



August 28, 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 – 2ND 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 2nd 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 response to the Texas Commission on Environmental Quality (TCEQ) Technical Notice of Deficiency dated April 11th, 2019, the DNAPL recovery frequency was increased to bi-monthly (twice a month) in June 2019. 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
Texas Geoscience Firm No. 50369. Texas Engineering Firm No. 2578

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 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 or US Ecology Robstown facility in Robstown, 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 June 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 February 2013 through March 2020 is presented on Figure 2, with individual graphs for each zone and/or portion of the Site discussed below. 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 (graph of DNAPL thickness from July 2018 through June 2020 shown on Figure 3).
 - o **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 and 2nd Quarter 2020.
 - o **MW-78A:** DNAPL thickness in MW-78A in December 2019 had increased to approximately 5.42 feet. During the first half of 2020, DNAPL thicknesses fluctuated between from 0.39 to 3.49 feet with an increase to 5.45 feet at the end of June 2020.
- **B-TZ Wells (West Side):** Recovery wells MW-12B and MW- completed in the B-TZ were evaluated for DNAPL recovery during this period (graph of DNAPL thickness from July 2018 through June 2020 shown on Figure 4).
 - o **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 submersible 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 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 pneumatic NAPL recovery pump. DNAPL thickness was between 24.19 and 27.08 feet during the first 3 recovery events with the new pump in the 2nd Quarter of 2020. Since

mid-May 2020, the DNAPL thickness in MW-12B has steadily decreased from 13.04 feet to 4.81 feet at the end of June 2020.

- o **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 designed for recovering the increasingly more viscous liquids observed in these wells. Immediately following installation, 2.5 gallons of DNAPL from MW-12B and 2 gallons from MW-41B were recovered using the new pneumatic pumps.

During a few of the recovery events after the new pump was installed in the 2nd Quarter of 2020, the top of the DNAPL was below the top of the pump at MW-41B, so it was not possible to record a DNAPL thickness. However, DNAPL was still recovered from MW-41B. The DNAPL thickness in MW-41B was estimated at 2.7 feet at the end of June 2020.

- B-TZ/B-CZ Wells (North (on-site and off-site)): Recovery wells MW-32B, MW-57B, MW-68B, and MW-70B completed in either the B-TZ or B-CZ on the north side of the Site or off-site to the north were evaluated for DNAPL recovery during this period (graph of DNAPL thickness from July 2018 through June 2020 shown on Figure 5).
 - o **MW-32B:** 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. The DNAPL thickness in MW-32B increased to 6.26 feet in early April 2020 which was the thickest measurement recorded in the well since the beginning of DNAPL recovery efforts in February 2013. Since early April, DNAPL thicknesses have generally decreased to about 1.28 feet thick in late-June 2020.
 - o **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.
 - o **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. DNAPL thickness ranged from 0.71 feet to 1.81 feet during the second quarter of 2020, and only trace amounts of DNAPL were able to be removed.

- o **MW-70B:** During the 1st and 2nd 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. Since mid-May 2020, DNAPL thickness has decreased from 5.02 feet to 3.53 feet at the end of June 2020.
- **B-TZ/B-CZ Wells (Englewood Intermodal Yard):** Recovery wells MW-49B and MW-75B in the Englewood Intermodal Yard completed in the B-CZ were evaluated for DNAPL recovery during this period (graph of DNAPL thickness from July 2018 through June 2020 shown on Figure 6).
 - o **MW-75B:** Measured DNAPL thicknesses during the 1st Quarter 2020 were 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. Trace DNAPL was detected in mid-March (0.05 feet-thick) and mid-June (0.15 feet thick) in MW-75B and was not detected during the other recovery events in the 2nd Quarter of 2020.
 - o **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. During the second quarter of 2020, DNAPL thicknesses fluctuated between 2.81 feet and 3.82 feet, and approximately 1.6 gallons of DNAPL were removed.
- **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 (graph of DNAPL thickness from July 2018 through June 2020 shown on Figure 7).
 - o **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 and 2nd Quarter 2020, DNAPL thickness in MW-23C fluctuated between 0.58 and 2.3 feet. DNAPL was not detected in mid-June and a trace amount (0.01 feet-thick) was noted in late-June 2020.
 - o **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 2nd Quarter of 2020.
 - o **MW-44C:** No measurable DNAPL had been detected in MW-44C from June 2019 (trace DNAPL noted in mid-June 2019) to May 2020. DNAPL was noted (0.39 feet thick) in MW-44C at the end of May 2020. However, it was discovered that the total depth measurement at MW-44C was approximately 10 feet higher than the well construction depth, suggesting that the well had

appeared to have silted up. MW-44C were re-developed during the site-wide monitoring activities in July 2020; these activities will be described in the 3rd Quarter 2020 report.

- o **MW-45C:** DNAPL had not been detected in MW-45C between August 2015 and May 2020. In May 2020, DNAPL was 1.3 feet and 0.6 feet thick. DNAPL was not detected in June 2020.
- o **MW-46C:** 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 June 2020, an estimated cumulative total of 772 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 2nd Quarter 2020, recovery has ranged from approximately 5.6 to 8.6 gallons per month (Table 1).

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 – June 2020
Figure 2 - DNAPL Recovery Activities February 2013 – June 2020
Figure 3 – A-TZ Wells – DNAPL Recovery Activities July 2018 – June 2020
Figure 4 – B-TZ Wells (West Side) – DNAPL Recovery Activities July 2018 – June 2020
Figure 5 – B-CZ/B-TZ Wells (North (On-Site and Off-Site) – DNAPL Recovery Activities July 2018 – June 2020
Figure 6 – B-CZ/B-TZ Wells (Englewood Intermodal Yard) – DNAPL Recovery Activities July 2018 – June 2020
Figure 7 – C-TZ Wells – DNAPL Recovery Activities July 2018 – June 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	2.5	25.9	77.12	0.68	0.0	4.63	33.3	3.1	0.25
4/9/2020	7.37	18.21	27.99	3	25.91	77.22	0.58	0.0	4.65	30.14	6.26	1
4/27/2020	8.64	19.12	27.08	3.5	26.31	76.45	1.35	0.0	5.39	34.52	1.88	0.5
5/14/2020	9.39	33.16	13.04	2.5	26.7	75.89	1.91	0.125	6.02	34.73	1.67	0.5
5/28/2020	8.79	40.29	5.91	1.5	26.75	75.71	2.09	0.125	5.84	34.35	2.05	1
6/11/2020	9.29	40.69	5.51	2.5	26.93	ND	0	0	5.89	35.01	1.39	0.25
6/25/2020	9.01	41.39	4.81	2	25.89	77.94	0.01	0	5.6	35.12	1.28	0.25
Total DNAPL Pumped (gal)	108.3				41.4				72.2			

Notes:

* - indicates DNAPL and groundwater mixture

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

** - indicates DTD from previous event was used; DNAPL recovered revised based on review of field notes.

--- - No DNAPL pumped

ND - Not detected

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

NM - Not measured

DTD - Depth to DNAPL (feet BTOC)

PoP - Product on probe, not measureable

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

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			0	7.76	40.28	4.53	3
5/29/2019	NM	NM	NM	0	Well Damaged			0	7.71	40.07	4.74	3
6/12/2019	NM	NM	NM	0	Well Damaged			0	7.52	39.63	5.18	3
6/30/2019	NM	NM	NM	0	Well Damaged			0	7.46	39.52	5.29	3
7/16/2019	NM	NM	NM	0	Well Damaged			0	7.39	39.46	5.35	3
8/2/2019	NM	NM	NM	0	Well Damaged			0	7.46	39.42	5.39	0
8/15/2019	NM	NM	NM	0	Well Damaged			0	7.51	39.31	5.5	3
8/28/2019	NM	NM	NM	0	Well Damaged			0	7.57	39.21	5.6	3
9/17/2019	NM	NM	NM	0	Well Damaged			0	7.66	39.02	5.79	3
10/2/2019	NM	NM	NM	0	Well Damaged			0	7.61	38.76	6.05	3
10/16/2019	NM	NM	NM	0	Well Damaged			0	5.21	38.67	6.14	3
10/31/2019	NM	NM	NM	0	Well Damaged			0	5.21	38.67	6.14	3
11/15/2019	NM	NM	NM	0	Well Damaged			0	4.81	38.12	6.69	2
12/3/2019	NM	NM	NM	0	Well Damaged			0	6.46	39.27	5.54	3
12/18/2019	NM	NM	NM	0	Well Damaged			0	6.51	41.7	3.11	0
12/30/2019	NM	NM	NM	0	Well Damaged			0	6.99	43.5	1.31	0
1/7/2020	--	--	--	--	--	--	--	--	--	--	--	--
1/15/2020	NM	NM	NM	0	Well Damaged			0	5.12	38.99	5.82	0
1/27/2020	NM	NM	NM	0	Well Damaged			0	3.41	40.7	4.11	0
2/13/2020	NM	NM	NM	0	Well Damaged			0	5.1	40.12	4.69	0
2/25/2020	NM	NM	NM	0	Well Damaged			0	4.5	41.12	3.69	0
3/13/2020	NM	NM	NM	0	Well Damaged			0	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
4/9/2020	NM	NM	NM	0	17.63	ND	0	0	6.47	BP		2
4/27/2020	NM	NM	NM	0	17.89	ND	0	0	8.01	BP		2
5/14/2020	NM	NM	NM	0	18.29	ND	0	0	8.71	42.1	2.71	3.5
5/28/2020	NM	NM	NM	0	18.31	ND	0	0	8.08	BP		3.5
6/11/2020	NM	NM	NM	0	18.51	ND	0	0	8.01	41.59	3.22	2
6/25/2020	NM	NM	NM	0	17.66	ND	0	0	7.52	42.11	2.7	2
Total DNAPL Pumped (gal)	0				0				230.5			

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

BP- Below pump; depth to DNAPL not measured because it is below top of in-well pump

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
4/9/2020	22.76	ND**	0	0	15.67	ND	0	0	15.89	ND	0	0
4/27/2020	14.67	ND**	0	0	15.94	ND	0	0	16.12	ND	0	0
5/14/2020	14.21	ND**	0	0	16.38	69.3	1.3	0.0625	16.51	ND	0	0
5/28/2020	12.06	57.61	0.39**	0	16.46	70	0.6	0	16.71	ND	0	0
6/11/2020	11.61	ND**	0	0	16.68	ND	0	0	16.83	ND	0	0
6/25/2020	10.37	ND**	0	0	14.99	ND	0	0	15.12	ND	0	0
Total DNAPL Pumped (gal)	26.6				5.7				31.5			

Notes:

* - indicates DNAPL and groundwater mixture

ND - Not detected

--- - No DNAPL pumped

NM - Not measured

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

PoP - Product on probe, not measureable

DTD - Depth to DNAPL (feet BTOC)

TR- Trace amount of DNAPL Extracted

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

**Total depth measured in MW-44C was approximately 10 ft higher than during previous events - will attempt to remove silt.

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
4/9/2020	14.13	31.04	3.82	0.5	13.36	ND	0	0	15.19	ND	0	0
4/27/2020	15.31	32.05	2.81	0.0625	14.45	ND	0	0	14.99	ND	0	0
5/14/2020	14.95	31.89	2.97	0.0625	14.84	ND	0	0	14.95	ND	0	0
5/28/2020	13.66	31.07	3.79	0.5	13.91	ND	0	0	14.92	ND	0	0
6/11/2020	14.56	31.22	3.64	0.25	14.41	ND	0	0	14.89	ND	0	0
6/25/2020	10.65	31.64	3.22	0.25	14.08	ND	0	0	14.28	ND	0	0
Total DNAPL Pumped (gal)	9.6				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	0.0	6.04	31.34	4.31	0.50	4.79	ND	0	0
4/9/2020	4.41	35.99	1.81	0.125	6.79	31.53	4.12	0.50	8.52	ND	0	0
4/27/2020	5.53	36.1	1.7	0.125	6.81	30.84	4.81	1.00	9.07	ND	0	0
5/14/2020	6.39	37.01	0.79	0	7.26	30.63	5.02	1.00	7.74	37.1	0.05	0
5/28/2020	5.99	37.09	0.71	TR	7.02	30.74	4.91	1.50	5.06	ND	0	0
6/11/2020	6.49	36.8	1	TR	7.53	31.2	4.45	0.50	5.79	37	0.15	TR
6/25/2020	6.09	36.94	0.86	TR	7.08	32.12	3.53	0.50	4.87	0	0	0
Total DNAPL Pumped (gal)	2.1				45.6				53.1			

Notes:

* - indicates DNAPL and groundwater mixture

ND - Not detected

* - indicates DNAPL and groundwater mixture

--- - No DNAPL pumped

NM - Not measured

--- - No DNAPL pumped

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

PoP - Product on probe, not measureab DTW - Depth to water (feet Below Top of Casing (B

DTD - Depth to DNAPL (feet BTOC)

TR- Trace amount of DNAPL Extracted 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	5.88
4/9/2020	7.52	22.5	2.85	0.125	7.25
4/27/2020	8.33	23.2	2.15	0.5	7.69
5/14/2020	8.05	23.22	2.13	0.5	8.25
5/28/2020	7.59	23.69	1.66	0.5	8.63
6/11/2020	7.39	24.96	0.39	0.125	5.63
6/25/2020	6.28	19.9	5.45	1.5	6.50
Total DNAPL Pumped (gal)	142.7				772.1

ND - Not detected

NM - Not measured

TOC)) PoP - Product on probe, not measureable

TR- Trace amount of DNAPL Extracted

FIGURES

Figure 2
DNAPL Recovery Activities February 2013 - June 2020
UPRR Houston Wood Preserving Works

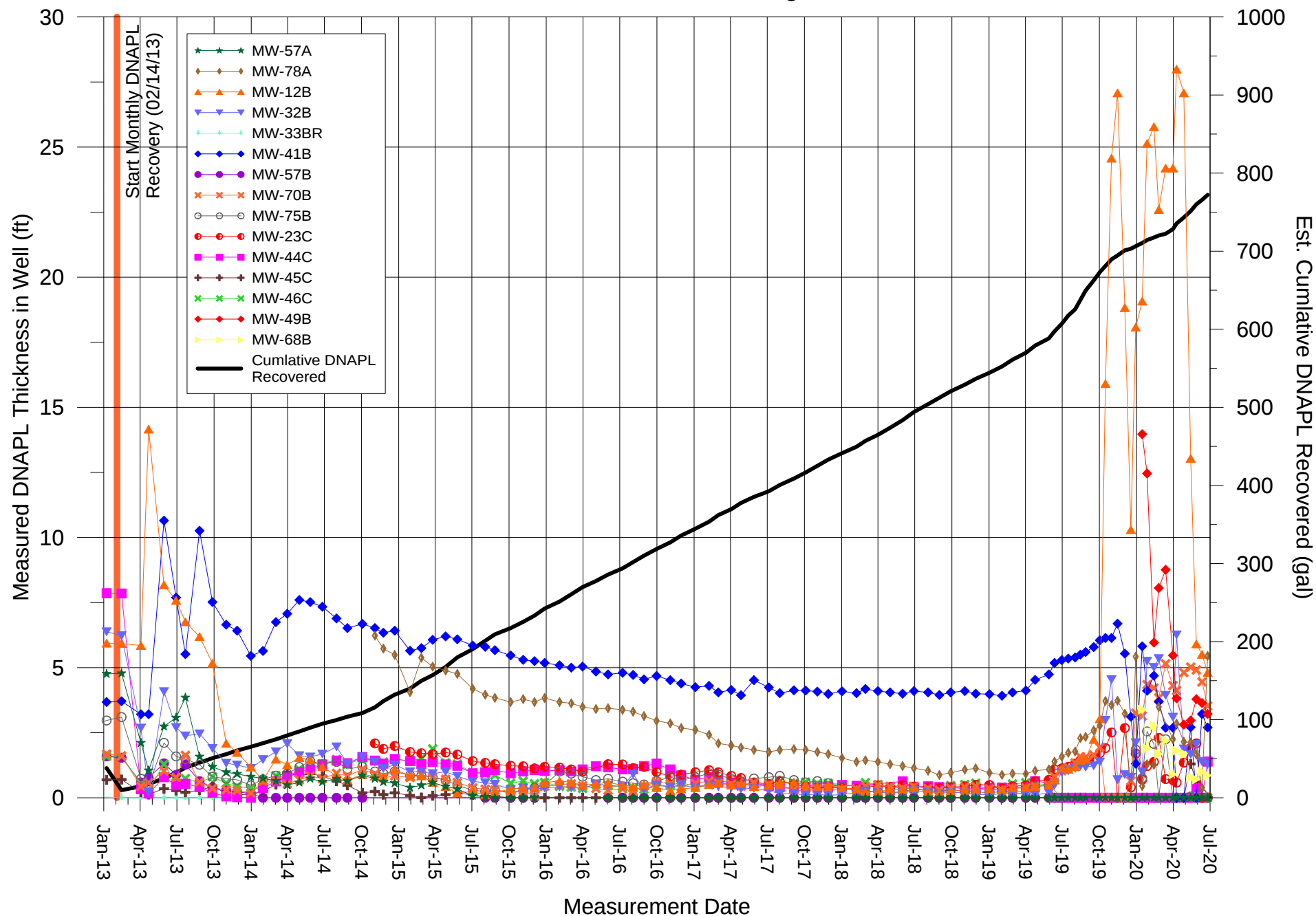


Figure 3
A-TZ Wells - DNAPL Recovery Activities July 2018 - June 2020
UPRR Houston Wood Preserving Works

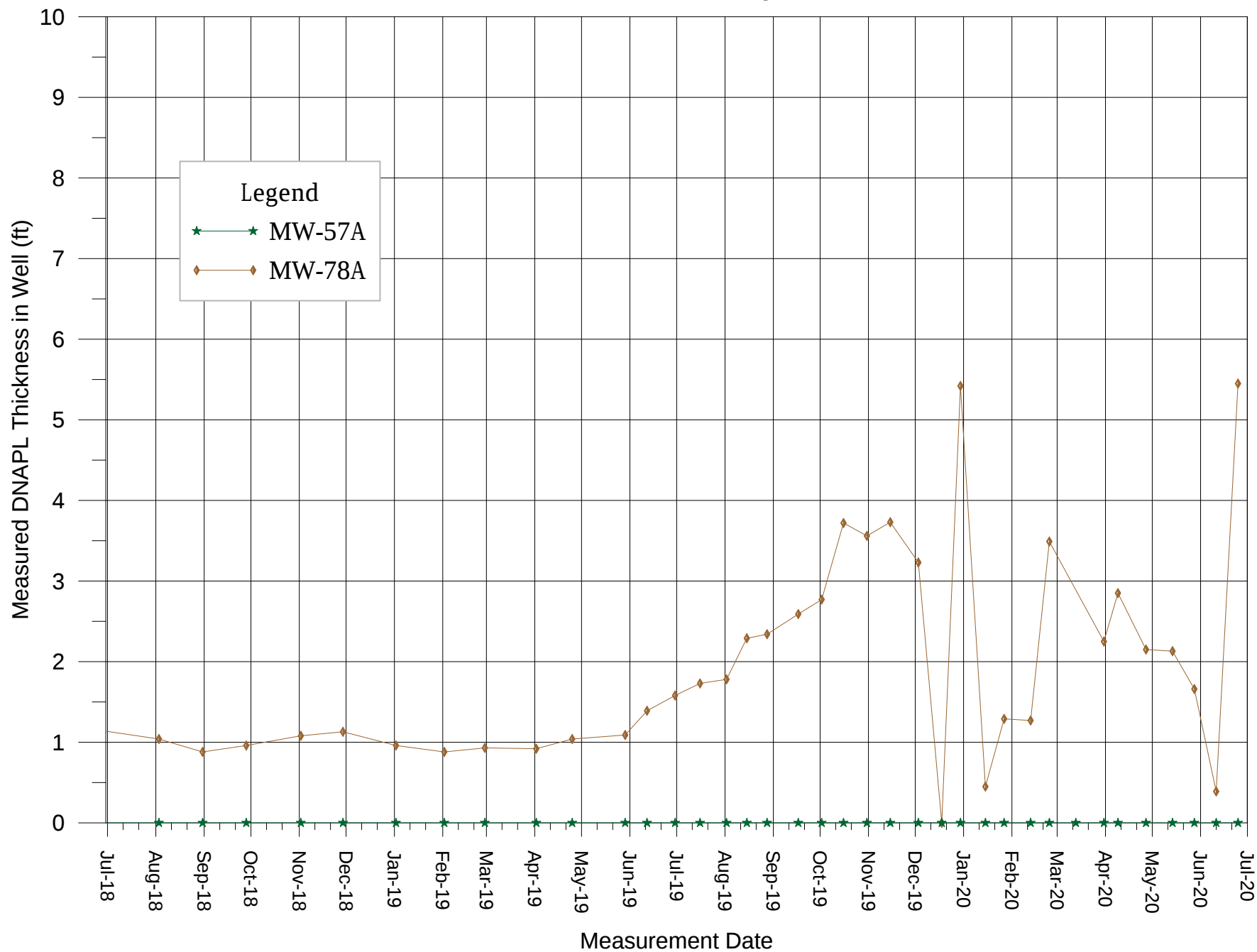


Figure 4
B-TZ Wells (West Side) - In-Well DNAPL Thickness July 2018 - June 2020
UPRR Houston Wood Preserving Works

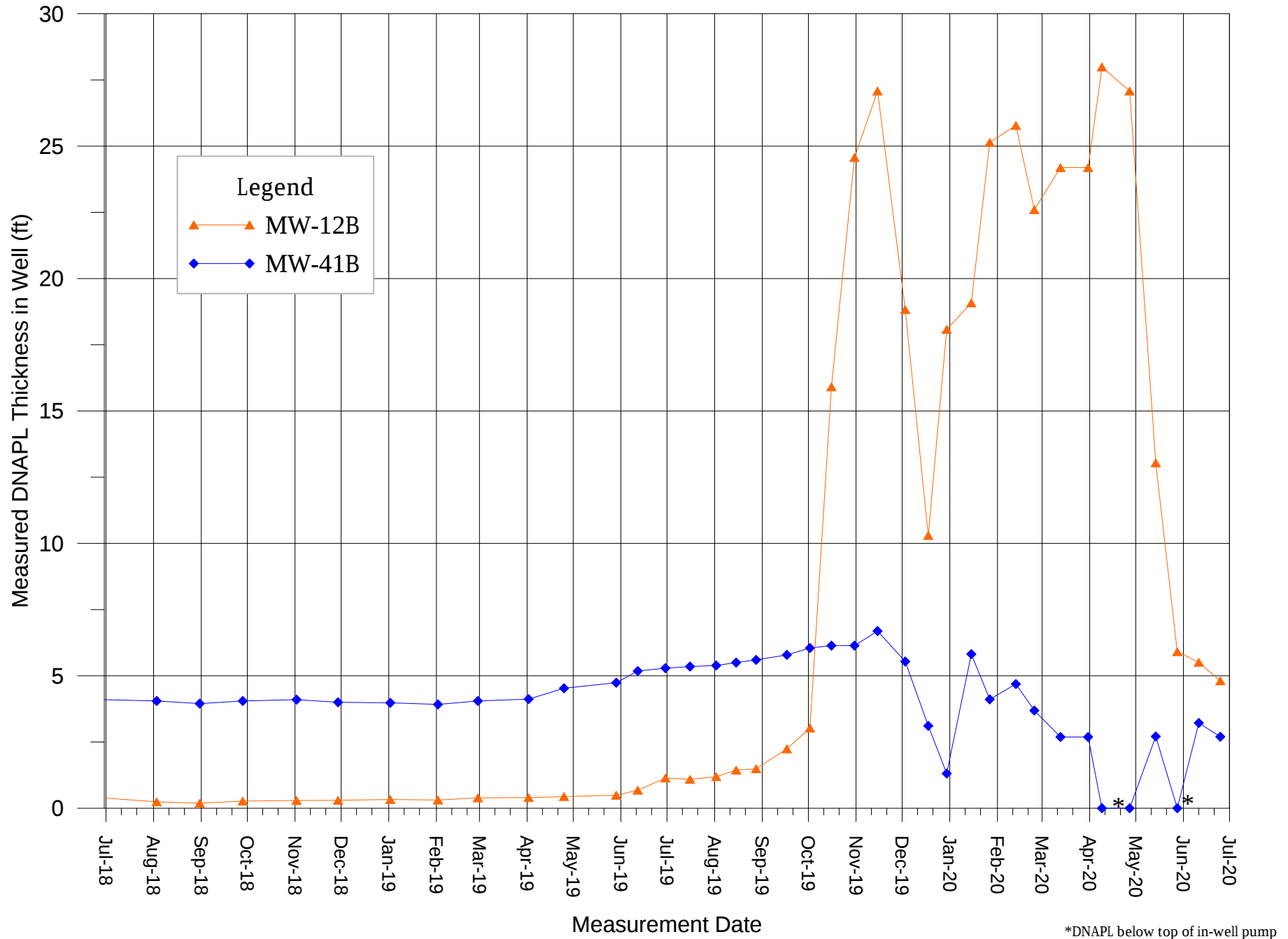


Figure 5
B-CZ/B-TZ Wells (North (On-Site and Off-Site)) - In-Well DNAPL Thickness July 2018 - June 2020
UPRR Houston Wood Preserving Works

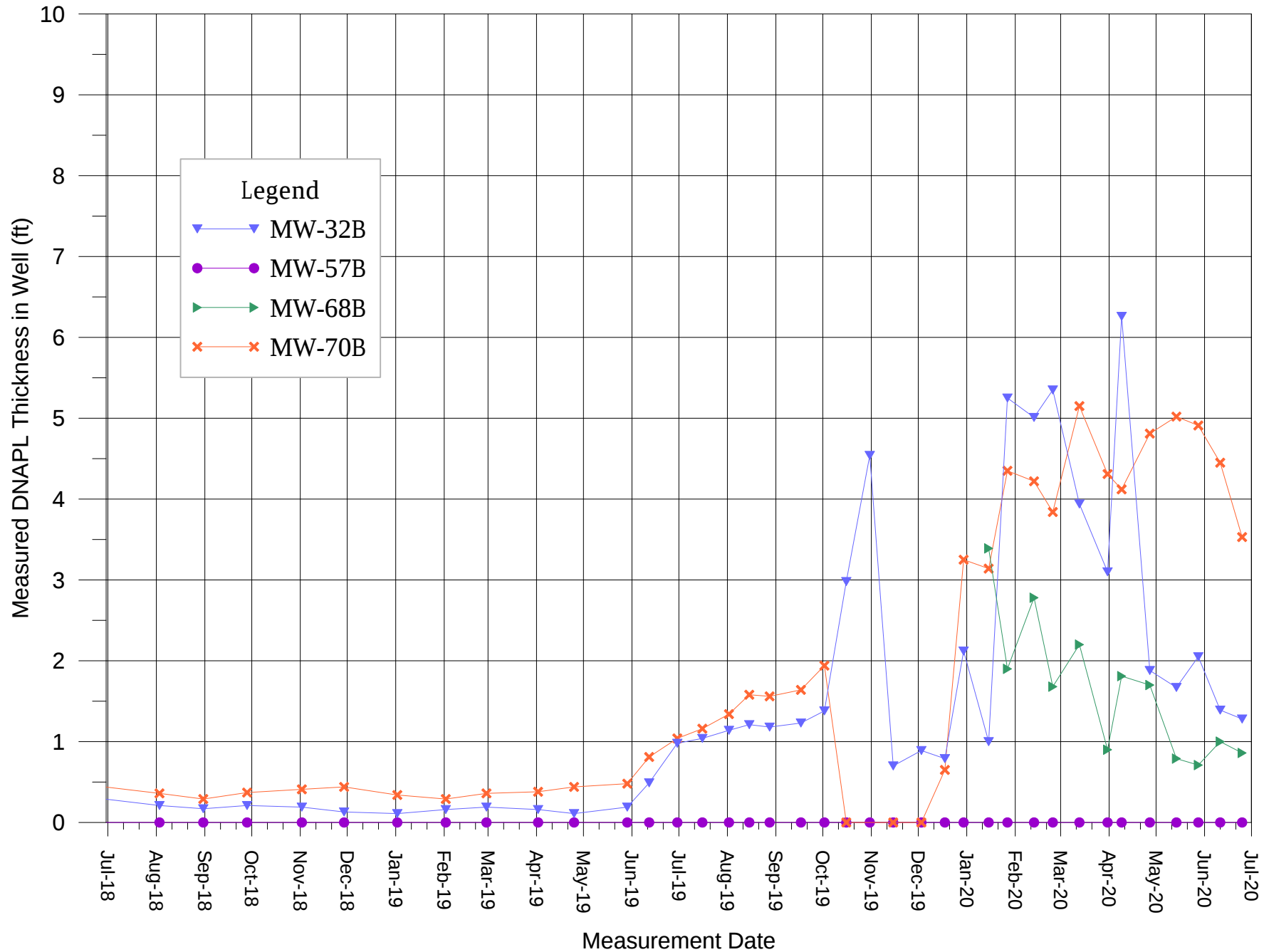


Figure 6
B-CZ/B-TZ Wells (Englewood Intermodal Yard) - In-Well DNAPL Thickness July 2018 - June 2020
UPRR Houston Wood Preserving Works

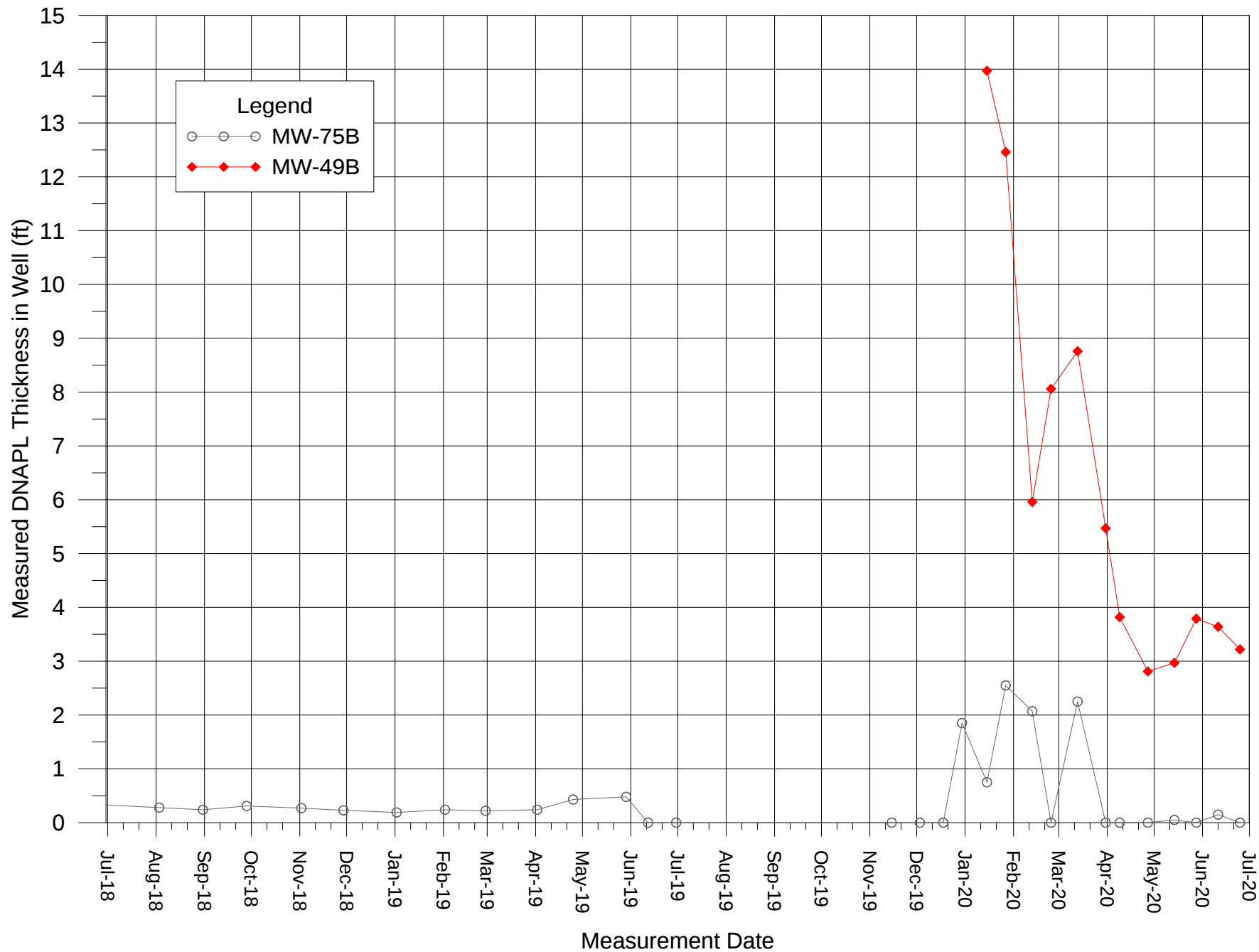
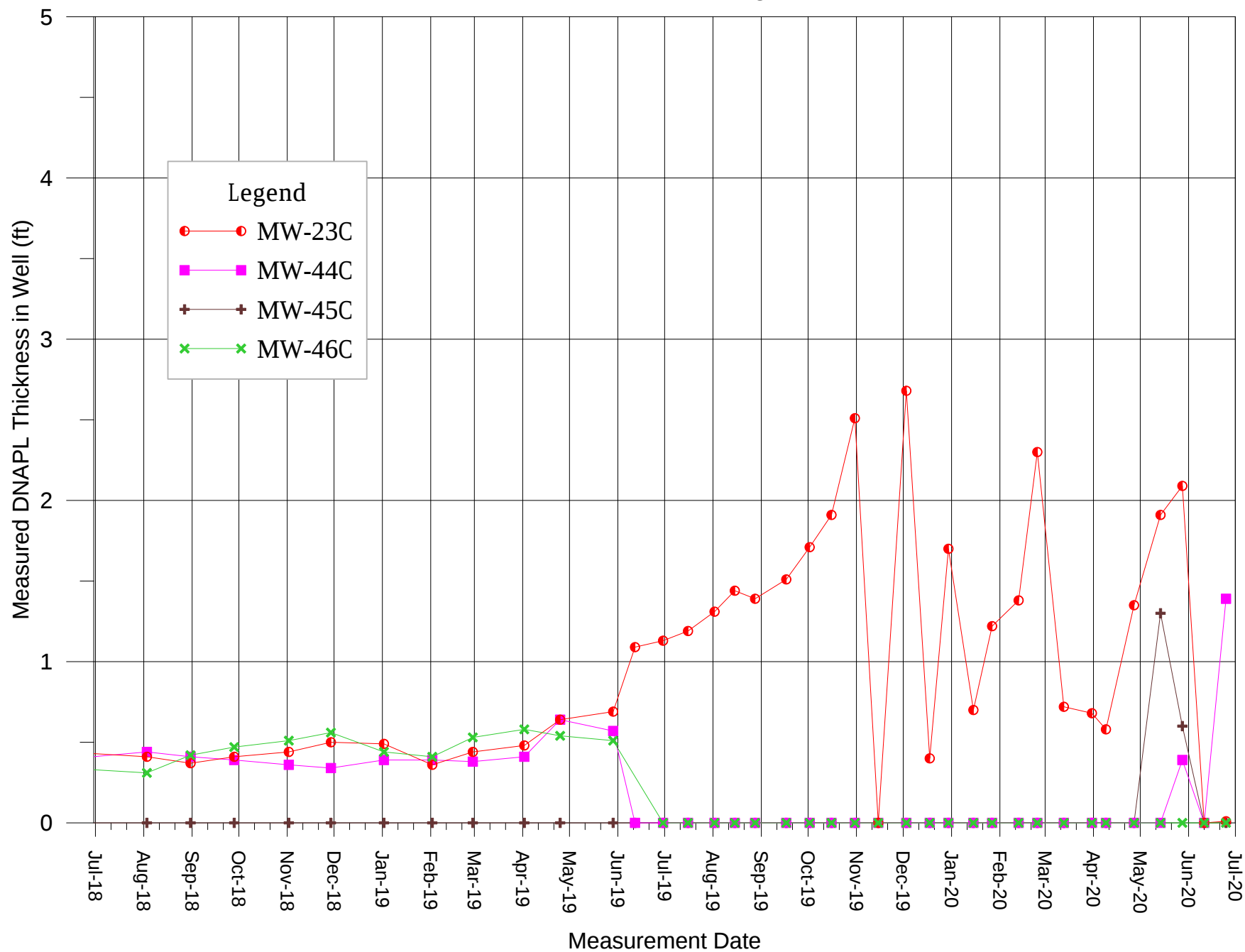


Figure 7
C-TZ Wells - In-Well DNAPL Thickness July 2018 - June 2020
UPRR Houston Wood Preserving Works

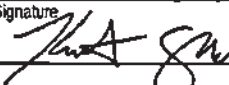


ATTACHMENT 1

Recovered DNAPL Waste Manifest

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number TXD000820266	2. Page 1 of 1	3. Emergency Response Phone 888-877-7267	4. Manifest Tracking Number 019318237 JJK		
5. Generator's Name and Mailing Address UPRR-WM C/O GHD-Attn. Manifest Receiving 6520 Corporate Dr. Indianapolis, IN 46278 (414) 267-4164				Generator's Site Address (if different than mailing address) 4910 Liberty Road Houston, TX 77026			
6. Transporter 1 Company Name NRC				U.S. EPA ID Number FLR000012823			
7. Transporter 2 Company Name EQ Industrial Services				U.S. EPA ID Number MIK435642742			
8. Designated Facility Name and Site Address US Ecology - Robstown 3277 County Road 69 Robstown, TX 78380 (800) 242-3209				U.S. EPA ID Number TXD069452340			
9a. HM		9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))		10. Containers		11. Total Quantity	12. Unit Wt./Vol.
				No.	Type		
GENERATOR X		1. RO, NA 3082, Hazardous waste, liquid, n.s. (creosote, benzene), 9, PG III (F034)		1	DM	SS	G
		2.					
		3.					
		4.					
13. Waste Codes							
14. Special Handling Instructions and Additional Information 1. WS# 090117968-0 WR# 000843							
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.							
Generator's/Officer's Printed/Typed Name Thomas Cappucci				Signature 		Month 6	Day 2
16. International Shipments		☐ Import to U.S. ☐ Export from U.S.		Port of entry/exit: Date leaving U.S.:			
17. Transporter Acknowledgment of Receipt of Materials							
Transporter 1 Printed/Typed Name Silbert R				Signature 		Month 6	Day 2
Transporter 2 Printed/Typed Name Kenneth Sharpe				Signature 		Month 6	Day 2
18. Discrepancy							
18a. Discrepancy Indication Space		☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection		Manifest Reference Number:			
18b. Alternate Facility (or Generator)				U.S. EPA ID Number			
Facility's Phone:							
18c. Signature of Alternate Facility (or Generator)						Month	Day
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)							
1. H141		2.		3.		4.	
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 Mark A. Raver				Signature 		Month 6	Day 10