



July 28, 2021

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 2021
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), a member of WSP, on behalf of Union Pacific Railroad Company (UPRR), submits this 2nd Quarter 2021 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 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

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Well Name	Zone
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 the Clean Harbors Deer Park TCEQ-permitted 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.

A summary of the DNAPL recovery measurements from February 2013 through June 2021 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 June 2021 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 2nd Quarter 2021 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 2021 shown on Figure 3).
 - **MW-57A:** No DNAPL was detected in MW-57A during the 1st Quarter and 2nd Quarter 2021.
 - **MW-78A:** No DNAPL was detected in MW-78A during the 1st Quarter and 2nd Quarter 2021.
- **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 June 2021 shown on Figure 4).

MW-12B: During the 1st Quarter and 2nd Quarter 2021 recovery events, the groundwater/DNAPL interface was below the top of the pneumatic pulse pump at MW-12B. 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. Based on the depth to the top of the pump assembly, the assumption is there is less than 2 feet of DNAPL in the well. Approximately 6

gallons of DNAPL were recovered using the pneumatic pump from MW-12B during the 2nd Quarter 2021.

- **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, so it was not possible to record a DNAPL thickness during the 1st Quarter and 2nd Quarter 2021 recovery events. Based on the depth to the top of the pump assembly, the assumption is there was less than 2 feet of DNAPL in the well during this period. Approximately 6 gallons of DNAPL were recovered using the pneumatic pump from MW-41B during the 2nd Quarter 2021.
- **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 2021 shown on Figure 5).
 - **MW-32B:** During the 2nd Quarter 2021, DNAPL thicknesses in MW-32B decreased from approximately 2.7 feet in early April to 1.8 feet in early June. DNAPL thickness in MW-32B increased to 2.42 feet in late June. Approximately 6 gallons of DNAPL were recovered from the MW-32B during the 2nd Quarter 2021.
 - **MW-57B:** Since June 2016, no measurable DNAPL has been detected in MW-57B. A trace amount of DNAPL was noted in MW-57B in January 2019 through May 2019, but no DNAPL has been detected since May 2019.
 - **MW-68B:** DNAPL was not detected in MW-68B during five of the six recovery events of the 2nd Quarter 2021. A DNAPL thickness of 0.42 feet was detected in early May 2021 but was not detected in late May or June. No DNAPL was recovered during the 2nd Quarter 2021.
 - **MW-70B:** DNAPL thickness increased from approximately 0.86 feet in early April to 1.26 feet in early May but decreased to 0.49 feet by the end of the 2nd Quarter 2021 in late June. Approximately 2.3 gallons of DNAPL were recovered from MW-70B during the 2nd Quarter 2021.
- **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 June 2021 shown on Figure 6).
 - **MW-49B:** During the 2nd Quarter 2021, DNAPL thickness decreased from 3.07 feet in early April to 2.06 feet in late June. Approximately 2.3 gallons of DNAPL were recovered from MW-49B during the 2nd Quarter 2021.

- **MW-74B:** During the January 2021 site-wide gauging event, DNAPL was first detected in MW-74B with an in-well thickness of 1.30 feet. DNAPL recovery events for MW-74B began during the 2nd Quarter 2021. In early May 2021, DNAPL thickness was approximately 2.2 feet prior to the initial recovery event but decreased to 0.3 feet by late June. Approximately 3.1 gallons of DNAPL were recovered from MW-74B in the 2nd Quarter 2021.
- **MW-75B:** DNAPL thickness was approximately 0.62 feet in early April 2021 and decreased to not detected by the end of the 2nd Quarter 2021. Approximately 0.7 gallons of DNAPL were recovered during the 2nd Quarter 2021.
- 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 March 2021 shown on Figure 7).
 - **MW-23C:** During the 2nd Quarter 2021, DNAPL thickness fluctuated between 1.45 feet (late April) to 2.55 feet (early May). At the end of the 2nd Quarter 2021 (late June), DNAPL in MW-23C was approximately 2.18 feet thick. Approximately 4.1 gallons of DNAPL were recovered during the 2nd Quarter 2021.
 - **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 has been observed since the 2nd Quarter of 2020. 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) 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 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. The well will be plugged, abandoned, and replaced with a proposed recovery well as detailed in the Revised Response Action Plan (RAP) dated August 31, 2020.
 - **MW-45C:** DNAPL was not detected in MW-45C during the 2nd Quarter 2021.
 - **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 March 2021, an estimated cumulative total of 911 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. DNAPL recovery volumes ranged from approximately 3.9 to 6.8 gallons per bi-weekly event, and a total of approximately 30 gallons were recovered during the 2nd Quarter 2021 (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 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 2021
Figure 2 - DNAPL Recovery Activities February 2013 – June 2021
Figure 3 – A-TZ Wells – DNAPL Recovery Activities July 2018 – June 2021
Figure 4 – B-TZ Wells (West Side) – DNAPL Recovery Activities July 2018 – June 2021
Figure 5 – B-CZ/B-TZ Wells (North (On-Site and Off-Site) – DNAPL Recovery Activities July 2018 – June 2021
Figure 6 – B-CZ/B-TZ Wells (Englewood Intermodal Yard) – DNAPL Recovery Activities July 2018 – June 2021
Figure 7 – C-TZ Wells – DNAPL Recovery Activities July 2018 – June 2021
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

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

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				

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

FIGURES

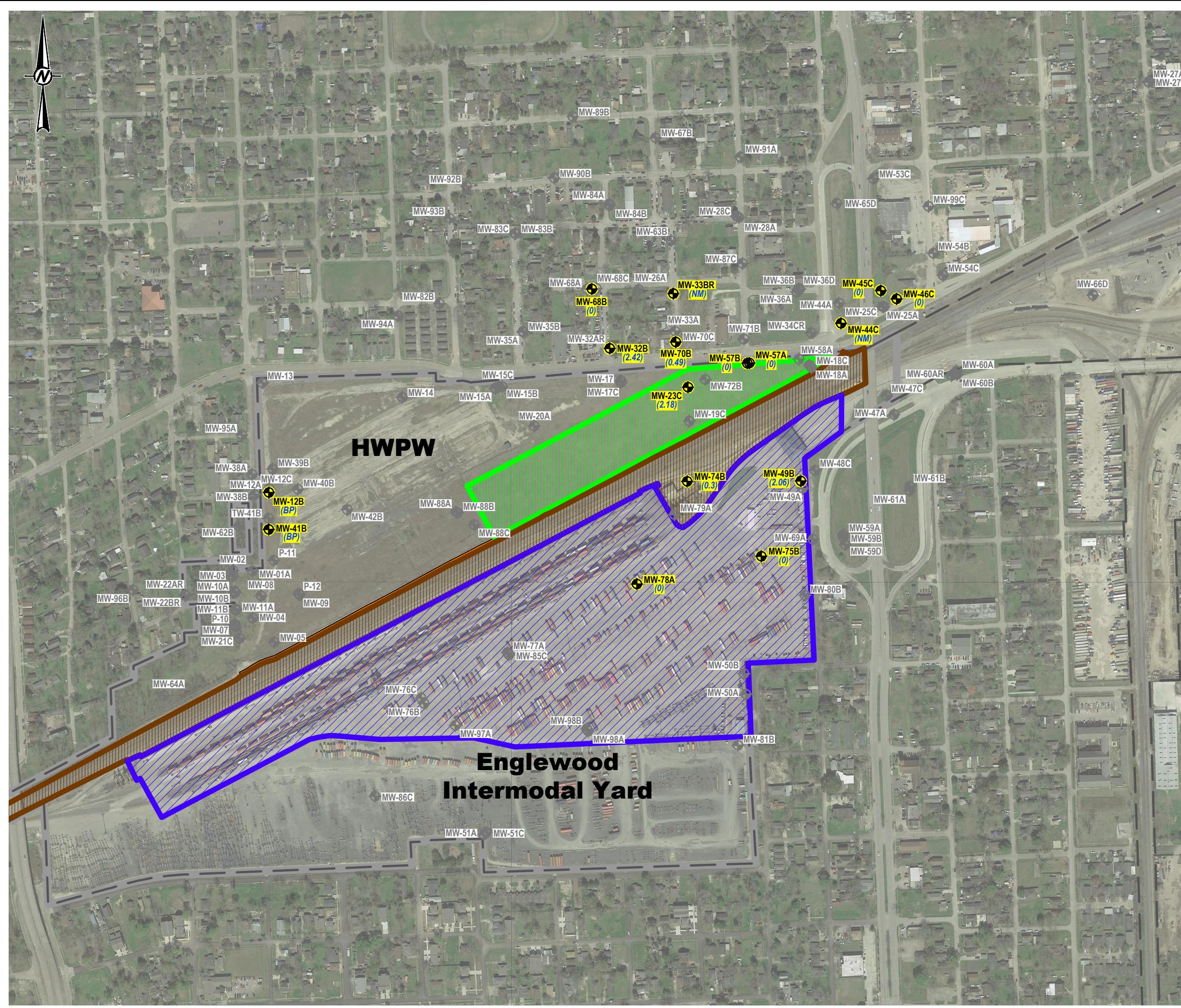


Figure 2
DNAPL Recovery Activities February 2013 - June 2021
UPRR Houston Wood Preserving Works

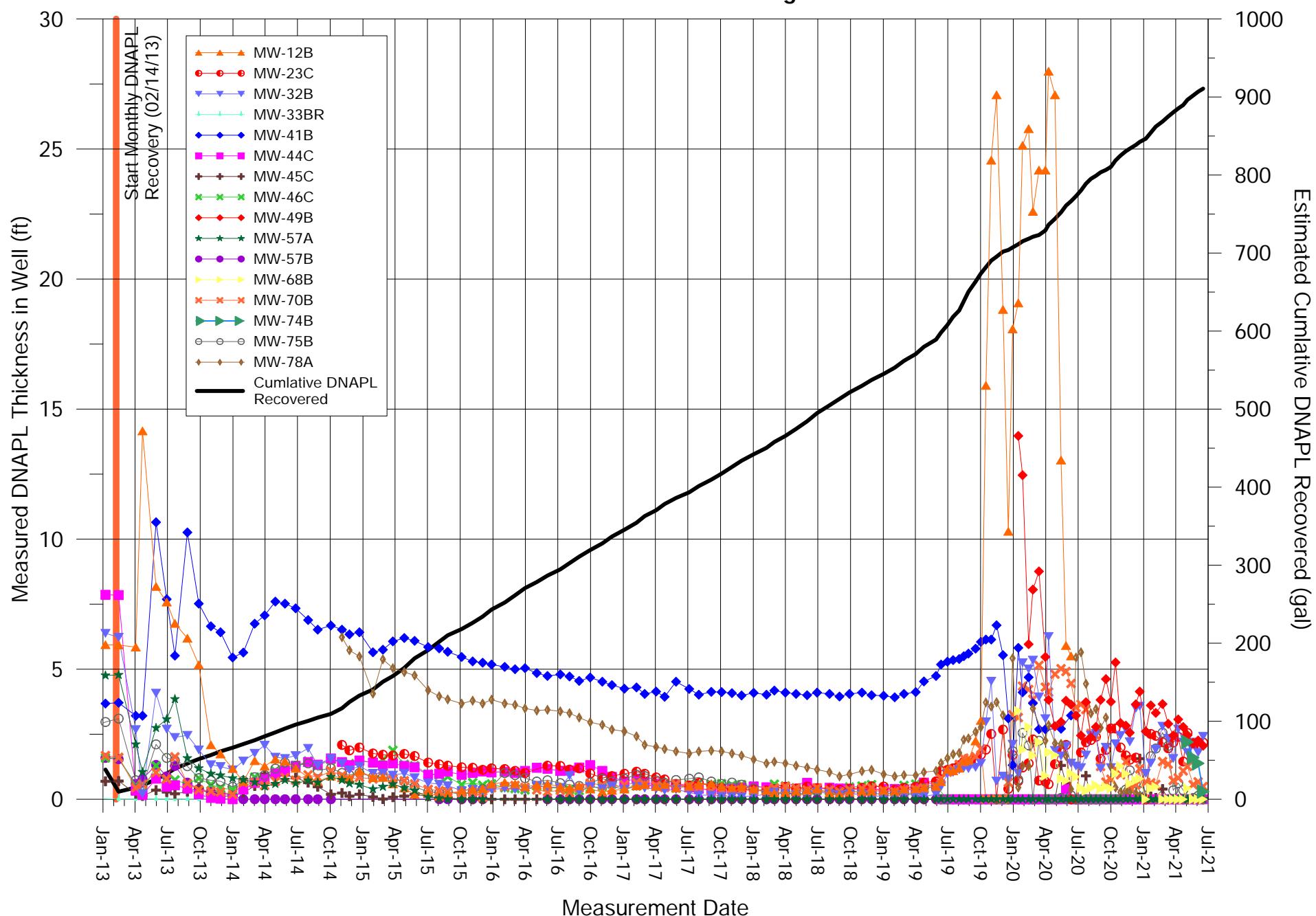


Figure 3
A-TZ Wells - DNAPL Recovery Activities July 2018 - June 2021
UPRR Houston Wood Preserving Works

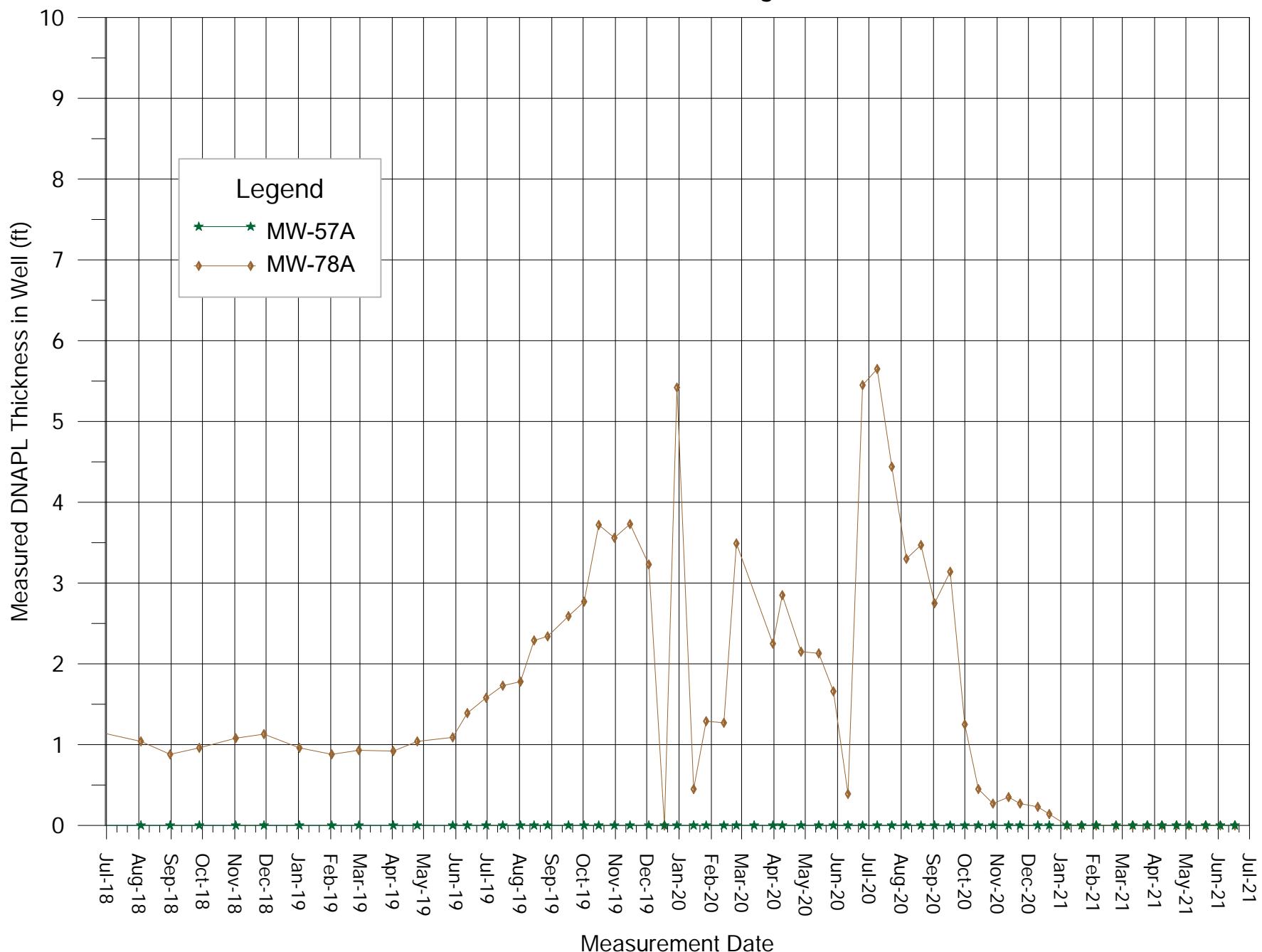
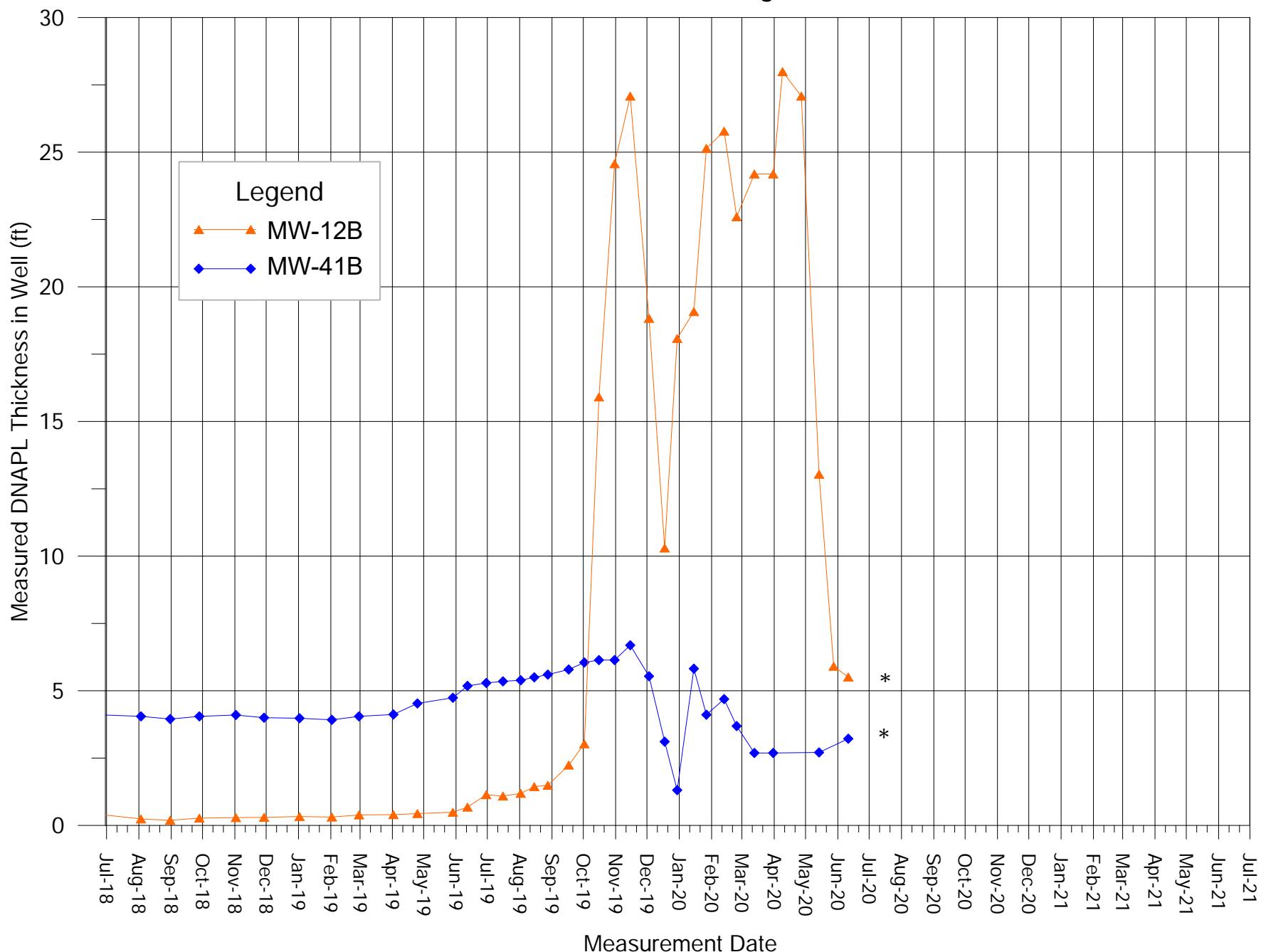


Figure 4
B-TZ Wells (West Side) - In-Well DNAPL Thickness July 2018 - June 2021
UPRR Houston Wood Preserving Works



*DNAPL below top of in-well pumps from 3rd Q 2020 to 2nd Q 2021; not measurable

Figure 5
B-CZ/B-TZ Wells (North (On-Site and Off-Site)) - In-Well DNAPL Thickness July 2018 - June 2021
UPRR Houston Wood Preserving Works

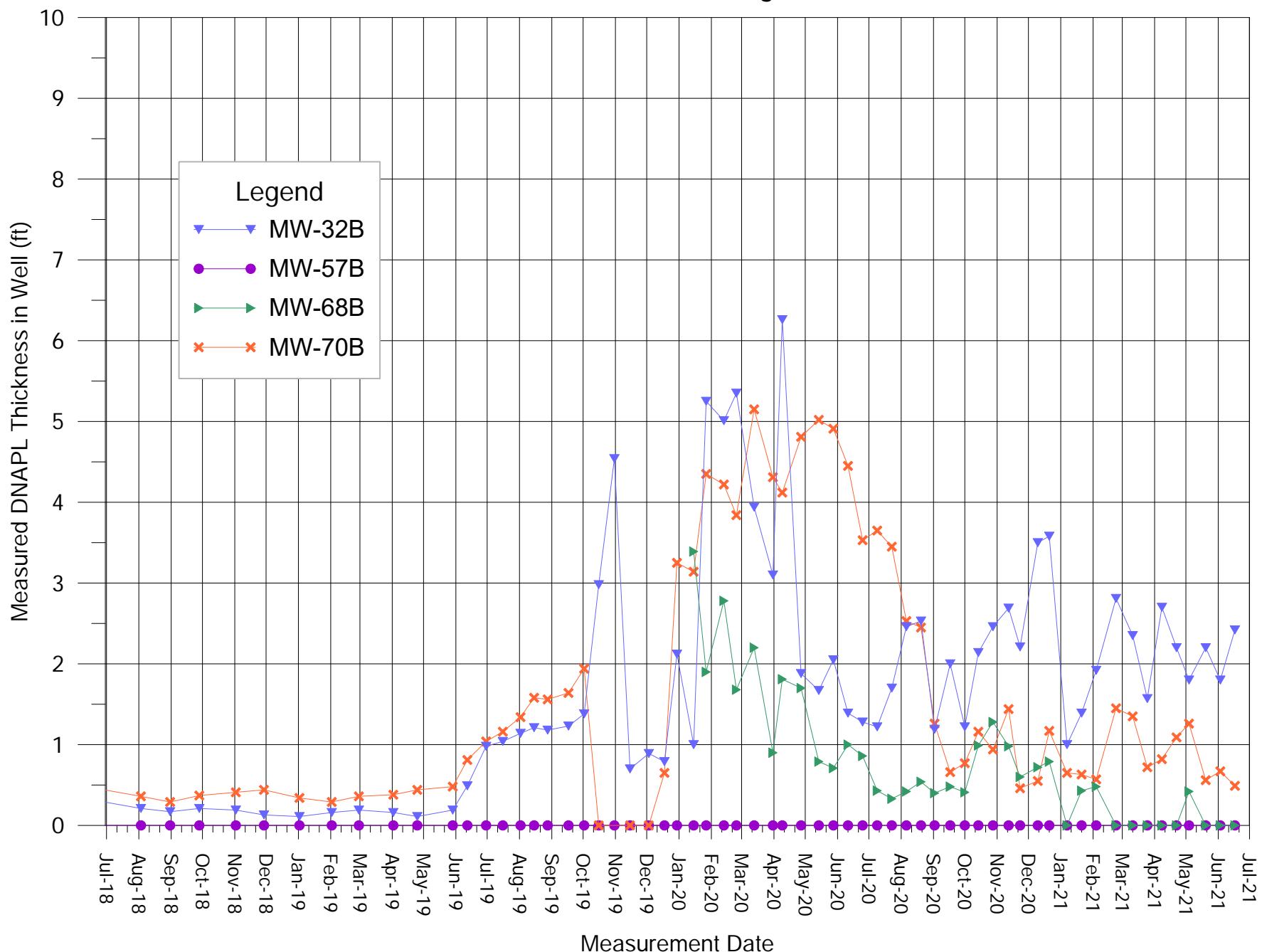


Figure 6
B-CZ/B-TZ Wells (Englewood Intermodal Yard) - In-Well DNAPL Thickness July 2018 - June 2021
UPRR Houston Wood Preserving Works

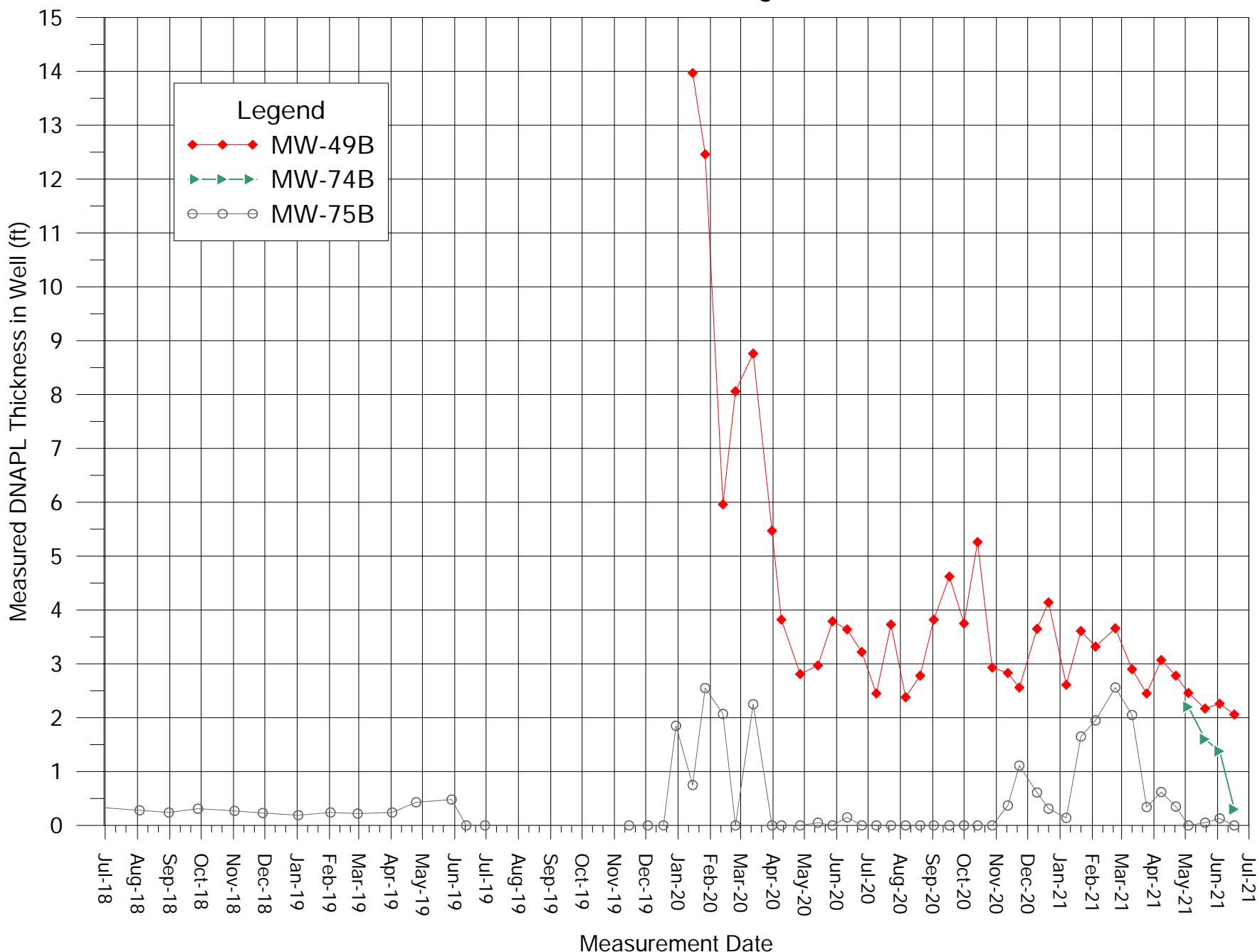
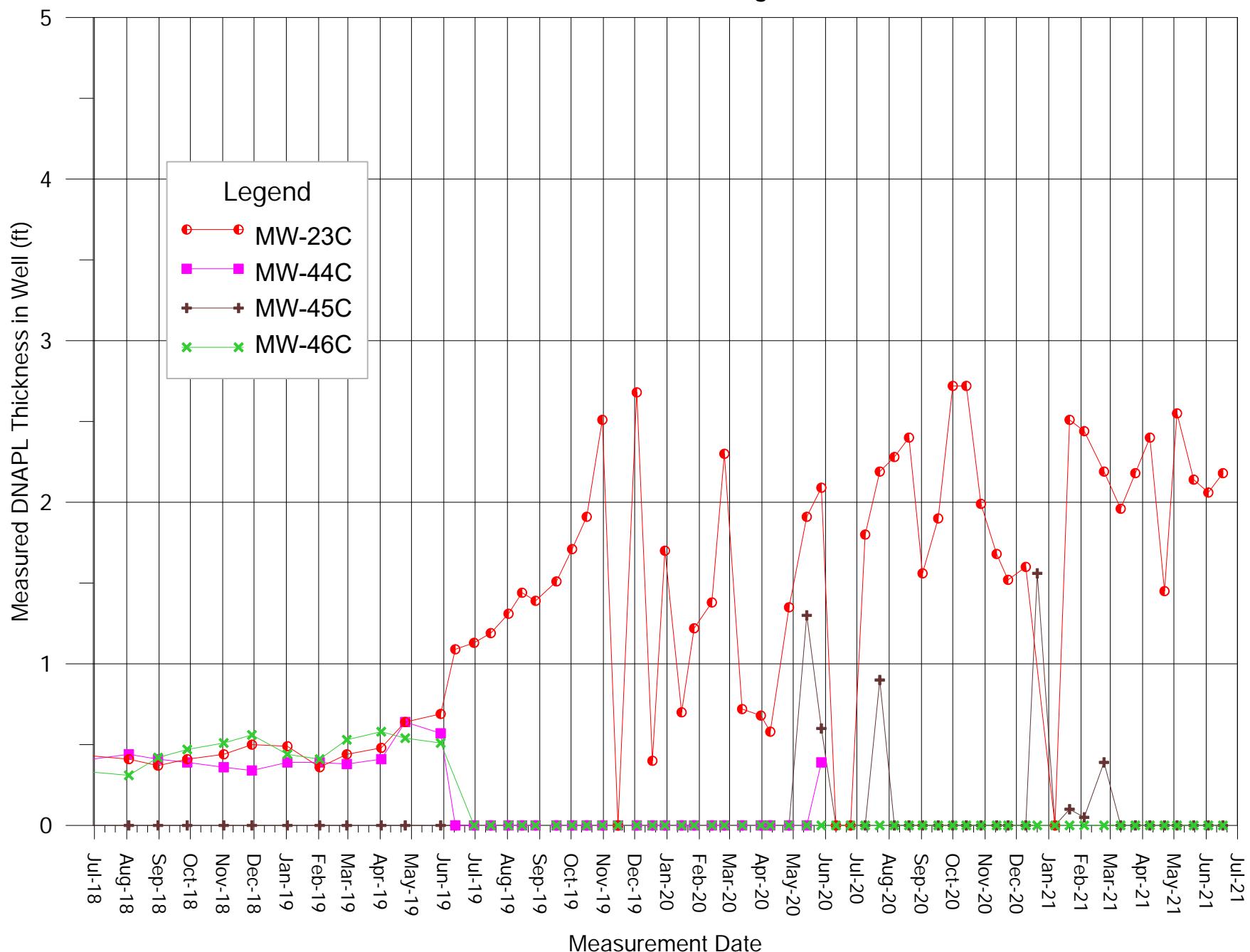


Figure 7
C-TZ Wells - In-Well DNAPL Thickness July 2018 - June 2021
UPRR Houston Wood Preserving Works



ATTACHMENT 1

Recovered DNAPL Waste Manifest

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number TXD 000 820 266	2. Page 1 of 1	3. Emergency Response Phone (800) 839-3975	4. Manifest Tracking Number 016056513 FLE				
5. Generator's Name and Mailing Address 6520 CORPORATE DR. INDIANAPOLIS, IN 46278 Generator's Phone: (414) 267-4164		Generator's Site Address (if different than mailing address) 4910 LIBERTY RD HOUSTON, TX 77026							
6. Transporter 1 Company Name		U.S. EPA ID Number							
7. Transporter 2 Company Name		U.S. EPA ID Number							
8. Designated Facility Name and Site Address 3277 COUNTY ROAD 69 ROBTS TOWN, TX 78380 Facility's Phone: (361) 387-3518		U.S. EPA ID Number TXD 069 452 340							
GENERATOR	9a. HM 3b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) X 1. RC, UN3082, Hazardous Waste, Liquid, N.O.S (Creosote, Benzene), 9, PGIII		10. Containers No. 1 Type DM		11. Total Quantity 411	12. Unit Wt/Vol P 219H	13. Waste Codes F034 D018 0918		
14. Special Handling Instructions and Additional Information 1. WS# 090117968-D WR# 004316									
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 <i>Tyler D. Parker</i>		Signature		Month Day Year <i>01 23 21</i>					
INT'L TRANSPORTER	16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S.		Port of entry/exit _____						
	Transporter signature (for exports only):		Date leaving U.S.: _____						
TRANSPORTER	17. Transporter Acknowledgment of Receipt of Materials Transporter 1 Printed/Typed Name <i>JSC Salines</i>		Signature		Month Day Year <i>14 23 21</i>				
	Transporter 2 Printed/Typed Name		Signature						
DESIGNATED FACILITY	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		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 Year						
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 <i>Gabriel Veler</i>		Signature		<i>Emerson VS</i>		Month Day Year <i>4 28 21</i>			