



June 6, 2020

Project No. 19119232

Ms. Maureen Hatfield

MC-127

VCP-CA Section, Remediation Division

Texas Commission on Environmental Quality

P.O. Box 13087

Austin, TX 78711-3087

**RE: DNAPL RECOVERY ACTIVITIES QUARTERLY REPORT – 1ST QUARTER 2020
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), submits this 1st Quarter 2020 summary report for the dense non-aqueous phase liquid (DNAPL) recovery activities conducted at the UPRR Houston Wood Preserving Works Facility (the Site). As detailed in the Response Action Plan (RAP) dated November 24, 2014, a 24-month DNAPL recovery pilot test, consisting of manual DNAPL recovery from selected wells on a monthly basis, was conducted at the Site. Following the 24-month pilot testing period, the DNAPL recovery activities have continued monthly following the same procedures detailed in the RAP. In June 2019, the DNAPL recovery frequency was increased to bi-monthly (twice a month). The following monitoring wells are included as part of the current DNAPL recovery activities:

Well Name	Zone
MW-57A	A-TZ
MW-78A	A-TZ
MW-12B	B-TZ
MW-32B	B-CZ
MW-41B	B-TZ
MW-49B*	B-CZ
MW-57B	B-CZ
MW-68B*	B-TZ
MW-70B	B-CZ
MW-75B	B-CZ
MW-23C	C-TZ
MW-34CR	C-TZ
MW-44C	C-TZ
MW-45C	C-TZ
MW-46C	C-TZ

Golder Associates Inc.

2201 Double Creek Dr, Suite 4004, Round Rock, Texas, USA 78664

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

*Wells MW-49B and MW-68B were added to the list of recovery wells beginning in January 2020. The locations of the DNAPL recovery wells are shown on Figure 1.

The DNAPL recovery activities consist of measuring the depth to groundwater surface, the depth to groundwater/DNAPL interface, and the total depth of the well relative to the top of casing prior to DNAPL recovery. DNAPL recovery from each well is then performed using a peristaltic pump or submersible pump. On March 30, 2020, dedicated pneumatic DNAPL pumps were installed in recovery wells MW-12B and MW-41B. DNAPL is pumped from the bottom of each well until groundwater returns in the pump discharge. The volume of recovered DNAPL is estimated from each well based on the volume pumped, and the well is gauged to measure the total depth of the well and depth to residual DNAPL following pumping. Recovered DNAPL from all the wells is consolidated into a 55-gallon drum and temporarily stored at the Containment Storage Area pending disposal at the Clean Harbors Deer Park permitted facility in La Porte, Texas. The most recent waste manifest for the disposal of recovered DNAPL and groundwater is provided in Attachment 1.

A summary of the DNAPL recovery measurements from February 2013 through March 2020 is provided in Table 1. DNAPL thicknesses listed on the table and referenced in this letter are “in-well thicknesses”. A graph of DNAPL thicknesses prior to each recovery effort over time from January 2018 through March 2020 is presented on Figure 2, with a graph of the same information dating back to the beginning of DNAPL recovery activities in February 2013 through March 2020 presented on Figure 3. Observations from the 1st Quarter 2020 gauging and recovery activities are provided below for each of the groundwater bearing units (GWBUs):

- A-TZ Wells: Two monitoring wells in the A-TZ have had measurable DNAPL detected: MW-57A and MW-78A.
 - **MW-57A:** No measurable DNAPL has been detected in MW-57A since August 2015. However, a trace of DNAPL was noted at MW-57A in January 2019 through May 2019, but not enough had accumulated in the well to be measured. No DNAPL was detected during the 1st Quarter 2020.
 - **MW-78A:** DNAPL thickness in MW-78A in December 2019 had increased to approximately 5.42 feet. During the 1st Quarter 2020, the DNAPL thickness decreased to 0.45 feet in January 2020, and then fluctuated between 1.27 feet and 3.49 feet thick through the end of March 2020.
- B-TZ/B-CZ Wells: Recovery wells MW-12B and MW-41B on the west side, and MW-32B, MW-49B, MW-57B, MW-68B, MW-70B and MW-75B completed in either the B-TZ or B-CZ were evaluated for DNAPL recovery during this period.
 - **MW-12B:** Beginning in early October 2019, DNAPL thickness in MW-12B increased to a historical peak of 27.08 feet thick (November 15, 2019) after the pump used to recovery DNAPL from the well could no longer pump the NAPL, which appeared to become more viscous over time. NAPL thickness decreased to 18.08 feet thick through the end of December 2019. During the 1st Quarter of 2020, DNAPL thicknesses in MW-12B have ranged from 19.08 feet (January 15, 2020) to 25.78 feet in February 2020. Recovery activities resumed at the end of March 2020 with the installation of the new NAPL recovery pump.

- **MW-41B:** From December 2019 through March 2020, DNAPL thickness has ranged from 1.31 feet thick to approximately 5.38 feet in MW-41B. In March 2020, DNAPL was measured to be 2.69 feet thick in MW-41B. Based on recent field observations, the DNAPL appeared to be more viscous similar to observations at MW-12B.

Beginning in October 2019, the DNAPL found in MW-12B and MW-41B was becoming too thick for the submersible pump to recover the DNAPL. Two stainless steel pneumatic pulse pumps (gas displacement pumps) from QED Environmental Systems (model LP1301) were installed in MW-12B and MW-41B on March 30, 2020. These pumps are better designed for recovering the more viscous liquids. Right after installation, six gallons of DNAPL from MW-12B and 2 gallons from MW-41B were recovered using the new pneumatic pumps.

- **MW-32B:** DNAPL thicknesses were less than one-foot thick (fluctuated between 0.7 and 0.89 feet thick) in MW-32B between November and mid-December 2019. During the 1st Quarter 2020, DNAPL thicknesses increased to levels fluctuating between 3.1 feet and 5.35 feet from January 2020 to late-March 2020. DNAPL thicknesses have decreased from February 25 (5.35 feet) through March 31 (3.1 feet). These DNAPL measurements are the thickest measured in the well since the beginning of DNAPL recovery efforts in February 2013.
- **MW-57B:** Since June 2016, no measurable DNAPL has been detected in MW-57B. A trace amount of DNAPL was noted in MW-57B in January 2019 through May 2019, but no DNAPL has been detected since May 2019.
- **MW-70B:** From April through October 2019, DNAPL thicknesses were increasing in MW-70B from 0.38 feet to 1.94 feet. At the end of the 4th Quarter 2019, DNAPL was detected at a thickness of 0.65 feet on December 18, 2019. During the 1st Quarter 2020, DNAPL thicknesses have increased to levels fluctuating between 3.14 feet and 5.15 feet thick, which are some of the thickest measurements observed in the well.
- **MW-75B:** DNAPL thicknesses during the 1st Quarter 2020 were measured greater than 2 feet in MW-75B in late-January, mid-February, and mid-March of 2020. However, in late-February and late-March, no DNAPL was observed in MW-75B.
- **MW-49B and MW-68B:** During site-wide groundwater monitoring and gauging activities in January 2020, measurable DNAPL was noted in wells MW-49B and MW-68B. These wells were added to the bi-weekly DNAPL recovery program.
 - **MW-49B:** DNAPL had been previously measured in MW-49B in January and July 2013 (1.19 feet and 0.84 feet, respectively) and in July 2019 (0.24 feet). During the January 2020 semi-annual monitoring event, the measured apparent thickness of DNAPL in MW-49B was approximately 14.77 feet. Well MW-49B was added to the DNAPL recovery well network and recovery efforts began in mid-January 2020. DNAPL thickness decreased to 5.47 feet thick by the end of the quarter as a result of the bi-weekly recovery efforts. Approximately 8 gallons of DNAPL were

recovered from MW-49B during the first quarter of 2020.

- **MW-68B:** DNAPL was measured in MW-68B at approximately 3.59 feet thick in January 2020. DNAPL had not been detected in the well since installation in 2011; however, the boring log for the well indicated that NAPL was noted in the soil core from 34.5 to 35 feet below ground surface. Following bi-weekly recovery events from this well, the DNAPL thickness decreased to 0.9 feet thick by the end of March 2020. Approximately 1.9 gallons of DNAPL from MW-68B were recovered during the first quarter of 2020.
- **C-TZ Wells:** Wells MW-23C, MW-34CR, MW-44C, MW-45C, and MW-46C completed in the C-TZ were evaluated for DNAPL recovery.
 - **MW-23C:** In December 2019, DNAPL thicknesses in MW-23C was approximately 2.68 feet thick. DNAPL thickness decreased approximately 1 foot to 1.7 feet thick by the end of December 2019. During the 1st Quarter 2020, DNAPL thickness in MW-23C increased to 2.3 feet thick by late-February but decreased to 0.68 feet thick by the end of March.
 - **MW-34CR:** In May 2014, replacement well MW-34CR was installed and gauged as part of the recovery program. However, no DNAPL has been detected in this well. The well pad was damaged in April 2019. In March 2020, MW-34CR well pad was repaired and no DNAPL was observed during the late-March gauging event.
 - **MW-44C:** No measurable DNAPL has been detected in MW-44C since June 2019 (trace DNAPL noted in mid-June 2019).
 - **MW-45C:** DNAPL has not been detected in MW-45C since August 2015.
 - **MW-46C:** Similar to well MW-44C, no measurable DNAPL has been observed in MW-46C since June 2019 (trace DNAPL noted in mid-June 2019).
- **DNAPL Recovery:** From February 2013 to March 2020, an estimated 732 gallons of creosote DNAPL have been recovered from the wells. Monthly DNAPL recovery volumes increased after the January 2015 event due to a change in pumping techniques. During the 1st Quarter 2020, recovery has ranged from approximately 2.25 to 9.4 gallons per month (Table 1). With dedicated DNAPL pumps installed in wells MW-12B and MW-41B during the first quarter of 2020, increases in DNAPL recovery are anticipated.

UPRR will continue to monitor the DNAPL thicknesses twice per month as discussed in the response to the TCEQ 4th Technical Notice of Deficiency (TNOD) letter (April 11, 2019).

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.



Michelle Hermiston, P.G.
Project Hydrogeologist



Eric Matzner, P.G.
Principal / Practice Leader



Texas Geoscience Firm No. 50369

CC: Waste Program Manager, TCEQ Region 12, Houston
 Mr. Kevin Peterburs, UPRR – Milwaukee, WI

Attachments: Table 1 - Summary of DNAPL Recovery Measurements
Figure 1 – In-Well DNAPL Thickness – March 2020
Figure 2 - DNAPL Recovery Activities January 2018 – March 2020
Figure 3 - DNAPL Recovery Activities February 2013 – March 2020
Attachment 1 – Recovered DNAPL Waste Manifest

TABLES

TABLE 1

**SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS**

DNAPL Recovery Date	MW-12B				MW-23C				MW-32B			
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
2/14/2013	9.06	39.87	5.93	2.5	NM	NM	NM	0	6.01	30.06	6.23	2
4/3/2013	9.41	39.95	5.85	1	NM	NM	NM	0	4.86	33.61	2.68	1
4/22/2013	8.61	31.64	14.16	0.5*	NM	NM	NM	0	5.62	36.08	0.21	0.25
5/30/2013	8.47	37.62	8.18	1.5*	NM	NM	NM	0	5.86	32.21	4.08	2
6/29/2013	9.62	38.22	7.58	1.5	NM	NM	NM	0	6.79	33.59	2.7	1.5
7/22/2013	11.16	39.04	6.76	1	NM	NM	NM	0	7.14	33.91	2.38	1.5
8/26/2013	11.31	39.61	6.19	1	NM	NM	NM	0	7.48	33.83	2.46	1
9/27/2013	11.17	40.63	5.17	1	NM	NM	NM	0	7.23	34.39	1.9	1
10/31/2013	11.09	43.71	2.09	1	NM	NM	NM	0	7.16	34.96	1.33	0.53
11/27/2013	11.17	44.06	1.74	1	NM	NM	NM	0	7.29	35.03	1.26	0.53
12/31/2013	11.02	44.62	1.18	1	NM	NM	NM	0	7.16	35.16	1.13	0.5
1/30/2014	11.34	45.12	0.68	1	NM	NM	NM	0	6.72	34.82	1.47	0.53
3/3/2014	11.17	44.32	1.48	1	NM	NM	NM	0	6.53	34.52	1.77	0.53
3/31/2014	11.03	44.53	1.27	1	NM	NM	NM	0	6.29	34.21	2.08	0.53
4/30/2014	10.92	44.26	1.54	1	NM	NM	NM	0	6.42	34.67	1.62	0.53
5/27/2014	10.81	44.34	1.46	1	NM	NM	NM	0	6.36	34.72	1.57	0.53
6/26/2014	10.72	44.61	1.19	1	NM	NM	NM	0	6.21	34.61	1.68	0.53
7/31/2014	10.13	44.96	0.84	1	NM	NM	NM	0	6.06	34.33	1.96	0.25
8/27/2014	10.26	45.12	0.68	1	NM	NM	NM	0	6.18	34.98	1.31	0.25
10/3/2014	10.17	44.91	0.89	1	NM	NM	NM	0	6.06	34.72	1.57	0.25
11/3/2014	10.29	44.97	0.83	1	22.51	70.71	2.09	0.25	6.18	34.91	1.38	0.25
11/24/2014	10.27	44.99	0.81	1	22.56	70.92	1.88	0.5	6.21	35.16	1.13	0.5
12/22/2014	10.23	44.71	1.09	1	22.47	70.81	1.99	0.5	6.14	35.02	1.27	0.75
1/29/2015	10.16	44.96	0.84	1	22.26	71.04	1.76	0.5	5.71	35.29	1	0.75
2/26/2015	10.12	44.96	0.84	1.5	22.06	71.09	1.71	0.5	6.02	35.29	1	1
3/26/2015	9.96	45.21	0.59	1.5	22.17	71.12	1.68	0.25	5.46	35.36	0.93	1
4/27/2015	9.89	45.37	0.43	1.5	22.23	71.06	1.74	0.5	5.21	35.29	1	1
5/26/2015	9.72	45.61	0.19	2	22.17	71.14	1.66	0.5	5.07	35.46	0.83	1
7/6/2015	7.12	45.96	0.24	2	19.01	71.39	1.41	0.5	4.06	35.66	0.63	1
8/3/2015	7.26	46.09	0.11	2	19.16	71.46	1.34	0.75	4.29	35.71	0.58	1
8/27/2015	8.09	46.01	0.19	1	20.34	71.51	1.29	0.75	5.05	35.77	0.52	1
10/5/2015	7.12	45.86	0.34	1	19.02	71.57	1.23	0.5	4.31	35.96	0.33	1
11/5/2015	6.86	45.81	0.39	1	18.59	71.59	1.21	0.5	4.02	35.91	0.38	1
12/3/2015	6.46	45.79	0.41	1	18.33	71.67	1.13	0.5	3.92	35.96	0.33	1
12/28/2015	6.23	45.62	0.58	1.25	23.21	71.61	1.19	0.75	3.73	35.91	0.38	1
2/3/2016	6.04	45.55	0.65	1.5	17.96	71.64	1.16	0.5	3.61	35.87	0.42	1
3/3/2016	5.96	45.61	0.59	1.5	17.92	71.71	1.09	0.5	3.51	35.91	0.38	1
3/31/2016	6.06	45.72	0.48	1.5	17.86	71.79	1.01	0.5	3.56	35.92	0.37	1
5/3/2016	6.13	45.66	0.54	1	NM	NM	NM	0	3.67	35.87	0.53	0.5
6/2/2016	6.21	45.61	0.59	1	22.9	71.51	1.29	0.5	3.74	35.92	0.48	0.5
7/8/2016	6.29	45.72	0.48	1	23.09	71.52	1.28	0.25	3.91	35.96	0.44	0.5
8/3/2016	6.34	45.77	0.43	1	23.16	71.66	1.14	0.25	4.03	35.49	0.91	0.5
8/30/2016	6.47	45.69	0.51	1	23.31	71.61	1.19	0.5	4.22	36.09	0.31	0.5
9/30/2016	6.59	45.81	0.39	1	23.39	71.81	0.99	0.5	4.33	35.91	0.49	0.5
11/3/2016	6.64	45.92	0.28	1	23.41	71.98	0.82	0.5	4.47	35.99	0.41	0.5
11/30/2016	6.86	45.86	0.34	0.5	23.59	71.91	0.89	0.75	4.62	35.91	0.49	0.5
1/4/2017	7.02	45.81	0.39	0.5	23.74	71.82	0.98	0.75	4.83	36.02	0.38	0.25
2/7/2017	6.97	45.69	0.51	0.5	23.67	71.74	1.06	0.75	4.81	35.91	0.49	0.25
3/2/2017	6.91	45.64	0.56	0.5	23.54	76.82	0.98	0.75	4.66	35.97	0.43	0.25
4/3/2017	6.82	45.71	0.49	0.5	23.46	76.96	0.84	0.75	4.57	36.01	0.39	0.25
4/27/2017	6.74	45.64	0.56	0.5	23.21	77.04	0.76	0.5	4.51	36.06	0.34	0.25
5/29/2017	6.89	45.77	0.43	0.5	23.49	77.21	0.59	0.25	4.74	36.03	0.37	0.25
7/5/2017	7.01	45.71	0.49	0.5	23.61	77.27	0.53	0.25	4.86	36.13	0.27	0.25
8/1/2017	7.14	45.63	0.57	0.75	23.79	77.17	0.63	0.25	4.99	36.24	0.16	0.25
9/5/2017	7.03	45.6	0.6	1	23.67	77.29	0.51	0.25	4.78	36.24	0.16	0.25
10/4/2017	7.07	45.69	0.51	1	23.61	77.36	0.44	0.25	4.89	36.29	0.11	0.25
11/2/2017	7.11	45.76	0.44	1	23.74	77.42	0.38	0.25	4.96	36.26	0.14	0.25
11/29/2017	7.16	45.71	0.49	1	23.81	77.4	0.40	0.25	5.06	36.31	0.09	0.25
1/2/2018	6.96	45.82	0.38	1	23.67	77.43	0.37	0.25	4.93	36.27	0.13	0.25
2/7/2018	7.13	45.87	0.33	1	23.86	77.46	0.34	0.25	5.16	36.21	0.19	0.25
3/1/2018	7.36	45.96	0.24	1	23.96	77.41	0.39	0.25	5.38	36.13	0.27	0.25

TABLE 1

**SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS**

DNAPL Recovery Date	MW-12B				MW-23C				MW-32B			
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
4/2/2018	7.29	45.94	0.26	1	23.9	77.32	0.48	0.5	5.31	36.18	0.22	0.25
5/1/2018	8.17	45.91	0.29	1	24.47	77.39	0.41	0.5	6.12	36.23	0.17	0.5
6/1/2018	8.49	45.86	0.34	1	24.81	77.31	0.49	0.5	6.41	36.19	0.21	0.5
6/29/2018	8.62	45.81	0.39	1	24.99	77.37	0.43	0.5	6.59	36.11	0.29	0.75
8/3/2018	8.79	45.96	0.24	1	25.12	77.39	0.41	0.5	6.74	36.19	0.21	0.75
8/31/2018	8.32	46.01	0.19	0.75	24.81	77.43	0.37	0.5	6.47	36.23	0.17	0.75
9/28/2018	8.27	45.93	0.27	0.5	24.69	77.39	0.41	0.5	6.41	36.19	0.21	0.75
11/2/2018	8.16	45.91	0.29	0.5	24.57	77.36	0.44	0.5	6.33	36.21	0.19	0.5
11/29/2018	8.01	45.9	0.30	0.5	24.36	77.3	0.50	0.5	6.21	36.27	0.13	0.25
1/2/2019	7.96	45.87	0.33	0.5	24.29	77.31	0.49	0.5	6.09	36.29	0.11	0.25
2/2/2019	7.82	45.89	0.31	0.5	24.21	77.44	0.36	0.5	5.97	36.24	0.16	0.5
2/28/2019	7.69	45.81	0.39	0.5	24.16	77.36	0.44	0.5	5.86	36.21	0.19	0.25
4/2/2019	7.61	45.8	0.4	0.5	24.08	77.32	0.48	0.5	5.79	36.24	0.16	0.25
4/25/2019	7.49	45.76	0.44	1	24.01	77.16	0.64	0.5	5.86	36.29	0.11	0.25
5/29/2019	7.51	45.71	0.49	1	24.11	77.11	0.69	0.5	5.91	36.21	0.19	0.25
6/12/2019	6.81	45.52	0.68	1.5	24.39	76.71	1.09	1	5.46	35.91	0.49	0.5
6/30/2019	6.67	45.06	1.14	2	24.32	76.67	1.13	0.75	5.39	35.42	0.98	1
7/16/2019	6.62	45.11	1.09	2	24.26	76.61	1.19	1	5.32	35.36	1.04	1
8/2/2019	6.69	45.01	1.19	1.5	24.31	76.49	1.31	1.5	5.41	35.26	1.14	1.5
8/15/2019	6.79	44.76	1.44	2	24.22	76.36	1.44	1.5	5.61	35.19	1.21	1.5
8/28/2019	6.88	44.71	1.49	2	24.29	76.41	1.39	1.5	5.72	35.22	1.18	1.5
9/17/2019	6.93	43.96	2.24	3	24.36	76.29	1.51	1.5	5.81	35.17	1.23	1.5
10/2/2019	6.86	43.17	3.03	0	24.32	76.09	1.71	1.5	5.77	35.02	1.38	1.5
10/16/2019	6.71	30.29	15.91	0	25.75	75.89	1.91	1.5	4.36	33.42	2.98	1.5
10/31/2019	6.53	21.63	24.57	0	26.33	75.29	2.51	1.5	3.43	31.86	4.54	1.5
11/15/2019	7.21	19.12	27.08	0.5	25.69	ND	0	0	3.47	35.7	0.7	1
12/3/2019	7.55	27.37	18.83	0	26.11	75.12	2.68	1.5	4.33	35.51	0.89	0
12/18/2019	12.68	35.9	10.3	0	26.13	77.4	0.4	0.25	4.71	35.61	0.79	1.5
12/30/2019	8.08	28.12	18.08	0	26.48	76.1	1.7	0.13	5.04	34.28	2.12	1.5
1/7/2020	--	--	--	--	--	--	--	--	--	--	--	--
1/15/2020	7.47	27.12	19.08	0	26.49	77.1	0.7	0.00	4.1	35.4	1	1
1/27/2020	6.28	21.06	25.14	0	25.99	76.58	1.22	0.0	3.01	31.15	5.25	1
2/13/2020	6.91	20.42	25.78	0	25.51	76.42	1.38	0.0	3.88	31.39	5.01	1
2/25/2020	6.4	23.6	22.6	0	25.6	75.5	2.3	0.0625	3.9	31.05	5.35	0.75
3/13/2020	7.61	22.01	24.19	0	25.66	77.08	0.72	0.0	4.32	32.46	3.94	1.25
3/31/2020	7.88	22.01**	24.19	6	25.9	77.12	0.68	0.0	4.63	33.3	3.1	0.25
Total DNAPL Pumped (gal)	96.8				41.2				68.7			

Notes:

* - indicates DNAPL and groundwater mixture

** - indicates DTD from previous event was used

--- - No DNAPL pumped

DTW - Depth to water (feet Below Top of Casing (BTOC))

DTD - Depth to DNAPL (feet BTOC)

MW-12B- TD measured at 46.2 instead of 45.8, August 28, 2015.

MW-23C- added 5 feet to TOC due to capping after 2/3/2016

ND - Not detected

NM - Not measured

PoP - Product on probe, not measureable

TR- Trace amount of DNAPL Extracted

TABLE 1

**SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS**

DNAPL Recovery Date	MW-33BR				MW-34C/MW-34CR (July 2014)				MW-41B			
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
2/14/2013	3.72	ND	0	0	NM	NM	NM	0	8.91	41.1	3.71	3
4/3/2013	4.02	PoP	0	0	NM	NM	NM	0	9.37	41.6	3.21	1.5
4/22/2013	3.63	ND	0	0	NM	NM	NM	0	8.62	41.6	3.21	0.5*
5/30/2013	3.59	ND	0	0	NM	NM	NM	0	8.73	34.16	10.65	2
6/29/2013	6.07	ND	0	0	NM	NM	NM	0	9.72	37.12	7.69	2
7/22/2013	9.68	ND	0	0	NM	NM	NM	0	10.31	39.29	5.52	1.5
8/26/2013	9.86	ND	0	0	NM	NM	NM	0	10.09	34.55	10.26	2.5
9/27/2013	9.57	ND	0	0	NM	NM	NM	0	9.63	37.29	7.52	2
10/31/2013	9.32	ND	0	0	21.63	NM	NM	0	9.52	38.16	6.65	2
11/27/2013	9.16	ND	0	0	NM	NM	NM	0	9.57	38.39	6.42	2
12/31/2013	8.97	ND	0	0	NM	NM	NM	0	9.42	39.36	5.45	2
1/30/2014	7.41	ND	0	0	NM	NM	NM	0	9.06	39.17	5.64	2
3/3/2014	7.16	ND	0	0	NM	NM	NM	0	8.62	38.06	6.75	2
3/31/2014	7.04	ND	0	0	NM	NM	NM	0	8.52	37.74	7.07	2
4/30/2014	6.88	ND	0	0	NM	NM	NM	0	8.36	37.21	7.6	2
5/27/2014	6.72	ND	0	0	NM	NM	NM	0	8.26	37.29	7.52	2
6/26/2014	6.52	ND	0	0	NM	NM	NM	0	8.02	37.47	7.34	2
7/31/2014	6.29	ND	0	0	19.06	ND	0	0	8.21	37.92	6.89	2
8/27/2014	6.47	ND	0	0	18.96	ND	0	0	8.07	38.29	6.52	1.5
10/3/2014	6.32	ND	0	0	18.81	ND	0	0	8.02	38.13	6.68	2
11/3/2014	NM	NM	NM	0	19.06	ND	0	0	8.22	38.29	6.52	2
11/24/2014	NM	NM	NM	0	19.11	ND	0	0	8.27	38.47	6.34	2
12/22/2014	NM	NM	NM	0	19.06	ND	0	0	8.16	38.39	6.42	2
1/29/2015	NM	NM	NM	0	18.79	ND	0	0	8.02	39.16	5.65	1.5
2/26/2015	NM	NM	NM	0	18.71	ND	0	0	7.92	39.06	5.75	2.5
3/26/2015	NM	NM	NM	0	18..67	ND	0	0	7.83	38.74	6.07	2.5
4/27/2015	NM	NM	NM	0	18.79	ND	0	0	8.02	38.61	6.2	3
5/26/2015	NM	NM	NM	0	18.63	ND	0	0	7.91	38.72	6.09	3
7/6/2015	NM	NM	NM	0	17.29	ND	0	0	6.03	38.96	5.85	2.5
8/3/2015	NM	NM	NM	0	17.21	ND	0	0	6.09	39.01	5.8	2.5
8/27/2015	NM	NM	NM	0	18.46	ND	0	0	7.39	39.14	5.67	2
10/5/2015	NM	NM	NM	0	17.29	ND	0	0	6.32	39.34	5.47	2
11/5/2015	NM	NM	NM	0	16.78	ND	0	0	6.01	39.51	5.3	2
12/3/2015	NM	NM	NM	0	16.44	ND	0	0	5.76	39.56	5.25	2
12/28/2015	NM	NM	NM	0	16.16	ND	0	0	5.62	39.63	5.18	2.25
2/3/2016	NM	NM	NM	0	15.98	ND	0	0	5.32	39.72	5.09	3
3/3/2016	NM	NM	NM	0	15.98	ND	0	0	5.17	39.81	5	3
3/31/2016	NM	NM	NM	0	15.98	ND	0	0	5.26	39.77	5.04	3
5/3/2016	NM	NM	NM	0	15.79	ND	0	0	5.52	39.96	4.85	3
6/2/2016	NM	NM	NM	0	15.97	ND	0	0	5.67	40.07	4.74	3
7/8/2016	NM	NM	NM	0	16.06	ND	0	0	5.72	40.01	4.8	3
8/3/2016	NM	NM	NM	0	16.17	ND	0	0	5.79	40.09	4.72	3
8/30/2016	NM	NM	NM	0	16.31	ND	0	0	5.91	40.26	4.55	3
9/30/2016	NM	NM	NM	0	16.42	ND	0	0	6.06	40.13	4.68	3
11/3/2016	NM	NM	NM	0	16.51	ND	0	0	6.11	40.29	4.52	3
11/30/2016	NM	NM	NM	0	16.72	ND	0	0	6.26	40.42	4.39	3
1/4/2017	NM	NM	NM	0	16.94	ND	0	0	6.39	40.56	4.25	3
2/7/2017	NM	NM	NM	0	16.91	ND	0	0	6.44	40.51	4.3	3
3/2/2017	NM	NM	NM	0	16.78	ND	0	0	6.29	40.76	4.05	3
4/3/2017	NM	NM	NM	0	16.71	ND	0	0	6.21	40.67	4.14	2.5
4/27/2017	NM	NM	NM	0	16.61	ND	0	0	6.19	40.87	3.94	3
5/29/2017	NM	NM	NM	0	16.84	ND	0	0	6.14	40.29	4.52	3
7/5/2017	NM	NM	NM	0	17.01	ND	0	0	6.34	40.57	4.24	2.5
8/1/2017	NM	NM	NM	0	17.17	ND	0	0	6.42	40.79	4.02	3
9/5/2017	NM	NM	NM	0	17.11	ND	0	0	6.36	40.68	4.13	3
10/4/2017	NM	NM	NM	0	17.06	ND	0	0	6.29	40.69	4.12	2.5
11/2/2017	NM	NM	NM	0	17.17	ND	0	0	6.41	40.73	4.08	3
11/29/2017	NM	NM	NM	0	17.29	ND	0	0	6.52	40.82	3.99	2.5
1/2/2018	NM	NM	NM	0	17.52	ND	0	0	6.72	40.72	4.09	2.5
2/7/2018	NM	NM	NM	0	18.11	ND	0	0	6.97	40.79	4.02	2.5
3/1/2018	NM	NM	NM	0	18.38	ND	0	0	7.16	40.63	4.18	2

TABLE 1
SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS

DNAPL Recovery Date	MW-33BR				MW-34C/MW-34CR (July 2014)				MW-41B			
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
4/2/2018	NM	NM	NM	0	18.29	ND	0	0	7.13	40.71	4.1	2
5/1/2018	NM	NM	NM	0	18.33	ND	0	0	8.26	40.76	4.05	2
6/1/2018	NM	NM	NM	0	18.62	ND	0	0	8.71	40.81	4	2.25
6/29/2018	NM	NM	NM	0	18.91	ND	0	0	9.02	40.71	4.1	2.5
8/3/2018	NM	NM	NM	0	19.06	ND	0	0	9.13	40.76	4.05	2.5
8/31/2018	NM	NM	NM	0	18.77	ND	0	0	8.89	40.86	3.95	2
9/28/2018	NM	NM	NM	0	18.64	ND	0	0	8.77	40.76	4.05	2
11/2/2018	NM	NM	NM	0	18.57	ND	0	0	8.61	40.71	4.1	2
11/29/2018	NM	NM	NM	0	18.39	ND	0	0	8.41	40.81	4	2
1/2/2019	NM	NM	NM	0	18.26	ND	0	0	8.22	40.83	3.98	2
2/2/2019	NM	NM	NM	0	18.19	ND	0	0	8.16	40.89	3.92	2
2/28/2019	NM	NM	NM	0	18.02	ND	0	0	8.03	40.76	4.05	3
4/2/2019	NM	NM	NM	0	17.96	ND	0	0	7.93	40.69	4.12	3
4/25/2019	NM	NM	NM	0	Well Damaged				7.76	40.28	4.53	3
5/29/2019	NM	NM	NM	0	Well Damaged				7.71	40.07	4.74	3
6/12/2019	NM	NM	NM	0	Well Damaged				7.52	39.63	5.18	3
6/30/2019	NM	NM	NM	0	Well Damaged				7.46	39.52	5.29	3
7/16/2019	NM	NM	NM	0	Well Damaged				7.39	39.46	5.35	3
8/2/2019	NM	NM	NM	0	Well Damaged				7.46	39.42	5.39	0
8/15/2019	NM	NM	NM	0	Well Damaged				7.51	39.31	5.5	3
8/28/2019	NM	NM	NM	0	Well Damaged				7.57	39.21	5.6	3
9/17/2019	NM	NM	NM	0	Well Damaged				7.66	39.02	5.79	3
10/2/2019	NM	NM	NM	0	Well Damaged				7.61	38.76	6.05	3
10/16/2019	NM	NM	NM	0	Well Damaged				5.21	38.67	6.14	3
10/31/2019	NM	NM	NM	0	Well Damaged				5.21	38.67	6.14	3
11/15/2019	NM	NM	NM	0	Well Damaged				4.81	38.12	6.69	2
12/3/2019	NM	NM	NM	0	Well Damaged				6.46	39.27	5.54	3
12/18/2019	NM	NM	NM	0	Well Damaged				6.51	41.7	3.11	0
12/30/2019	NM	NM	NM	0	Well Damaged				6.99	43.5	1.31	0
1/7/2020	--	--	--	--	--	--	--	--	--	--	--	--
1/15/2020	NM	NM	NM	0	Well Damaged				5.12	38.99	5.82	0
1/27/2020	NM	NM	NM	0	Well Damaged				3.41	40.7	4.11	0
2/13/2020	NM	NM	NM	0	Well Damaged				5.1	40.12	4.69	0
2/25/2020	NM	NM	NM	0	Well Damaged				4.5	41.12	3.69	0
3/13/2020	NM	NM	NM	0	Well Damaged				6.06	42.12	2.69	0
3/31/2020	NM	NM	NM	0	17.49	ND	0	0	6.82	42.12**	2.69	2
Total DNAPL Pumped (gal)	0				0				215.5			

Notes:

* - indicates DNAPL and groundwater mixture

** - indicates DTD from previous event was used

--- - No DNAPL pumped

DTW - Depth to water (feet Below Top of Casing (BTOC))

DTD - Depth to DNAPL (feet BTOC)

ND - Not detected

NM - Not measured

PoP - Product on probe, not measureable

TR- Trace amount of DNAPL Extracted

TABLE 1

**SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS**

DNAPL Recovery Date	MW-44C				MW-45C				MW-46C			
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
2/14/2013	18.96	62.95	7.85	1	21.26	69.9	0.7	0.25	21.07	71.3	1.6	0.25
4/3/2013	19.34	70.47	0.33	0.25*	21.39	70.39	0.21	0.25*	20.61	72.36	0.54	0.25*
4/22/2013	18.62	70.64	0.16	0.25*	21.03	70.47	0.13	0.25*	20.61	72.61	0.29	0.25*
5/30/2013	18.43	70.01	0.79	0.25*	21.16	70.25	0.35	0.25*	20.59	71.61	1.29	0.25*
6/29/2013	19.34	70.32	0.48	0.25	21.93	70.32	0.28	0.25*	21.09	72.34	0.56	0.25*
7/22/2013	20.36	70.26	0.54	0.25	22.72	70.39	0.21	0.25*	21.96	72.16	0.74	0.25*
8/26/2013	20.62	70.39	0.41	0.25	22.86	70.31	0.29	0.25	22.23	72.32	0.58	0.25
9/27/2013	20.39	70.61	0.19	0.25	22.66	70.17	0.43	0.25	22.09	72.09	0.81	0.25
10/31/2013	20.17	70.75	0.05	0.07	22.59	70.42	0.18	0.13	22.41	72.34	0.56	0.2
11/27/2013	20.09	70.78	0.02	0.00	22.52	70.49	0.11	0	22.31	72.47	0.43	0.07
12/31/2013	20.01	70.8	PoP	0.00	22.39	70.46	0.14	0	22.03	72.53	0.37	0.07
1/30/2014	19.67	70.42	0.38	0.25	22.13	70.35	0.25	0	21.81	72.55	0.35	0.07
3/3/2014	19.29	70.17	0.63	0.25	21.86	70.09	0.51	0	21.57	72.05	0.85	0.25
3/31/2014	19.17	70.02	0.78	0.25	21.71	69.63	0.97	0.25	21.43	72.12	0.78	0.13
4/30/2014	19.02	69.81	0.99	0.25	21.59	69.74	0.86	0.25	21.27	71.81	1.09	0.25
5/27/2014	18.92	69.71	1.09	0.00	21.52	69.67	0.93	0.25	21.34	71.71	1.19	0.25
6/26/2014	18.81	69.52	1.28	0.25	21.59	69.77	0.83	0.25	21.17	71.6	1.3	0.25
7/31/2014	18.66	69.37	1.43	0.25	21.21	69.96	0.64	0.25	20.39	71.43	1.47	0.25
8/27/2014	18.53	69.47	1.33	0.25	21.13	70.12	0.48	0.25	20.22	71.61	1.29	0.25
10/3/2014	18.41	69.23	1.57	0.25	20.13	70.41	0.19	0.25	20.14	71.39	1.51	0.25
11/3/2014	18.52	69.37	1.43	0.25	20.29	70.36	0.24	0.25	20.27	71.47	1.43	0.25
11/24/2014	18.57	69.49	1.31	0.5	20.34	70.48	0.12	0.25	20.38	71.53	1.37	0.5
12/22/2014	18.51	69.31	1.49	0.5	20.31	70.41	0.19	0.25	20.37	71.42	1.48	0.5
1/29/2015	18.39	69.39	1.41	0.5	20.17	70.51	0.09	0.25	20.13	71.48	1.42	0.5
2/26/2015	18.42	69.51	1.29	0.5	20.11	70.59	0.01	0	20.09	71.38	1.52	0.5
3/26/2015	18.39	69.42	1.38	0.25	19.26	70.52	0.08	0	20.17	71.02	1.88	0.25
4/27/2015	18.29	69.52	1.28	0.5	20.17	70.48	0.12	0.25	20.22	71.56	1.34	1
5/26/2015	18.17	69.57	1.23	0.75	20.12	70.41	0.19	0.25	20.12	71.61	1.29	1
7/6/2015	16.29	69.86	0.94	0.5	18.07	70.49	0.11	0.25	18.17	71.93	0.97	0.75
8/3/2015	16.18	69.82	0.98	0.5	18.16	70.56	0.04	TR*	18.24	71.98	0.92	0.75
8/27/2015	17.46	69.74	1.06	0.25	19.03	70.54	0.06	TR*	19.39	72.03	0.87	0.5
10/5/2015	16.83	69.86	0.94	0.25	18.39	ND	0	0	18.72	72.34	0.56	0.5
11/5/2015	16.62	69.79	1.01	0.25	17.96	ND	0	0	18.51	72.26	0.64	0.5
12/3/2015	16.46	69.73	1.07	0.25	17.72	ND	0	0	18.62	72.36	0.54	0.5
12/28/2015	16.32	69.77	1.03	0.25	17.62	ND	0	0	18.42	72.31	0.59	0.5
2/3/2016	16.17	69.74	1.06	0.25	17.42	ND	0	0	18.29	72.46	0.44	0.25
3/3/2016	16.12	69.79	1.01	0.25	17.39	ND	0	0	18.23	72.49	0.41	0.25
3/31/2016	16.06	69.71	1.09	0.25	17.33	ND	0	0	18.24	72.54	0.36	0.25
5/3/2016	16.27	69.59	1.21	0.25	17.47	ND	0	0	18.39	72.39	0.51	0.25
6/2/2016	16.38	69.63	1.17	0.25	17.52	ND	0	0	18.43	72.43	0.47	0.25
7/8/2016	16.47	69.71	1.09	0.25	17.62	ND	0	0	18.54	72.49	0.41	0.25
8/3/2016	16.59	69.7	1.1	0.25	17.69	ND	0	0	18.51	72.53	0.37	0.25
8/30/2016	16.67	69.58	1.22	0.25	17.76	ND	0	0	18.72	72.57	0.33	0.25
9/30/2016	16.79	69.49	1.31	0.5	17.86	ND	0	0	18.83	72.46	0.44	0.25
11/3/2016	16.86	69.71	1.09	0.5	17.92	ND	0	0	18.89	72.41	0.49	0.25
11/30/2016	17.03	69.94	0.86	0.75	18.09	ND	0	0	19.12	72.32	0.58	0.25
1/4/2017	17.22	70.11	0.69	0.75	18.22	ND	0	0	19.27	72.46	0.44	0.25
2/7/2017	17.29	70.01	0.79	0.5	18.17	ND	0	0	19.19	72.39	0.51	0.25
3/2/2017	17.17	70.16	0.64	0.5	17.96	ND	0	0	19.03	72.31	0.59	0.25
4/3/2017	17.06	70.21	0.59	0	17.89	ND	0	0	18.97	72.39	0.51	0.25
4/27/2017	17.01	70.29	0.51	0	17.67	ND	0	0	18.84	72.31	0.59	0.5
5/29/2017	17.23	70.24	0.56	0.25	17.84	ND	0	0	18.94	72.47	0.43	0.25
7/5/2017	17.33	70.34	0.46	0.25	17.96	ND	0	0	19.12	72.34	0.56	0.5
8/1/2017	17.39	70.39	0.41	0.25	18.09	ND	0	0	19.23	72.27	0.63	0.5
9/5/2017	17.36	70.43	0.37	0.25	18.16	ND	0	0	19.29	72.34	0.56	0.5
10/4/2017	17.31	70.41	0.39	0.25	18.21	ND	0	0	19.36	72.3	0.6	0.5
11/2/2017	17.42	70.4	0.4	0.25	18.32	ND	0	0	19.42	72.36	0.54	0.5
11/29/2017	17.49	70.36	0.44	0.25	18.43	ND	0	0	19.57	72.34	0.56	0.5
1/2/2018	17.67	70.31	0.49	0.5	18.73	ND	0	0	19.81	72.39	0.51	0.5
2/7/2018	17.77	70.34	0.46	0.5	18.62	ND	0	0	19.96	72.46	0.44	0.5
3/1/2018	NM	NM	NM	0	18.79	ND	0	0	20.02	72.32	0.58	0.5

TABLE 1

**SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS**

DNAPL Recovery Date	MW-44C				MW-45C				MW-46C			
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
4/2/2018	NM	NM	NM	0	18.72	ND	0	0	19.81	72.39	0.51	0.5
5/1/2018	NM	NM	NM	0	19.31	ND	0	0	20.62	72.46	0.44	1
6/1/2018	18.31	70.17	0.63	0.75	19.47	ND	0	0	20.87	72.51	0.39	1
6/29/2018	18.79	70.39	0.41	0.75	19.67	ND	0	0	20.97	72.57	0.33	1
8/3/2018	18.97	70.36	0.44	0.75	19.77	ND	0	0	21.11	72.59	0.31	1
8/31/2018	18.87	70.39	0.41	0.5	19.41	ND	0	0	20.96	72.48	0.42	0.5
9/28/2018	18.82	70.41	0.39	0.75	19.32	ND	0	0	20.91	72.43	0.47	0.5
11/2/2018	18.67	70.44	0.36	0.75	19.26	ND	0	0	20.77	72.39	0.51	0.75
11/29/2018	18.47	70.46	0.34	0.25	19.16	ND	0	0	20.52	72.34	0.56	0.5
1/2/2019	18.42	70.41	0.39	0.5	19.02	ND	0	0	20.49	72.46	0.44	0.5
2/2/2019	18.29	70.41	0.39	0.5	18.93	ND	0	0	20.43	72.49	0.41	0.5
2/28/2019	18.16	70.42	0.38	0.5	18.77	ND	0	0	20.34	72.37	0.53	0.5
4/2/2019	18.09	70.39	0.41	0.5	18.71	ND	0	0	20.18	72.32	0.58	0.5
4/25/2019	18.02	70.16	0.64	0.5	18.63	ND	0	0	20.14	72.36	0.54	0.5
5/29/2019	18.61	70.23	0.57	0.5	18.47	ND	0	0	20.06	72.39	0.51	0.5
6/12/2019	18.29	ND	Trace	0	18.81	ND	0	0	18.02	ND	Trace	0
6/30/2019	18.16	ND	0	0	18.71	ND	0	0	18.09	ND	0	0
7/16/2019	18.09	ND	0	0	18.66	ND	0	0	18.12	ND	0	0
8/2/2019	18.17	ND	0	0	18.72	ND	0	0	18.17	ND	0	0
8/15/2019	18.22	ND	0	0	18.79	ND	0	0	18.09	ND	0	0
8/28/2019	18.29	ND	0	0	18.86	ND	0	0	18.17	ND	0	0
9/17/2019	18.39	ND	0	0	18.97	ND	0	0	18.23	ND	0	0
10/2/2019	18.32	ND	0	0	18.89	ND	0	0	18.17	ND	0	0
10/16/2019	15.06	ND	0	0	16.23	ND	0	0	16.34	ND	0	0
10/31/2019	14.89	ND	0	0	15.94	ND	0	0	16.06	ND	0	0
11/15/2019	14.21	ND	0	0	15.69	ND	0	0	15.81	ND	0	0
12/3/2019	16.11	ND	0	0	15.71	ND	0	0	15.91	ND	0	0
12/18/2019	16.51	ND	0	0	15.91	ND	0	0	16.11	ND	0	0
12/30/2019	16.65	ND	0	0	16.11	ND	0	0	16.22	ND	0	0
1/7/2020	--	--	--	--	--	--	--	--	--	--	--	--
1/15/2020	16.61	ND	0	0	16.11	ND	0	0	16.29	ND	0	0
1/27/2020	16.24	ND	0	0	15.71	ND	0	0	16.15	ND	0	0
2/13/2020	15.81	ND	0	0	15.29	ND	0	0	14.4	ND	0	0
2/25/2020	15.81	ND	0	0	15.28	ND	0	0	15.42	ND	0	0
3/13/2020	15.84	ND	0	0	15.31	ND	0	0	15.57	ND	0	0
3/31/2020	14.82	ND	0	0	15.59	ND	0	0	15.72	ND	0	0
Total DNAPL Pumped (gal)	26.6				5.6				31.5			

Notes:

* - indicates DNAPL and groundwater mixture

--- - No DNAPL pumped

DTW - Depth to water (feet Below Top of Casing (BTOC))

DTD - Depth to DNAPL (feet BTOC)

MW-44C not measured 3/1/18 - 5/1/18; couldn't locate well due to construction.

ND - Not detected

NM - Not measured

PoP - Product on probe, not measureable

TR- Trace amount of DNAPL Extracted

TABLE 1

**SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS**

DNAPL Recovery Date	MW-49B				MW-57A				MW-57B			
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
2/14/2013					10.56	22.12	4.78	0.5	28.56	41.41	1.54	0.25
4/3/2013					10.32	24.79	2.11	0.5	28.09	42.36	0.59	0.25*
4/22/2013					10.71	25.85	1.05	0.5	27.06	42.17	0.78	0.25
5/30/2013					10.63	24.16	2.74	0.5	27.13	41.63	1.32	0.25
6/29/2013					12.16	23.82	3.08	2	18.26	42.07	0.88	0.25
7/22/2013					13.21	23.05	3.85	2	16.34	41.67	1.28	0.75
8/26/2013					12.91	25.32	1.58	1	18.01	42.31	0.64	0.25
9/27/2013					12.72	25.71	1.19	0.75	17.74	42.51	0.39	0.25
10/31/2013					12.72	25.92	0.98	1	17.61	42.61	0.29	0.07
11/27/2013					12.61	25.98	0.92	1	17.54	42.67	0.23	0.07
12/31/2013					12.46	26.09	0.81	1	17.36	42.74	0.16	0.07
1/30/2014					11.79	26.15	0.75	0.25	17.04	ND	Trace	0
3/3/2014					11.02	26.25	0.65	0.25	16.51	ND	Trace	0
3/31/2014					10.83	26.41	0.49	0.25	16.41	ND	Trace	0
4/30/2014					10.71	26.31	0.59	0.25	16.29	ND	Trace	0
5/27/2014					10.74	26.16	0.74	0.25	16.13	ND	Trace	0
6/26/2014					10.61	26.29	0.61	0.25	16.02	ND	Trace	0
7/31/2014					10.35	26.18	0.72	0.25	15.84	ND	Trace	0
8/27/2014					10.22	26.26	0.64	0.25	15.71	ND	Trace	0
10/3/2014					10.09	26.04	0.86	0.25	15.61	ND	Trace	0
11/3/2014					10.17	26.16	0.74	0.25	NM	NM	NM	0
11/24/2014					10.13	26.29	0.61	0.25	NM	NM	NM	0
12/22/2014					10.06	26.34	0.56	0.25	NM	NM	NM	0
1/29/2015					9.73	26.51	0.39	0.25	NM	NM	NM	0
2/26/2015					9.87	26.42	0.48	0.25	NM	NM	NM	0
3/26/2015					9.81	26.32	0.58	0.25	NM	NM	NM	0
4/27/2015					9.82	26.47	0.43	0.5	NM	NM	NM	0
5/26/2015					9.71	26.56	0.34	0.5	NM	NM	NM	0
7/6/2015					7.41	26.82	0.08	TR*	NM	NM	NM	0
8/3/2015					7.29	26.86	0.04	TR*	12.32	ND	PoP	0
8/27/2015					8.11	ND	0	TR*	13.04	ND	0	0
10/5/2015					7.72	ND	0	0	12.62	ND	0	0
11/5/2015					7.39	ND	0	0	12.27	ND	0	0
12/3/2015					7.13	ND	0	0	12.02	ND	0	0
12/28/2015					NM	NM	NM	0	NM	NM	NM	0
2/3/2016					NM	NM	NM	0	NM	NM	NM	0
3/3/2016					NM	NM	NM	0	NM	NM	NM	0
3/31/2016					NM	NM	NM	0	NM	NM	NM	0
5/3/2016					NM	NM	NM	0	NM	NM	NM	0
6/2/2016					7.26	ND	0	0	12.32	ND	0	0
7/8/2016					7.39	ND	0	0	12.44	ND	0	0
8/3/2016					7.46	ND	0	0	12.52	ND	0	0
8/30/2016					7.58	ND	0	0	12.67	ND	0	0
9/30/2016					7.69	ND	0	0	12.81	ND	0	0
11/3/2016					7.77	ND	0	0	12.92	ND	0	0
11/30/2016					7.92	ND	0	0	13.16	ND	0	0
1/4/2017					8.07	ND	0	0	13.24	ND	0	0
2/7/2017					8.18	ND	0	0	13.29	ND	0	0
3/2/2017					8.02	ND	0	0	13.17	ND	0	0
4/3/2017					8.06	ND	0	0	13.04	ND	0	0
4/27/2017					8.01	ND	0	0	13.14	ND	0	0
5/29/2017					8.34	ND	0	0	13.41	ND	0	0
7/5/2017					8.41	ND	0	0	13.57	ND	0	0
8/1/2017					8.52	ND	0	0	13.69	ND	0	0
9/5/2017					8.46	ND	0	0	13.79	ND	0	0
10/4/2017					8.41	ND	0	0	13.71	ND	0	0
11/2/2017					8.52	ND	0	0	13.91	ND	0	0
11/29/2017					8.67	ND	0	0	14.02	ND	0	0
1/2/2018					8.91	ND	0	0	13.06	ND	0	0
2/7/2018					8.98	ND	0	0	12.42	ND	0	0
3/1/2018					9.22	ND	0	0	12.58	ND	0	0

TABLE 1

**SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS**

DNAPL Recovery Date	MW-49B				MW-57A				MW-57B			
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
4/2/2018					9.16	ND	0	0	12.46	ND	0	0
5/1/2018					9.34	ND	0	0	13.04	ND	0	0
6/1/2018					9.67	ND	0	0	13.29	ND	0	0
6/29/2018					9.87	ND	0	0	13.47	ND	0	0
8/3/2018					10.02	ND	0	0	13.61	ND	0	0
8/31/2018					9.91	ND	0	0	13.47	ND	0	0
9/28/2018					9.86	ND	0	0	13.36	ND	0	0
11/2/2018					9.77	ND	0	0	13.21	ND	0	0
11/29/2018					9.56	ND	0	0	13.01	ND	0	0
1/2/2019					9.52	ND	Trace	0	13.03	ND	Trace	0
2/2/2019					9.41	ND	Trace	0	12.91	ND	Trace	0
2/28/2019					9.32	ND	Trace	0	12.83	ND	Trace	0
4/2/2019					9.27	ND	Trace	0	12.76	ND	Trace	0
4/25/2019					9.16	ND	Trace	0	12.71	ND	Trace	0
5/29/2019					9.06	ND	Trace	0	12.70	ND	Trace	0
6/12/2019					9.39	ND	0	0	12.93	ND	0	0
6/30/2019					9.21	ND	0	0	12.86	ND	0	0
7/16/2019					9.17	ND	0	0	12.79	ND	0	0
8/2/2019					9.22	ND	0	0	12.84	ND	0	0
8/15/2019					9.29	ND	0	0	12.92	ND	0	0
8/28/2019					9.33	ND	0	0	12.96	ND	0	0
9/17/2019					9.46	ND	0	0	12.86	ND	0	0
10/2/2019					9.74	ND	0	0	12.83	ND	0	0
10/16/2019					10.39	ND	0	0	13.67	ND	0	0
10/31/2019					11.92	ND	0	0	14.21	ND	0	0
11/15/2019					11.14	ND	0	0	6.21	ND	0	0
12/3/2019					13.75	ND	0	0	13.51	ND	0	0
12/18/2019					14.09	ND	0	0	13.51	ND	0	0
12/30/2019					14.42	ND	0	0	13.51	ND	0	0
1/7/2020	11.51	20.09	14.77	--	--	--	--	--	--	--	--	--
1/15/2020	15.48	20.89	13.97	2.5	12.79	ND	0	0	21.93	ND	0	0
1/27/2020	14.2	22.4	12.46	2	11.61	ND	0	0	19.96	ND	0	0
2/13/2020	13.31	28.9	5.96	1.5	13.22	ND	0	0	17.91	ND	0	0
2/25/2020	11.51	26.8	8.06	1	12.31	ND	0	0	16.86	ND	0	0
3/13/2020	11.73	26.1	8.76	0.5	13.71	ND	0	0	15.91	ND	0	0
3/31/2020	13.72	29.39	5.47	0.5	13.85	ND	0	0	15.37	ND	0	0
Total DNAPL Pumped (gal)	8.0				15.5				2.7			

Notes:

* - indicates DNAPL and groundwater mixture

--- - No DNAPL pumped

DTW - Depth to water (feet Below Top of Casing (BTOC))

DTD - Depth to DNAPL (feet BTOC)

ND - Not detected

NM - Not measured

PoP - Product on probe, not measureable

TR- Trace amount of DNAPL Extracted

TABLE 1

**SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS**

DNAPL Recovery Date	MW-68B				MW-70B				MW-75B			
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
2/14/2013					6.57	34.09	1.61	0.25	10.01	34.1	3.1	0.25
4/3/2013					6.79	35.26	0.44	0.25	13.71	36.47	0.73	0.25
4/22/2013					6.06	35.12	0.58	0.25	9.72	36.72	0.48	0.25
5/30/2013					6.19	34.67	1.03	0.25	9.61	35.09	2.11	0.75
6/29/2013					8.01	34.92	0.78	0.25*	10.61	35.61	1.59	0.75
7/22/2013					8.22	34.07	1.63	0.25*	9.74	35.71	1.49	0.75
8/26/2013					8.17	35.09	0.61	0.25	10.76	35.93	1.27	0.75
9/27/2013					8.32	35.34	0.36	0.25	10.52	36.39	0.81	0.5
10/31/2013					8.26	35.39	0.31	0.07	10.31	36.47	0.73	1
11/27/2013					8.12	35.42	0.28	0.07	10.39	36.51	0.69	1
12/31/2013					7.89	35.51	0.19	0.07	10.13	36.72	0.48	1
1/30/2014					7.84	35.06	0.64	0.07	12.62	36.49	0.71	0.75
3/3/2014					7.09	35.05	0.65	0.13	12.12	36.35	0.85	0.75
3/31/2014					6.87	35.17	0.53	0.07	12.01	36.27	0.93	0.75
4/30/2014					6.72	35.01	0.69	0.07	11.84	36.02	1.18	0.75
5/27/2014					6.64	34.86	0.84	0.07	11.71	35.79	1.41	0.75
6/26/2014					6.52	34.97	0.73	0.25	11.58	35.91	1.29	0.5
7/31/2014					6.26	34.76	0.94	0.25	11.32	35.82	1.38	0.5
8/27/2014					6.84	34.86	0.84	0.25	11.19	36.09	1.11	0.5
10/3/2014					6.71	34.61	1.09	0.25	11.09	36.01	1.19	0.5
11/3/2014					6.79	34.79	0.91	0.25	11.16	36.19	1.01	0.75
11/24/2014					6.77	34.93	0.77	0.25	11.21	36.27	0.93	0.5
12/22/2014					6.69	34.86	0.84	0.25	11.26	36.19	1.01	0.5
1/29/2015					6.48	34.92	0.78	0.25	11.06	36.34	0.86	0.5
2/26/2015					6.39	34.81	0.89	0.5	11.09	36.34	0.86	0.5
3/26/2015					6.27	34.91	0.79	0.25	10.93	36.42	0.78	0.5
4/27/2015					6.19	34.99	0.71	0.25	10.78	36.52	0.68	0.5
5/26/2015					6.07	35.11	0.59	0.5	10.61	36.72	0.48	0.75
7/6/2015					5.03	35.32	0.38	0.25	8.52	36.91	0.29	0.75
8/3/2015					5.12	35.37	0.33	TR*	8.66	36.96	0.24	0.75
8/27/2015					6.31	35.41	0.29	TR*	9.31	36.91	0.29	0.75
10/5/2015					5.72	35.47	0.23	0.25	8.62	37.02	0.18	0.5
11/5/2015					5.41	35.42	0.28	0.25	8.34	36.93	0.27	0.5
12/3/2015					5.13	35.63	0.07	0.25	8.12	36.81	0.39	0.5
12/28/2015					5.02	35.26	0.44	0.25	8.01	36.72	0.48	0.5
2/3/2016					4.86	35.21	0.49	0.25	7.82	36.19	1.01	0.25
3/3/2016					4.92	35.17	0.53	0.25	7.74	36.27	0.93	0.5
3/31/2016					4.91	35.24	0.46	0.25	7.67	36.39	0.81	0.5
5/3/2016					5.13	35.29	0.36	0.25	7.79	36.47	0.68	0.5
6/2/2016					5.26	35.36	0.29	0.25	7.71	36.42	0.73	0.5
7/8/2016					5.34	35.31	0.34	0.25	7.8	36.53	0.62	0.5
8/3/2016					5.42	35.39	0.26	0.25	7.89	36.59	0.56	0.5
8/30/2016					5.61	35.21	0.44	0.25	7.96	36.64	0.51	0.5
9/30/2016					5.74	35.03	0.62	0.25	7.91	36.51	0.64	0.5
11/3/2016					5.79	35.11	0.54	0.25	7.86	36.36	0.79	0.5
11/30/2016					6.03	35.23	0.42	0.25	7.97	36.47	0.68	0.75
1/4/2017					6.17	35.09	0.56	0.5	8.04	36.36	0.79	0.75
2/7/2017					6.26	35.01	0.64	0.5	8.12	36.21	0.94	0.75
3/2/2017					6.16	35.09	0.56	0.5	8.01	36.26	0.89	0.75
4/3/2017					6.09	35.13	0.52	0.5	7.93	36.43	0.72	0.75
4/27/2017					6.12	35.2	0.45	0.5	7.86	36.52	0.63	0.75
5/29/2017					6.29	35.06	0.59	0.5	7.94	36.41	0.74	0.75
7/5/2017					6.39	35.14	0.51	0.25	8.04	36.36	0.79	0.75
8/1/2017					6.47	35.21	0.44	0.25	8.16	36.31	0.84	0.75
9/5/2017					6.56	35.34	0.31	0.25	8.22	36.47	0.68	0.75
10/4/2017					6.63	35.39	0.26	0.25	8.29	36.56	0.59	0.75
11/2/2017					6.74	35.31	0.34	0.25	8.37	36.51	0.64	1
11/29/2017					6.79	35.29	0.36	0.25	8.33	36.59	0.56	1
1/2/2018					6.34	35.34	0.31	0.25	8.07	36.72	0.43	1
2/7/2018					6.42	35.31	0.34	0.25	8.17	36.91	0.24	1
3/1/2018					6.67	35.21	0.44	0.5	8.31	36.94	0.21	1

TABLE 1

**SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS**

DNAPL Recovery Date	MW-68B				MW-70B				MW-75B			
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)
4/2/2018					6.61	35.16	0.49	0.5	8.26	36.89	0.26	0.75
5/1/2018					7.22	35.23	0.42	1.25	8.92	36.96	0.19	0.75
6/1/2018					7.42	35.29	0.36	1	9.34	36.91	0.24	0.75
6/29/2018					7.58	35.21	0.44	1	9.67	36.82	0.33	0.75
8/3/2018					7.69	35.29	0.36	0.75	9.84	36.87	0.28	0.75
8/31/2018					7.42	35.36	0.29	0.5	9.71	36.91	0.24	0.75
9/28/2018					7.33	35.28	0.37	0.5	9.62	36.84	0.31	0.75
11/2/2018					7.22	35.24	0.41	0.75	9.57	36.88	0.27	0.75
11/29/2018					7.06	35.21	0.44	0.5	9.41	36.92	0.23	1
1/2/2019					6.96	35.31	0.34	0.5	9.28	36.96	0.19	1
2/2/2019					6.87	35.36	0.29	0.5	9.22	36.91	0.24	1
2/28/2019					6.74	35.29	0.36	0.5	9.16	36.93	0.22	1
4/2/2019					6.67	35.27	0.38	0.5	9.06	36.91	0.24	1
4/25/2019					6.74	35.21	0.44	0.5	9.02	36.72	0.43	1
5/29/2019					6.71	35.17	0.48	0.5	9.07	36.67	0.48	1
6/12/2019					6.43	34.84	0.81	1	8.92	ND	Trace	0
6/30/2019					6.48	34.61	1.04	1	8.66	ND	Trace	0
7/16/2019					6.43	34.49	1.16	1.5	8.62	ND	Trace	0
8/2/2019					6.48	34.31	1.34	1.5	8.67	ND	Trace	0
8/15/2019					6.51	34.07	1.58	2	8.69	ND	ND	0
8/28/2019					6.57	34.09	1.56	2	8.72	ND	Trace	0
9/17/2019					6.51	34.01	1.64	2	8.61	ND	Trace	0
10/2/2019					6.46	33.71	1.94	2.5	8.53	ND	Trace	0
10/16/2019					6.42	ND	0	0	NM	NM	NM	0
10/31/2019					6.43	ND	Trace	0	NM	NM	NM	0
11/15/2019					4.75	ND	0	0	7.91	ND	0	0
12/3/2019					5.01	ND	0	0	8.24	ND	0	0
12/18/2019					5.53	35	0.65	0.33	4.99	ND	0	0
12/30/2019					5.71	32.4	3.25	0.13	7.79	35.3	1.85	0
1/7/2020	4.82	34.21	3.59	--	--	--	--	--	--	--	--	--
1/15/2020	4.82	34.41	3.39	0.50	7.19	32.51	3.14	0.0625	6.47	36.4	0.75	0
1/27/2020	2.15	35.9	1.9	0.50	9.9	31.3	4.35	0.125	5.92	34.6	2.55	0.125
2/13/2020	3.49	35.02	2.78	0.50	5.99	31.43	4.22	0.125	7.88	35.08	2.07	0.125
2/25/2020	2.35	36.12	1.68	0.25	4.71	31.81	3.84	0.25	5.82	ND	0	0
3/13/2020	3.99	35.6	2.2	0.125	4.63	30.5	5.15	0.25	8.24	34.9	2.25	0.125
3/31/2020	4.46	36.9	0.9	0.00	6.04	31.34	4.31	0.50	4.79	ND	0	0
Total DNAPL Pumped (gal)	1.9				40.6				53.1			

Notes:

* - indicates DNAPL and groundwater mixture

--- - No DNAPL pumped

DTW - Depth to water (feet Below Top of Casing (BTOC))

DTD - Depth to DNAPL (feet BTOC)

* - indicates DNAPL and groundwater mixture

--- - No DNAPL pumped

PoP - Product on probe, not measurable DTW - Depth to water (feet Below Top of Casing (BTOC))

TR- Trace amount of DNAPL Extract DTD - Depth to DNAPL (feet BTOC)

TABLE 1

**SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS**

DNAPL Recovery Date	MW-78A				Approx DNAPL Recovered (gal)
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	
2/14/2013	NM	NM	NM	0	9.75
4/3/2013	NM	NM	NM	0	5.00
4/22/2013	NM	NM	NM	0	2.75
5/30/2013	NM	NM	NM	0	7.50
6/29/2013	NM	NM	NM	0	7.00
7/22/2013	NM	NM	NM	0	6.50
8/26/2013	NM	NM	NM	0	6.50
9/27/2013	NM	NM	NM	0	5.75
10/31/2013	NM	NM	NM	0	5.07
11/27/2013	NM	NM	NM	0	4.74
12/31/2013	NM	NM	NM	0	4.71
1/30/2014	NM	NM	NM	0	4.67
3/3/2014	NM	NM	NM	0	4.91
3/31/2014	NM	NM	NM	0	4.98
4/30/2014	NM	NM	NM	0	5.10
5/27/2014	NM	NM	NM	0	4.85
6/26/2014	NM	NM	NM	0	5.03
7/31/2014	NM	NM	NM	0	4.75
8/27/2014	NM	NM	NM	0	4.25
10/3/2014	NM	NM	NM	0	4.75
11/3/2014	9.31	19.12	6.23	2	7.25
11/24/2014	9.39	19.62	5.73	2	8.00
12/22/2014	9.34	19.86	5.49	2	8.25
1/29/2015	9.14	21.29	4.06	2	7.75
2/26/2015	9.17	19.97	5.38	2.5	10.00
3/26/2015	9.12	20.31	5.04	0.75	7.25
4/27/2015	9.17	20.46	4.89	2	10.50
5/26/2015	9.09	20.59	4.76	2.5	12.25
7/6/2015	7.01	21.16	4.19	2	10.50
8/3/2015	7.12	21.39	3.96	2.5	10.75
8/27/2015	7.96	21.51	3.84	2	8.25
10/5/2015	7.23	21.67	3.68	2	8.00
11/5/2015	7.02	21.56	3.79	2	8.00
12/3/2015	6.83	21.67	3.68	2	8.00
12/28/2015	6.71	21.52	3.83	2.25	9.00
2/3/2016	6.52	21.67	3.68	2	9.00
3/3/2016	6.46	21.72	3.63	2	9.25
3/31/2016	6.49	21.86	3.49	2	9.25
5/3/2016	6.57	21.94	3.41	2	7.75
6/2/2016	6.65	21.91	3.44	2	8.25
7/8/2016	6.71	21.97	3.38	2	8.00
8/3/2016	6.82	22.04	3.31	2	8.00
8/30/2016	6.94	22.21	3.14	2	8.25
9/30/2016	7.04	22.39	2.96	2	8.50
11/3/2016	7.11	22.49	2.86	2	8.50
11/30/2016	7.29	22.67	2.68	2	8.75
1/4/2017	7.42	22.74	2.61	2	8.75
2/7/2017	7.48	22.93	2.42	2.5	9.00
3/2/2017	7.36	23.26	2.09	2	8.50
4/3/2017	7.29	23.34	2.01	2	7.50
4/27/2017	7.36	23.42	1.93	2	8.00
5/29/2017	7.51	23.51	1.84	2	7.75
7/5/2017	7.79	23.59	1.76	2	7.25
8/1/2017	7.89	23.51	1.84	2	8.00
9/5/2017	7.81	23.48	1.87	2	8.25
10/4/2017	7.89	23.51	1.84	2	7.75
11/2/2017	7.97	23.59	1.76	2	8.50
11/29/2017	8.02	23.67	1.68	2	8.00
1/2/2018	8.17	23.82	1.53	2	8.25
2/7/2018	8.29	23.97	1.38	2	8.25
3/1/2018	8.47	23.91	1.44	2	7.50

TABLE 1
SUMMARY OF DNAPL RECOVERY MEASUREMENTS
UPRR HOUSTON, TX - WOOD PRESERVING WORKS

DNAPL Recovery Date	MW-78A				Approx DNAPL Recovered (gal)
	DTW (ft BTOC)	DTD (ft BTOC)	DNAPL Thickness (ft)	DNAPL Pumped (gal)	
4/2/2018	8.39	23.97	1.38	2.25	7.75
5/1/2018	9.02	24.06	1.29	2	9.00
6/1/2018	9.21	24.13	1.22	2	9.75
6/29/2018	9.39	24.21	1.14	2.25	10.50
8/3/2018	9.47	24.31	1.04	2	10.00
8/31/2018	9.32	24.47	0.88	2	8.25
9/28/2018	9.22	24.39	0.96	2	8.25
11/2/2018	9.09	24.27	1.08	2	8.50
11/29/2018	8.96	24.22	1.13	2	7.50
1/2/2019	8.78	24.39	0.96	2	7.75
2/2/2019	8.71	24.47	0.88	2	8.00
2/28/2019	8.67	24.42	0.93	2	8.75
4/2/2019	8.58	24.43	0.92	2	8.75
4/25/2019	8.49	24.31	1.04	2	9.25
5/29/2019	8.42	24.26	1.09	2	9.25
6/12/2019	8.67	23.96	1.39	2	9.00
6/30/2019	9.36	23.77	1.58	2	9.75
7/16/2019	9.29	23.62	1.73	2	10.50
8/2/2019	9.34	23.57	1.78	2	8.00
8/15/2019	9.42	23.06	2.29	2	12.00
8/28/2019	9.51	23.01	2.34	2	12.00
9/17/2019	9.39	22.76	2.59	2	13.00
10/2/2019	9.27	22.58	2.77	2	10.50
10/16/2019	10.16	21.63	3.72	2	8.00
10/31/2019	10.41	21.79	3.56	2.5	8.50
11/15/2019	8.01	21.62	3.73	1.5	5.00
12/3/2019	8.41	22.12	3.23	2	6.50
12/18/2019	8.38	ND	0	0	2.08
12/30/2019	9.16	19.93	5.42	1.5	3.25
1/7/2020	--	--	--	--	--
1/15/2020	8.79	24.9	0.45	0.0625	4.13
1/27/2020	7.06	24.06	1.29	0	3.75
2/13/2020	8.01	24.08	1.27	0	3.25
2/25/2020	7.84	21.86	3.49	0.25	2.56
3/13/2020	NM	NM	NM	0	2.25
3/31/2020	7.82	23.1	2.25	0.125	9.38
Total DNAPL Pumped (gal)				139.4	731.7

ND - Not detected
 NM - Not measured
 TOC)) PoP - Product on probe, not measurable
 TR- Trace amount of DNAPL Extracted

FIGURES

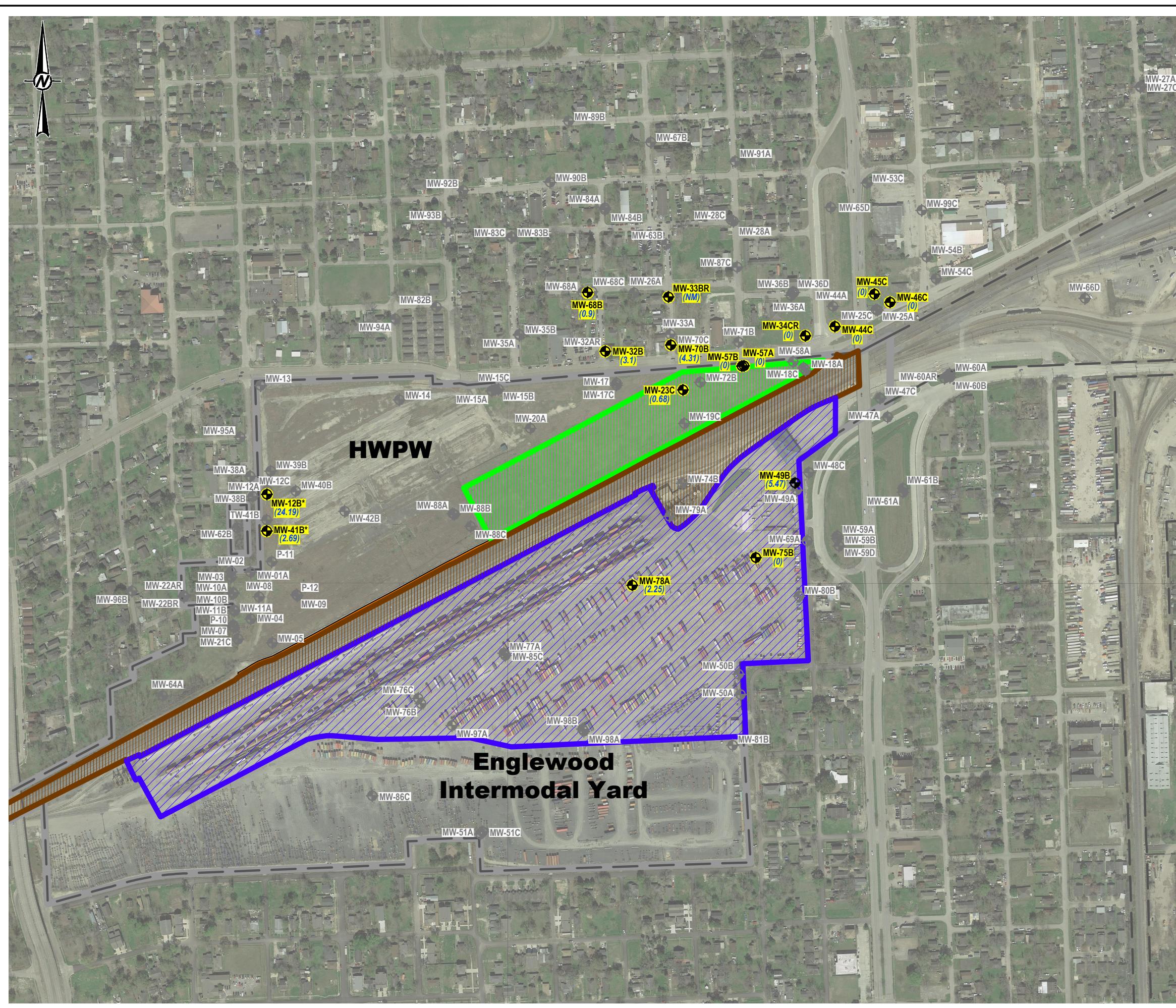


Figure 3
DNAPL Recovery Activities February 2013 - March 2020
UPRR Houston Wood Preserving Works

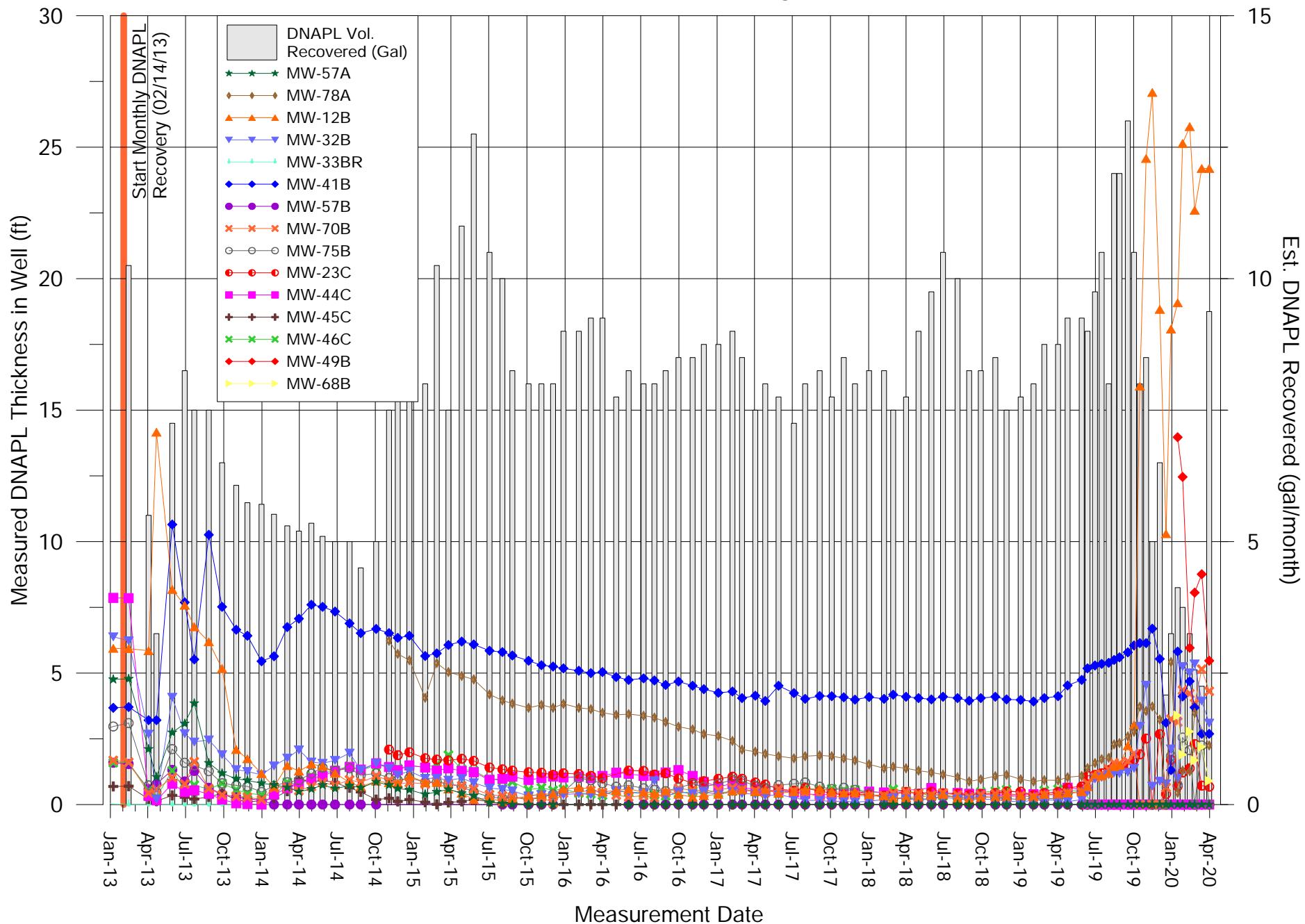
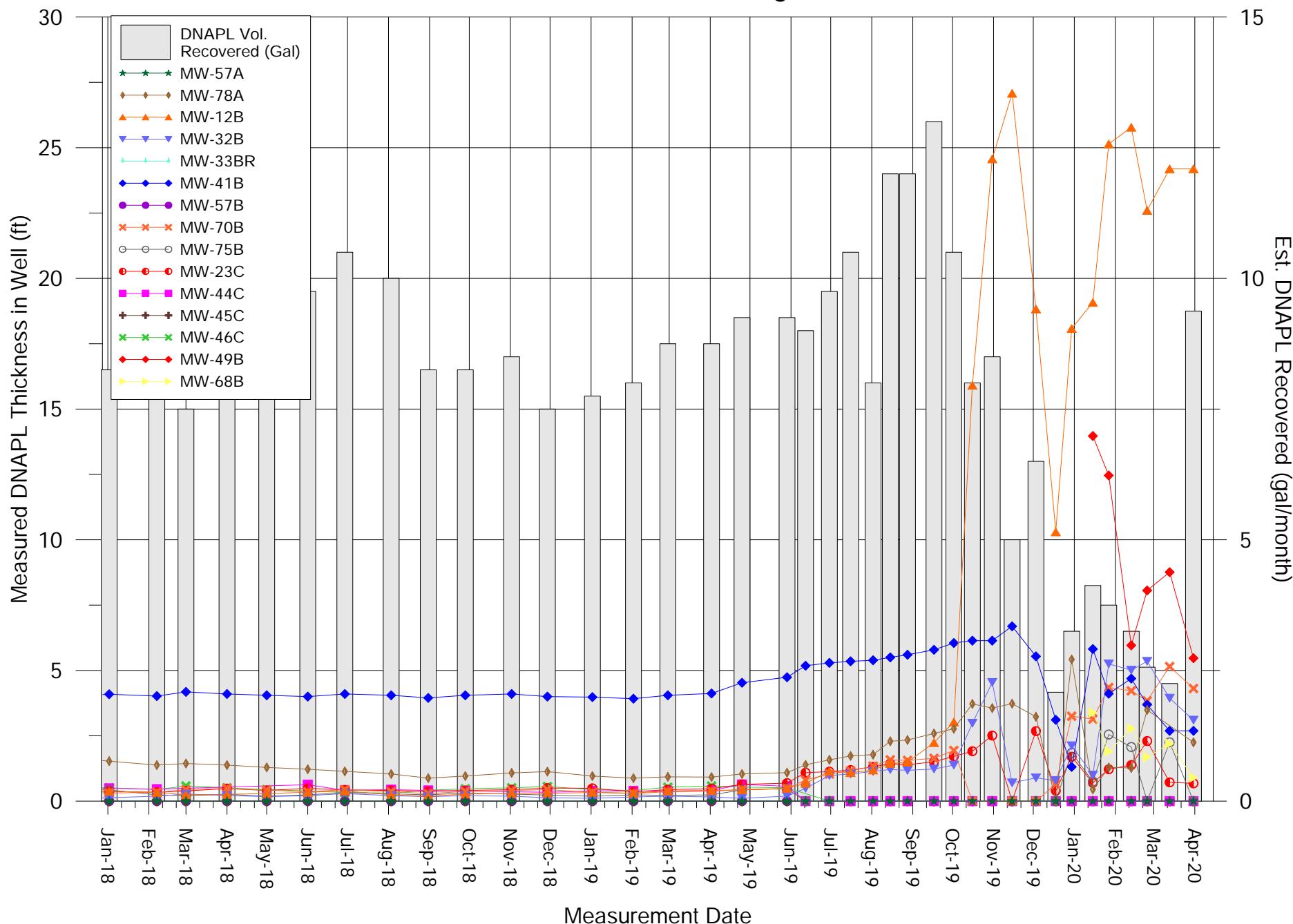


Figure 2
DNAPL Recovery Activities January 2018 - March 2020
UPRR Houston Wood Preserving Works



ATTACHMENT 1

Recovered DNAPL Waste Manifest

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number TXD000820266 / 31547	2. Page 1 of 1	3. Emergency Response Phone 877-577-2669	4. Manifest Tracking Number 014407039 FLE		
Generator's Name and Mailing Address Union Pacific Railroad C/o GHD 301 NE 2nd Ave., ATTN: Fred Rhode Portland, OR 97202 Generator's Phone: (503) 227-1161 ATTN: Kevin Peterburs							
5. Generator's Site Address (if different than mailing address) UP Railrod Houston Wood Preserving Works 4910 Liberty Rd Houston, TX 77026							
6. Transporter 1 Company Name None <i>Stensville Specialty Waste</i> Indy Parks , IN 46278							
7. Transporter 2 Company Name Clean Harbors Env. Sv.							
8. Designated Facility Name and Site Address Clean Harbors Deer Park, L.P. 2027 Independence Pkwy South LaPorte, TX 77571							
State ID#: 50089 TXD055141378							
Facility's Phone: 281-930-2200							
9a. HM		9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) RQ, NA3082, Hazardous waste, liquid, n.o.s. (creosote), 9, PG III, ERG 1/1	10. Containers No. 1 Type DM		11. Total Quantity 30	12. Unit Wt./Vol. G	13. Waste Codes 09162104 F034
		1.					
		2.					
		3.					
		4.					
14. Special Handling Instructions and Additional Information 01. Recovered creosote VWR # 21809 (PFCH1269245) 55G						Month 02 Day 28 Year 20	
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.						Signature X Kevin Peterburs	
16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S.						Port of entry/exit: _____ Date leaving U.S.: _____	
Transporter signature (for exports only): Kevin Medina						Signature X Kevin Medina	
17. Transporter Acknowledgment of Receipt of Materials Transporter 1 Printed/Typed Name Kevin Medina						Month 02 Day 28 Year 20	
Transporter 2 Printed/Typed Name T. Woods						Signature X T. Woods	
18. Discrepancy						Month 02 Day 28 Year 20	
18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection						Manifest Reference Number: _____	
18b. Alternate Facility (or Generator)						U.S. EPA ID Number	
Facility's Phone:						Month Day Year	
18c. Signature of Alternate Facility (or Generator)						Month Day Year	
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)						Method Codes	
1. 01-1104C		2. _____	3. _____	4. _____	Method Codes		
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a							
Printed/Typed Name D. Hardin						Signature X	
						Month 03 Day 13 Year 20	