*105*	*70 - 130*	*2.448*	*3.13*	*20*	

The following samples were analyzed in this batch: HS19091463-01

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145860 (0) **Instrument: ICPMS06** **Method: ICP-MS METALS BY SW6020A**

MBLK Sample ID: **MBLK-145860** Units: **mg/L** Analysis Date: **02-Oct-2019 13:51**
Client ID: Run ID: **ICPMS06_347438** SeqNo: **5279241** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	< 0.00200	0.00200								
Barium	< 0.00400	0.00400								
Cadmium	< 0.00200	0.00200								
Chromium	< 0.00400	0.00400								
Lead	< 0.00200	0.00200								
Selenium	< 0.00200	0.00200								
Silver	< 0.00200	0.00200								

LCS Sample ID: **LCS-145860** Units: **mg/L** Analysis Date: **02-Oct-2019 00:18**
Client ID: Run ID: **ICPMS04_347352** SeqNo: **5278043** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.04468	0.00200	0.05	0	89.4	80 - 120				
Barium	0.04374	0.00400	0.05	0	87.5	80 - 120				
Cadmium	0.04541	0.00200	0.05	0	90.8	80 - 120				
Chromium	0.0448	0.00400	0.05	0	89.6	80 - 120				
Lead	0.04474	0.00200	0.05	0	89.5	80 - 120				
Selenium	0.04703	0.00200	0.05	0	94.1	80 - 120				
Silver	0.04365	0.00200	0.05	0	87.3	80 - 120				

MS Sample ID: **HS19091325-02MS** Units: **mg/L** Analysis Date: **02-Oct-2019 00:25**
Client ID: Run ID: **ICPMS04_347352** SeqNo: **5278046** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.04561	0.00200	0.05	0.000194	90.8	80 - 120				
Barium	0.2508	0.00400	0.05	0.2274	46.8	80 - 120				SO
Cadmium	0.04543	0.00200	0.05	0.000074	90.7	80 - 120				
Chromium	0.04627	0.00400	0.05	0.001364	89.8	80 - 120				
Lead	0.04402	0.00200	0.05	0.000112	87.8	80 - 120				
Selenium	0.04473	0.00200	0.05	0.000508	88.4	80 - 120				
Silver	0.04346	0.00200	0.05	0.000065	86.8	80 - 120				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145860 (0) **Instrument: ICPMS06** **Method: ICP-MS METALS BY SW6020A**

MSD Sample ID: **HS19091325-02MSD** Units: **mg/L** Analysis Date: **02-Oct-2019 00:27**
Client ID: Run ID: **ICPMS04_347352** SeqNo: **5278047** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.04664	0.00200	0.05	0.000194	92.9	80 - 120	0.04561	2.23	20	
Barium	0.2533	0.00400	0.05	0.2274	51.9	80 - 120	0.2508	1.01	20	SO
Cadmium	0.04719	0.00200	0.05	0.000074	94.2	80 - 120	0.04543	3.81	20	
Chromium	0.0477	0.00400	0.05	0.001364	92.7	80 - 120	0.04627	3.05	20	
Lead	0.04549	0.00200	0.05	0.000112	90.8	80 - 120	0.04402	3.3	20	
Selenium	0.0458	0.00200	0.05	0.000508	90.6	80 - 120	0.04473	2.37	20	
Silver	0.04373	0.00200	0.05	0.000065	87.3	80 - 120	0.04346	0.617	20	

PDS Sample ID: **HS19091325-02PDS** Units: **mg/L** Analysis Date: **02-Oct-2019 00:29**
Client ID: Run ID: **ICPMS04_347352** SeqNo: **5278048** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.1009	0.00200	0.1	0.000194	101	75 - 125				
Barium	0.3273	0.00400	0.1	0.2274	99.9	75 - 125				
Cadmium	0.1014	0.00200	0.1	0.000074	101	75 - 125				
Chromium	0.1001	0.00400	0.1	0.001364	98.7	75 - 125				
Lead	0.09619	0.00200	0.1	0.000112	96.1	75 - 125				
Selenium	0.09893	0.00200	0.1	0.000508	98.4	75 - 125				
Silver	0.09693	0.00200	0.1	0.000065	96.9	75 - 125				

SD Sample ID: **HS19091325-02SD** Units: **mg/L** Analysis Date: **02-Oct-2019 00:23**
Client ID: Run ID: **ICPMS04_347352** SeqNo: **5278045** PrepDate: **01-Oct-2019** DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Arsenic	< 0.0100	0.0100					0.000194	0	10	
Barium	0.2209	0.0200					0.2274	2.86	10	
Cadmium	< 0.0100	0.0100					0.000074	0	10	
Chromium	< 0.0200	0.0200					0.001364	0	10	
Lead	< 0.0100	0.0100					0.000112	0	10	
Selenium	< 0.0100	0.0100					0.000508	0	10	
Silver	< 0.0100	0.0100					0.000065	0	10	

The following samples were analyzed in this batch: HS19091463-01

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145884 (0) **Instrument: HG03** **Method: MERCURY BY SW7470A**

MBLK Sample ID: **MBLK-145884** Units: **mg/L** Analysis Date: **01-Oct-2019 16:36**
Client ID: Run ID: **HG03_347401** SeqNo: **5278412** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	< 0.000200	0.000200								

LCS Sample ID: **LCS-145884** Units: **mg/L** Analysis Date: **01-Oct-2019 16:37**
Client ID: Run ID: **HG03_347401** SeqNo: **5278413** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00541	0.000200	0.005	0	108	80 - 120				

MS Sample ID: **HS19091325-02MS** Units: **mg/L** Analysis Date: **01-Oct-2019 16:58**
Client ID: Run ID: **HG03_347401** SeqNo: **5278421** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00511	0.000200	0.005	0.000131	99.6	75 - 125				

MS Sample ID: **HS19091280-02MS** Units: **mg/L** Analysis Date: **01-Oct-2019 16:45**
Client ID: Run ID: **HG03_347401** SeqNo: **5278415** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00508	0.000200	0.005	0.000002	102	75 - 125				

MSD Sample ID: **HS19091325-02MSD** Units: **mg/L** Analysis Date: **01-Oct-2019 16:59**
Client ID: Run ID: **HG03_347401** SeqNo: **5278422** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00503	0.000200	0.005	0.000131	98.0	75 - 125	0.00511	1.58	20	

MSD Sample ID: **HS19091280-02MSD** Units: **mg/L** Analysis Date: **01-Oct-2019 16:47**
Client ID: Run ID: **HG03_347401** SeqNo: **5278416** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00501	0.000200	0.005	0.000002	100	75 - 125	0.00508	1.39	20	

The following samples were analyzed in this batch: HS19091463-01

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145857 (0) **Instrument: SV-7** **Method: LOW-LEVEL SEMIVOLATILES BY 8270D**

MBLK Sample ID: **MBLK-145857** Units: **ug/L** Analysis Date: **02-Oct-2019 11:06**
Client ID: Run ID: **SV-7_347447** SeqNo: **5278988** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	< 0.20	0.20								
2,4,5-Trichlorophenol	< 0.20	0.20								
2,4,6-Trichlorophenol	< 0.20	0.20								
2,4-Dichlorophenol	< 0.20	0.20								
2,4-Dimethylphenol	< 0.20	0.20								
2,4-Dinitrophenol	< 1.0	1.0								
2,4-Dinitrotoluene	< 0.20	0.20								
2,6-Dinitrotoluene	< 0.20	0.20								
2-Chloronaphthalene	< 0.20	0.20								
2-Chlorophenol	< 0.20	0.20								
2-Methylnaphthalene	< 0.10	0.10								
2-Methylphenol	< 0.20	0.20								
2-Nitroaniline	< 0.20	0.20								
2-Nitrophenol	< 0.20	0.20								
3&4-Methylphenol	< 0.20	0.20								
3,3´-Dichlorobenzidine	< 0.20	0.20								
3-Nitroaniline	< 0.20	0.20								
4,6-Dinitro-2-methylphenol	< 0.20	0.20								
4-Bromophenyl phenyl ether	< 0.20	0.20								
4-Chloro-3-methylphenol	< 0.20	0.20								
4-Chloroaniline	< 0.20	0.20								
4-Chlorophenyl phenyl ether	< 0.20	0.20								
4-Nitroaniline	< 0.20	0.20								
4-Nitrophenol	< 1.0	1.0								
Acenaphthene	< 0.10	0.10								
Acenaphthylene	< 0.10	0.10								
Anthracene	< 0.10	0.10								
Benz(a)anthracene	< 0.10	0.10								
Benzidine	< 0.20	0.20								
Benzo(a)pyrene	< 0.10	0.10								
Benzo(b)fluoranthene	< 0.10	0.10								
Benzo(g,h,i)perylene	< 0.10	0.10								
Benzo(k)fluoranthene	< 0.10	0.10								
Benzyl alcohol	< 0.20	0.20								

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145857 (0) **Instrument: SV-7** **Method: LOW-LEVEL SEMIVOLATILES BY 8270D**

MBLK Sample ID: **MBLK-145857** Units: **ug/L** Analysis Date: **02-Oct-2019 11:06**
Client ID: Run ID: **SV-7_347447** SeqNo: **5278988** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bis(2-chloroethoxy)methane	< 0.20	0.20								
Bis(2-chloroethyl)ether	< 0.20	0.20								
Bis(2-chloroisopropyl)ether	< 0.20	0.20								
Bis(2-ethylhexyl)phthalate	< 0.20	0.20								
Butyl benzyl phthalate	< 0.20	0.20								
Carbazole	< 0.20	0.20								
Chrysene	< 0.10	0.10								
Dibenz(a,h)anthracene	< 0.10	0.10								
Dibenzofuran	< 0.10	0.10								
Diethyl phthalate	< 0.20	0.20								
Dimethyl phthalate	< 0.20	0.20								
Di-n-butyl phthalate	< 0.20	0.20								
Di-n-octyl phthalate	< 0.20	0.20								
Fluoranthene	< 0.10	0.10								
Fluorene	< 0.10	0.10								
Hexachlorobenzene	< 0.20	0.20								
Hexachlorobutadiene	< 0.20	0.20								
Hexachlorocyclopentadiene	< 0.20	0.20								
Hexachloroethane	< 0.20	0.20								
Indeno(1,2,3-cd)pyrene	< 0.10	0.10								
Isophorone	< 0.20	0.20								
Naphthalene	< 0.10	0.10								
Nitrobenzene	< 0.20	0.20								
N-Nitrosodimethylamine	< 0.20	0.20								
N-Nitrosodi-n-propylamine	< 0.20	0.20								
N-Nitrosodiphenylamine	< 0.20	0.20								
Pentachlorophenol	< 0.20	0.20								
Phenanthrene	< 0.10	0.10								
Phenol	< 0.20	0.20								
Pyrene	< 0.10	0.10								
Pyridine	< 1.0	1.0								
Surr: 2,4,6-Tribromophenol	*4.279*	*0.20*	*5*	*0*	*85.6*	*34 - 129*				
Surr: 2-Fluorobiphenyl	*4.241*	*0.20*	*5*	*0*	*84.8*	*40 - 125*				
Surr: 2-Fluorophenol	*4.552*	*0.20*	*5*	*0*	*91.0*	*20 - 120*				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145857 (0) **Instrument: SV-7** **Method: LOW-LEVEL SEMIVOLATILES BY 8270D**

MBLK Sample ID: **MBLK-145857** Units: **ug/L** Analysis Date: **02-Oct-2019 11:06**
Client ID: Run ID: **SV-7_347447** SeqNo: **5278988** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: 4-Terphenyl-d14	*4.764*	*0.20*	*5*	*0*	*95.3*	*40 - 135*				
Surr: Nitrobenzene-d5	*3.93*	*0.20*	*5*	*0*	*78.6*	*41 - 120*				
Surr: Phenol-d6	*4.408*	*0.20*	*5*	*0*	*88.2*	*20 - 120*				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145857 (0) **Instrument: SV-7** **Method: LOW-LEVEL SEMIVOLATILES BY 8270D**

LCS Sample ID: **LCS-145857** Units: **ug/L** Analysis Date: **02-Oct-2019 11:25**
Client ID: Run ID: **SV-7_347447** SeqNo: **5278989** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
1,2,4-Trichlorobenzene	4.28	0.20	5	0	85.6	45 - 120			
2,4,5-Trichlorophenol	3.997	0.20	5	0	79.9	46 - 120			
2,4,6-Trichlorophenol	3.985	0.20	5	0	79.7	42 - 120			
2,4-Dichlorophenol	4.656	0.20	5	0	93.1	49 - 120			
2,4-Dimethylphenol	4.229	0.20	5	0	84.6	35 - 120			
2,4-Dinitrophenol	4.888	1.0	5	0	97.8	15 - 120			
2,4-Dinitrotoluene	4.827	0.20	5	0	96.5	50 - 122			
2,6-Dinitrotoluene	4.79	0.20	5	0	95.8	50 - 120			
2-Chloronaphthalene	4.396	0.20	5	0	87.9	50 - 120			
2-Chlorophenol	4.208	0.20	5	0	84.2	40 - 120			
2-Methylnaphthalene	3.92	0.10	5	0	78.4	50 - 120			
2-Methylphenol	4.491	0.20	5	0	89.8	45 - 120			
2-Nitroaniline	5.746	0.20	5	0	115	28 - 139			
2-Nitrophenol	4.212	0.20	5	0	84.2	40 - 120			
3&4-Methylphenol	4.316	0.20	5	0	86.3	35 - 120			
3,3´-Dichlorobenzidine	4.967	0.20	5	0	99.3	15 - 120			
3-Nitroaniline	5.689	0.20	5	0	114	30 - 120			
4,6-Dinitro-2-methylphenol	5.57	0.20	5	0	111	25 - 121			
4-Bromophenyl phenyl ether	4.164	0.20	5	0	83.3	45 - 120			
4-Chloro-3-methylphenol	4.797	0.20	5	0	95.9	47 - 120			
4-Chloroaniline	4.475	0.20	5	0	89.5	20 - 120			
4-Chlorophenyl phenyl ether	4.625	0.20	5	0	92.5	50 - 120			
4-Nitroaniline	5.324	0.20	5	0	106	30 - 133			
4-Nitrophenol	5.425	1.0	5	0	109	30 - 130			
Acenaphthene	4.394	0.10	5	0	87.9	45 - 120			
Acenaphthylene	4.542	0.10	5	0	90.8	47 - 120			
Anthracene	4.806	0.10	5	0	96.1	45 - 120			
Benz(a)anthracene	4.995	0.10	5	0	99.9	40 - 120			
Benzidine	0.662	0.20	5	0	13.2	10 - 120			
Benzo(a)pyrene	5.074	0.10	5	0	101	45 - 120			
Benzo(b)fluoranthene	5.717	0.10	5	0	114	50 - 120			
Benzo(g,h,i)perylene	4.407	0.10	5	0	88.1	42 - 127			
Benzo(k)fluoranthene	4.716	0.10	5	0	94.3	45 - 127			
Benzyl alcohol	4.152	0.20	5	0	83.0	35 - 122			

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145857 (0) **Instrument: SV-7** **Method: LOW-LEVEL SEMIVOLATILES BY 8270D**

LCS Sample ID: **LCS-145857** Units: **ug/L** Analysis Date: **02-Oct-2019 11:25**
Client ID: Run ID: **SV-7_347447** SeqNo: **5278989** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bis(2-chloroethoxy)methane	4.357	0.20	5	0	87.1	45 - 120				
Bis(2-chloroethyl)ether	4.213	0.20	5	0	84.3	37 - 121				
Bis(2-chloroisopropyl)ether	4.809	0.20	5	0	96.2	40 - 120				
Bis(2-ethylhexyl)phthalate	5.13	0.20	5	0	103	40 - 139				
Butyl benzyl phthalate	5.408	0.20	5	0	108	47 - 123				
Carbazole	5.604	0.20	5	0	112	42 - 128				
Chrysene	5.006	0.10	5	0	100	43 - 120				
Dibenz(a,h)anthracene	4.962	0.10	5	0	99.2	45 - 125				
Dibenzofuran	4.688	0.10	5	0	93.8	50 - 120				
Diethyl phthalate	4.88	0.20	5	0	97.6	41 - 120				
Dimethyl phthalate	4.735	0.20	5	0	94.7	40 - 122				
Di-n-butyl phthalate	4.993	0.20	5	0	99.9	45 - 123				
Di-n-octyl phthalate	5.584	0.20	5	0	112	45 - 129				
Fluoranthene	4.478	0.10	5	0	89.6	45 - 125				
Fluorene	4.793	0.10	5	0	95.9	49 - 120				
Hexachlorobenzene	3.933	0.20	5	0	78.7	48 - 120				
Hexachlorobutadiene	4.305	0.20	5	0	86.1	40 - 120				
Hexachlorocyclopentadiene	3.96	0.20	5	0	79.2	34 - 136				
Hexachloroethane	4.342	0.20	5	0	86.8	40 - 120				
Indeno(1,2,3-cd)pyrene	5.019	0.10	5	0	100	41 - 128				
Isophorone	4.186	0.20	5	0	83.7	40 - 121				
Naphthalene	4.25	0.10	5	0	85.0	45 - 120				
Nitrobenzene	3.861	0.20	5	0	77.2	44 - 120				
N-Nitrosodimethylamine	4.476	0.20	5	0	89.5	30 - 121				
N-Nitrosodi-n-propylamine	4.457	0.20	5	0	89.1	40 - 120				
N-Nitrosodiphenylamine	4.887	0.20	5	0	97.7	40 - 125				
Pentachlorophenol	3.843	0.20	5	0	76.9	19 - 121				
Phenanthrene	4.726	0.10	5	0	94.5	45 - 121				
Phenol	4.214	0.20	5	0	84.3	20 - 124				
Pyrene	5.959	0.10	5	0	119	40 - 130				
Pyridine	3.883	1.0	5	0	77.7	15 - 120				
Surr: 2,4,6-Tribromophenol	*5.219*	*0.20*	*5*	*0*	*104*	*34 - 129*				
Surr: 2-Fluorobiphenyl	*4.261*	*0.20*	*5*	*0*	*85.2*	*40 - 125*				
Surr: 2-Fluorophenol	*4.527*	*0.20*	*5*	*0*	*90.5*	*20 - 120*				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145857 (0) **Instrument: SV-7** **Method: LOW-LEVEL SEMIVOLATILES BY 8270D**

LCS Sample ID: **LCS-145857** Units: **ug/L** Analysis Date: **02-Oct-2019 11:25**
Client ID: Run ID: **SV-7_347447** SeqNo: **5278989** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: 4-Terphenyl-d14	*5.275*	*0.20*	*5*	*0*	*105*	*40 - 135*				
Surr: Nitrobenzene-d5	*4.007*	*0.20*	*5*	*0*	*80.1*	*41 - 120*				
Surr: Phenol-d6	*4.714*	*0.20*	*5*	*0*	*94.3*	*20 - 120*				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145857 (0) **Instrument: SV-7** **Method: LOW-LEVEL SEMIVOLATILES BY 8270D**

LCSD Sample ID: **LCSD-145857** Units: **ug/L** Analysis Date: **02-Oct-2019 12:14**
Client ID: Run ID: **SV-7_347447** SeqNo: **5278990** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	4.056	0.20	5	0	81.1	45 - 120	4.28	5.37	20	
2,4,5-Trichlorophenol	5.04	0.20	5	0	101	46 - 120	3.997	23.1	20	R
2,4,6-Trichlorophenol	4.856	0.20	5	0	97.1	42 - 120	3.985	19.7	20	
2,4-Dichlorophenol	4.912	0.20	5	0	98.2	49 - 120	4.656	5.35	20	
2,4-Dimethylphenol	4.26	0.20	5	0	85.2	35 - 120	4.229	0.724	20	
2,4-Dinitrophenol	4.827	1.0	5	0	96.5	15 - 120	4.888	1.26	50	
2,4-Dinitrotoluene	4.939	0.20	5	0	98.8	50 - 122	4.827	2.31	20	
2,6-Dinitrotoluene	5.446	0.20	5	0	109	50 - 120	4.79	12.8	20	
2-Chloronaphthalene	5.509	0.20	5	0	110	50 - 120	4.396	22.5	20	R
2-Chlorophenol	4.23	0.20	5	0	84.6	40 - 120	4.208	0.519	20	
2-Methylnaphthalene	4.53	0.10	5	0	90.6	50 - 120	3.92	14.5	20	
2-Methylphenol	4.64	0.20	5	0	92.8	45 - 120	4.491	3.28	20	
2-Nitroaniline	5.778	0.20	5	0	116	28 - 139	5.746	0.552	20	
2-Nitrophenol	4.299	0.20	5	0	86.0	40 - 120	4.212	2.05	20	
3&4-Methylphenol	4.506	0.20	5	0	90.1	35 - 120	4.316	4.32	20	
3,3´-Dichlorobenzidine	3.62	0.20	5	0	72.4	15 - 120	4.967	31.4	20	R
3-Nitroaniline	5.213	0.20	5	0	104	30 - 120	5.689	8.75	20	
4,6-Dinitro-2-methylphenol	5.101	0.20	5	0	102	25 - 121	5.57	8.78	30	
4-Bromophenyl phenyl ether	4.481	0.20	5	0	89.6	45 - 120	4.164	7.33	20	
4-Chloro-3-methylphenol	4.818	0.20	5	0	96.4	47 - 120	4.797	0.438	20	
4-Chloroaniline	4.557	0.20	5	0	91.1	20 - 120	4.475	1.83	20	
4-Chlorophenyl phenyl ether	4.615	0.20	5	0	92.3	50 - 120	4.625	0.211	20	
4-Nitroaniline	5.599	0.20	5	0	112	30 - 133	5.324	5.05	20	
4-Nitrophenol	5.309	1.0	5	0	106	30 - 130	5.425	2.16	20	
Acenaphthene	4.328	0.10	5	0	86.6	45 - 120	4.394	1.52	20	
Acenaphthylene	4.511	0.10	5	0	90.2	47 - 120	4.542	0.686	20	
Anthracene	4.533	0.10	5	0	90.7	45 - 120	4.806	5.85	20	
Benz(a)anthracene	4.986	0.10	5	0	99.7	40 - 120	4.995	0.182	20	
Benzidine	0.7642	0.20	5	0	15.3	10 - 120	0.662	14.3	30	
Benzo(a)pyrene	5.01	0.10	5	0	100	45 - 120	5.074	1.27	20	
Benzo(b)fluoranthene	5.711	0.10	5	0	114	50 - 120	5.717	0.11	20	
Benzo(g,h,i)perylene	4.265	0.10	5	0	85.3	42 - 127	4.407	3.28	20	
Benzo(k)fluoranthene	5.39	0.10	5	0	108	45 - 127	4.716	13.3	20	
Benzyl alcohol	4.134	0.20	5	0	82.7	35 - 122	4.152	0.436	20	

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145857 (0) **Instrument: SV-7** **Method: LOW-LEVEL SEMIVOLATILES BY 8270D**

LCSD Sample ID: **LCSD-145857** Units: **ug/L** Analysis Date: **02-Oct-2019 12:14**
Client ID: Run ID: **SV-7_347447** SeqNo: **5278990** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Bis(2-chloroethoxy)methane	4.683	0.20	5	0	93.7	45 - 120	4.357	7.22	20	
Bis(2-chloroethyl)ether	4.602	0.20	5	0	92.0	37 - 121	4.213	8.82	20	
Bis(2-chloroisopropyl)ether	4.938	0.20	5	0	98.8	40 - 120	4.809	2.65	20	
Bis(2-ethylhexyl)phthalate	5.224	0.20	5	0	104	40 - 139	5.13	1.81	20	
Butyl benzyl phthalate	5.17	0.20	5	0	103	47 - 123	5.408	4.5	20	
Carbazole	5.671	0.20	5	0	113	42 - 128	5.604	1.19	20	
Chrysene	5.111	0.10	5	0	102	43 - 120	5.006	2.07	20	
Dibenz(a,h)anthracene	4.817	0.10	5	0	96.3	45 - 125	4.962	2.96	20	
Dibenzofuran	4.633	0.10	5	0	92.7	50 - 120	4.688	1.18	20	
Diethyl phthalate	5.003	0.20	5	0	100	41 - 120	4.88	2.48	20	
Dimethyl phthalate	5.434	0.20	5	0	109	40 - 122	4.735	13.7	20	
Di-n-butyl phthalate	4.576	0.20	5	0	91.5	45 - 123	4.993	8.71	20	
Di-n-octyl phthalate	5.331	0.20	5	0	107	45 - 129	5.584	4.63	20	
Fluoranthene	4.844	0.10	5	0	96.9	45 - 125	4.478	7.86	20	
Fluorene	4.873	0.10	5	0	97.5	49 - 120	4.793	1.67	20	
Hexachlorobenzene	4.578	0.20	5	0	91.6	48 - 120	3.933	15.2	20	
Hexachlorobutadiene	4.355	0.20	5	0	87.1	40 - 120	4.305	1.16	20	
Hexachlorocyclopentadiene	4.373	0.20	5	0	87.5	34 - 136	3.96	9.91	20	
Hexachloroethane	4.091	0.20	5	0	81.8	40 - 120	4.342	5.95	20	
Indeno(1,2,3-cd)pyrene	4.837	0.10	5	0	96.7	41 - 128	5.019	3.68	20	
Isophorone	4.609	0.20	5	0	92.2	40 - 121	4.186	9.63	20	
Naphthalene	4.267	0.10	5	0	85.3	45 - 120	4.25	0.421	20	
Nitrobenzene	4.508	0.20	5	0	90.2	44 - 120	3.861	15.4	20	
N-Nitrosodimethylamine	4.011	0.20	5	0	80.2	30 - 121	4.476	11	20	
N-Nitrosodi-n-propylamine	4.539	0.20	5	0	90.8	40 - 120	4.457	1.83	20	
N-Nitrosodiphenylamine	4.468	0.20	5	0	89.4	40 - 125	4.887	8.95	20	
Pentachlorophenol	4.207	0.20	5	0	84.1	19 - 121	3.843	9.06	20	
Phenanthrene	4.751	0.10	5	0	95.0	45 - 121	4.726	0.536	20	
Phenol	4.434	0.20	5	0	88.7	20 - 124	4.214	5.09	20	
Pyrene	5.701	0.10	5	0	114	40 - 130	5.959	4.42	20	
Pyridine	3.437	1.0	5	0	68.7	15 - 120	3.883	12.2	20	
Surr: 2,4,6-Tribromophenol	*5.347*	*0.20*	*5*	*0*	*107*	*34 - 129*	*5.219*	*2.43*	*20*	
Surr: 2-Fluorobiphenyl	*5.46*	*0.20*	*5*	*0*	*109*	*40 - 125*	*4.261*	*24.7*	*20*	R
Surr: 2-Fluorophenol	*4.724*	*0.20*	*5*	*0*	*94.5*	*20 - 120*	*4.527*	*4.27*	*20*	

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145857 (0) **Instrument: SV-7** **Method: LOW-LEVEL SEMIVOLATILES BY 8270D**

LCSD Sample ID: **LCSD-145857** Units: **ug/L** Analysis Date: **02-Oct-2019 12:14**
Client ID: Run ID: **SV-7_347447** SeqNo: **5278990** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: 4-Terphenyl-d14	*5.753*	*0.20*	*5*	*0*	*115*	*40 - 135*	*5.275*	*8.68*	*20*	
Surr: Nitrobenzene-d5	*4.627*	*0.20*	*5*	*0*	*92.5*	*41 - 120*	*4.007*	*14.4*	*20*	
Surr: Phenol-d6	*5.006*	*0.20*	*5*	*0*	*100*	*20 - 120*	*4.714*	*6.01*	*20*	

The following samples were analyzed in this batch: HS19091463-01

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347514 (0) **Instrument: VOA2** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-191002** Units: **ug/L** Analysis Date: **02-Oct-2019 14:43**
Client ID: Run ID: **VOA2_347514** SeqNo: **5280446** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	< 1.0	1.0								
1,1,2,2-Tetrachloroethane	< 1.0	1.0								
1,1,2-Trichloroethane	< 1.0	1.0								
1,1-Dichloroethane	< 1.0	1.0								
1,1-Dichloroethene	< 1.0	1.0								
1,2-Dichlorobenzene	< 1.0	1.0								
1,2-Dichloroethane	< 1.0	1.0								
1,2-Dichloropropane	< 1.0	1.0								
1,3-Dichlorobenzene	< 1.0	1.0								
1,4-Dichlorobenzene	< 1.0	1.0								
2-Butanone	< 2.0	2.0								
2-Hexanone	< 2.0	2.0								
4-Methyl-2-pentanone	< 2.0	2.0								
Acetone	< 2.0	2.0								
Benzene	< 1.0	1.0								
Bromochloromethane	< 1.0	1.0								
Bromodichloromethane	< 1.0	1.0								
Bromoform	< 1.0	1.0								
Bromomethane	< 1.0	1.0								
Carbon disulfide	< 2.0	2.0								
Carbon tetrachloride	< 1.0	1.0								
Chlorobenzene	< 1.0	1.0								
Chloroethane	< 1.0	1.0								
Chloroform	< 1.0	1.0								
Chloromethane	< 1.0	1.0								
cis-1,2-Dichloroethene	< 1.0	1.0								
cis-1,3-Dichloropropene	< 1.0	1.0								
Dibromochloromethane	< 1.0	1.0								
Ethylbenzene	< 1.0	1.0								
m,p-Xylene	< 2.0	2.0								
Methylene chloride	< 2.0	2.0								
o-Xylene	< 1.0	1.0								
Styrene	< 1.0	1.0								
Tetrachloroethene	< 1.0	1.0								

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347514 (0) **Instrument: VOA2** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-191002** Units: **ug/L** Analysis Date: **02-Oct-2019 14:43**
Client ID: Run ID: **VOA2_347514** SeqNo: **5280446** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Toluene	< 1.0	1.0								
trans-1,2-Dichloroethene	< 1.0	1.0								
trans-1,3-Dichloropropene	< 1.0	1.0								
Trichloroethene	< 1.0	1.0								
Vinyl acetate	< 1.0	1.0								
Vinyl chloride	< 1.0	1.0								
Xylenes, Total	< 1.0	1.0								
1,2-Dichloroethene, Total	< 1.0	1.0								
Surr: 1,2-Dichloroethane-d4	*49.15*	*1.0*	*50*	*0*	*98.3*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*48.78*	*1.0*	*50*	*0*	*97.6*	*82 - 115*				
Surr: Dibromofluoromethane	*52.81*	*1.0*	*50*	*0*	*106*	*73 - 126*				
Surr: Toluene-d8	*50.14*	*1.0*	*50*	*0*	*100*	*81 - 120*				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347514 (0) **Instrument: VOA2** **Method: LOW LEVEL VOLATILES BY SW8260C**

LCS Sample ID: **VLCSW-191002** Units: **ug/L** Analysis Date: **02-Oct-2019 13:54**
Client ID: Run ID: **VOA2_347514** SeqNo: **5280445** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	20.04	1.0	20	0	100	70 - 130				
1,1,2,2-Tetrachloroethane	18.77	1.0	20	0	93.8	70 - 120				
1,1,2-Trichloroethane	19.11	1.0	20	0	95.5	77 - 113				
1,1-Dichloroethane	19.94	1.0	20	0	99.7	71 - 122				
1,1-Dichloroethene	20.52	1.0	20	0	103	70 - 130				
1,2-Dichlorobenzene	17.89	1.0	20	0	89.5	77 - 113				
1,2-Dichloroethane	17.88	1.0	20	0	89.4	70 - 124				
1,2-Dichloropropane	18.58	1.0	20	0	92.9	72 - 119				
1,3-Dichlorobenzene	18.51	1.0	20	0	92.5	78 - 118				
1,4-Dichlorobenzene	17.9	1.0	20	0	89.5	79 - 113				
2-Butanone	44.2	2.0	40	0	111	70 - 130				
2-Hexanone	41.93	2.0	40	0	105	70 - 130				
4-Methyl-2-pentanone	41.86	2.0	40	0	105	70 - 130				
Acetone	44.41	2.0	40	0	111	70 - 130				
Benzene	18.77	1.0	20	0	93.8	74 - 120				
Bromochloromethane	18.93	1.0	20	0	94.7	76 - 124				
Bromodichloromethane	19.03	1.0	20	0	95.2	74 - 122				
Bromoform	19.54	1.0	20	0	97.7	73 - 128				
Bromomethane	19.45	1.0	20	0	97.2	70 - 130				
Carbon disulfide	36.52	2.0	40	0	91.3	70 - 130				
Carbon tetrachloride	19.05	1.0	20	0	95.3	71 - 125				
Chlorobenzene	18.11	1.0	20	0	90.6	76 - 113				
Chloroethane	17.79	1.0	20	0	88.9	70 - 130				
Chloroform	18.55	1.0	20	0	92.7	71 - 121				
Chloromethane	17.36	1.0	20	0	86.8	70 - 129				
cis-1,2-Dichloroethene	18.92	1.0	20	0	94.6	75 - 122				
cis-1,3-Dichloropropene	19.41	1.0	20	0	97.1	73 - 127				
Dibromochloromethane	19.23	1.0	20	0	96.1	77 - 122				
Ethylbenzene	18.82	1.0	20	0	94.1	77 - 117				
m,p-Xylene	37.47	2.0	40	0	93.7	77 - 122				
Methylene chloride	19.19	2.0	20	0	96.0	70 - 127				
o-Xylene	18.68	1.0	20	0	93.4	75 - 119				
Styrene	18.45	1.0	20	0	92.2	72 - 126				
Tetrachloroethene	18.77	1.0	20	0	93.9	76 - 119				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347514 (0) **Instrument: VOA2** **Method: LOW LEVEL VOLATILES BY SW8260C**

LCS Sample ID: **VLCSW-191002** Units: **ug/L** Analysis Date: **02-Oct-2019 13:54**
Client ID: Run ID: **VOA2_347514** SeqNo: **5280445** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Toluene	18.69	1.0	20	0	93.5	77 - 118				
trans-1,2-Dichloroethene	19.73	1.0	20	0	98.7	72 - 127				
trans-1,3-Dichloropropene	20.84	1.0	20	0	104	77 - 119				
Trichloroethene	19.44	1.0	20	0	97.2	77 - 121				
Vinyl acetate	42.44	1.0	40	0	106	70 - 130				
Vinyl chloride	20	1.0	20	0	100	70 - 130				
Xylenes, Total	56.15	1.0	60	0	93.6	75 - 122				
1,2-Dichloroethene, Total	38.65	1.0	40	0	96.6	72 - 127				
Surr: 1,2-Dichloroethane-d4	*53.56*	*1.0*	*50*	*0*	*107*	*70 - 130*				
Surr: 4-Bromofluorobenzene	*49.86*	*1.0*	*50*	*0*	*99.7*	*82 - 115*				
Surr: Dibromofluoromethane	*51.42*	*1.0*	*50*	*0*	*103*	*73 - 126*				
Surr: Toluene-d8	*49.45*	*1.0*	*50*	*0*	*98.9*	*81 - 120*				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347514 (0) **Instrument: VOA2** **Method: LOW LEVEL VOLATILES BY SW8260C**

MS Sample ID: **HS19091453-03MS** Units: **ug/L** Analysis Date: **02-Oct-2019 19:39**
Client ID: Run ID: **VOA2_347514** SeqNo: **5280458** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	16.31	1.0	20	0	81.6	70 - 130				
1,1,2,2-Tetrachloroethane	14.7	1.0	20	0	73.5	70 - 123				
1,1,2-Trichloroethane	15.26	1.0	20	0	76.3	70 - 117				
1,1-Dichloroethane	15.41	1.0	20	0	77.0	70 - 127				
1,1-Dichloroethene	16.52	1.0	20	0	82.6	70 - 130				
1,2-Dichlorobenzene	14.12	1.0	20	0	70.6	70 - 115				
1,2-Dichloroethane	13.8	1.0	20	0	69.0	70 - 127				S
1,2-Dichloropropane	14.63	1.0	20	0	73.2	70 - 122				
1,3-Dichlorobenzene	14.79	1.0	20	0	73.9	70 - 119				
1,4-Dichlorobenzene	14.15	1.0	20	0	70.8	70 - 114				
2-Butanone	31.55	2.0	40	0	78.9	70 - 130				
2-Hexanone	32.06	2.0	40	0	80.1	70 - 130				
4-Methyl-2-pentanone	31.57	2.0	40	0	78.9	70 - 130				
Acetone	31.03	2.0	40	0	77.6	70 - 130				
Benzene	14.93	1.0	20	0	74.6	70 - 127				
Bromochloromethane	15.18	1.0	20	0	75.9	70 - 127				
Bromodichloromethane	14.65	1.0	20	0	73.3	70 - 124				
Bromoform	14.35	1.0	20	0	71.7	70 - 129				
Bromomethane	18.87	1.0	20	0	94.4	70 - 130				
Carbon disulfide	27.91	2.0	40	0	69.8	70 - 130				S
Carbon tetrachloride	15.47	1.0	20	0	77.4	70 - 130				
Chlorobenzene	14.25	1.0	20	0	71.3	70 - 114				
Chloroethane	17.77	1.0	20	0	88.9	70 - 130				
Chloroform	14.91	1.0	20	0	74.5	70 - 125				
Chloromethane	15.7	1.0	20	0	78.5	70 - 130				
cis-1,2-Dichloroethene	24.96	1.0	20	9.885	75.4	70 - 128				
cis-1,3-Dichloropropene	14.39	1.0	20	0	72.0	70 - 125				
Dibromochloromethane	14.33	1.0	20	0	71.7	70 - 124				
Ethylbenzene	15.45	1.0	20	0	77.3	70 - 124				
m,p-Xylene	30.38	2.0	40	0	76.0	70 - 130				
Methylene chloride	14.12	2.0	20	0	70.6	70 - 128				
o-Xylene	15.02	1.0	20	0	75.1	70 - 124				
Styrene	2.201	1.0	20	0	11.0	70 - 130				S
Tetrachloroethene	15.6	1.0	20	0	78.0	70 - 130				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347514 (0) **Instrument: VOA2** **Method: LOW LEVEL VOLATILES BY SW8260C**

MS Sample ID: **HS19091453-03MS** Units: **ug/L** Analysis Date: **02-Oct-2019 19:39**
Client ID: Run ID: **VOA2_347514** SeqNo: **5280458** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Toluene	15.26	1.0	20	0	76.3	70 - 123				
trans-1,2-Dichloroethene	15.44	1.0	20	0	77.2	70 - 130				
trans-1,3-Dichloropropene	15.53	1.0	20	0	77.7	70 - 121				
Trichloroethene	75.87	1.0	20	61.51	71.8	70 - 129				
Vinyl acetate	17.78	1.0	40	0	44.4	70 - 130				S
Vinyl chloride	19.6	1.0	20	0.4938	95.5	70 - 130				
Xylenes, Total	45.4	1.0	60	0	75.7	70 - 130				
1,2-Dichloroethene, Total	40.4	1.0	40	9.885	76.3	70 - 130				
Surr: 1,2-Dichloroethane-d4	*51.31*	*1.0*	*50*	*0*	*103*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*49.61*	*1.0*	*50*	*0*	*99.2*	*81 - 113*				
Surr: Dibromofluoromethane	*50.6*	*1.0*	*50*	*0*	*101*	*77 - 123*				
Surr: Toluene-d8	*50.14*	*1.0*	*50*	*0*	*100*	*82 - 127*				

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347514 (0) **Instrument: VOA2** **Method: LOW LEVEL VOLATILES BY SW8260C**

MSD Sample ID: **HS19091453-03MSD** Units: **ug/L** Analysis Date: **02-Oct-2019 20:03**
Client ID: Run ID: **VOA2_347514** SeqNo: **5280459** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
1,1,1-Trichloroethane	15.44	1.0	20	0	77.2	70 - 130	16.31	5.54	20	
1,1,2,2-Tetrachloroethane	14.38	1.0	20	0	71.9	70 - 123	14.7	2.17	20	
1,1,2-Trichloroethane	15.4	1.0	20	0	77.0	70 - 117	15.26	0.948	20	
1,1-Dichloroethane	14.91	1.0	20	0	74.5	70 - 127	15.41	3.3	20	
1,1-Dichloroethene	14.97	1.0	20	0	74.8	70 - 130	16.52	9.88	20	
1,2-Dichlorobenzene	13.83	1.0	20	0	69.2	70 - 115	14.12	2.04	20	S
1,2-Dichloroethane	13.29	1.0	20	0	66.4	70 - 127	13.8	3.8	20	S
1,2-Dichloropropane	13.98	1.0	20	0	69.9	70 - 122	14.63	4.54	20	S
1,3-Dichlorobenzene	14.61	1.0	20	0	73.1	70 - 119	14.79	1.17	20	
1,4-Dichlorobenzene	13.59	1.0	20	0	68.0	70 - 114	14.15	4.05	20	S
2-Butanone	30.82	2.0	40	0	77.1	70 - 130	31.55	2.35	20	
2-Hexanone	31.04	2.0	40	0	77.6	70 - 130	32.06	3.23	20	
4-Methyl-2-pentanone	30.99	2.0	40	0	77.5	70 - 130	31.57	1.85	20	
Acetone	30.04	2.0	40	0	75.1	70 - 130	31.03	3.25	20	
Benzene	14.2	1.0	20	0	71.0	70 - 127	14.93	5.01	20	
Bromochloromethane	14.19	1.0	20	0	71.0	70 - 127	15.18	6.71	20	
Bromodichloromethane	14.46	1.0	20	0	72.3	70 - 124	14.65	1.33	20	
Bromoform	13.91	1.0	20	0	69.6	70 - 129	14.35	3.08	20	S
Bromomethane	16.57	1.0	20	0	82.9	70 - 130	18.87	13	20	
Carbon disulfide	26.41	2.0	40	0	66.0	70 - 130	27.91	5.53	20	S
Carbon tetrachloride	14.8	1.0	20	0	74.0	70 - 130	15.47	4.43	20	
Chlorobenzene	13.89	1.0	20	0	69.4	70 - 114	14.25	2.59	20	S
Chloroethane	16.84	1.0	20	0	84.2	70 - 130	17.77	5.36	20	
Chloroform	14.29	1.0	20	0	71.4	70 - 125	14.91	4.24	20	
Chloromethane	15.19	1.0	20	0	76.0	70 - 130	15.7	3.25	20	
cis-1,2-Dichloroethene	23.32	1.0	20	9.885	67.2	70 - 128	24.96	6.79	20	S
cis-1,3-Dichloropropene	13.99	1.0	20	0	70.0	70 - 125	14.39	2.81	20	S
Dibromochloromethane	13.93	1.0	20	0	69.6	70 - 124	14.33	2.87	20	S
Ethylbenzene	14.47	1.0	20	0	72.3	70 - 124	15.45	6.58	20	
m,p-Xylene	28.78	2.0	40	0	71.9	70 - 130	30.38	5.44	20	
Methylene chloride	13.47	2.0	20	0	67.3	70 - 128	14.12	4.75	20	S
o-Xylene	13.91	1.0	20	0	69.5	70 - 124	15.02	7.67	20	S
Styrene	1.782	1.0	20	0	8.91	70 - 130	2.201	21.1	20	SR
Tetrachloroethene	14.7	1.0	20	0	73.5	70 - 130	15.6	5.92	20	

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347514 (0) **Instrument: VOA2** **Method: LOW LEVEL VOLATILES BY SW8260C**

MSD Sample ID: **HS19091453-03MSD** Units: **ug/L** Analysis Date: **02-Oct-2019 20:03**
Client ID: Run ID: **VOA2_347514** SeqNo: **5280459** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Toluene	14.29	1.0	20	0	71.5	70 - 123	15.26	6.57	20	
trans-1,2-Dichloroethene	15.4	1.0	20	0	77.0	70 - 130	15.44	0.261	20	
trans-1,3-Dichloropropene	14.61	1.0	20	0	73.1	70 - 121	15.53	6.09	20	
Trichloroethene	70.93	1.0	20	61.51	47.1	70 - 129	75.87	6.73	20	S
Vinyl acetate	16.69	1.0	40	0	41.7	70 - 130	17.78	6.31	20	S
Vinyl chloride	18.4	1.0	20	0.4938	89.5	70 - 130	19.6	6.29	20	
Xylenes, Total	42.69	1.0	60	0	71.1	70 - 130	45.4	6.17	20	
1,2-Dichloroethene, Total	38.72	1.0	40	9.885	72.1	70 - 130	40.4	4.25	20	
Surr: 1,2-Dichloroethane-d4	*51.93*	*1.0*	*50*	*0*	*104*	*70 - 126*	*51.31*	*1.19*	*20*	
Surr: 4-Bromofluorobenzene	*49.23*	*1.0*	*50*	*0*	*98.5*	*81 - 113*	*49.61*	*0.756*	*20*	
Surr: Dibromofluoromethane	*50.72*	*1.0*	*50*	*0*	*101*	*77 - 123*	*50.6*	*0.228*	*20*	
Surr: Toluene-d8	*49.51*	*1.0*	*50*	*0*	*99.0*	*82 - 127*	*50.14*	*1.28*	*20*	

The following samples were analyzed in this batch: HS19091463-01

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: 145873 (0) **Instrument: UV-2450** **Method: CYANIDE - SW9014**

MBLK Sample ID: **MBLK-145873** Units: **mg/L** Analysis Date: **01-Oct-2019 17:00**
Client ID: Run ID: **UV-2450_347534** SeqNo: **5280725** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	< 0.00500	0.00500								

LCS Sample ID: **LCS-145873** Units: **mg/L** Analysis Date: **01-Oct-2019 17:00**
Client ID: Run ID: **UV-2450_347534** SeqNo: **5280724** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	0.209	0.00500	0.2	0	104	80 - 120				

MS Sample ID: **HS19091389-01MS** Units: **mg/L** Analysis Date: **01-Oct-2019 17:00**
Client ID: Run ID: **UV-2450_347534** SeqNo: **5280722** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	0.195	0.00500	0.2	0.001	97.0	80 - 120				

MSD Sample ID: **HS19091389-01MSD** Units: **mg/L** Analysis Date: **01-Oct-2019 17:00**
Client ID: Run ID: **UV-2450_347534** SeqNo: **5280723** PrepDate: **01-Oct-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	0.195	0.00500	0.2	0.001	97.0	80 - 120	0.195	0	20	

The following samples were analyzed in this batch: HS19091463-01

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347391 (0) **Instrument: WetChem_HS** **Method: PH BY SW9040C**

DUP Sample ID: **HS19091285-01DUP** Units: **pH Units** Analysis Date: **01-Oct-2019 16:30**
Client ID: Run ID: **WetChem_HS_347391** SeqNo: **5277512** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	7.95	0.100					7.94	0.126	10	
Temp Deg C @pH	20.1	0					20.1	0	10	

The following samples were analyzed in this batch: HS19091463-01

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347476 (0) **Instrument: WetChem_HS** **Method: SULFIDE BY SM4500 S2-F**

MBLK Sample ID: **MBLK-R347476** Units: **mg/L** Analysis Date: **02-Oct-2019 11:00**
Client ID: Run ID: **WetChem_HS_347476** SeqNo: **5279490** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide	< 1.00	1.00								

LCS Sample ID: **LCS-R347476** Units: **mg/L** Analysis Date: **02-Oct-2019 11:00**
Client ID: Run ID: **WetChem_HS_347476** SeqNo: **5279489** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide	21.28	1.00	25	0	85.1	85 - 115				

LCSD Sample ID: **LCSD-R347476** Units: **mg/L** Analysis Date: **02-Oct-2019 11:00**
Client ID: Run ID: **WetChem_HS_347476** SeqNo: **5279488** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide	21.08	1.00	25	0	84.3	85 - 115	21.28	0.944	20	S

MS Sample ID: **HS19091210-01MS** Units: **mg/L** Analysis Date: **02-Oct-2019 11:00**
Client ID: Run ID: **WetChem_HS_347476** SeqNo: **5279491** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide	22.68	1.00	25	0.68	88.0	80 - 120				

The following samples were analyzed in this batch: HS19091463-01

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: HS19091463

QC BATCH REPORT

Batch ID: R347490 (0) **Instrument:** WetChem_HS **Method:** FLASH POINT BY PENSKY-MARTENS SW1010A

LCS Sample ID: **LCS-R347490** Units: **°F** Analysis Date: **02-Oct-2019 09:00**
Client ID: Run ID: **WetChem_HS_347490** SeqNo: **5279803** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ignitability	81.43	70.0	81	0	101	95 - 105				

DUP Sample ID: **HS19091387-01DUP** Units: **°F** Analysis Date: **02-Oct-2019 09:00**
Client ID: Run ID: **WetChem_HS_347490** SeqNo: **5279804** PrepDate: DF: **1**

Analyte	Result	PQL	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: HS19091463-01

Client: Golder Associates Inc.
Project: Houston TX-Wood Preserving Works IDWW
WorkOrder: **HS19091463**

QUALIFIERS, ACRONYMS, UNITS

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

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

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-141	31-Aug-2020
Texas	TX104704231-19-23	30-Apr-2020

Sample Receipt Checklist

Client Name: PBW
Work Order: HS19091463

Date/Time Received: **30-Sep-2019 11:26**
Received by: **PMG**

Checklist completed by: *Paresh M. Giga* eSignature — 30-Sep-2019 Date

Reviewed by: *Dane J. Wacasey* eSignature — 3-Oct-2019 Date

Matrices: **Liquid**

Carrier name: **Client**

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	1 Page(s)
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	COC IDs:210026
Samplers name present on COC?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	

Temperature(s)/Thermometer(s):	5.1c U/C	IR25
Cooler(s)/Kit(s):	44671	
Date/Time sample(s) sent to storage:	9/30/19 16:55	

Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:			

Login Notes:

Client Contacted: Date Contacted: 3-Oct-2019 Person Contacted: Bryan Luper

Contacted By: Regarding:

Comments:

Corrective Action:

Cincinnati, OH +1 513 733 5336
Everett, WA +1 425 356 2600
Fort Collins, CO +1 970 490 1511
Holland, MI +1 616 399 6070
Houston, TX +1 281 530 5656
Middletown, PA +1 717 944 5541
Spring City, PA +1 610 9[illegible]
Salt Lake City, UT +1 801 2[illegible]
South Charleston, WV [illegible]4 356 3168
[illegible]A [illegible]7 505 5280

Chain of Custody Form

Page 1 of _____

COC ID: 210026

RUSH

ALS Project Manager:	ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order	UPRR/Kevin Peterburs	Project Name	Houston TX-Wood Preserving Works	A	8260_LL_W (5632528 Volatile Organics)
Work Order		Project Number	1620-09-Rev0 SR 92688 IDWW	B	TX1005_W_Low (5643233 TPH TX1005)
Company Name	Golder Associates Inc.	Bill To Company	Union Pacific Railroad- A/P	C	8270_LOW_W (5632532 Semivolatile Organics (UP list w/py
Send Report To	Eric Matzner	Invoice Attn	Accounts Payable	D	ICP_TW (5652643 5652646 RCRA 8+4 Metals)
Address	2201 Double Creek Drive Suite 4004	Address	1400 Douglas Street Stop 0750	E	CN_TW_9014 (5652638 Cyanide - RCI)
				F	SULFD_4500S F (5652638 Sulfide - RCI)
City/State/Zip	Round Rock, TX 78664	City/State/Zip	Omaha NE 681790750	G	pH_W_9040C (5632436 pH - RCI)
Phone	(512) 671-3434	Phone		H	IGN_W (5652637 Ignitability - RCI)
Fax	(512) 671-3446	Fax		I	
e-Mail Address	Eric_Matzner@golder.com	e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	1620-IDW01-20190930	09/30/2019	0945	Liquid	1,2,4,7,8	12	X	X	X	X	X	X	X	X			
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

HS19091463

Golder Associates Inc.

Houston TX-Wood Preserving Works IDWW

Sampler(s) Please Print & Sign: Jacqueline Engel

Shipment Method: Drop off

Required Turnaround Time: (Check Box) [X] 3 [ ] STD 10 Wk Days [ ] 5 Wk Days [ ] 2 Wk Days [ ] 24 Hour

Results Due Date:

Relinquished by: Date: 9/30/2019 Time: 1124 Received by:

Relinquished by: Date: Time: Received by (Laboratory): 9/30/19 11:26

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

Notes: UPRR Houston HWPW 1620

Cooler ID	Cooler Temp.
[illegible]	[illegible]
[illegible]	[illegible]
	[illegible]

QC Package: (Check One Box Below)

- [X] Level II Std QC
- [ ] Level III Std QC/Raw Data
- [ ] Level IV SW846/CLP
- [ ] Other
- [ ] TRRP Checklist
- [ ] TRRP Level IV

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

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

ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

u4671

CUSTODY SEAL

Date: 9/30/19 Time: 1125
Name: Jacqueline Engel
Company: ALS

Seal Broken By: SM
Date: 09130119

u4671

SEP - 0 2019