



February 13, 2023

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 – 4TH QUARTER 2022
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:

WSP USA Inc. (WSP), which acquired Golder Associates Inc. in 2021, on behalf of Union Pacific Railroad Company (UPRR), submits this 4th Quarter 2022 summary report for the dense non-aqueous phase liquid (DNAPL) recovery activities conducted at the UPRR Houston Wood Preserving Works Facility (the Site).

DNAPL Recovery Summary – 4th Quarter 2022

Below is a summary of the DNAPL recovery activities for the 4th Quarter 2022:

- Total depth measurements taken during recent DNAPL recovery events indicate varying degrees of siltation in the wells. Two wells were redeveloped in October 2022, in addition to the eleven that were redeveloped during 3rd Quarter 2022. DNAPL recovery volumes have remained elevated after the well redevelopment.
- DNAPL was recovered from five wells (MW-12B, MW-32B, MW-41B, MW-49B, and MW-70B) throughout 4th Quarter 2022. Three of the recovery wells (MW-32B, MW-49B, and MW-70B) exhibited measurable DNAPL during each of the six semi-monthly events during the 4th Quarter 2022. Wells MW-12B and MW-41B also exhibited recoverable DNAPL during each event, but the groundwater/DNAPL interface was not measurable as it remained below the dedicated pumps in both wells.
- Approximately 31.1 gallons of DNAPL were recovered during the 4th Quarter 2022.
- Two wells were either damaged (MW-44C) or not accessible (MW-75B) throughout the quarter.

DNAPL Recovery Procedures

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

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(TCEQ) Technical Notice of Deficiency dated April 11, 2019, the DNAPL recovery frequency was increased to bi-monthly (twice a month) in June 2019.

The following monitoring wells are 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-74B*	B-TZ
MW-75B	B-CZ
MW-23C	C-TZ
MW-34CR	C-TZ
MW-44C	C-TZ
MW-45C	C-TZ
MW-46C	C-TZ

* Well MW-74B was added to the list of recovery wells beginning in May 2021 after measurable DNAPL was noted during site-wide gauging activities. The locations of the DNAPL recovery wells are shown on Figure 1.

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. Beginning in October 2019, the DNAPL encountered in MW-12B and MW-41B was too thick for the submersible pump to efficiently recover. 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 more viscous liquids observed in these wells. 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 at the Site pending disposal at TCEQ-permitted facilities including the Clean Harbors Deer Park Facility in La Porte, Texas or the 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.

3rd Quarter 2022 DNAPL Well Redevelopment

Total DNAPL recovery volumes began to decline in 2020 and decreased significantly beginning in September 2021. Total depth measurements taken during recent DNAPL recovery events indicate varying degrees of siltation in the wells used for DNAPL recovery. Of the 16 wells currently listed in the table above as DNAPL recovery wells, 14 were identified as candidates for redevelopment based on total well depths indicating

greater than 20 percent of the well screened interval had been silted. The two wells that were not included in the well redevelopment activities were MW-57B and MW-44C. Recovery well MW-57B was not redeveloped as recent total depth measurements indicate that less than 20 percent of the screened interval in the well had silted. Recovery well MW-44C was also not redeveloped since it is damaged and will be plugged, abandoned, and replaced according to the August 2020 Revised Response Action Plan (RAP) at a later date.

The redevelopment activities were conducted from August 29 through August 31, 2022. Eleven wells were redeveloped using pumping and surging techniques (MW-78A, MW-12B, MW-32B, MW-41B, MW-49B, MW-68B, MW-70B, MW-74B, MW-34CR, MW-45C, and MW-46C). The purging and surging techniques were conducted using either an electric submersible pump or rigid HDPE tubing with a check valve at the bottom of the tubing. The pump or HDPE tubing was lower to the bottom of the well and then raised and lowered rapidly to disturb and pump out the sediment from the bottom of the well. Redevelopment of MW-23C and MW-57A was started on August 29, 2022 but could not be completed due to wet conditions on the Soil Cap area. Recovery well MW-75B was inaccessible during the redevelopment activities in August 2022.

During the DNAPL recovery event conducted on September 16, 2022 following the August 2022 well redevelopment activities, DNAPL was recovered from three wells which had DNAPL previously measured but had not been detected recently in the wells (MW-49B, MW-68B, and MW-70B).

4th Quarter 2022 DNAPL Recovery Activities

Well redevelopment of MW-23C and MW-57A was completed on October 27, 2022. Following the redevelopment, there was no DNAPL detected nor recovered from either well throughout the 4th Quarter 2022, which was consistent with recent data. Recovery well MW-75B remained inaccessible during the 4th Quarter 2022 and will be redeveloped once access is restored. Below is a summary of the DNAPL recovery observations during the 4th Quarter 2022.

Purgewater and any NAPL removed from the wells during the October 2022 redevelopment was collected into one 55-gallon drum and temporarily stored at the Containment Storage Area at the Site. The drum was picked up for disposal at the US Ecology Robstown Facility in Robstown, Texas on January 23, 2023. The waste manifest for the disposal will be provided with the 1st Quarter 2023 DNAPL Recovery report.

DNAPL Recovery Observations

A summary of the DNAPL recovery measurements from February 2013 through December 2022 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 measured prior to each recovery effort over time from February 2013 through December 2022 is presented on Figure 2, with individual graphs for each zone and/or portion of the Site (Figures 3 through 7) discussed below. Observations from the 4th Quarter 2022 gauging and recovery activities are provided below for each of the groundwater bearing units (GWBUs):

- **A-TZ Wells:** Recovery wells MW-57A and MW-78A completed in the A-TZ were evaluated for DNAPL recovery during this period (graph of DNAPL thickness from July 2018 through December 2022 shown on Figure 3).
 - **MW-57A:** No DNAPL was detected in MW-57A during the October 12, 2022 DNAPL recovery event. No DNAPL was detected in the well prior to well redevelopment on October 27, 2022; however, some product was noted in the purge water that was recovered from MW-57A during the well redevelopment. No DNAPL was detected nor recovered from MW-57A for the remainder of 4th Quarter 2022. DNAPL has not been detected in this well since May 2019,

when a trace amount was measured. Measurable DNAPL has not been recorded in MW-57A since July 2015.

- **MW-78A:** A trace amount of DNAPL was detected but not measurable during the first three of the six semi-monthly events during the 4th Quarter 2022. Measurable DNAPL has not been detected in this well since December 2020.
- **B-TZ Wells (West Side):** Recovery wells MW-12B and MW-41B completed in the B-TZ were evaluated for DNAPL recovery during this period (graph of DNAPL thickness from July 2018 through December 2022 shown on Figure 4).

MW-12B: During the 4th Quarter 2022 recovery events at MW-12B, the groundwater/DNAPL interface was below the top of the pneumatic pulse pump. As a result, the interface probe could not get past the pump assembly, and it was not possible to record a DNAPL thickness in the well. On October 8, 2021, the pump was removed in order to verify the total depth of the well and length of the pump. The pump length was measured to be approximately 1.55 feet. Based on the measured length of the pump assembly, the assumption is there is less than 1.55 feet of DNAPL in the well. Approximately 1.5 gallons of DNAPL were recovered from MW-12B using the pneumatic pump during the 4th Quarter 2022.

- **MW-41B:** Similar to MW-12B, the top of the groundwater/DNAPL interface in MW-41B was below the top of the pneumatic pulse pump during the 4th Quarter 2022. On October 8, 2021, the pump length was measured to be approximately 1.55 feet. Based on measured length of the pump assembly, the assumption is there is less than 1.55 feet of DNAPL in the well. Approximately 1.5 gallons of DNAPL were recovered from MW-41B using the pneumatic pump during the 4th Quarter 2022.
- **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 December 2022 shown on Figure 5).
 - **MW-32B (off-site):** Following the redevelopment of MW-32B during 3rd Quarter 2022, DNAPL thickness had increased from 0.53 feet prior to development on August 29, 2022 to 7.55 feet on September 30, 2022. This was the thickest measurement of DNAPL observed in MW-32B. During the 4th Quarter 2022, DNAPL thickness in MW-32B peaked at 8.70 feet on October 17, 2022. By the DNAPL recovery event on December 27, 2022 DNAPL thickness decreased to 6.84 feet. Approximately 10.5 gallons of DNAPL were recovered from MW-32B during the 4th Quarter 2022.
 - **MW-57B (on-site):** Since June 2016, no measurable DNAPL has been detected in MW-57B. Throughout the 4th Quarter 2022, a trace amount of DNAPL was detected but not measurable during all six recovery events. No DNAPL was recovered from MW-57B during 4th Quarter 2022.
 - **MW-68B (off-site):** Following the redevelopment of MW-68B during 3rd Quarter 2022, DNAPL thickness was measured at 0.75 feet on September 16, 2022. Prior to the

redevelopment event, no measurable DNAPL had been detected in MW-68B since July 2021. Throughout 4th Quarter 2022 a trace amount of DNAPL was detected but not measurable during all six recovery events. No DNAPL was recovered from this well during 4th Quarter 2022.

- **MW-70B (off-site):** Following redevelopment in the 3rd Quarter 2022, DNAPL thickness in MW-70B peaked at 3.40 feet on September 16, 2022. DNAPL thickness decreased through 4th Quarter 2022 from 2.45 feet on October 17, 2022 to 1.78 feet on December 27, 2022. Approximately 2.6 gallons of DNAPL was recovered from MW-70B during 4th Quarter 2022, and 3.1 gallons total since redevelopment.
- **B-TZ/B-CZ Wells (Englewood Intermodal Yard):** Recovery wells MW-49B, MW-74B, and MW-75B in the Englewood Intermodal Yard completed in the B-CZ and B-TZ were evaluated for DNAPL recovery during this period (graph of DNAPL thickness from July 2018 through December 2022 shown on Figure 6).
 - **MW-49B:** Prior to the well redevelopment on August 31, 2022, the last time measurable DNAPL was detected in this well was on February 10, 2022 when a thickness of 2.76 feet was observed. Following well redevelopment, DNAPL thickness in MW-49B peaked on September 30, 2022, when a DNAPL thickness 15.5 feet was measured. During 4th Quarter 2022, DNAPL thicknesses in MW-49B decreased from 9.15 feet on October 17, 2022 to 8.52 feet on December 16, 2022. On December 27, 2022 DNAPL thickness increased slightly to 8.88 feet. However, recent total depth measurements at MW-49B have been approximately 7 feet shallower than the well construction depth and suggest that the well has an obstruction or casing failure. The well will be plugged, abandoned, and replaced at a later date. A total of approximately 15.0 gallons of DNAPL were recovered from MW-49B during 4th Quarter 2022, and 23 gallons total since redevelopment.
 - **MW-74B:** No DNAPL was detected nor recovered from MW-74B during 4th Quarter 2022. No measurable DNAPL has been detected in this well since November 2021.
 - **MW-75B:** Measurable DNAPL has only been detected once in MW-75B since June 2021. However, the well was inaccessible during the 4th Quarter 2022 DNAPL recovery events due to ongoing container operations in the intermodal yard.
- **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 December 2022 shown on Figure 7).
 - **MW-23C:** No DNAPL was detected nor recovered from this well during the six recovery events for the 4th Quarter 2022. No DNAPL was observed in the purge water removed from the well during the October 27, 2022 redevelopment. Measurable DNAPL has not been detected in MW-23C since February 2022.
 - **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. No DNAPL was observed during the well redevelopment on August 30, 2022. Given the absence of DNAPL in

this well, a graph for MW-34CR is not included in Figure 7.

- **MW-44C:** No measurable DNAPL had been detected in MW-44C from June 2019 (trace DNAPL noted in mid-June 2019) through 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 was re-developed on July 24, 2020 during the site-wide monitoring activities. Over 10 feet of silt was removed, and the final measured depth of the well was within a foot of the original total depth. During the next recovery event in early August, the well appeared to have silted up again. Redevelopment was attempted a second time on October 1, 2020, but it was unsuccessful. MW-44C was not included in the August 2022 well redevelopment activities. The well will be plugged, abandoned, and replaced with a proposed recovery well as detailed in the RAP dated August 31, 2020.
- **MW-45C:** No DNAPL was detected nor recovered from this well during 4th Quarter 2022. No measurable DNAPL has been recorded in MW-45C since March 2022.
- **MW-46C:** No DNAPL was detected nor recovered from this well during 4th Quarter 2022. No measurable DNAPL has been recorded in MW-46C since May 2019.

DNAPL Recovery: From February 2013 to December 2022, an estimated cumulative total of 1017 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. Recovery volumes began to decline in 2020 and decreased significantly beginning in September 2021. Total depth measurements taken during recent events indicated varying degrees of siltation in the DNAPL recovery wells. Eleven of the wells were redeveloped in August 2022 and two additional wells were redeveloped in October 2022. Following the redevelopment, DNAPL recovery volumes increased. A total of 8.0 gallons was recovered on September 30, 2022, which is the highest total recovery volume for a recovery event since October 2020. During 4th Quarter 2022, an average of 5.2 gallons was recovered per recovery event. DNAPL recovery volumes ranged from approximately 5.0 to 5.5 gallons per semi-monthly event, and a total of approximately 31.1 gallons were recovered during the 4th Quarter 2022 (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 us at (512) 671-3434 or Mr. Kevin Peterburs of UPRR at (414) 267-4164.

Sincerely,

Golder Associates USA Inc.



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Consultant, Geologist



Eric C. Matzner, P.G.
Vice-President, Director Hydrogeologist



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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 – December 27, 2022
Figure 2 - DNAPL Recovery Activities February 2013 – December 2022
Figure 3 – A-TZ Wells – DNAPL Recovery Activities July 2018 – December 2022
Figure 4 – B-TZ Wells (West Side) – DNAPL Recovery Activities July 2018 – December 2022
Figure 5 – B-CZ/B-TZ Wells (North (On-Site and Off-Site) – DNAPL Recovery Activities July 2018 – December 2022
Figure 6 – B-CZ/B-TZ Wells (Englewood Intermodal Yard) – DNAPL Recovery Activities July 2018 – December 2022
Figure 7 – C-TZ Wells – DNAPL Recovery Activities July 2018 – December 2022
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	1.0	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	0.3
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	1.0	NM	NM	NM	0	7.14	33.91	2.38	1.5
8/26/2013	11.31	39.61	6.19	1.0	NM	NM	NM	0	7.48	33.83	2.46	1
9/27/2013	11.17	40.63	5.17	1.0	NM	NM	NM	0	7.23	34.39	1.9	1
10/31/2013	11.09	43.71	2.09	1.0	NM	NM	NM	0	7.16	34.96	1.33	0.5
11/27/2013	11.17	44.06	1.74	1.0	NM	NM	NM	0	7.29	35.03	1.26	0.5
12/31/2013	11.02	44.62	1.18	1.0	NM	NM	NM	0	7.16	35.16	1.13	0.5
1/30/2014	11.34	45.12	0.68	1.0	NM	NM	NM	0	6.72	34.82	1.47	0.5
3/3/2014	11.17	44.32	1.48	1.0	NM	NM	NM	0	6.53	34.52	1.77	0.5
3/31/2014	11.03	44.53	1.27	1.0	NM	NM	NM	0	6.29	34.21	2.08	0.5
4/30/2014	10.92	44.26	1.54	1.0	NM	NM	NM	0	6.42	34.67	1.62	0.5
5/27/2014	10.81	44.34	1.46	1.0	NM	NM	NM	0	6.36	34.72	1.57	0.5
6/26/2014	10.72	44.61	1.19	1.0	NM	NM	NM	0	6.21	34.61	1.68	0.5
7/31/2014	10.13	44.96	0.84	1.0	NM	NM	NM	0	6.06	34.33	1.96	0.3
8/27/2014	10.26	45.12	0.68	1.0	NM	NM	NM	0	6.18	34.98	1.31	0.3
10/3/2014	10.17	44.91	0.89	1.0	NM	NM	NM	0	6.06	34.72	1.57	0.3
11/3/2014	10.29	44.97	0.83	1.0	22.51	70.71	2.09	0.3	6.18	34.91	1.38	0.3
11/24/2014	10.27	44.99	0.81	1.0	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	1.0	22.47	70.81	1.99	0.5	6.14	35.02	1.27	0.8
1/29/2015	10.16	44.96	0.84	1.0	22.26	71.04	1.76	0.5	5.71	35.29	1	0.8
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	0.3	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	2.0	22.17	71.14	1.66	0.5	5.07	35.46	0.83	1
7/6/2015	7.12	45.96	0.24	2.0	19.01	71.39	1.41	0.5	4.06	35.66	0.63	1
8/3/2015	7.26	46.09	0.11	2.0	19.16	71.46	1.34	0.8	4.29	35.71	0.58	1
8/27/2015	8.09	46.01	0.19	1.0	20.34	71.51	1.29	0.8	5.05	35.77	0.52	1
10/5/2015	7.12	45.86	0.34	1.0	19.02	71.57	1.23	0.5	4.31	35.96	0.33	1
11/5/2015	6.86	45.81	0.39	1.0	18.59	71.59	1.21	0.5	4.02	35.91	0.38	1
12/3/2015	6.46	45.79	0.41	1.0	18.33	71.67	1.13	0.5	3.92	35.96	0.33	1
12/28/2015	6.23	45.62	0.58	1.3	23.21	71.61	1.19	0.8	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	1.0	NM	NM	NM	0.0	3.67	35.87	0.53	0.5
6/2/2016	6.21	45.61	0.59	1.0	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	1.0	23.09	71.52	1.28	0.3	3.91	35.96	0.44	0.5
8/3/2016	6.34	45.77	0.43	1.0	23.16	71.66	1.14	0.3	4.03	35.49	0.91	0.5
8/30/2016	6.47	45.69	0.51	1.0	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	1.0	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	1.0	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	0.8	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	0.8	4.83	36.02	0.38	0.3
2/7/2017	6.97	45.69	0.51	0.5	23.67	71.74	1.06	0.8	4.81	35.91	0.49	0.3
3/2/2017	6.91	45.64	0.56	0.5	23.54	76.82	0.98	0.8	4.66	35.97	0.43	0.3
4/3/2017	6.82	45.71	0.49	0.5	23.46	76.96	0.84	0.8	4.57	36.01	0.39	0.3
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	0.3
5/29/2017	6.89	45.77	0.43	0.5	23.49	77.21	0.59	0.3	4.74	36.03	0.37	0.3
7/5/2017	7.01	45.71	0.49	0.5	23.61	77.27	0.53	0.3	4.86	36.13	0.27	0.3
8/1/2017	7.14	45.63	0.57	0.8	23.79	77.17	0.63	0.3	4.99	36.24	0.16	0.3
9/5/2017	7.03	45.6	0.6	1.0	23.67	77.29	0.51	0.3	4.78	36.24	0.16	0.3
10/4/2017	7.07	45.69	0.51	1.0	23.61	77.36	0.44	0.3	4.89	36.29	0.11	0.3
11/2/2017	7.11	45.76	0.44	1.0	23.74	77.42	0.38	0.3	4.96	36.26	0.14	0.3
11/29/2017	7.16	45.71	0.49	1.0	23.81	77.4	0.40	0.3	5.06	36.31	0.09	0.3
1/2/2018	6.96	45.82	0.38	1.0	23.67	77.43	0.37	0.3	4.93	36.27	0.13	0.3
2/7/2018	7.13	45.87	0.33	1.0	23.86	77.46	0.34	0.3	5.16	36.21	0.19	0.3
3/1/2018	7.36	45.96	0.24	1.0	23.96	77.41	0.39	0.3	5.38	36.13	0.27	0.3
4/2/2018	7.29	45.94	0.26	1.0	23.9	77.32	0.48	0.5	5.31	36.18	0.22	0.3
5/1/2018	8.17	45.91	0.29	1.0	24.47	77.39	0.41	0.5	6.12	36.23	0.17	0.5

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)
6/1/2018	8.49	45.86	0.34	1.0	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	1.0	24.99	77.37	0.43	0.5	6.59	36.11	0.29	0.8
8/3/2018	8.79	45.96	0.24	1.0	25.12	77.39	0.41	0.5	6.74	36.19	0.21	0.8
8/31/2018	8.32	46.01	0.19	0.8	24.81	77.43	0.37	0.5	6.47	36.23	0.17	0.8
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	0.8
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	0.3
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	0.3
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	0.3
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	0.3
4/25/2019	7.49	45.76	0.44	1.0	24.01	77.16	0.64	0.5	5.86	36.29	0.11	0.3
5/29/2019	7.51	45.71	0.49	1.0	24.11	77.11	0.69	0.5	5.91	36.21	0.19	0.3
6/12/2019	6.81	45.52	0.68	1.5	24.39	76.71	1.09	1.0	5.46	35.91	0.49	0.5
6/30/2019	6.67	45.06	1.14	2.0	24.32	76.67	1.13	0.8	5.39	35.42	0.98	1
7/16/2019	6.62	45.11	1.09	2.0	24.26	76.61	1.19	1.0	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	2.0	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	2.0	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	3.0	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	0.0	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	0.0	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	0.0	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	0.0	3.47	35.7	0.7	1
12/3/2019	7.55	27.37	18.83	0.0	26.11	75.12	2.68	1.5	4.33	35.51	0.89	0
12/18/2019	12.68	35.9	10.3	0.0	26.13	77.4	0.4	0.3	4.71	35.61	0.79	1.5
12/30/2019	8.08	28.12	18.08	0.0	26.48	76.1	1.7	0.1	5.04	34.28	2.12	1.5
1/7/2020	--	--	--	--	--	--	--	--	--	--	--	--
1/15/2020	7.47	27.12	19.08	0.0	26.49	77.1	0.7	0.0	4.1	35.4	1	1
1/27/2020	6.28	21.06	25.14	0.0	25.99	76.58	1.22	0.0	3.01	31.15	5.25	1
2/13/2020	6.91	20.42	25.78	0.0	25.51	76.42	1.38	0.0	3.88	31.39	5.01	1
2/25/2020	6.4	23.6	22.6	0.0	25.6	75.5	2.3	0.1	3.9	31.05	5.35	0.8
3/13/2020	7.61	22.01	24.19	0.0	25.66	77.08	0.72	0.0	4.32	32.46	3.94	1.3
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	0.3
4/9/2020	7.37	18.21	27.99	3.0	25.91	77.22	0.58	0.0	4.65	30.14	6.26	1.0
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	0.1	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	0.1	5.84	34.35	2.05	1.0
6/11/2020	9.29	40.69	5.51	2.5	26.93	ND	0	0.0	5.89	35.01	1.39	0.3
6/25/2020	9.01	BP	NM	2.0	25.89	77.94	0	0.0	5.6	35.12	1.28	0.3
7/9/2020	8.04	BP	NM	1.0	26.64	76	1.8	0.3	4.83	35.18	1.22	0.3
7/23/2020	8.17	BP	NM	2.5	26.81	75.61	2.19	0.3	5.63	34.7	1.7	1.0
8/6/2020	5.43	BP	NM	1.0	26.41	75.52	2.28	0.3	3.88	33.94	2.46	1.3
8/20/2020	8.03	BP	NM	1.0	26.38	75.4	2.4	0.3	4.87	33.87	2.53	0.5
9/2/2020	8.89	BP	NM	1.0	26.71	76.24	1.56	0.5	5.54	35.21	1.19	0.3
9/17/2020	9.84	BP	NM	0.0	26.99	75.9	1.9	0.5	6.01	34.4	2	0.5
10/1/2020	6.9	BP	NM	0.5	26.59	75.08	2.72	0.3	4.88	35.18	1.22	0.3
10/14/2020	8.42	BP	NM	2.5	26.71	75.08	2.72	0.3	4.95	34.26	2.14	0.5
10/28/2020	8.31	BP	NM	2.0	26.84	75.81	1.99	0.3	5.31	33.94	2.46	0.8
11/12/2020	9.19	BP	NM	1.0	27.12	76.12	1.68	TR	5.79	33.71	2.69	2.5
11/23/2020	9.55	BP	NM	0.8	27.41	76.28	1.52	0.3	6.24	34.19	2.21	1.0
12/10/2020	6.67	BP	NM	1.5	26.72	76.2	1.6	0.3	3.68	32.9	3.5	1.0
12/21/2020	5.46	BP	NM	0.8	26.21	NM	NM	0.0	3.89	32.82	3.58	1.0
1/7/2021	5.01	BP	NM	1.0	25.85	ND	0	0.0	3.02	35.4	1	1.0
1/21/2021	5.72	BP	NM	2.0	25.49	75.29	2.51	0.3	3.48	35.01	1.39	1.0
2/4/2021	6.87	BP	NM	1.5	25.48	75.36	2.44	1.3	4.09	34.48	1.92	1.0
2/23/2021	5.47	BP	NM	1.0	25.25	75.61	2.19	1.0	3.19	33.59	2.81	1.0
3/11/2021	5.95	BP	NM	0.8	25.31	75.84	1.96	1.0	3.47	34.05	2.35	1.0
3/25/2021	9.28	BP	NM	1.0	25.2	75.62	2.18	1.0	3.85	34.83	1.57	1.0
4/8/2021	7.52	BP	NM	1.0	25.38	75.4	2.4	1.0	4.92	33.7	2.7	1.0
4/22/2021	8.42	BP	NM	1.0	25.94	76.35	1.45	0.1	5.03	34.2	2.2	1.0
5/4/2021	6.82	BP	NM	1.0	25.95	75.25	2.55	1.0	4.26	34.6	1.8	1.0
5/20/2021	5.52	BP	NM	1.0	25.84	75.66	2.14	1.0	3.55	34.2	2.2	1.0

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)
6/3/2021	5.46	BP	NM	1.0	25.19	75.74	2.06	0.5	2.54	34.6	1.8	1.0
6/17/2021	6.67	BP	NM	1.0	25.06	75.62	2.18	0.5	3.08	33.98	2.42	1.0
7/1/2021	5.46	BP	NM	1.0	24.72	75.12	2.68	0.5	2.61	34.38	2.02	1.0
7/19/2021	5.08	BP	NM	1.0	23.99	74.9	2.9	0.5	2.68	34.18	2.22	0.5
7/29/2021	7.1	BP	NM	1.0	24.19	75.25	2.55	0.3	3.71	34.10	2.3	0.5
8/12/2021	8.71	BP	NM	1.0	24.96	75.72	2.08	0.3	4.96	34.19	2.21	1.0
8/26/2021	8.93	BP	NM	1.0	25.42	75.81	1.99	0.5	5.2	34.8	1.6	1.0
9/10/2021	8.91	BP	NM	0.7	25.87	75.79	2.01	TR	5.68	34.48	1.92	1.1
9/22/2021	7.42	BP	NM	0	25.93	ND	0	0	4.72	31.15	5.25	1.3
10/8/2021	6.00	45.60	0.10	0	25.68	75.60	2.20	0	3.30	32.70	3.70	1.0
10/20/2021	7.81	44.00	1.70	0	26.14	ND	0	0	4.82	32.82	3.58	1.2
11/4/2021	6.03	BP	NM	0	25.57	ND	0	0	3.93	33.30	3.10	1.5
11/18/2021	6.75	BP	NM	0	25.65	74.80	1.71	0	4.3	33.61	2.79	0.3
12/3/2021	6.30	BP	NM	0	25.79	ND	0	0	4.64	32.70	3.70	1.3
12/16/2021	6.37	BP	NM	0	25.92	76.00	0.51	0	4.84	33.30	2.70	1.3
12/30/2021	6.21	BP	NM	0	25.84	ND	Trace	0	4.22	33.63	2.37	1.5
1/14/2022	6.26	ND	Trace	0	25.92	ND	Trace	0	4.31	33.74	2.26	1.5
1/26/2022	6.32	ND	Trace	0	26.01	ND	Trace	0	4.26	33.61	2.39	1.5
2/10/2022	5.70	43.50	2.20	0.12	25.65	75.3	1.2	0	3.51	34.65	1.35	0.3
2/24/2022	6.53	BP	NM	0.15	26.00	75.51	0.99	0.2	4.87	34.32	1.68	0.3
3/10/2022	6.40	BP	NM	0.2	25.96	ND	0	0	5.03	34.6	1.40	0.5
3/24/2022	6.83	BP	NM	0	26.55	ND	0	0	5.33	35.07	0.93	0.3
4/7/2022	6.98	BP	NM	0.1	26.51	ND	0	0	4.48	35.51	0.53	0.3
4/18/2022	7.49	BP	NM	0.8	26.72	ND	0	0	4.77	35.46	0.54	0.5
5/2/2022	7.95	BP	NM	1.0	26.89	ND	Trace	0	5.12	35.33	0.57	0.5
5/20/2022	6.72	BP	NM	1.0	26.39	ND	0	0	5.21	35.21	0.84	0.5
6/2/2022	6.81	BP	NM	1.0	26.31	ND	0	0	5.39	35.34	0.71	0.5
6/16/2022	9.85	BP	NM	0.5	27.62	ND	Trace	0	5.20	35.50	0.35	0.3
6/30/2022	9.91	BP	NM	0.25	27.98	ND	0	0	6.97	ND	Trace	0.1
7/15/2022	6.89	BP	NM	1.0	27.87	ND	0	0	6.26	35.31	0.69	0.5
7/28/2022	6.96	BP	NM	1.0	27.96	ND	0	0	6.39	35.21	0.79	0.5
8/12/2022	9.10	BP	NM	0.1	28.28	Trace	Trace	0	6.92	34.15	1.85	NM
8/29/2022	8.56	BP	NM	0.5	26.56	ND	0	0	5.52	35.52	0.53	0.5
9/16/2022	8.30	BP	NM	0.5	27.70	ND	0	0	5.20	31.00	5.05	0.5
9/30/2022	9.80	BP	NM	0.25	28.00	ND	0	0	6.40	28.50	7.55	3.0
10/17/2022	11.52	BP	NM	0.25	28.32	ND	0	0	7.10	27.35	8.70	2.0
10/27/2022	11.79	BP	NM	0.25	28.74	ND	0	0	7.49	28.91	7.14	2.0
11/10/2022	11.47	BP	NM	0.25	28.51	ND	0	0	7.22	28.96	7.09	2.0
11/30/2022	7.49	BP	NM	0.25	26.21	ND	0	0	3.76	29.31	6.74	1.5
12/16/2022	7.36	BP	NM	0.25	26.06	ND	0	0	3.52	29.26	6.79	1.5
12/27/2022	7.59	BP	NM	0.25	25.67	ND	0	0	3.71	29.21	6.84	1.5
Total DNAPL Pumped (gal)	152.6				55.5				131.7			

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

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

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	2.3
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
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

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)
6/1/2018	NM	NM	NM	0	18.62	ND	0	0	8.71	40.81	4	2.3
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	NM	2
4/27/2020	NM	NM	NM	0	17.89	ND	0	0	8.01	BP	NM	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	NM	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	BP	NM	2
7/9/2020	NM	NM	NM	0	18.22	ND	0	0	7.29	BP	NM	2
7/23/2020	NM	NM	NM	0	18.36	ND	0	0	7.49	BP	NM	2.5
8/6/2020	NM	NM	NM	0	17.66	ND	0	0	5.64	BP	NM	1.3
8/20/2020	NM	NM	NM	0	18.02	ND	0	0	7.38	BP	NM	0.5
9/2/2020	NM	NM	NM	0	18.2	ND	0	0	8.11	BP	NM	0.8
9/17/2020	NM	NM	NM	0	18.56	ND	0	0	8.81	BP	NM	1
10/1/2020	NM	NM	NM	0	18.29	ND	0	0	6.39	BP	NM	0.8
10/14/2020	NM	NM	NM	0	18.31	ND	0	0	8.71	BP	NM	2
10/28/2020	NM	NM	NM	0	18.61	ND	0	0	8.51	BP	NM	1.5
11/12/2020	NM	NM	NM	0	18.71	ND	0	0	8.49	BP	NM	0.5
11/23/2020	NM	NM	NM	0	18.97	ND	0	0	8.84	BP	NM	0
12/10/2020	NM	NM	NM	0	18.62	ND	0	0	5.31	BP	NM	1.5
12/21/2020	NM	NM	NM	0	18.01	ND	0	0	4.42	BP	NM	1
1/7/2021	NM	NM	NM	0	17.52	ND	0	0	4.48	BP	NM	1.5
1/21/2021	NM	NM	NM	0	17.39	ND	0	0	4.59	BP	NM	2
2/4/2021	NM	NM	NM	0	17.22	ND	0	0	5.62	BP	NM	1.5
2/23/2021	NM	NM	NM	0	17.04	ND	0	0	4.58	BP	NM	1
3/11/2021	NM	NM	NM	0	16.98	ND	0	0	4.22	BP	NM	1.5
3/25/2021	NM	NM	NM	0	17.01	ND	0	0	5.13	BP	NM	1.0
4/8/2021	NM	NM	NM	0	17.22	ND	0	0	6.63	BP	NM	1.0
4/22/2021	NM	NM	NM	0	17.41	ND	0	0	7.64	BP	NM	1.0
5/4/2021	NM	NM	NM	0	17.57	ND	0	0	5.96	BP	NM	1.0
5/20/2021	NM	NM	NM	0	16.51	ND	0	0	5.62	BP	NM	1.0

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)
6/3/2021	NM	NM	NM	0	15.81	ND	0	0	4.41	BP	NM	1.0
6/17/2021	NM	NM	NM	0	16.74	ND	0	0	5.81	BP	NM	1.0
7/1/2021	NM	NM	NM	0	15.71	ND	0	0	4.36	BP	NM	1.0
7/19/2021	NM	NM	NM	0	15.49	ND	0	0	4.11	BP	NM	1.0
7/29/2021	NM	NM	NM	0	15.98	ND	0	0	6.51	BP	NM	1.0
8/12/2021	NM	NM	NM	0	16.58	ND	0	0	8.01	BP	NM	1.0
8/26/2021	NM	NM	NM	0	17.11	ND	0	0	8.04	BP	NM	1.0
9/10/2021	NM	NM	NM	0	17.56	ND	0	0	8.25	BP	NM	0.3
9/22/2021	5.32	ND	0	0	17.32	ND	0	0	5.66	BP	NM	0
10/8/2021	1.53	ND	0	0	NM	NM	NM	0	1.34	43.68	1.13	0.0
10/20/2021	1.98	ND	0	0	17.68	ND	0	0	5.98	43.01	1.80	0.0
11/4/2021	3.56	ND	0	0	NM	NM	NM	0	5.08	42.00	2.81	0.3
11/18/2021	NM	NM	NM	0	NM	NM	NM	0	5.92	BP	NM	0.0
12/3/2021	3.7	ND	0	0	NM	NM	NM	0	6.57	BP	NM	0.0
12/16/2021	4.6	ND	0	0	17.6	ND	0	0	6.63	BP	NM	0.0
12/30/2021	4.29	ND	0	0	17.52	ND	0	0	5.21	BP	NM	0.0
1/14/2022	4.36	ND	0	0	17.58	ND	0	0	5.34	ND	Trace	0.0
1/26/2022	4.43	ND	0	0	17.66	ND	0	0	5.42	ND	Trace	0.0
2/10/2022	4.3	ND	0	0	17.3	ND	0	0	4.61	41.55	3.26	0.3
2/24/2022	4.25	ND	0	0	17.42	ND	0	0	5.6	41.55	3.26	0.2
3/10/2022	NM	NM	NM	0	17.48	ND	0	0	5.59	41.58	3.23	0.3
3/24/2022	5.08	ND	0	0	17.72	ND	0	0	5.06	BP	NM	TR
4/7/2022	4.80	ND	0	0	17.40	ND	0	0	5.80	BP	NM	0.1
4/18/2022	5.16	ND	0	0	17.86	ND	0	0	6.03	BP	NM	1.0
5/2/2022	5.40	ND	0	0	18.10	ND	0	0	6.24	BP	NM	1.0
5/20/2022	5.46	ND	0	0	18.02	ND	0	0	6.13	BP	NM	1.0
6/2/2022	5.61	ND	0	0	18.12	ND	0	0	6.29	BP	NM	1.0
6/16/2022	5.82	ND	0	0	18.21	ND	0	0	9.23	BP	NM	1.0
6/30/2022	5.87	ND	0	0	18.39	ND	0	0	9.37	BP	NM	1.0
7/15/2022	6.81	ND	0	0	19.27	ND	0	0	6.54	BP	NM	1.0
7/28/2022	6.94	ND	0	0	19.39	ND	0	0	6.67	BP	NM	1.0
8/12/2022	7.68	ND	0	0	20.00	ND	0	0	1.00	BP	NM	0.25
8/29/2022	NM	NM	NM	0	19.81	ND	0	0	6.47	BP	NM	0.5
9/16/2022	5.70	ND	0	0	19.45	ND	0	0	8.00	BP	NM	0.5
9/30/2022	NM	NM	NM	0	19.60	ND	0	0	9.10	42.50	2.31	1.0
10/17/2022	6.90	ND	0	0	19.93	ND	0	0	9.88	BP	NM	0.25
10/27/2022	7.02	ND	0	0	20.06	ND	0	0	10.13	BP	NM	0.25
11/10/2022	6.91	ND	0	0	19.92	ND	0	0	10.02	BP	NM	0.25
11/30/2022	5.24	ND	0	0	17.52	ND	0	0	6.12	BP	NM	0.25
12/16/2022	5.17	ND	0	0	17.39	ND	0	0	6.02	BP	NM	0.25
12/27/2022	5.46	ND	0	0	17.58	ND	0	0	6.34	BP	NM	0.25
Total DNAPL Pumped (gal)	0.0				0.0				278.4			

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)

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

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	0.3	21.07	71.3	1.6	0.3
4/3/2013	19.34	70.47	0.33	0.3*	21.39	70.39	0.21	0.3*	20.61	72.36	0.54	0.3*
4/22/2013	18.62	70.64	0.16	0.3*	21.03	70.47	0.13	0.3*	20.61	72.61	0.29	0.3*
5/30/2013	18.43	70.01	0.79	0.3*	21.16	70.25	0.35	0.3*	20.59	71.61	1.29	0.3*
6/29/2013	19.34	70.32	0.48	0.3	21.93	70.32	0.28	0.3*	21.09	72.34	0.56	0.3*
7/22/2013	20.36	70.26	0.54	0.3	22.72	70.39	0.21	0.3*	21.96	72.16	0.74	0.3*
8/26/2013	20.62	70.39	0.41	0.3	22.86	70.31	0.29	0.3	22.23	72.32	0.58	0.3
9/27/2013	20.39	70.61	0.19	0.3	22.66	70.17	0.43	0.3	22.09	72.09	0.81	0.3
10/31/2013	20.17	70.75	0.05	0.1	22.59	70.42	0.18	0.1	22.41	72.34	0.56	0.2
11/27/2013	20.09	70.78	0.02	0.0	22.52	70.49	0.11	0	22.31	72.47	0.43	0.1
12/31/2013	20.01	70.8	PoP	0.0	22.39	70.46	0.14	0	22.03	72.53	0.37	0.1
1/30/2014	19.67	70.42	0.38	0.3	22.13	70.35	0.25	0	21.81	72.55	0.35	0.1
3/3/2014	19.29	70.17	0.63	0.3	21.86	70.09	0.51	0	21.57	72.05	0.85	0.3
3/31/2014	19.17	70.02	0.78	0.3	21.71	69.63	0.97	0.3	21.43	72.12	0.78	0.1
4/30/2014	19.02	69.81	0.99	0.3	21.59	69.74	0.86	0.3	21.27	71.81	1.09	0.3
5/27/2014	18.92	69.71	1.09	0.0	21.52	69.67	0.93	0.3	21.34	71.71	1.19	0.3
6/26/2014	18.81	69.52	1.28	0.3	21.59	69.77	0.83	0.3	21.17	71.6	1.3	0.3
7/31/2014	18.66	69.37	1.43	0.3	21.21	69.96	0.64	0.3	20.39	71.43	1.47	0.3
8/27/2014	18.53	69.47	1.33	0.3	21.13	70.12	0.48	0.3	20.22	71.61	1.29	0.3
10/3/2014	18.41	69.23	1.57	0.3	20.13	70.41	0.19	0.3	20.14	71.39	1.51	0.3
11/3/2014	18.52	69.37	1.43	0.3	20.29	70.36	0.24	0.3	20.27	71.47	1.43	0.3
11/24/2014	18.57	69.49	1.31	0.5	20.34	70.48	0.12	0.3	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	0.3	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	0.3	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	0.3	19.26	70.52	0.08	0	20.17	71.02	1.88	0.3
4/27/2015	18.29	69.52	1.28	0.5	20.17	70.48	0.12	0.3	20.22	71.56	1.34	1.0
5/26/2015	18.17	69.57	1.23	0.8	20.12	70.41	0.19	0.3	20.12	71.61	1.29	1.0
7/6/2015	16.29	69.86	0.94	0.5	18.07	70.49	0.11	0.3	18.17	71.93	0.97	0.8
8/3/2015	16.18	69.82	0.98	0.5	18.16	70.56	0.04	TR*	18.24	71.98	0.92	0.8
8/27/2015	17.46	69.74	1.06	0.3	19.03	70.54	0.06	TR*	19.39	72.03	0.87	0.5
10/5/2015	16.83	69.86	0.94	0.3	18.39	ND	0	0	18.72	72.34	0.56	0.5
11/5/2015	16.62	69.79	1.01	0.3	17.96	ND	0	0	18.51	72.26	0.64	0.5
12/3/2015	16.46	69.73	1.07	0.3	17.72	ND	0	0	18.62	72.36	0.54	0.5
12/28/2015	16.32	69.77	1.03	0.3	17.62	ND	0	0	18.42	72.31	0.59	0.5
2/3/2016	16.17	69.74	1.06	0.3	17.42	ND	0	0	18.29	72.46	0.44	0.3
3/3/2016	16.12	69.79	1.01	0.3	17.39	ND	0	0	18.23	72.49	0.41	0.3
3/31/2016	16.06	69.71	1.09	0.3	17.33	ND	0	0	18.24	72.54	0.36	0.3
5/3/2016	16.27	69.59	1.21	0.3	17.47	ND	0	0	18.39	72.39	0.51	0.3
6/2/2016	16.38	69.63	1.17	0.3	17.52	ND	0	0	18.43	72.43	0.47	0.3
7/8/2016	16.47	69.71	1.09	0.3	17.62	ND	0	0	18.54	72.49	0.41	0.3
8/3/2016	16.59	69.7	1.1	0.3	17.69	ND	0	0	18.51	72.53	0.37	0.3
8/30/2016	16.67	69.58	1.22	0.3	17.76	ND	0	0	18.72	72.57	0.33	0.3
9/30/2016	16.79	69.49	1.31	0.5	17.86	ND	0	0	18.83	72.46	0.44	0.3
11/3/2016	16.86	69.71	1.09	0.5	17.92	ND	0	0	18.89	72.41	0.49	0.3
11/30/2016	17.03	69.94	0.86	0.8	18.09	ND	0	0	19.12	72.32	0.58	0.3
1/4/2017	17.22	70.11	0.69	0.8	18.22	ND	0	0	19.27	72.46	0.44	0.3
2/7/2017	17.29	70.01	0.79	0.5	18.17	ND	0	0	19.19	72.39	0.51	0.3
3/2/2017	17.17	70.16	0.64	0.5	17.96	ND	0	0	19.03	72.31	0.59	0.3
4/3/2017	17.06	70.21	0.59	0	17.89	ND	0	0	18.97	72.39	0.51	0.3
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	0.3	17.84	ND	0	0	18.94	72.47	0.43	0.3
7/5/2017	17.33	70.34	0.46	0.3	17.96	ND	0	0	19.12	72.34	0.56	0.5
8/1/2017	17.39	70.39	0.41	0.3	18.09	ND	0	0	19.23	72.27	0.63	0.5
9/5/2017	17.36	70.43	0.37	0.3	18.16	ND	0	0	19.29	72.34	0.56	0.5
10/4/2017	17.31	70.41	0.39	0.3	18.21	ND	0	0	19.36	72.3	0.6	0.5
11/2/2017	17.42	70.4	0.4	0.3	18.32	ND	0	0	19.42	72.36	0.54	0.5
11/29/2017	17.49	70.36	0.44	0.3	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
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

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)
6/1/2018	18.31	70.17	0.63	0.8	19.47	ND	0	0	20.87	72.51	0.39	1
6/29/2018	18.79	70.39	0.41	0.8	19.67	ND	0	0	20.97	72.57	0.33	1
8/3/2018	18.97	70.36	0.44	0.8	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	0.8	19.32	ND	0	0	20.91	72.43	0.47	0.5
11/2/2018	18.67	70.44	0.36	0.8	19.26	ND	0	0	20.77	72.39	0.51	0.8
11/29/2018	18.47	70.46	0.34	0.3	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	1.30	0.1	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
7/9/2020	11.51	ND**	0	0	16.28	ND	0	0	16.51	ND	0	0
7/23/2020	16.92	ND**	0	0	16.49	69.7	0.90	TR	16.49	ND	0	0
8/6/2020	16.75	ND**	0	0	16.19	ND	0	0	16.47	ND	0	0
8/20/2020	16.71	ND**	0	0	16.18	ND	0	0	16.35	ND	0	0
9/2/2020	16.84	ND**	0	0	16.21	ND	0	0	16.51	ND	0	0
9/17/2020	17.29	ND**	0	0	16.71	ND	0	0	16.85	ND	0	0
10/1/2020	16.84	ND**	0	0	16.61	ND	0	0	16.64	ND	0	0
10/14/2020	16.92	ND**	0	0	16.39	ND	0	0	16.58	ND	0	0
10/28/2020	17.11	ND**	0	0	16.58	70.6	Trace	TR	16.74	ND	0	0
11/12/2020	17.42	ND**	0	0	16.83	ND	0	0	17.04	ND	0	0
11/23/2020	17.69	ND**	0	0	17.12	ND	0	0	17.33	ND	0	0
12/10/2020	17.01	ND**	0	0	16.50	ND	0	0	16.71	ND	0	0
12/21/2020	16.69	ND**	0	0	16.02	69.04	1.56	0.3	16.22	ND	0	0
1/7/2021	15.91	ND**	0	0	15.59	ND	0	0	15.81	ND	0	0
1/21/2021	15.77	ND**	0	0	15.2	70.5	0.1	TR	15.44	ND	0	0
2/4/2021	15.69	ND**	0	0	15.19	70.55	0.05	TR	15.39	ND	0	0
2/23/2021	14.55	ND**	0	0	14.99	70.21	0.39	TR	15.24	ND	0	0
3/11/2021	15.49	ND**	0	0	14.98	ND	0	0	15.21	ND	0	0
3/25/2021	15.5	ND**	0	0	14.99	ND	0	0	15.18	ND	0	0
4/8/2021	15.59	ND**	0	0	15.19	ND	0	0	15.41	ND	0	0
4/22/2021	16.09	ND**	0	0	15.52	ND	0	0	15.77	ND	0	0
5/4/2021	Well Damaged			0	14.58	ND	0	0	14.74	ND	0	0
5/20/2021	Well Damaged			0	15.58	ND	0	0	15.75	ND	0	0

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)
6/3/2021	Well Damaged			0	14.96	ND	0	0	15.21	ND	0	0
6/17/2021	Well Damaged			0	15.76	ND	0	0	15.08	ND	0	0
7/1/2021	Well Damaged			0	14.59	69.79	0.81	0.3	14.81	ND	0	0
7/19/2021	Well Damaged			0	14.05	69.42	1.18	0.3	14.26	ND	0	0
7/29/2021	Well Damaged			0	14.05	69.71	0.89	0.1	14.29	ND	0	0
8/12/2021	Well Damaged			0	14.68	70.36	0.24	TR	14.84	ND	0	0
8/26/2021	Well Damaged			0	15.21	ND	0	0	15.43	ND	0	0
9/10/2021	Well Damaged			0	15.63	ND	0	0	15.82	ND	0	0
9/22/2021	Well Damaged			0	15.71	ND	0	0	15.89	ND	0	0
10/8/2021	Well Damaged			0	15.47	ND	0	0	15.83	ND	0	0
10/20/2021	Well Damaged			0	15.88	ND	0	0	15.98	ND	0	0
11/4/2021	Well Damaged			0	15.31	68.61	1.99	0	15.51	ND	0	0
11/18/2021	Well Damaged			0	15.31	ND	0	0	15.51	ND	0	0
12/3/2021	Well Damaged			0	15.51	ND	0	0	15.72	ND	0	0
12/16/2021	Well Damaged			0	15.68	ND	0	0	16.02	ND	0	0
12/30/2021	Well Damaged			0	15.61	ND	Trace	0	15.62	ND	Trace	0
1/14/2022	Well Damaged			0	15.72	ND	Trace	0	15.81	ND	Trace	0
1/26/2022	Well Damaged			0	15.83	ND	Trace	0	15.96	ND	Trace	0
2/10/2022	Well Damaged			0	15.33	ND	0	0	15.56	ND	0	0
2/24/2022	Well Damaged			0	15.58	69.83	0.67	0	15.78	ND	0	0
3/10/2022	Well Damaged			0	15.58	69.71	0.79	0.3	15.83	ND	0	0
3/24/2022	Well Damaged			0	16.08	ND	0	0	16.20	ND	0	0
4/7/2022	Well Damaged			0	16.15	ND	0	0	16.34	ND	0	0
4/18/2022	Well Damaged			0	16.29	ND	0	0	16.59	ND	0	0
5/2/2022	Well Damaged			0	16.43	ND	0	0	16.61	ND	0	0
5/20/2022	Well Damaged			0	16.29	ND	0	0	16.52	ND	0	0
6/2/2022	Well Damaged			0	16.42	ND	0	0	16.74	ND	0	0
6/16/2022	Well Damaged			0	NM	NM	NM	0	17.33	ND	0	0
6/30/2022	Well Damaged			0	NM	NM	NM	0	17.72	ND	0	0
7/15/2022	Well Damaged			0	17.98	ND	0	0	18.21	ND	0	0
7/28/2022	Well Damaged			0	18.06	ND	0	0	18.41	ND	0	0
8/12/2022	Well Damaged			0	NM	NM	NM	0	18.00	ND	0	0
8/29/2022	Well Damaged			0	18.57	ND	0	0	19.42	ND	0	0
9/16/2022	Well Damaged			0	17.35	ND	Trace	0	17.60	ND	0	0
9/30/2022	Well Damaged			0	17.65	ND	Trace	0	17.85	ND	0	0
10/17/2022	Well Damaged			0	18.95	ND	0	0	18.12	ND	0	0
10/27/2022	Well Damaged			0	19.03	ND	0	0	18.22	ND	0	0
11/10/2022	Well Damaged			0	18.76	ND	0	0	18.76	ND	0	0
11/30/2022	Well Damaged			0	16.46	ND	0	0	15.79	ND	0	0
12/16/2022	Well Damaged			0	16.52	ND	0	0	15.71	ND	0	0
12/27/2022	Well Damaged			0	16.74	ND	0	0	16.12	ND	0	0
Total DNAPL Pumped (gal)	26.7				7.1				31.8			

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. MW-45C not measured 6/16/22-6/30/22; couldn't locate well

**Total depth measured in MW-44C was approximately 10 ft higher than during previous events - attempted to remove silt in July and October 2020.

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	0.3
4/3/2013					10.32	24.79	2.11	0.5	28.09	42.36	0.59	0.3*
4/22/2013					10.71	25.85	1.05	0.5	27.06	42.17	0.78	0.3
5/30/2013					10.63	24.16	2.74	0.5	27.13	41.63	1.32	0.3
6/29/2013					12.16	23.82	3.08	2	18.26	42.07	0.88	0.3
7/22/2013	11.83	33.91	0.84	--	13.21	23.05	3.85	2	16.34	41.67	1.28	0.8
8/26/2013					12.91	25.32	1.58	1	18.01	42.31	0.64	0.3
9/27/2013					12.72	25.71	1.19	0.8	17.74	42.51	0.39	0.3
10/31/2013					12.72	25.92	0.98	1	17.61	42.61	0.29	0.1
11/27/2013					12.61	25.98	0.92	1	17.54	42.67	0.23	0.1
12/31/2013					12.46	26.09	0.81	1	17.36	42.74	0.16	0.1
1/30/2014					11.79	26.15	0.75	0.3	17.04	ND	Trace	0
3/3/2014					11.02	26.25	0.65	0.3	16.51	ND	Trace	0
3/31/2014					10.83	26.41	0.49	0.3	16.41	ND	Trace	0
4/30/2014					10.71	26.31	0.59	0.3	16.29	ND	Trace	0
5/27/2014					10.74	26.16	0.74	0.3	16.13	ND	Trace	0
6/26/2014					10.61	26.29	0.61	0.3	16.02	ND	Trace	0
7/31/2014					10.35	26.18	0.72	0.3	15.84	ND	Trace	0
8/27/2014					10.22	26.26	0.64	0.3	15.71	ND	Trace	0
10/3/2014					10.09	26.04	0.86	0.3	15.61	ND	Trace	0
11/3/2014					10.17	26.16	0.74	0.3	NM	NM	NM	0
11/24/2014					10.13	26.29	0.61	0.3	NM	NM	NM	0
12/22/2014					10.06	26.34	0.56	0.3	NM	NM	NM	0
1/29/2015					9.73	26.51	0.39	0.3	NM	NM	NM	0
2/26/2015					9.87	26.42	0.48	0.3	NM	NM	NM	0
3/26/2015					9.81	26.32	0.58	0.3	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
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

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)
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	12.02	34.62	0.24	--	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	1.0	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	0.1	14.45	ND	0	0	14.99	ND	0	0
5/14/2020	14.95	31.89	2.97	0.1	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	0.3	14.41	ND	0	0	14.89	ND	0	0
6/25/2020	10.65	31.64	3.22	0.3	14.08	ND	0	0	14.28	ND	0	0
7/9/2020	10.51	32.41	2.45	0.5	13.51	ND	0	0	14.67	ND	0	0
7/23/2020	13.51	31.13	3.73	0.5	13.26	ND	0	0	17.09	ND	0	0
8/6/2020	13.23	32.48	2.38	0.3	11.53	ND	0	0	16.20	ND	0	0
8/20/2020	12.11	32.08	2.78	0.1	13.11	ND	0	0	15.47	ND	0	0
9/2/2020	13.58	31.04	3.82	0.8	13.91	ND	0	0	15.01	ND	0	0
9/17/2020	15.91	30.24	4.62	0.5	14.43	ND	0	0	14.71	ND	0	0
10/1/2020	13.63	31.11	3.75	0.8	12.41	ND	0	0	14.44	ND	0	0
10/14/2020	12.18	29.6	5.26	2.0	13.74	ND	0	0	14.08	ND	0	0
10/28/2020	13.71	31.93	2.93	1.0	13.91	ND	0	0	13.87	ND	0	0
11/12/2020	12.74	32.03	2.83	0.5	14.64	ND	0	0	13.81	ND	0	0
11/23/2020	12.08	32.30	2.56	0.3	14.99	ND	0	0	13.21	ND	0	0
12/10/2020	8.66	31.21	3.65	0.3	12.31	ND	0	0	13.76	ND	0	0
12/21/2020	6.6	30.72	4.14	0.5	10.92	ND	0	0	13.56	ND	0	0
1/7/2021	6.41	32.25	2.61	0.5	12.51	ND	0	0	13.25	ND	0	0
1/21/2021	15.44	31.25	3.61	0.5	12.54	ND	0	0	20.69	ND	0	0
2/4/2021	15.81	31.54	3.32	0.5	13.15	ND	0	0	18.46	ND	0	0
2/23/2021	13.44	31.2	3.66	0.5	12.32	ND	0	0	16.49	ND	0	0
3/11/2021	11.91	31.96	2.9	0.5	13.13	ND	0	0	15.55	ND	0	0
3/25/2021	10.28	32.41	2.45	0.5	13.01	ND	0	0	15.06	ND	0	0
4/8/2021	10.79	31.79	3.07	0.5	13.71	ND	0	0	14.84	ND	0	0
4/22/2021	11.29	32.08	2.78	0.5	14.31	ND	0	0	14.65	ND	0	0
5/4/2021	7.94	32.4	2.46	0.3	13.03	ND	0	0	14.59	ND	0	0
5/20/2021	7.04	32.69	2.17	0.5	10.45	ND	0	0	14.61	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)
6/3/2021	4.81	32.6	2.26	0.5	11.15	ND	0	0	14.12	ND	0	0
6/17/2021	6.39	32.8	2.06	TR	12.21	ND	0	0	13.84	ND	0	0
7/1/2021	4.51	ND	0	0	10.38	ND	0	0	13.61	ND	0	0
7/19/2021	0.39	ND	0	0	9.79	ND	0	0	13.22	ND	0	0
7/29/2021	12.91	ND	0	0	12.51	ND	0	0	16.66	ND	0	0
8/12/2021	10.49	32.60	2.26	0.1	13.91	ND	0	0	15.32	ND	0	0
8/26/2021	9.87	31.90	2.96	0.5	14.11	ND	0	0	14.92	ND	0	0
9/10/2021	10.03	31.79	3.07	0.2	14.28	ND	0	0	14.61	ND	0	0
9/22/2021	7.50	ND	0	0	13.21	ND	0	0	14.40	ND	0	0
10/8/2021	7.56	ND	0	0	12.05	ND	0	0	14.10	ND	0	0
10/20/2021	7.8	30.94	1.82	0.1	13.80	ND	0	0	14.61	ND	0	0
11/4/2021	7.63	ND	0	0	12.45	ND	0	0	13.59	ND	0	0
11/18/2021	8.00	ND	0	0	13.37	ND	0	0	13.44	ND	0	0
12/3/2021	8.25	ND	0	0	13.81	ND	0	0	13.40	ND	0	0
12/16/2021	8.52	ND	0	0	13.69	ND	0	0	13.36	ND	0	0
12/30/2021	7.81	ND	0	0	13.36	ND	0	0	13.41	ND	Trace	0
1/14/2022	7.92	ND	0	0	13.43	ND	0	0	13.52	ND	Trace	0
1/26/2022	7.91	ND	0	0	13.56	ND	0	0	13.44	ND	Trace	0
2/10/2022	11.38	30	2.76	0.3	12.71	ND	0	0	19.21	ND	0	0
2/24/2022	12.6	ND	0	0	13.68	ND	0	0	17.65	ND	0	0
3/10/2022	11.96	ND	0	0	14.40	ND	0	0	18.44	ND	0	0
3/24/2022	12.20	ND	0	0	12.56	ND	0	0	16.06	ND	0	0
4/7/2022	11.60	ND	0	0	13.70	ND	0	0	15.60	ND	0	0
4/18/2022	11.32	ND	0	0	13.81	ND	0	0	15.39	ND	0	0
5/2/2022	11.08	ND	0	0	13.99	ND	0	0	15.17	ND	0	0
5/20/2022	11.17	ND	0	0	13.46	ND	0	0	15.41	ND	0	0
6/2/2022	11.12	ND	0	0	13.34	ND	0	0	15.34	ND	0	0
6/16/2022	10.97	ND	0	0	15.03	ND	0	0	14.95	ND	Trace	0
6/30/2022	11.16	ND	0	0	15.48	ND	0	0	15.03	ND	Trace	0
7/15/2022	8.73	ND	0	0	13.96	ND	0	0	15.22	ND	Trace	0
7/28/2022	8.84	ND	0	0	14.06	ND	0	0	15.38	ND	Trace	0
8/12/2022	11.11	ND	0	0	13.50	ND	0	0	16.60	ND	Trace	0
8/29/2022	11.39	ND	NM	2	13.56	ND	0	0	15.61	ND	0	0
9/16/2022	9.60	24.00	11.50	2.5	13.85	ND	0	0	15.30	ND	0	0
9/30/2022	10.80	20.00	15.50	3.5	14.80	ND	0	0	15.00	ND	Trace	0
10/17/2022	11.85	19.35	9.15	2.5	15.41	ND	0	0	14.85	ND	Trace	0
10/27/2022	12.06	19.47	9.03	2.5	15.79	ND	0	0	14.93	ND	Trace	0
11/10/2022	11.77	19.62	8.88	2.5	15.61	ND	0	0	14.77	ND	Trace	0
11/30/2022	7.52	19.86	8.64	2.5	12.29	ND	0	0	11.23	ND	Trace	0
12/16/2022	7.46	19.98	8.52	2.5	12.17	ND	0	0	11.06	ND	Trace	0
12/27/2022	7.74	19.62	8.88	2.5	12.46	ND	0	0	11.49	ND	Trace	0
Total DNAPL Pumped (gal)	46.9				15.5				2.8			

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-74B			
	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	0.3				
4/3/2013					6.79	35.26	0.44	0.3				
4/22/2013					6.06	35.12	0.58	0.3				
5/30/2013					6.19	34.67	1.03	0.3				
6/29/2013					8.01	34.92	0.78	0.3*				
7/22/2013					8.22	34.07	1.63	0.3*				
8/26/2013					8.17	35.09	0.61	0.3				
9/27/2013					8.32	35.34	0.36	0.3				
10/31/2013					8.26	35.39	0.31	0.1				
11/27/2013					8.12	35.42	0.28	0.1				
12/31/2013					7.89	35.51	0.19	0.1				
1/30/2014					7.84	35.06	0.64	0.1				
3/3/2014					7.09	35.05	0.65	0.1				
3/31/2014					6.87	35.17	0.53	0.1				
4/30/2014					6.72	35.01	0.69	0.1				
5/27/2014					6.64	34.86	0.84	0.1				
6/26/2014					6.52	34.97	0.73	0.3				
7/31/2014					6.26	34.76	0.94	0.3				
8/27/2014					6.84	34.86	0.84	0.3				
10/3/2014					6.71	34.61	1.09	0.3				
11/3/2014					6.79	34.79	0.91	0.3				
11/24/2014					6.77	34.93	0.77	0.3				
12/22/2014					6.69	34.86	0.84	0.3				
1/29/2015					6.48	34.92	0.78	0.3				
2/26/2015					6.39	34.81	0.89	0.5				
3/26/2015					6.27	34.91	0.79	0.3				
4/27/2015					6.19	34.99	0.71	0.3				
5/26/2015					6.07	35.11	0.59	0.5				
7/6/2015					5.03	35.32	0.38	0.3				
8/3/2015					5.12	35.37	0.33	TR*				
8/27/2015					6.31	35.41	0.29	TR*				
10/5/2015					5.72	35.47	0.23	0.3				
11/5/2015					5.41	35.42	0.28	0.3				
12/3/2015					5.13	35.63	0.07	0.3				
12/28/2015					5.02	35.26	0.44	0.3				
2/3/2016					4.86	35.21	0.49	0.3				
3/3/2016					4.92	35.17	0.53	0.3				
3/31/2016					4.91	35.24	0.46	0.3				
5/3/2016					5.13	35.29	0.36	0.3				
6/2/2016					5.26	35.36	0.29	0.3				
7/8/2016					5.34	35.31	0.34	0.3				
8/3/2016					5.42	35.39	0.26	0.3				
8/30/2016					5.61	35.21	0.44	0.3				
9/30/2016					5.74	35.03	0.62	0.3				
11/3/2016					5.79	35.11	0.54	0.3				
11/30/2016					6.03	35.23	0.42	0.3				
1/4/2017					6.17	35.09	0.56	0.5				
2/7/2017					6.26	35.01	0.64	0.5				
3/2/2017					6.16	35.09	0.56	0.5				
4/3/2017					6.09	35.13	0.52	0.5				
4/27/2017					6.12	35.2	0.45	0.5				
5/29/2017					6.29	35.06	0.59	0.5				
7/5/2017					6.39	35.14	0.51	0.3				
8/1/2017					6.47	35.21	0.44	0.3				
9/5/2017					6.56	35.34	0.31	0.3				
10/4/2017					6.63	35.39	0.26	0.3				
11/2/2017					6.74	35.31	0.34	0.3				
11/29/2017					6.79	35.29	0.36	0.3				
1/2/2018					6.34	35.34	0.31	0.3				
2/7/2018					6.42	35.31	0.34	0.3				
3/1/2018					6.67	35.21	0.44	0.5				
4/2/2018					6.61	35.16	0.49	0.5				
5/1/2018					7.22	35.23	0.42	1.3				

TABLE 1

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

DNAPL Recovery Date	MW-68B				MW-70B				MW-74B			
	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)
6/1/2018					7.42	35.29	0.36	1				
6/29/2018					7.58	35.21	0.44	1				
8/3/2018					7.69	35.29	0.36	0.8				
8/31/2018					7.42	35.36	0.29	0.5				
9/28/2018					7.33	35.28	0.37	0.5				
11/2/2018					7.22	35.24	0.41	0.8				
11/29/2018					7.06	35.21	0.44	0.5				
1/2/2019					6.96	35.31	0.34	0.5				
2/2/2019					6.87	35.36	0.29	0.5				
2/28/2019					6.74	35.29	0.36	0.5				
4/2/2019					6.67	35.27	0.38	0.5				
4/25/2019					6.74	35.21	0.44	0.5				
5/29/2019					6.71	35.17	0.48	0.5				
6/12/2019					6.43	34.84	0.81	1				
6/30/2019					6.48	34.61	1.04	1				
7/16/2019					6.43	34.49	1.16	1.5				
8/2/2019					6.48	34.31	1.34	1.5				
8/15/2019					6.51	34.07	1.58	2				
8/28/2019					6.57	34.09	1.56	2				
9/17/2019					6.51	34.01	1.64	2				
10/2/2019					6.46	33.71	1.94	2.5				
10/16/2019					6.42	ND	0	0				
10/31/2019					6.43	ND	Trace	0				
11/15/2019					4.75	ND	0	0				
12/3/2019					5.01	ND	0	0				
12/18/2019					5.53	35	0.65	0.3				
12/30/2019					5.71	32.4	3.25	0.1				
1/7/2020	4.82	34.21	3.59	--	--	--	--	--				
1/15/2020	4.82	34.41	3.39	0.5	7.19	32.51	3.14	0.1				
1/27/2020	2.15	35.9	1.9	0.5	9.9	31.3	4.35	0.1				
2/13/2020	3.49	35.02	2.78	0.5	5.99	31.43	4.22	0.1				
2/25/2020	2.35	36.12	1.68	0.3	4.71	31.81	3.84	0.3				
3/13/2020	3.99	35.6	2.2	0.1	4.63	30.5	5.15	0.3				
3/31/2020	4.46	36.9	0.9	0.0	6.04	31.34	4.31	0.5				
4/9/2020	4.41	35.99	1.81	0.1	6.79	31.53	4.12	0.5				
4/27/2020	5.53	36.1	1.7	0.1	6.81	30.84	4.81	1.0				
5/14/2020	6.39	37.01	0.79	0	7.26	30.63	5.02	1.0				
5/28/2020	5.99	37.09	0.71	TR	7.02	30.74	4.91	1.5				
6/11/2020	6.49	36.8	1	TR	7.53	31.2	4.45	0.5				
6/25/2020	6.09	36.94	0.86	TR	7.08	32.12	3.53	0.5				
7/9/2020	5.06	37.37	0.43	0.3	5.61	32	3.65	0.5				
7/23/2020	5.31	37.47	0.33	TR	6.33	32.2	3.45	1.0				
8/6/2020	3.02	37.38	0.42	TR	6.15	33.12	2.53	1.3				
8/20/2020	5.11	37.26	0.54	TR	5.74	33.2	2.45	1.0				
9/2/2020	5.96	37.4	0.4	TR	6.74	34.39	1.26	0.1				
9/17/2020	6.6	37.32	0.48	0.1	6.92	34.99	0.66	0.1				
10/1/2020	3.81	37.39	0.41	0.1	5.52	34.88	0.77	0.3				
10/14/2020	5.11	36.81	0.99	0.3	5.63	34.49	1.16	0.3				
10/28/2020	5.26	36.52	1.28	0.3	4.8	34.71	0.94	0.3				
11/12/2020	6.13	36.82	0.98	0.3	6.38	34.21	1.44	0.5				
11/23/2020	6.54	37.2	0.6	0.3	7.51	35.19	0.46	0.3				
12/10/2020	3.24	37.08	0.72	0.0	5.82	35.10	0.55	0.1				
12/21/2020	1.22	37.01	0.79	0.1	5.55	34.48	1.17	0.1				
1/7/2021	2.48	ND	0	0	5.04	35	0.65	TR				
1/21/2021	2.99	37.37	0.43	TR	4.72	35.02	0.63	TR				
2/4/2021	3.62	37.32	0.48	TR	7.2	35.08	0.57	TR				
2/23/2021	2.51	ND	0	0	5.33	34.2	1.45	1.0				
3/11/2021	3.49	ND	0	0	5.33	34.3	1.35	0.8				
3/25/2021	3.34	ND	0	0	5.78	34.93	0.72	0.5				
4/8/2021	4.28	ND	0	0	5.88	34.83	0.82	0.5				
4/22/2021	4.96	ND	0	0	5.99	34.56	1.09	0.5				
5/4/2021	3.64	37.38	0.42	0	6.21	34.39	1.26	0.5	7.81	32.80	2.20	2.0
5/20/2021	0.99	ND	0	0	5.89	35.09	0.56	0.3	5.93	33.40	1.60	0.5

TABLE 1

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

DNAPL Recovery Date	MW-68B				MW-70B				MW-74B			
	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)
6/3/2021	2.66	ND	0	0	4.58	34.98	0.67	0.3	6.54	33.62	1.38	0.5
6/17/2021	3.51	ND	0	0	4.78	35.16	0.49	0.3	6.86	34.70	0.30	0.1
7/1/2021	1.11	37.01	0.39	0.1	4.48	34.85	0.8	TR	3.68	34.08	0.92	0.5
7/19/2021	1.06	37.21	0.19	TR	3.78	34.9	0.75	TR	5.36	34.15	0.85	0.8
7/29/2021	3.74	37.38	0.02	TR	5.74	35.2	0.45	TR	6.31	33.60	1.40	1.0
8/12/2021	5.21	ND	0	0	5.71	35.12	0.53	TR	7.51	33.34	1.66	1.0
8/26/2021	5.80	ND	0	TR	5.88	35.16	0.49	TR	7.34	33.22	1.78	1.0
9/10/2021	5.08	ND	0	0	6.41	35.18	0.47	0.1	7.81	34.40	0.60	0.2
9/22/2021	4.65	ND	0	0	6.46	ND	0	0	11.35	34.41	0.59	0
10/8/2021	3.14	ND	0	0	5.12	ND	0	0	6.94	33.58	1.42	0
10/20/2021	5.01	ND	0	0	6.84	35.27	0.38	0	11.84	34.81	0.19	0
11/4/2021	3.38	ND	0	0	5.10	ND	0	0	7.24	33.83	1.17	0.3
11/18/2021	4.38	ND	0	0	5.34	ND	0	0	7.41	ND	0	0
12/3/2021	4.38	ND	0	0	5.58	ND	0	0	7.90	ND	0	0
12/16/2021	4.72	ND	0	0	5.84	ND	0	0	7.51	ND	0	0
12/30/2021	3.88	ND	0	0	5.46	ND	Trace	0	7.76	ND	Trace	0
1/14/2022	3.92	ND	0	0	5.56	ND	Trace	0	7.82	ND	Trace	0
1/26/2022	4.06	ND	0	0	5.67	ND	Trace	0	7.91	ND	Trace	0
2/10/2022	3.07	ND	0	0	5.39	ND	0	0	7.30	ND	0	0
2/24/2022	4.08	ND	0	0	5.52	34.7	0.6	0.2	8.41	ND	0	0
3/10/2022	4.99	ND	0	0	6.23	ND	0	0	8.60	ND	0	0
3/24/2022	2.91	ND	0	0	6.24	ND	0	0	8.62	ND	0	0
4/7/2022	4.23	ND	0	0	6.05	ND	0	0	8.20	ND	0	0
4/18/2022	4.46	ND	0	0	6.29	ND	0	0	8.42	ND	0	0
5/2/2022	5.13	ND	0	0	6.40	ND	Trace	0	8.52	ND	0	0
5/20/2022	5.21	ND	0	0	6.52	ND	0	0	8.51	ND	0	0
6/2/2022	5.39	ND	0	0	6.43	ND	0	0	8.39	ND	0	0
6/16/2022	5.27	ND	0	0	8.80	ND	0	0	9.09	ND	Trace	0
6/30/2022	5.35	ND	0	0	8.96	ND	0	0	9.47	ND	Trace	0
7/15/2022	6.79	ND	0	0	7.34	ND	0	0	8.41	ND	Trace	0
7/28/2022	6.91	ND	0	0	7.41	ND	0	0	8.51	ND	Trace	0
8/12/2022	6.54	ND	Trace	0	7.90	ND	0	0	8.82	ND	Trace	0
8/29/2022	4.35	ND	0	0	6.26	ND	0	0	8.62	ND	0	0
9/16/2022	6.00	37.20	0.75	0.25	7.30	31.90	3.40	0.25	8.80	ND	Trace	0
9/30/2022	7.00	ND	Trace	0	7.40	32.00	3.30	0.25	8.70	ND	0	0
10/17/2022	7.83	ND	Trace	0	7.90	32.85	2.45	0.10	9.24	ND	0	0
10/27/2022	7.97	ND	Trace	0	8.27	32.97	2.33	0.50	9.42	ND	0	0
11/10/2022	7.72	ND	Trace	0	8.13	32.82	2.48	0.50	9.31	ND	0	0
11/30/2022	3.22	ND	Trace	0	3.29	33.63	1.67	0.50	6.02	ND	0	0
12/16/2022	3.34	ND	Trace	0	3.16	33.69	1.61	0.50	6.12	ND	0	0
12/27/2022	2.96	ND	Trace	0	2.87	33.52	1.78	0.50	6.02	ND	0	0
Total DNAPL Pumped (gal)	4.1				59.3				7.8			

* - 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

TABLE 1

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

DNAPL Recovery Date	MW-75B				MW-78A				Approx DNAPL Recovered (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	10.01	34.1	3.1	0.3	NM	NM	NM	0	9.8
4/3/2013	13.71	36.47	0.73	0.3	NM	NM	NM	0	5.2
4/22/2013	9.72	36.72	0.48	0.3	NM	NM	NM	0	2.9
5/30/2013	9.61	35.09	2.11	0.8	NM	NM	NM	0	7.7
6/29/2013	10.61	35.61	1.59	0.8	NM	NM	NM	0	7.2
7/22/2013	9.74	35.71	1.49	0.8	NM	NM	NM	0	6.7
8/26/2013	10.76	35.93	1.27	0.8	NM	NM	NM	0	6.5
9/27/2013	10.52	36.39	0.81	0.5	NM	NM	NM	0	5.8
10/31/2013	10.31	36.47	0.73	1	NM	NM	NM	0	5.1
11/27/2013	10.39	36.51	0.69	1	NM	NM	NM	0	4.7
12/31/2013	10.13	36.72	0.48	1	NM	NM	NM	0	4.7
1/30/2014	12.62	36.49	0.71	0.8	NM	NM	NM	0	4.7
3/3/2014	12.12	36.35	0.85	0.8	NM	NM	NM	0	4.9
3/31/2014	12.01	36.27	0.93	0.8	NM	NM	NM	0	5.0
4/30/2014	11.84	36.02	1.18	0.8	NM	NM	NM	0	5.1
5/27/2014	11.71	35.79	1.41	0.8	NM	NM	NM	0	4.9
6/26/2014	11.58	35.91	1.29	0.5	NM	NM	NM	0	5.0
7/31/2014	11.32	35.82	1.38	0.5	NM	NM	NM	0	4.8
8/27/2014	11.19	36.09	1.11	0.5	NM	NM	NM	0	4.3
10/3/2014	11.09	36.01	1.19	0.5	NM	NM	NM	0	4.8
11/3/2014	11.16	36.19	1.01	0.8	9.31	19.12	6.23	2	7.3
11/24/2014	11.21	36.27	0.93	0.5	9.39	19.62	5.73	2	8.0
12/22/2014	11.26	36.19	1.01	0.5	9.34	19.86	5.49	2	8.3
1/29/2015	11.06	36.34	0.86	0.5	9.14	21.29	4.06	2	7.8
2/26/2015	11.09	36.34	0.86	0.5	9.17	19.97	5.38	2.5	10.0
3/26/2015	10.93	36.42	0.78	0.5	9.12	20.31	5.04	0.8	7.3
4/27/2015	10.78	36.52	0.68	0.5	9.17	20.46	4.89	2	10.5
5/26/2015	10.61	36.72	0.48	0.8	9.09	20.59	4.76	2.5	12.3
7/6/2015	8.52	36.91	0.29	0.8	7.01	21.16	4.19	2	10.5
8/3/2015	8.66	36.96	0.24	0.8	7.12	21.39	3.96	2.5	10.8
8/27/2015	9.31	36.91	0.29	0.8	7.96	21.51	3.84	2	8.3
10/5/2015	8.62	37.02	0.18	0.5	7.23	21.67	3.68	2	8.0
11/5/2015	8.34	36.93	0.27	0.5	7.02	21.56	3.79	2	8.0
12/3/2015	8.12	36.81	0.39	0.5	6.83	21.67	3.68	2	8.0
12/28/2015	8.01	36.72	0.48	0.5	6.71	21.52	3.83	2.3	9.0
2/3/2016	7.82	36.19	1.01	0.3	6.52	21.67	3.68	2	9.0
3/3/2016	7.74	36.27	0.93	0.5	6.46	21.72	3.63	2	9.3
3/31/2016	7.67	36.39	0.81	0.5	6.49	21.86	3.49	2	9.3
5/3/2016	7.79	36.47	0.68	0.5	6.57	21.94	3.41	2	7.8
6/2/2016	7.71	36.42	0.73	0.5	6.65	21.91	3.44	2	8.3
7/8/2016	7.8	36.53	0.62	0.5	6.71	21.97	3.38	2	8.0
8/3/2016	7.89	36.59	0.56	0.5	6.82	22.04	3.31	2	8.0
8/30/2016	7.96	36.64	0.51	0.5	6.94	22.21	3.14	2	8.3
9/30/2016	7.91	36.51	0.64	0.5	7.04	22.39	2.96	2	8.5
11/3/2016	7.86	36.36	0.79	0.5	7.11	22.49	2.86	2	8.5
11/30/2016	7.97	36.47	0.68	0.8	7.29	22.67	2.68	2	8.8
1/4/2017	8.04	36.36	0.79	0.8	7.42	22.74	2.61	2	8.8
2/7/2017	8.12	36.21	0.94	0.8	7.48	22.93	2.42	2.5	9.0
3/2/2017	8.01	36.26	0.89	0.8	7.36	23.26	2.09	2	8.5
4/3/2017	7.93	36.43	0.72	0.8	7.29	23.34	2.01	2	7.5
4/27/2017	7.86	36.52	0.63	0.8	7.36	23.42	1.93	2	8.0
5/29/2017	7.94	36.41	0.74	0.8	7.51	23.51	1.84	2	7.8
7/5/2017	8.04	36.36	0.79	0.8	7.79	23.59	1.76	2	7.3
8/1/2017	8.16	36.31	0.84	0.8	7.89	23.51	1.84	2	8.0
9/5/2017	8.22	36.47	0.68	0.8	7.81	23.48	1.87	2	8.3
10/4/2017	8.29	36.56	0.59	0.8	7.89	23.51	1.84	2	7.8
11/2/2017	8.37	36.51	0.64	1	7.97	23.59	1.76	2	8.5
11/29/2017	8.33	36.59	0.56	1	8.02	23.67	1.68	2	8.0
1/2/2018	8.07	36.72	0.43	1	8.17	23.82	1.53	2	8.3
2/7/2018	8.17	36.91	0.24	1	8.29	23.97	1.38	2	8.3
3/1/2018	8.31	36.94	0.21	1	8.47	23.91	1.44	2	7.5
4/2/2018	8.26	36.89	0.26	0.8	8.39	23.97	1.38	2.3	7.8
5/1/2018	8.92	36.96	0.19	0.8	9.02	24.06	1.29	2	9.0

TABLE 1

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

DNAPL Recovery Date	MW-75B				MW-78A				Approx DNAPL Recovered (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)	
6/1/2018	9.34	36.91	0.24	0.8	9.21	24.13	1.22	2	9.8
6/29/2018	9.67	36.82	0.33	0.8	9.39	24.21	1.14	2.3	10.5
8/3/2018	9.84	36.87	0.28	0.8	9.47	24.31	1.04	2	10.0
8/31/2018	9.71	36.91	0.24	0.8	9.32	24.47	0.88	2	8.3
9/28/2018	9.62	36.84	0.31	0.8	9.22	24.39	0.96	2	8.3
11/2/2018	9.57	36.88	0.27	0.8	9.09	24.27	1.08	2	8.5
11/29/2018	9.41	36.92	0.23	1	8.96	24.22	1.13	2	7.5
1/2/2019	9.28	36.96	0.19	1	8.78	24.39	0.96	2	7.8
2/2/2019	9.22	36.91	0.24	1	8.71	24.47	0.88	2	8.0
2/28/2019	9.16	36.93	0.22	1	8.67	24.42	0.93	2	8.8
4/2/2019	9.06	36.91	0.24	1	8.58	24.43	0.92	2	8.8
4/25/2019	9.02	36.72	0.43	1	8.49	24.31	1.04	2	9.3
5/29/2019	9.07	36.67	0.48	1	8.42	24.26	1.09	2	9.3
6/12/2019	8.92	ND	Trace	0	8.67	23.96	1.39	2	9.0
6/30/2019	8.66	ND	Trace	0	9.36	23.77	1.58	2	9.8
7/16/2019	8.62	ND	Trace	0	9.29	23.62	1.73	2	10.5
8/2/2019	8.67	ND	Trace	0	9.34	23.57	1.78	2	8.0
8/15/2019	8.69	ND	ND	0	9.42	23.06	2.29	2	12.0
8/28/2019	8.72	ND	Trace	0	9.51	23.01	2.34	2	12.0
9/17/2019	8.61	ND	Trace	0	9.39	22.76	2.59	2	13.0
10/2/2019	8.53	ND	Trace	0	9.27	22.58	2.77	2	10.5
10/16/2019	NM	NM	NM	0	10.16	21.63	3.72	2	8.0
10/31/2019	NM	NM	NM	0	10.41	21.79	3.56	2.5	8.5
11/15/2019	7.91	ND	0	0	8.01	21.62	3.73	1.5	5.0
12/3/2019	8.24	ND	0	0	8.41	22.12	3.23	2	6.5
12/18/2019	4.99	ND	0	0	8.38	ND	0	0	2.1
12/30/2019	7.79	35.3	1.85	0	9.16	19.93	5.42	1.5	3.3
1/7/2020	--	--	--	--	--	--	--	--	--
1/15/2020	6.47	36.4	0.75	0	8.79	24.9	0.45	0.1	4.1
1/27/2020	5.92	34.6	2.55	0.1	7.06	24.06	1.29	0	3.8
2/13/2020	7.88	35.08	2.07	0.1	8.01	24.08	1.27	0	3.3
2/25/2020	5.82	ND	0	0	7.84	21.86	3.49	0.3	2.6
3/13/2020	8.24	34.9	2.25	0.1	NM	NM	NM	0	2.3
3/31/2020	4.79	ND	0	0	7.82	23.1	2.25	0.1	5.9
4/9/2020	8.52	ND	0	0	7.52	22.5	2.85	0.1	7.3
4/27/2020	9.07	ND	0	0	8.33	23.2	2.15	0.5	7.7
5/14/2020	7.74	37.1	0.05	0	8.05	23.22	2.13	0.5	8.3
5/28/2020	5.06	ND	0	0	7.59	23.69	1.66	0.5	8.6
6/11/2020	5.79	37	0.15	TR	7.39	24.96	0.39	0.1	5.6
6/25/2020	4.87	ND	0	0	6.28	19.9	5.45	1.5	6.5
7/9/2020	8.91	ND	0	0	8.41	19.7	5.65	2.5	7.3
7/23/2020	8.71	ND	0	0	7.85	20.91	4.44	1.0	8.8
8/6/2020	6.74	ND	0	0	7.81	22.05	3.3	1.0	6.3
8/20/2020	6.01	ND	0	0	7.21	21.88	3.47	0.5	3.9
9/2/2020	8.61	ND	0	0	6.98	22.6	2.75	1.0	4.4
9/17/2020	8.52	ND	0	0	8.05	22.21	3.14	0.5	3.1
10/1/2020	7.33	37.1	Trace	0	8.01	24.1	1.25	1.0	3.9
10/14/2020	8.26	37.2	Trace	TR	8.11	24.9	0.45	0.5	8.3
10/28/2020	8.11	ND	0	0	7.99	25.08	0.27	0.3	6.3
11/12/2020	8.41	36.78	0.37	0.3	8.42	25.0	0.35	0.1	5.6
11/23/2020	8.62	36.04	1.11	0.3	9.19	25.08	0.27	0.3	3.3
12/10/2020	7.94	36.54	0.61	0.1	8.79	25.12	0.23	TR	4.8
12/21/2020	6.15	36.84	0.31	0.1	6.43	25.21	0.14	TR	3.9
1/7/2021	6.81	37.01	0.14	0.1	7.31	ND	0	0	4.1
1/21/2021	7.85	35.5	1.65	2.0	7.71	ND	0	0	7.8
2/4/2021	8.19	35.2	1.95	2.0	7.63	ND	0	0	7.8
2/23/2021	7.64	34.59	2.56	1.0	7.52	ND	0	0	6.5
3/11/2021	7.82	35.1	2.05	1.0	7.42	ND	0	0	6.5
3/25/2021	7.91	36.81	0.34	0.3	7.28	ND	0	0	5.3
4/8/2021	7.08	36.53	0.62	0	7.41	ND	0	0	5.0
4/22/2021	8.59	36.8	0.35	0.3	7.02	ND	0	0	4.4
5/4/2021	7.83	ND	0	0	7.22	ND	0	0	6.8
5/20/2021	8.06	37.1	0.05	0.3	8.04	ND	0	0	5.5

TABLE 1

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

DNAPL Recovery Date	MW-75B				MW-78A				Approx DNAPL Recovered (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)	
6/3/2021	3.71	37.02	0.13	0.1	7.49	ND	0	0	4.9
6/17/2021	5.21	ND	0	0	6.81	ND	0	0	3.9
7/1/2021	7.33	ND	0	0	NM	NM	NM	0	4.4
7/19/2021	5.16	ND	0	0	NM	NM	NM	0	4.0
7/29/2021	7.48	ND	0	0	7.18	ND	0	0	3.9
8/12/2021	7.58	ND	0	0	6.84	ND	0	0	4.4
8/26/2021	8.19	37.01	0.14	TR	6.92	ND	0	0	5.0
9/10/2021	8.63	ND	0	0	6.58	ND	0	0	2.6
9/22/2021	8.09	ND	0	0	NM	NM	NM	0	1.3
10/8/2021	8.03	ND	0	0	7.14	ND	0	0	1.0
10/20/2021	8.21	ND	0	0	NM	NM	NM	0	1.3
11/4/2021	7.70	ND	0	0	7.01	ND	0	0	2.0
11/18/2021	7.70	ND	0	0	7.11	ND	0	0	0.3
12/3/2021	7.94	ND	0	0	7.46	ND	0	0	1.3
12/16/2021	8.12	ND	0	0	7.80	ND	0	0	1.3
12/30/2021	NM	NM	NM	0	8.09	ND	Trace	0	1.5
1/14/2022	NM	NM	NM	0	8.16	ND	Trace	0	1.5
1/26/2022	NM	NM	NM	0	8.27	ND	Trace	0	1.5
2/10/2022	NM	NM	NM	0	8.88	ND	0	0	0.9
2/24/2022	NM	NM	NM	0	8.51	ND	0	0	1.1
3/10/2022	NM	NM	NM	0	8.67	ND	0	0	1.2
3/24/2022	NM	NM	NM	0	8.65	ND	0	0	0.3
4/7/2022	NM	NM	NM	0	8.90	ND	0	0	0.5
4/18/2022	NM	NM	NM	0	8.96	ND	0	0	2.3
5/2/2022	NM	NM	NM	0	9.02	ND	0	0	2.5
5/20/2022	NM	NM	NM	0	9.13	ND	0	0	2.5
6/2/2022	NM	NM	NM	0	9.26	ND	0	0	2.5
6/16/2022	NM	NM	NM	0	9.13	ND	Trace	0	1.8
6/30/2022	NM	NM	NM	0	9.23	ND	Trace	0	1.4
7/15/2022	NM	NM	NM	0	9.26	ND	Trace	0	2.5
7/28/2022	NM	NM	NM	0	9.36	ND	Trace	0	2.5
8/12/2022	NM	NM	NM	0	9.59	ND	Trace	0	0.4
8/29/2022	NM	NM	NM	0	9.41	ND	0	0	3.5
9/16/2022	NM	NM	NM	0	NM	NM	NM	0	4.5
9/30/2022	NM	NM	NM	0	9.20	ND	Trace	0	8.0
10/17/2022	NM	NM	NM	0	9.21	ND	Trace	0	5.1
10/27/2022	NM	NM	NM	0	9.34	ND	Trace	0	5.5
11/10/2022	NM	NM	NM	0	9.17	ND	Trace	0	5.5
11/30/2022	NM	NM	NM	0	5.81	ND	0	0	5.0
12/16/2022	NM	NM	NM	0	5.72	ND	0	0	5.0
12/27/2022	NM	NM	NM	0	6.17	ND	0	0	5.0
Total DNAPL Pumped (gal)	60.9				151.3				1016.8

* - 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-78A not measured 7/1/21, 7/19/21, 9/22/21, 10/20/21; well inaccessible due to container operations

MW-75B not measured 12/30/21; well inaccessible due to container operations

FIGURES

Figure 2
DNAPL Recovery Activities February 2013 - December 2022
UPRR Houston Wood Preserving Works

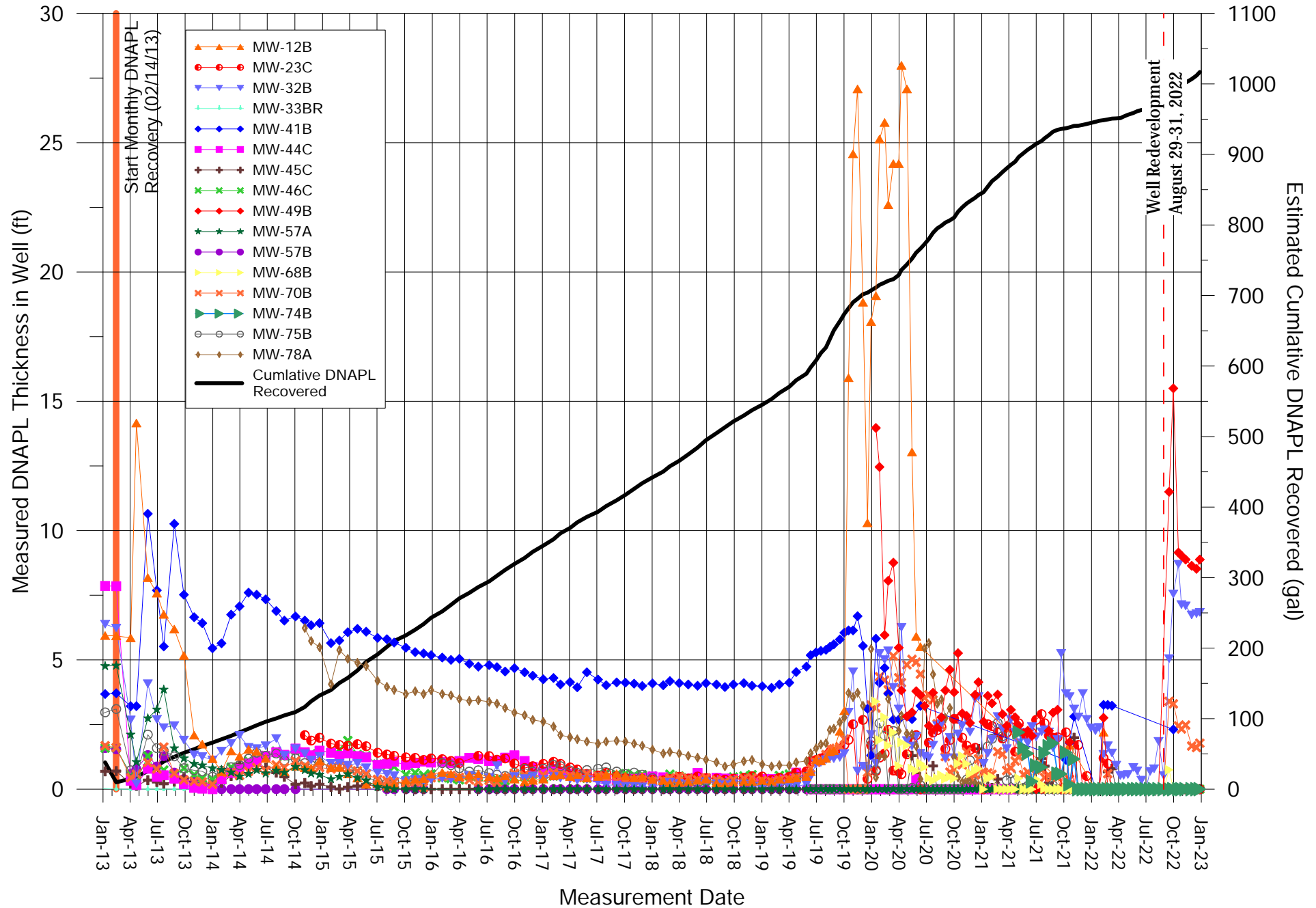
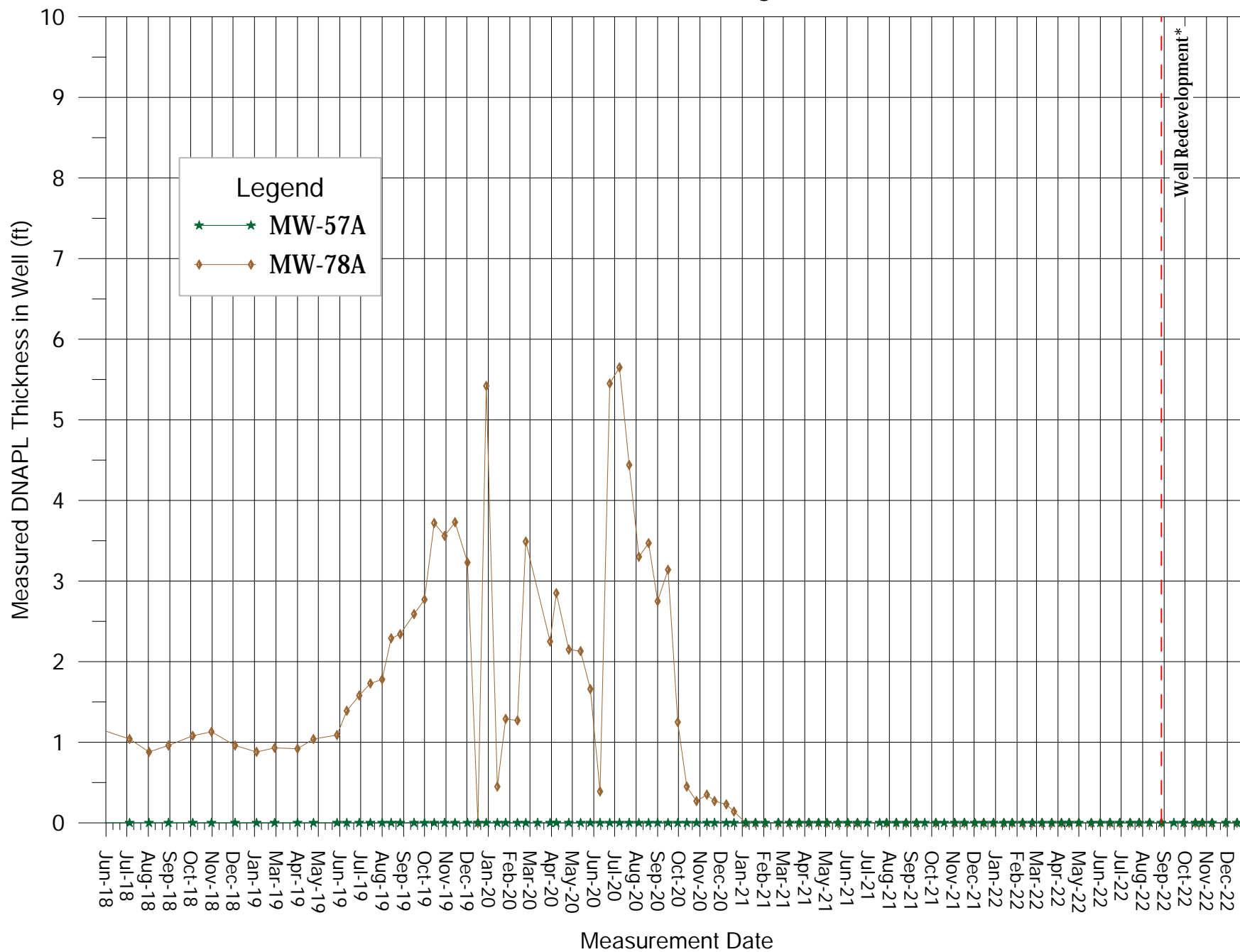
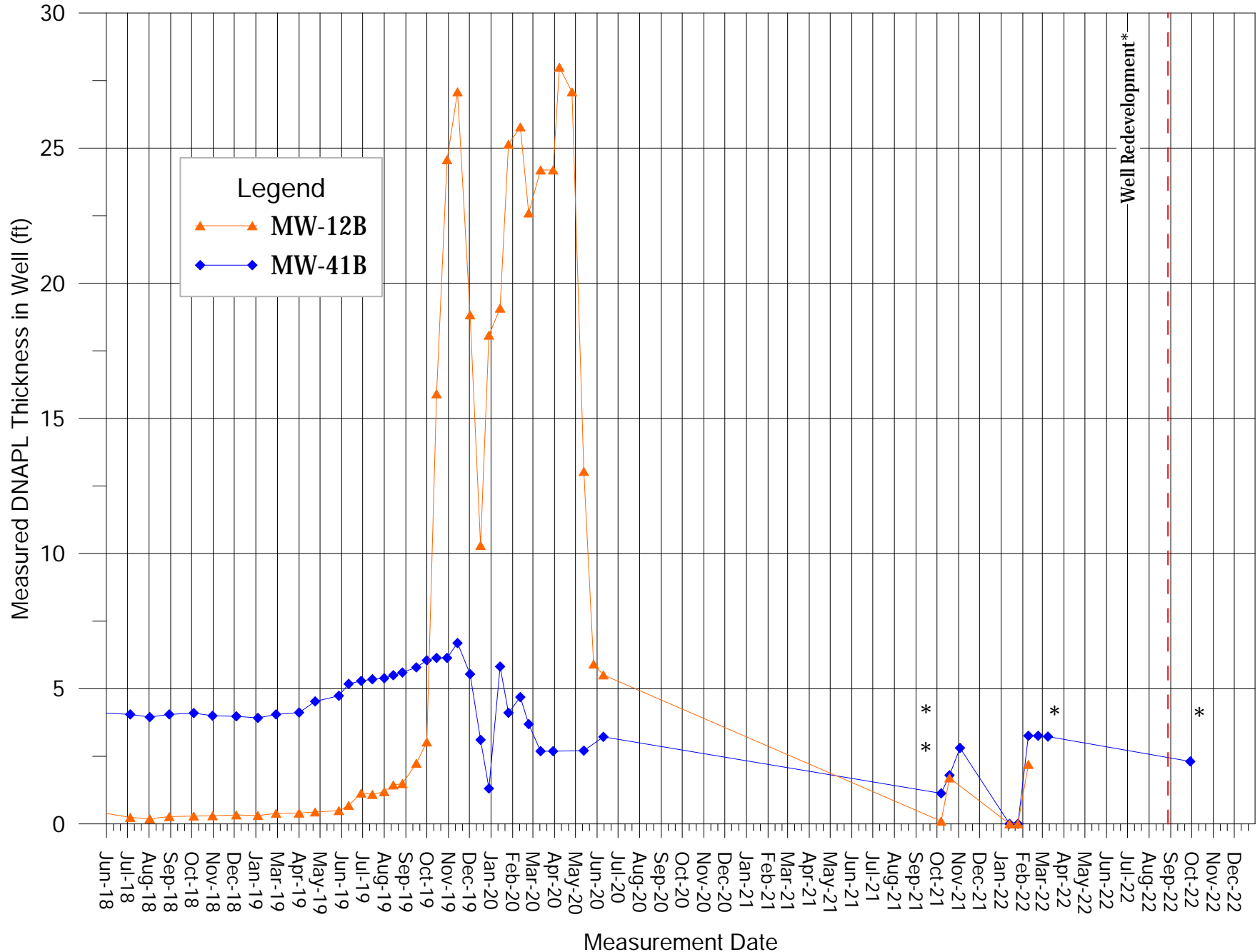


Figure 3
A-TZ Wells - DNAPL Recovery Activities July 2018 - December 2022
UPRR Houston Wood Preserving Works



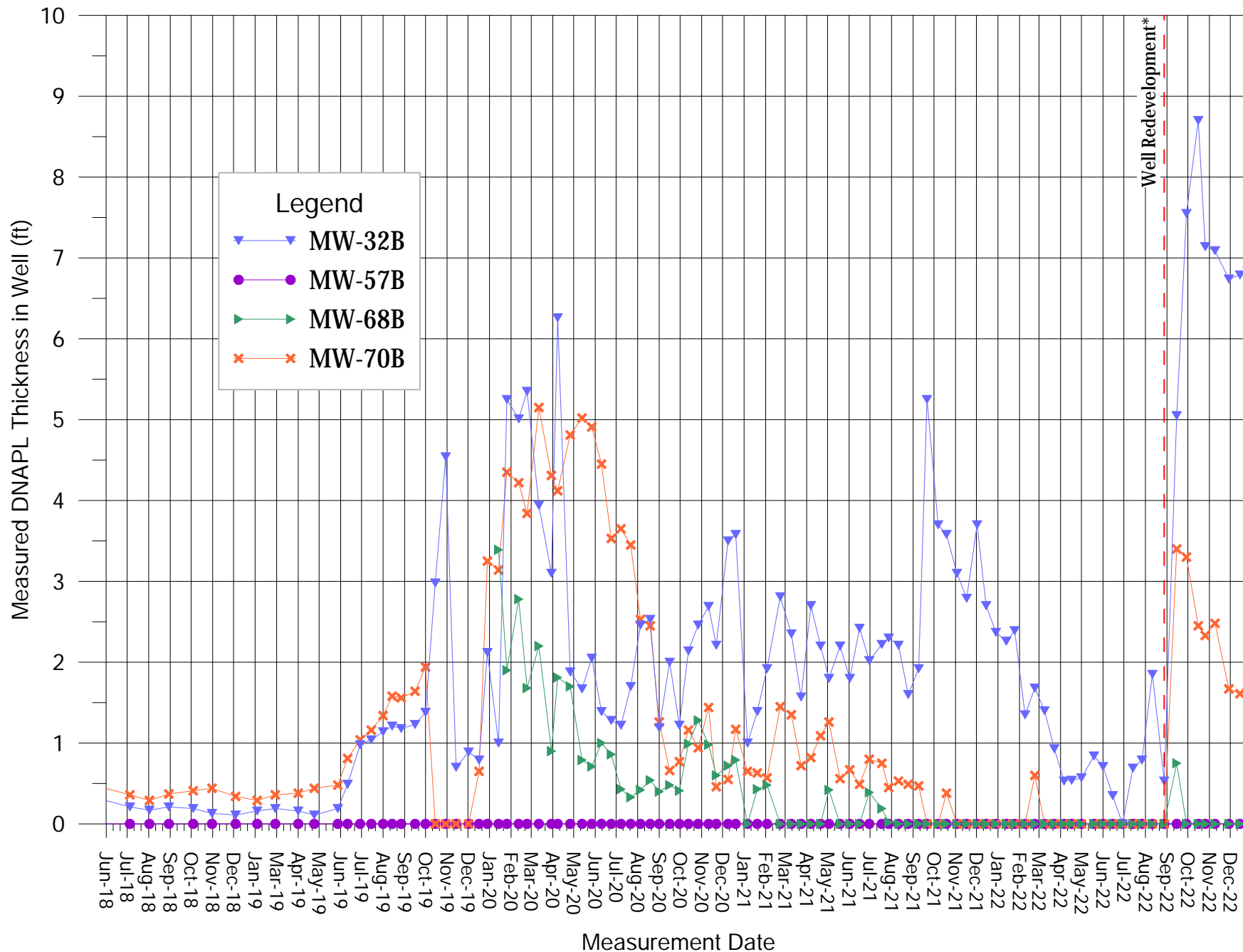
*Wells MW-57A and MW-78A redeveloped on August 29, 2022

Figure 4
B-TZ Wells (West Side) - In-Well DNAPL Thickness July 2018 - December 2022
UPRR Houston Wood Preserving Works



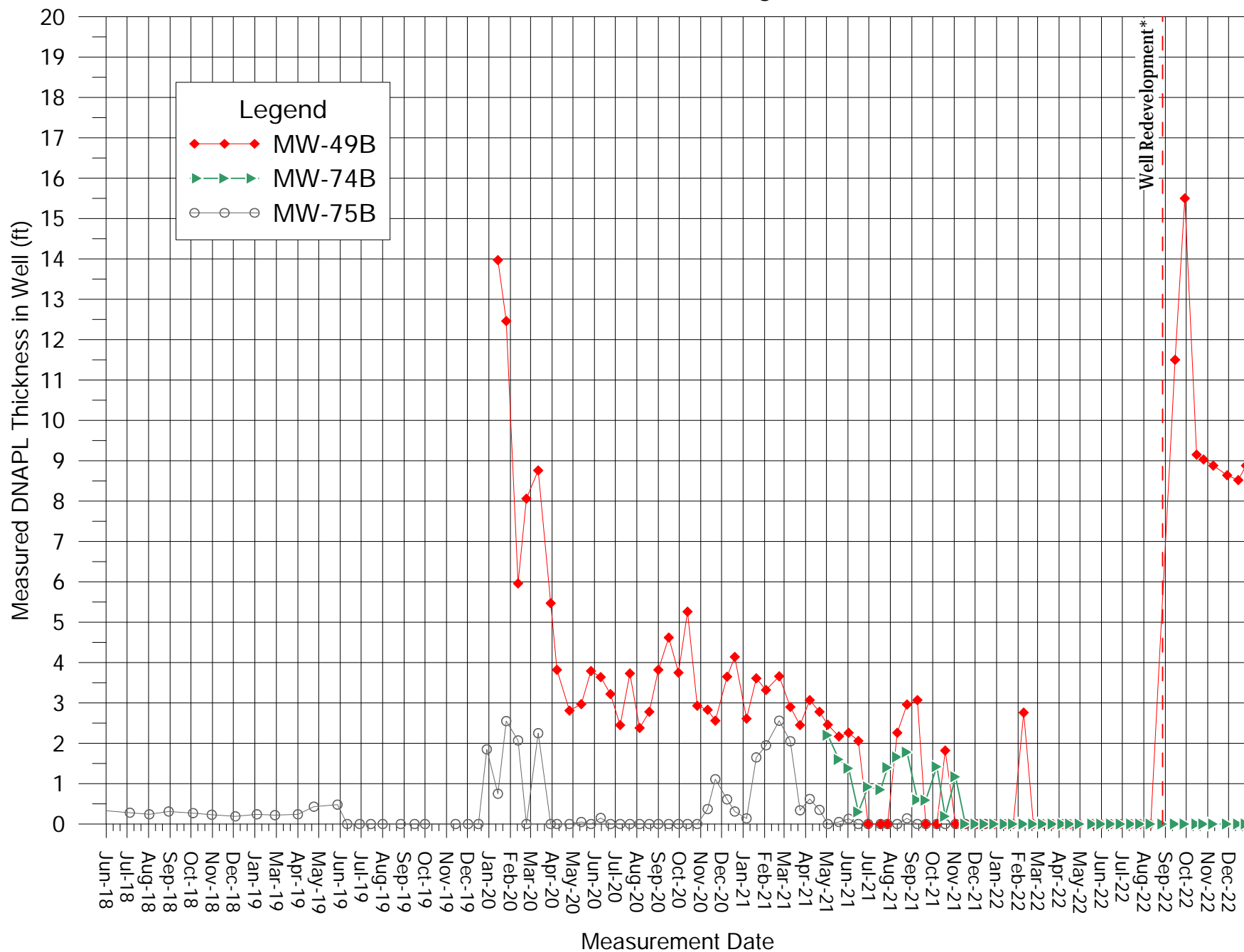
*DNAPL below top of in-well pumps from 3rd Q 2020 to 3rd Q 2021, Nov. and Dec. 2021, April- Sept. 2022, Oct.-Dec. 2022; not measurable
Pumps removed on 10/08/2021 to measure pump length. Pumps are 1.55 ft in length.
Wells MW-12B and MW-41B redeveloped on 8/30/2022.

Figure 5
B-CZ/B-TZ Wells (North (On-Site and Off-Site)) - In-Well DNAPL Thickness July 2018 - December 2022
UPRR Houston Wood Preserving Works



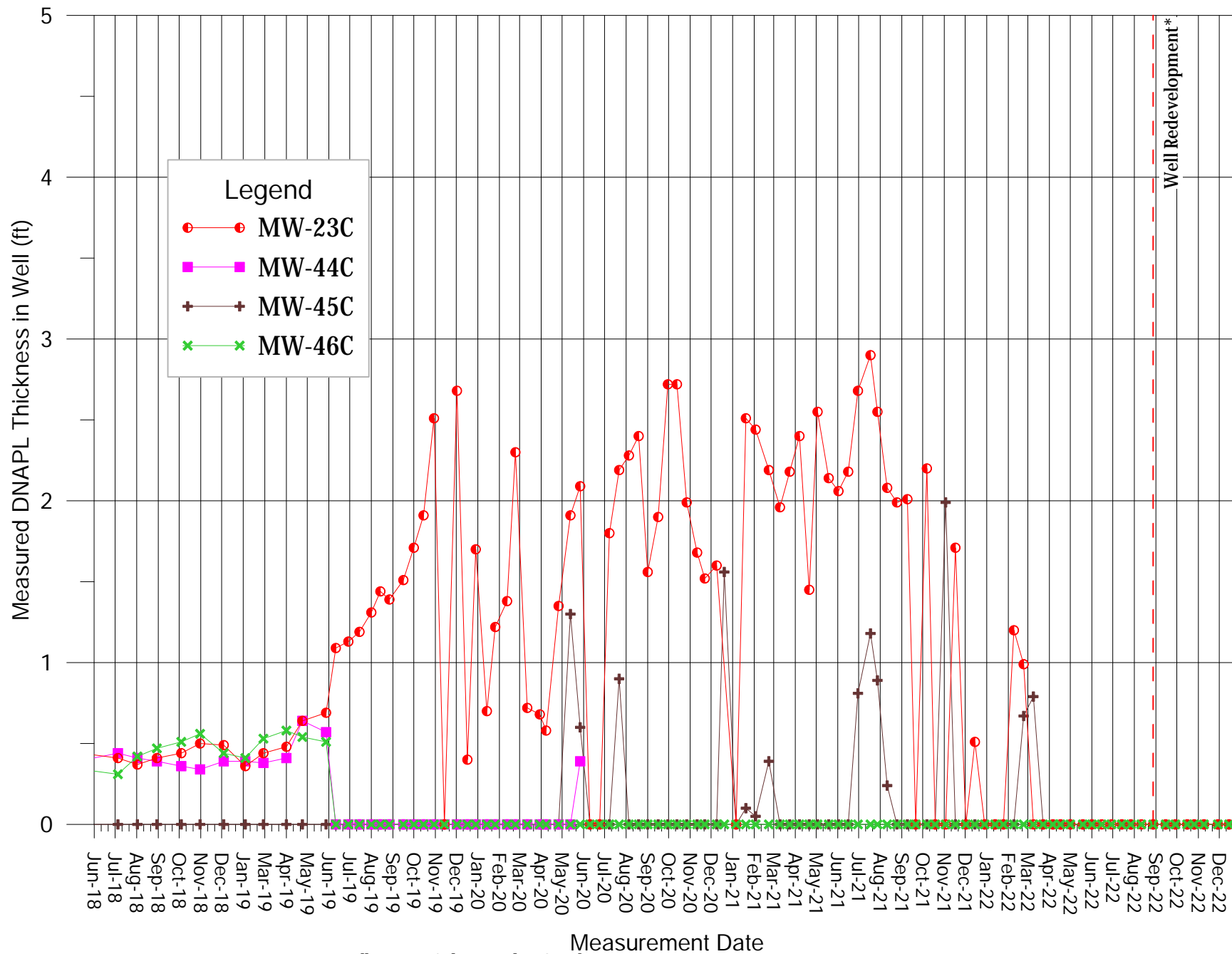
*Wells MW-32B, MW-68B, and MW-70B were redeveloped on 8/30/2022

Figure 6
B-CZ/B-TZ Wells (Englewood Intermodal Yard) - In-Well DNAPL Thickness July 2018 - December 2022
UPRR Houston Wood Preserving Works



*Well MW-75B inaccessible from December 2021-September 2022
 Well MW-74B redeveloped 8/29/22; well MW-49B redeveloped 8/31/22

Figure 7
C-TZ Wells - In-Well DNAPL Thickness July 2018 - December 2022
UPRR Houston Wood Preserving Works



*Well MW-44C damaged in October 2019

Well MW-23C redeveloped 8/29/22; wells MW-45C and MW-46C redeveloped 8/30/22

ATTACHMENT 1

Recovered DNAPL Waste Manifest

Truck # 4460179 596884

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number TXD000820266	2. Page 1 of 1	3. Emergency Response Phone 888-897-7267	4. Manifest Tracking Number 023111775 JJK	
5. Generator's Name and Mailing Address UPRR-WM c/o GHD - Attn: Manifest Receiving 6520 CORPORATE DR. INDIANAPOLIS, IN 46278 Generator's Phone: (414) 267-4164			Generator's Site Address (if different than mailing address) Union Pacific Railroad 4910 Liberty Road Houston TX 77025			
6. Transporter 1 Company Name OMI ENVIRONMENTAL			U.S. EPA ID Number LAD980870018			
7. Transporter 2 Company Name US Ecology			U.S. EPA ID Number MIK593743833			
8. Designated Facility Name and Site Address U.S. Ecology - Robstown 3277 County Road 69, Robstown, TX 78380 Facility's Phone: (800) 242-3169			U.S. EPA ID Number TXD069452340			
GENERATOR	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		
	1.	RO, NA3082, Hazardous waste, liquid, n.o.s. (Creosote, Benzene), 9, PG III (F034)	002	X ^{nc} DM	110	G
	2.				55 ^{nc}	
	3.					
	4.					
13. Waste Codes F034 0918 219H 0018						
14. Special Handling Instructions and Additional Information 1. Profile # 096130010-0 WR # 012429						
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/Offeror's Printed/Typed Name Dusty Pitts		Signature <i>[Signature]</i>			Month Day Year 11 15 02	
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.:						
17. Transporter Acknowledgment of Receipt of Materials						
Transporter 1 Printed/Typed Name John F. Clement		Signature <i>[Signature]</i>			Month Day Year 11 15 02	
Transporter 2 Printed/Typed Name Kenneth Sharpe		Signature <i>[Signature]</i>			Month Day Year 11 15 2002	
18. Discrepancy						
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						
18b. Alternate Facility (or Generator) Manifest Reference Number: U.S. EPA ID Number:						
Facility's Phone:						
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)						
1. HX1		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 Amir Zamir		Signature <i>[Signature]</i>			Month Day Year 11 18 22	