

# Technical Memorandum

## IRAM Status Update: 4Q-2022

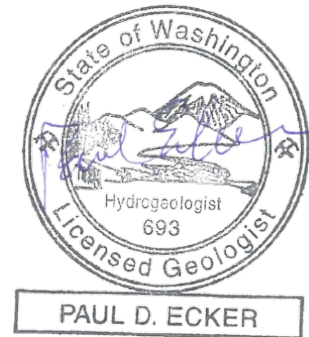
To: Kyle Parker, Toxics Cleanup Program, WA Department of Ecology CRO

Copies: Brandon Christensen, Christensen Inc.  
Dianne K. Conway, Gordon Thomas Honeywell LLP

From: Pierce Thieme, GIT, Daniele Peters, PE, & Paul Ecker, LHG

Date: December 30, 2022

Regarding: Former DeBock's Texaco  
100 West Wine Country Road, Grandview, Washington  
Ecology Facility ID #94369212  
Cleanup Site ID #6910  
Voluntary Cleanup ID #CE0488  
EES Project 2093-02



This memorandum summarizes product removal work conducted through October 2022 at the former DeBock's Texaco Site (Figure 1). This work is being conducted as an interim remedial action measure (IRAM), in accordance with WAC 173-340. Site maps, summary tables, and charts are attached for reference.

### PRODUCT RECOVERY

Floating free-phase hydrocarbon product (LNAPL) has been observed since October 2017 at well MW-2 near abandoned fuel transmission piping and west of the service station building (Figure 2). Product removal and rebound observation activities have been routinely conducted by EES since February 2018, including periodic active total fluid recovery (TFR conducted February 2018-January 2019) and full-time passive product recovery using absorbent collection devices (February 2019-present).

Historically, observed LNAPL accumulation at MW-2 increased during seasonal low water periods, typically occurring in March-April each year (just before the six-month summer irrigation cycle begins) and LNAPL accumulation decreased during high-water periods (irrigation season). This pattern is illustrated on Charts 1 and 2 and has been discussed separately (see the EES Remedial Investigation Report dated November 23, 2020). Accumulated product thicknesses at MW-2 have decreased since initiation of the removal actions in early 2018 (see Chart 1), but LNAPL persists and continues to be removed at a relatively steady rate (see Chart 2). Product thickness measurements are summarized in Table 1 and product removal trends are illustrated on Charts 1 through 3.

During the eight active total fluids recovery events, a total of approximately six gallons of emulsified fuel and water was removed from MW-2. Due to relatively low yield and slow recharge rates, product

removal by TFR was discontinued after the January 2019 recovery event. In February 2019, EES initiated full-time passive product recovery by deploying hydrocarbon-absorbent socks in MW-2. The absorbent material is inspected on a quarterly basis, weighed to estimate product recovery mass/volume, and replaced as needed. A summary of passive product removal is provided in Table 2 and shown on Chart 3.

Since installation of the absorbent socks in February 2019, approximately 3.7 gallons of floating free product have been removed from MW-2. When present, surplus floating product exceeding the absorptive capacity of the sock material (typically observed during seasonal low-water conditions) is manually removed from MW-2 before installing new absorbents, although this surplus condition has not been observed by EES since April 2020. While floating free product in MW-2 no longer exceeds the absorptive capacity of the socks, LNAPL persists and was recovered at a relatively steady rate of approximately 0.25 gallons quarterly during 2022, which is approximately the maximum capacity of the absorbent media.

## ONGOING IRAM ACTIVITIES

Although localized among low-transmissivity soils, LNAPL persists at MW-2. Fluctuations in product thickness and recovery volumes appear to have stabilized in 2022, with LNAPL removal rates approximating the maximum absorbent capacity of the socks on a quarterly basis.

As an interim action, EES will continue to inspect and evaluate product removal performance on a quarterly basis unless/until LNAPL removal stabilizes at a lower rate, at which time the frequency of this effort may be reduced. EES is working with the Property owner to develop a long-term cleanup action plan. As discussed with Ecology, however, an upgradient source of groundwater contamination is unresolved and remains an impediment to developing a permanent remedial action for the DeBock's Property.

Note that groundwater monitoring wells MW-4, MW-5, and MW-7 located on the western adjoining property were paved over in Summer 2020 and are now inaccessible. As discussed and agreed upon with the neighboring property owner, Rodolfo Mora, EES plans to restore the wells at a future date, as part of remedy implementation at this Site.

## ATTACHMENTS

Figure 1: Site Vicinity Map

Figure 2: Site Features

Table 1: Groundwater Elevation and Product Thickness Data

Table 2: LNAPL Removal Estimates since Installation of Absorbent Socks (02/19/2019)

Chart 1: LNAPL Thickness at Well MW-2

Chart 2: Quarterly LNAPL Removal at Well MW-2 since 02/19/2019

Chart 3: Cumulative LNAPL Removal at Well MW-2 since 2/19/2019

# Figures

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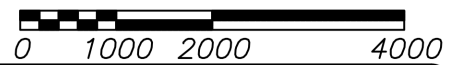
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SOURCE:  
USGS, GRANDVIEW QUADRANGLE  
WASHINGTON-YAKIMA CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)



APPROXIMATE SCALE IN FEET



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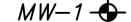



**SITE VICINITY MAP**

DEBOCK'S TEXACO  
100 WEST MAIN ST.  
GRANDVIEW, WA.

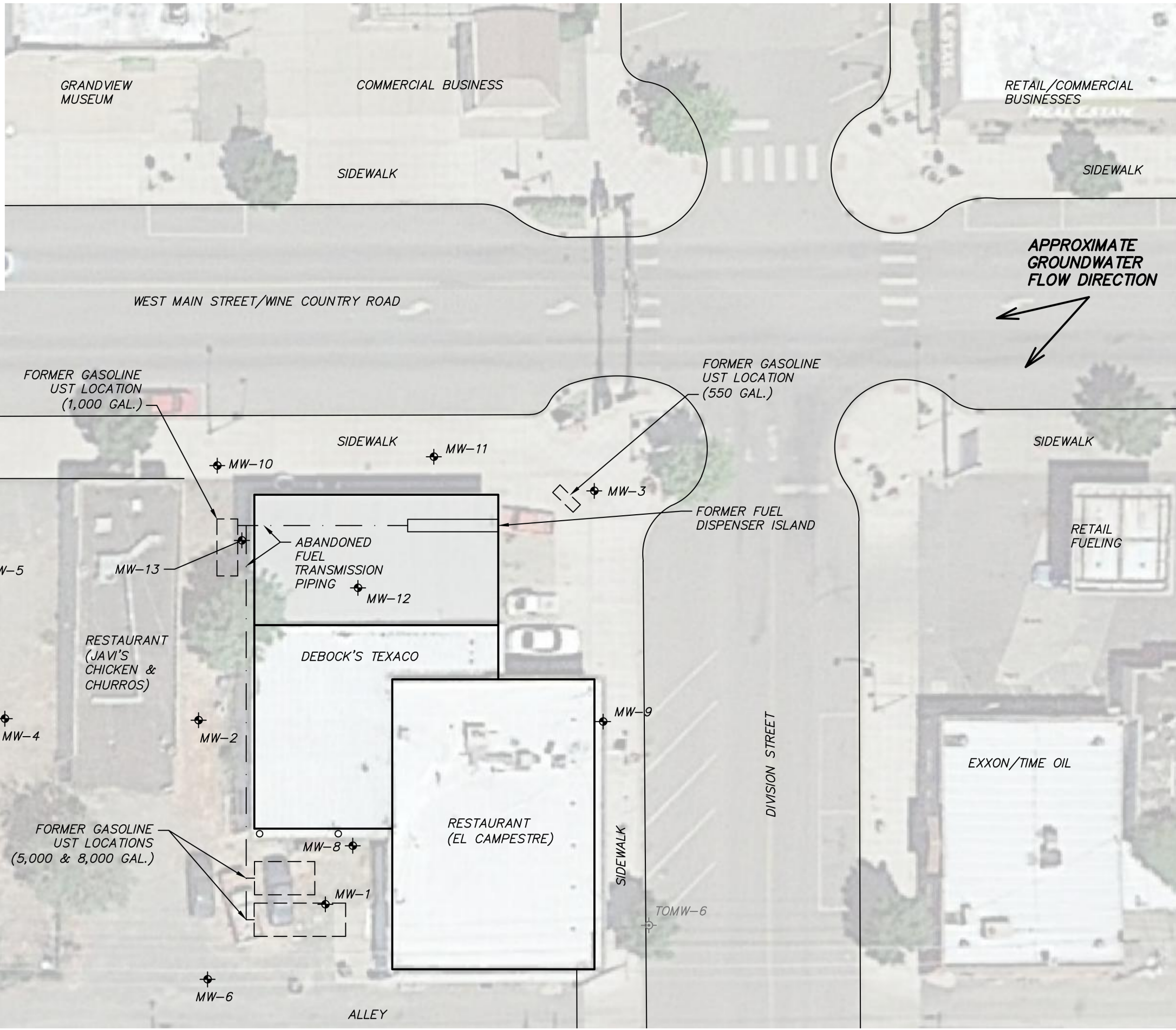
DATE: 11-24-20	PROJECT NO. 2093-01
FILE: 2093-01	2093-01
DRAWN: JJT	FIGURE NO. 1
APPROVED: CR	



**LEGEND**

-  PROPERTY LINE
-  BUILDING
-  ROADWAY
-  MW-1 MONITORING WELL
-  TOMW-6 TIME OIL MONITORING WELL (DECOMMISSIONED BY OTHERS, 2019)
-  UST FILL PORT
-  FORMER UST LOCATIONS

SITE FEATURES ARE APPROXIMATE.



PROJECT NO.	2093-01
DATE: 8-28-20	FILE: 2093-01
DRAWN: JJT	FIGURE NO. 2
APPROVED: CR	

SITE FEATURES

DEBOCK'S TEXACO  
100 WEST MAIN ST.  
GRANDVIEW, WA.

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## Tables

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**TABLE 1**  
**Groundwater Elevation and Product Thickness Data**  
DeBock's Texaco  
Grandview, Washington

Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Depth to Product (feet below TOC)	Product Thickness (feet)	Groundwater Elevation <sup>a</sup> (feet)
MW-1	99.08	04/01/1998	17.34	-	0	81.74
		09/27/2000	14.26	-	0	84.82
		10/25/2017	18.59	-	0	80.49
		11/07/2017	18.88	-	0	80.20
		02/02/2018	20.18	-	0	78.90
	812.37	03/06/2018	20.59	-	0	791.78
		03/16/2018	20.71	-	0	791.66
		04/02/2018	20.93	-	0	791.44
		04/05/2018	20.96	-	0	791.41
		04/24/2018	21.14	-	0	791.23
		07/17/2018	20.40	-	0	791.97
		10/22/2018	19.07	-	0	793.30
		01/22/2019	20.64	-	0	791.73
		08/08/2019	19.36	-	0	793.01
		10/29/2019	18.66	-	0	793.71
		01/16/2020	20.22	-	0	792.15
		02/19/2020	20.73	-	0	791.64
		04/24/2020	21.59	-	0	790.78
		07/21/2020	20.48	-	0	791.89
		10/28/2020	19.20	-	0	793.17
		01/14/2021	20.72	-	0	791.65
		04/08/2021	21.75	-	0	790.62
07/22/2021	19.61	-	0	792.76		
10/28/2021	18.88	-	0	793.49		
01/19/2022	19.98	-	0	792.39		
MW-2	99.55	04/01/1998	17.93	-	0	81.62
		09/27/2000	14.66	-	0	84.89
		10/25/2017	19.91	19.05	0.86	80.27
		11/07/2017	20.13	19.22	0.91	80.08
		02/01/2018	21.81	20.67	1.14	78.57
	812.91	02/02/2018	21.31	21.18	0.13	78.33
		02/03/2018	21.14	20.89	0.25	78.59
		03/06/2018	21.61	21.22	0.39	791.58
		03/16/2018	21.73	21.32	0.41	791.48
		04/02/2018	22.03	21.53	0.50	791.24
		04/05/2018	22.03	21.56	0.47	791.22
		04/24/2018	22.32	21.73	0.59	791.02
		05/04/2018	22.42	21.83	0.59	790.92
		06/05/2018	21.80	21.67	0.13	791.20
		07/17/2018	21.00	-	0	791.91
		08/17/2018	20.53	20.40	0.13	792.47
		09/10/2018	19.86	19.78	0.08	793.11
		10/22/2018	19.73	19.63	0.10	793.25
		11/13/2018	20.13	20.06	0.07	792.83
		12/11/2018	20.65	20.57	0.08	792.32
		01/22/2019	21.32	21.26	0.06	791.63

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DeBock's Texaco  
Grandview, Washington

Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Depth to Product (feet below TOC)	Product Thickness (feet)	Groundwater Elevation <sup>a</sup> (feet)	
MW-2 (cont'd)		02/19/2019	21.62	21.56	0.06	791.33	
		04/23/2019	22.08	21.60	0.48	791.18	
		07/23/2019	20.21	20.20	0.01	792.71	
		10/29/2019	19.38	-	0	793.53	
		01/16/2020	20.97	-	0	791.94	
		04/24/2020	22.59	22.40	0.19	790.46	
		07/21/2020	21.23	-	0	791.68	
		10/28/2020	19.99	-	0	792.92	
		01/14/2021	21.50	-	0	791.41	
		04/08/2021	22.82	22.79	0.03	790.11	
		07/22/2021	20.35	-	0	792.56	
		10/28/2021	19.61	-	0	793.30	
		01/19/2022	19.79	-	0	793.12	
		04/29/2022	21.91	-	0	791.00	
		07/19/2022	19.73	-	0	793.18	
10/10/2022	17.73	-	0	795.18			
MW-3	99.23	04/01/1998	16.29	-	0	82.94	
		09/27/2000	13.01	-	0	86.22	
		10/25/2017	17.92	-	0	81.31	
		11/07/2017	18.18	-	0	81.05	
		02/02/2018	19.58	-	0	79.65	
		812.74	03/06/2018	19.99	-	0	792.75
			03/16/2018	21.02	-	0	791.72
			04/05/2018	20.38	-	0	792.36
			04/24/2018	20.62	-	0	792.12
			07/17/2018	19.83	-	0	792.91
	10/22/2018		18.40	-	0	794.34	
	01/22/2019		20.05	-	0	792.69	
	08/08/2019		18.72	-	0	794.02	
	10/29/2019		17.92	-	0	794.82	
	01/16/2020		19.56	-	0	793.18	
	02/19/2020		20.20	-	0	792.54	
	04/24/2020		19.99	-	0	792.75	
	07/21/2020	19.80	-	0	792.94		
	10/28/2020	18.42	-	0	794.32		
	01/14/2021	20.07	-	0	792.67		
	04/08/2021	21.14	-	0	791.60		
	07/22/2021	18.75	-	0	793.99		
10/28/2021	18.09	-	0	794.65			
01/19/2022	19.24	-	0	793.50			
04/29/2022	20.42	-	0	792.32			
07/19/2022	18.16	-	0	794.58			
10/10/2022	16.13	-	0	796.61			
MW-4		03/16/2018	21.04	-	0	-	
		04/02/2018	21.27	-	0	-	
		04/05/2018	21.30	-	0	-	

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Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Depth to Product (feet below TOC)	Product Thickness (feet)	Groundwater Elevation <sup>a</sup> (feet)
MW-4 (cont'd)	811.94	04/24/2018	21.48	-	0	790.46
		07/17/2018	20.66	-	0	791.28
		10/22/2018	19.27	-	0	792.67
		01/22/2019	20.90	-	0	791.04
		08/08/2019	19.59	-	0	792.35
		10/29/2019	18.90	-	0	793.04
		01/16/2020	20.27	-	0	791.67
		02/19/2020	20.96	-	0	790.98
		04/24/2020	21.89	-	0	790.05
		07/21/2020			Well Inaccessible - Paved Over	
MW-5	811.64	04/05/2018	20.83	-	0	-
		04/24/2018	20.99	-	0	790.65
		07/17/2018	19.91	-	0	791.73
		10/22/2018	18.56	-	0	793.08
		01/22/2019	20.40	-	0	791.24
		08/08/2019	18.82	-	0	792.82
		10/29/2019	18.35	-	0	793.29
		01/16/2020	19.98	-	0	791.66
		02/19/2020	20.49	-	0	791.15
		04/24/2020	21.40	-	0	790.24
07/21/2020			Well Inaccessible - Paved Over			
MW-6	811.99	04/05/2018	20.96	-	0	-
		04/24/2018	21.10	-	0	790.89
		07/17/2018	20.34	-	0	791.65
		10/22/2018	19.02	-	0	792.97
		01/22/2019	20.60	-	0	791.39
		08/08/2019	19.31	-	0	792.68
		10/29/2019	18.62	-	0	793.37
		01/16/2020	20.15	-	0	791.84
		02/19/2020	20.63	-	0	791.36
		04/24/2020	21.51	-	0	790.48
		07/21/2020	20.42	-	0	791.57
		10/28/2020	19.11	-	0	792.88
		01/14/2021	20.67	-	0	791.32
		04/08/2021	21.68	-	0	790.31
		07/22/2021	19.59	-	0	792.40
10/28/2021	18.80	-	0	793.19		
01/19/2022	19.87	-	0	792.12		
04/29/2022	21.05	-	0	790.94		
MW-7	811.92	04/05/2018	22.82	-	0	-
		04/24/2018	21.75	-	0	790.17
		07/17/2018	20.99	-	0	790.93
		10/22/2018	19.65	-	0	792.27
		01/22/2019	21.20	-	0	790.72
		08/08/2019	19.93	-	0	791.99
10/29/2019	19.24	-	0	792.68		



**TABLE 1**  
**Groundwater Elevation and Product Thickness Data**  
DeBock's Texaco  
Grandview, Washington

Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Depth to Product (feet below TOC)	Product Thickness (feet)	Groundwater Elevation <sup>a</sup> (feet)
MW-7 (cont'd)		01/16/2020	20.78	-	0	791.14
		02/19/2020	21.27	-	0	790.65
		04/24/2020	22.14	-	0	789.78
		07/21/2020	Well Inaccessible - Paved Over			
MW-8	812.28	04/05/2018	20.77	-	0	-
		04/24/2018	20.94	-	0	791.34
		07/17/2018	20.20	-	0	792.08
		10/22/2018	18.84	-	0	793.44
		1/22/20019	20.41	-	0	791.87
		08/08/2019	19.15	-	0	793.13
		10/29/2019	18.42	-	0	793.86
		01/16/2020	20.01	-	0	792.27
		02/19/2020	20.49	-	0	791.79
		04/24/2020	21.38	-	0	790.90
		07/21/2020	20.26	-	0	792.02
		10/28/2020	18.95	-	0	793.33
		01/14/2021	20.48	-	0	791.80
		04/08/2021	21.54	-	0	790.74
		07/22/2021	19.36	-	0	792.92
10/28/2021	18.64	-	0	793.64		
01/19/2022	19.72	-	0	792.56		
MW-9	812.76	04/05/2018	21.02	-	0	-
		04/24/2018	20.69	-	0	792.07
		07/17/2018	19.92	-	0	792.84
		10/22/2018	18.56	-	0	794.20
		01/22/2019	20.15	-	0	792.61
		08/08/2019	18.81	-	0	793.95
		10/29/2019	18.15	-	0	794.61
		01/16/2020	19.73	-	0	793.03
		02/19/2020	20.24	-	0	792.52
		04/24/2020	21.13	-	0	791.63
		07/21/2020	20.00	-	0	792.76
		10/28/2020	18.67	-	0	794.09
		01/14/2021	20.22	-	0	792.54
		04/08/2021	21.30	-	0	791.46
		07/22/2021	19.13	-	0	793.63
10/28/2021	18.34	-	0	794.42		
01/19/2022	19.43	-	0	793.33		
04/29/2022	20.61	-	0	792.15		
07/19/2022	18.47	-	0	794.29		
10/10/2022	16.40	-	0	796.36		
MW-10	812.05	04/05/2018	20.91	-	0	-
		04/24/2018	20.70	-	0	791.35
		07/17/2018	19.79	-	0	792.26
		10/22/2018	18.38	-	0	793.67
		01/22/2019	20.10	-	0	791.95

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DeBock's Texaco  
Grandview, Washington

Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Depth to Product (feet below TOC)	Product Thickness (feet)	Groundwater Elevation <sup>a</sup> (feet)
MW-10 (cont'd)		08/08/2019	18.70	-	0	793.35
		10/29/2019	18.02	-	0	794.03
		01/16/2020	19.71	-	0	792.34
		02/19/2020	20.21	-	0	791.84
		04/24/2020	21.13	-	0	790.92
		07/21/2020	19.85	-	0	792.20
		10/28/2020	18.60	-	0	793.45
		01/14/2021	20.20	-	0	791.85
		04/08/2021	21.27	-	0	790.78
		07/22/2021	18.84	-	0	793.21
		10/28/2021	18.20	-	0	793.85
		01/19/2022	19.44	-	0	792.61
		04/29/2022	20.62	-	0	791.43
		07/19/2022	18.21	-	0	793.84
10/10/2022	16.16	-	0	795.89		
MW-11	812.13	04/05/2018	-	-	0	-
		04/24/2018	20.29	-	0	791.84
		07/17/2018	19.47	-	0	792.66
		10/22/2018	18.05	-	0	794.08
		01/22/2019	19.68	-	0	792.45
		08/08/2019	18.40	-	0	793.73
		10/29/2019	17.63	-	0	794.50
		01/16/2020	19.29	-	0	792.84
		02/19/2020	19.81	-	0	792.32
		04/24/2020	20.72	-	0	791.41
		07/21/2020	19.49	-	0	792.64
		10/28/2020	18.24	-	0	793.89
		01/14/2021	19.80	-	0	792.33
		04/08/2021	20.86	-	0	791.27
		07/22/2021	18.46	-	0	793.67
		10/28/2021	17.83	-	0	794.30
		01/19/2022	18.93	-	0	793.20
04/29/2022	20.20	-	0	791.93		
07/19/2022	17.97	-	0	794.16		
10/10/2022	15.98	-	0	796.15		
MW-12	812.81	04/05/2018	-	-	0	-
		04/24/2018	21.18	-	0	791.63
		07/17/2018	20.38	-	0	792.43
		10/22/2018	18.93	-	0	793.88
		01/22/2019	20.62	-	0	792.19
		08/08/2019	19.31	-	0	793.50
		01/16/2020	20.18	-	0	792.63
		02/19/2020	20.51	-	0	792.30
		04/24/2020	21.58	-	0	791.23
		07/21/2020	20.43	-	0	792.38
		10/28/2020	19.13	-	0	793.68

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 DeBock's Texaco  
 Grandview, Washington

Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Depth to Product (feet below TOC)	Product Thickness (feet)	Groundwater Elevation <sup>a</sup> (feet)
MW-12 (cont'd)		01/14/2021	20.67	-	0	792.14
		07/22/2021	19.41	-	0	793.40
		10/28/2021	18.78	-	0	794.03
		01/19/2022	19.89	-	0	792.92
		10/10/2022	16.85	-	0	795.96
MW-13	812.72	08/08/2019	19.40	-	0	793.32
		02/19/2020	20.85	-	0	791.87
		04/24/2020	22.17	-	0	790.55
		07/21/2020	20.55	-	0	792.17
		10/28/2020	19.23	-	0	793.49
		01/14/2021	20.86	-	0	791.86
		04/08/2021	21.53	-	0	791.19
		07/22/2021	19.54	-	0	793.18
		10/28/2021	18.86	-	0	793.86
		01/19/2022	19.98	-	0	792.74
		04/29/2022	21.25	-	0	791.47
		07/19/2022	18.93	-	0	793.79
		10/10/2022	16.93	-	0	795.79

**Notes:**

<sup>a</sup> Groundwater elevation is adjusted to account for floating gasoline product, where present, using the typical specific gravity of gasoline at 15°C of 0.729 (How to Effectively Recover Free Product At Leaking Underground Storage Tank Sites, United States Environmental Protection Agency, 1996).

Data prior to 2017 was obtained from historical reports.

Wells surveyed on 3/6/2018, 4/24/2018, and 8/7/2019 by PLSA of Yakima, Washington.

TOC = Top of Casing

- = Not measured

**TABLE 2**  
**LNAPL Removal Estimates since Installation of Absorbent Socks (02/19/2019)**  
 DeBock's Texaco  
 Grandview, Washington

Well Identification	Specific Gravity <sup>a</sup> (unitless)	Date Measured	Product Thickness <sup>b</sup> (feet)	Weight of Product Removed with Absorbent Sock during Monitoring Period (pounds)	Calculated Volume of Product Removed with Absorbent Sock during Monitoring Period <sup>c</sup> (gallons)	Volume of Product Bailed/Pumped from Well during Monitoring Event (gallons)	Total Estimated Volume of Product Removed per Monitoring Period (gallons)	Cumulative Estimated Volume of Product Removed <sup>d</sup> (gallons)
MW-2	0.729	2/19/2019	0.06	NA	NA	0.00	0.00	0.00
		4/23/2019	0.48	1.21	0.20	0.30	0.50	0.50
		7/23/2019	0.01	0.94	0.15	0.00	0.15	0.65
		10/29/2019	0.00	1.46	0.24	0.00	0.24	0.89
		1/16/2020	0.00	1.15	0.19	0.00	0.19	1.08
		4/24/2020	0.19	1.46	0.24	0.04	0.28	1.36
		7/21/2020	0.00	1.68	0.28	0.00	0.28	1.64
		10/28/2020	0.00	1.55	0.25	0.00	0.25	1.89
		1/14/2021	0.00	0.77	0.13	0.00	0.13	2.02
		4/8/2021	0.03	1.53	0.25	0.00	0.25	2.27
		7/22/2021	0.00	1.28	0.21	0.00	0.21	2.48
		10/28/2021	0.00	1.59	0.26	0.00	0.26	2.74
		1/19/2022	0.00	1.50	0.25	0.00	0.25	2.99
		4/29/2022	0.00	1.28	0.21	0.00	0.21	3.20
		7/19/2022	0.00	1.37	0.23	0.00	0.23	3.43
10/10/2022	0.00	1.45	0.24	0.00	0.24	3.67		

**Notes:**

<sup>a</sup> Typical specific gravity of gasoline shown at 15°C (How to Effectively Recover Free Product At Leaking Underground Storage Tank Sires, United States Environmental Protection Agency, 1996).

<sup>b</sup> Product thickness measured after removing absorbent assembly from the well during each monitoring event.

<sup>c</sup> Based on typical specific gravity of gasoline and the measured product weight.

<sup>d</sup> Volume shown is the total LNAPL removed since absorbent sock installation (February 19, 2019).

NA = Not Applicable

**Sample Calculation:**

$$\text{Specific Gravity} = \frac{\rho_{\text{product}}}{\rho_{\text{water}}}$$

$$\text{Specific Gravity} = \frac{m_{\text{product}}/V_{\text{product}}}{\rho_{\text{water}}}$$

$$V_{\text{product}} = \frac{m_{\text{product}}}{\text{Specific Gravity} \times \rho_{\text{water}}}$$

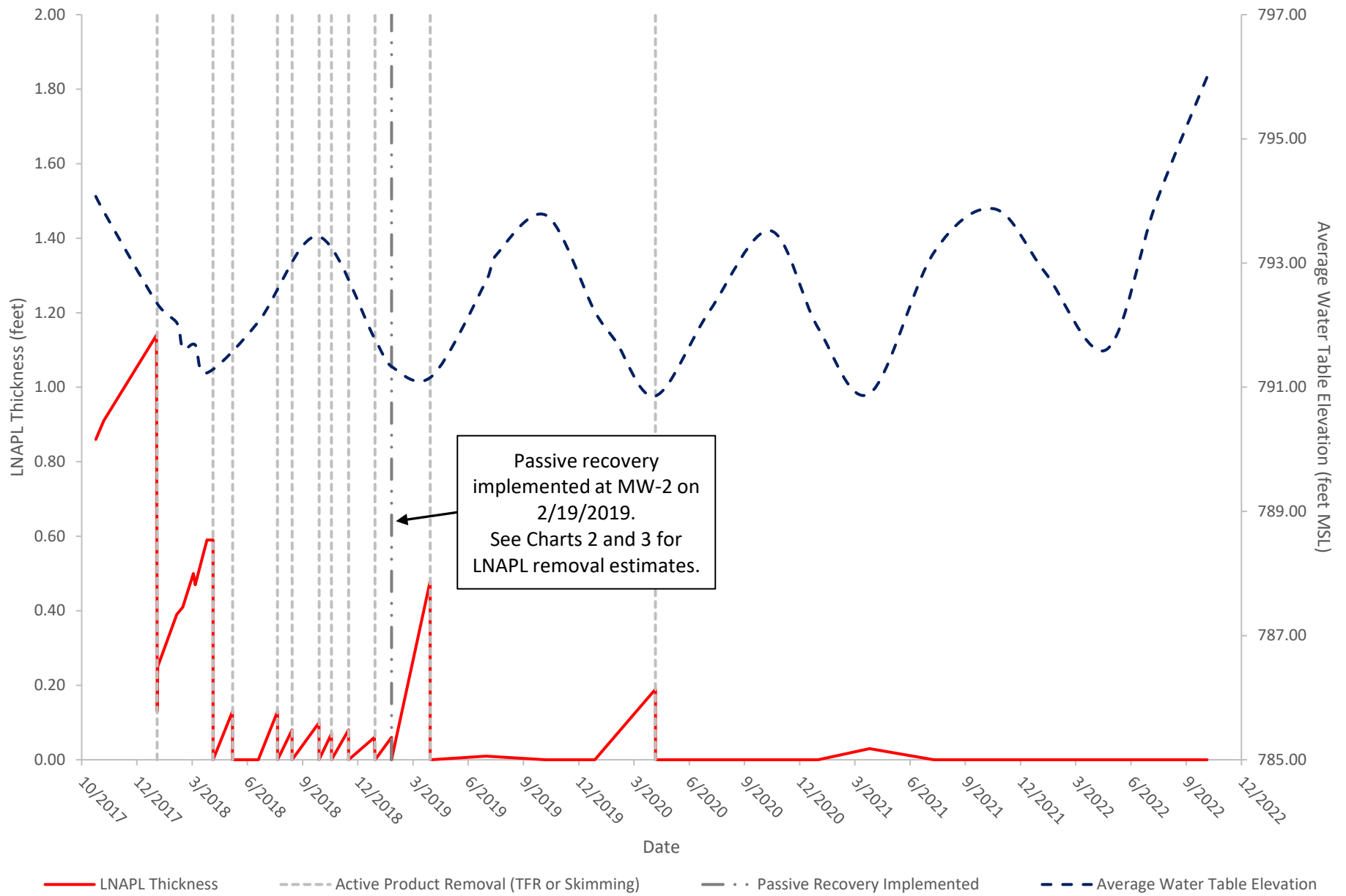
$$V_{\text{product}} = \frac{1.41 \text{ lbs}}{0.729 \times 8.34 \text{ lbs/gal}} = 0.20 \text{ gal}$$

# Charts

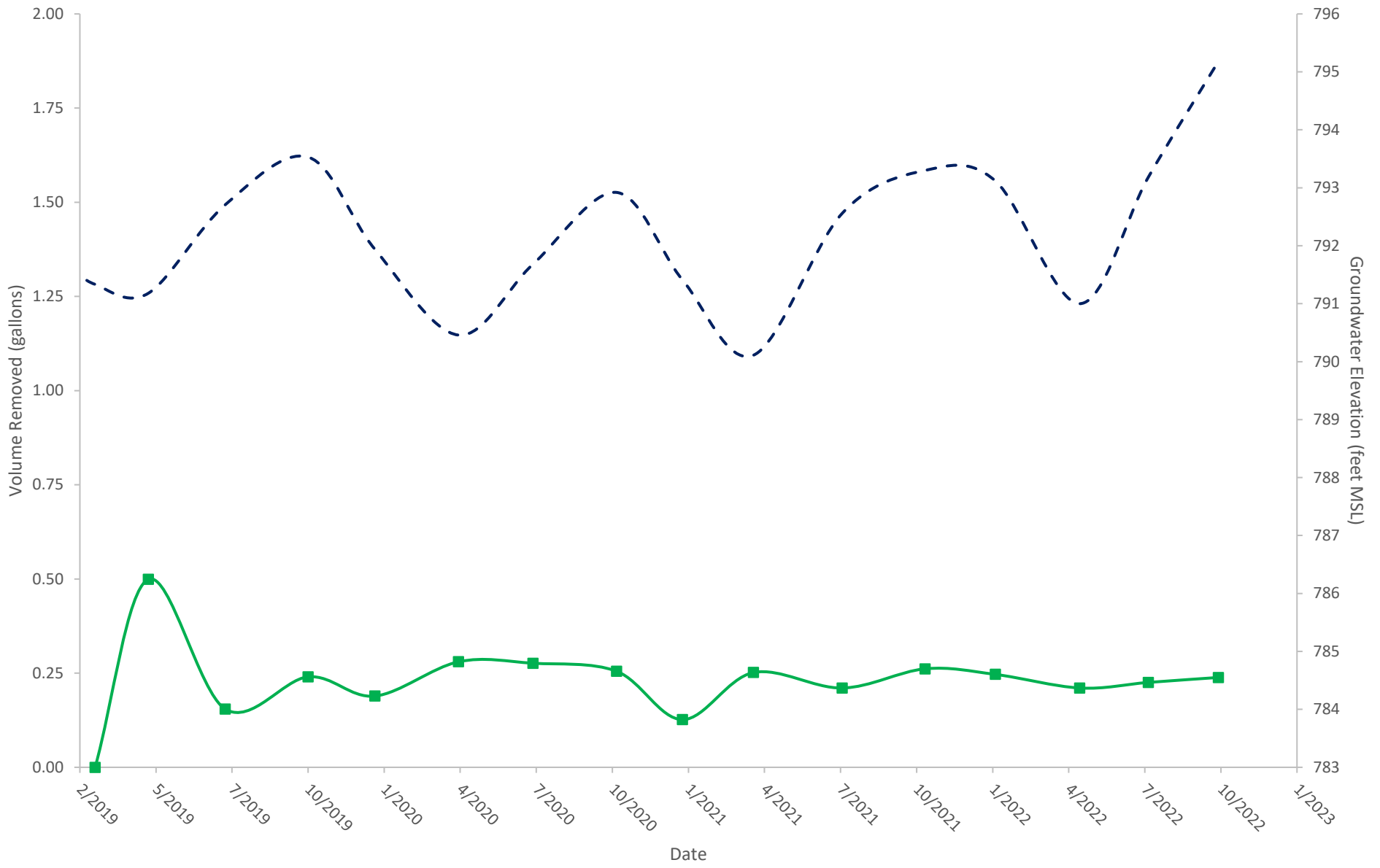
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**CHART 1**  
**LNAPL Thickness at Well MW-2**  
 DeBock's Texaco  
 Grandview, Washington

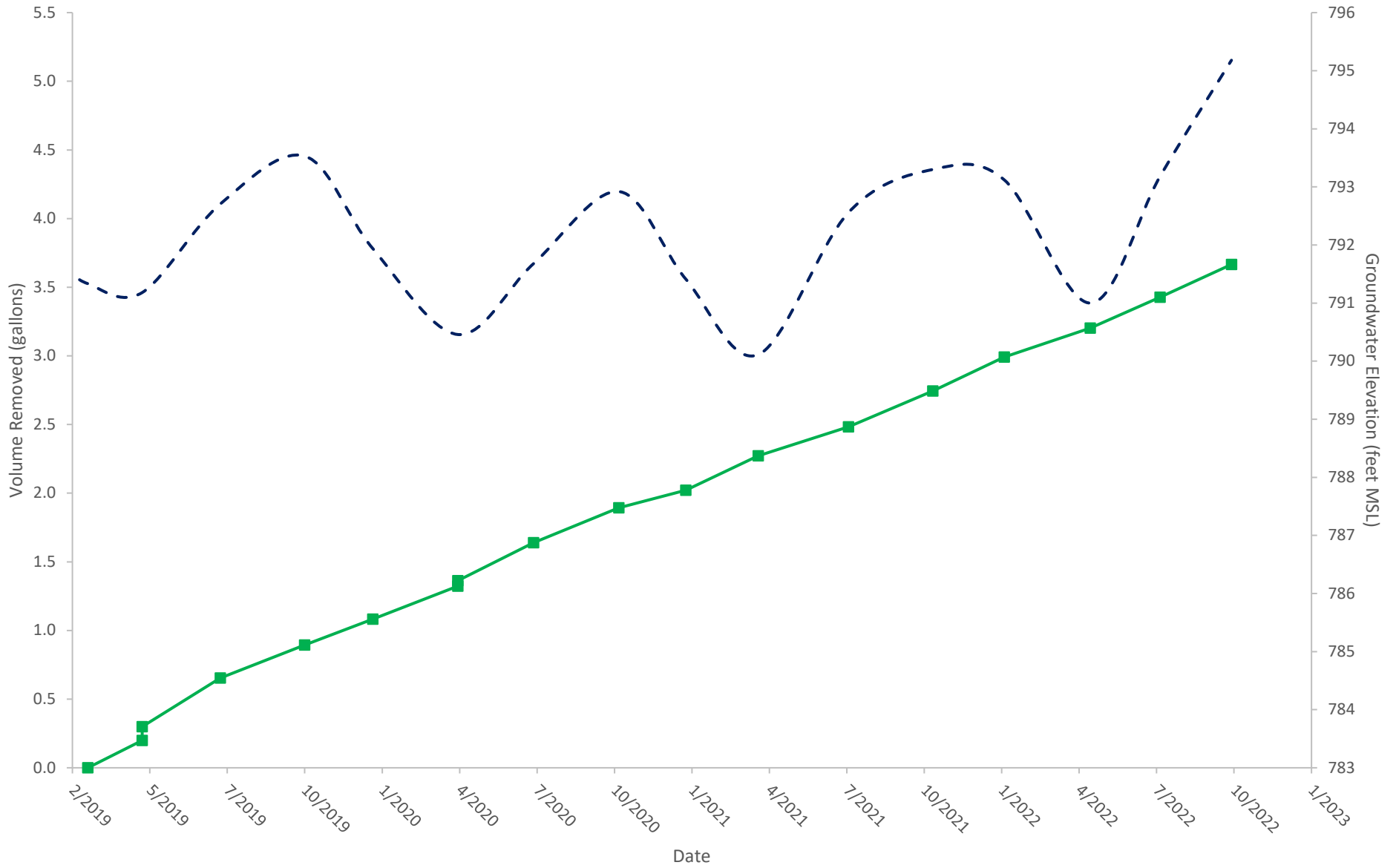


**CHART 2**  
**Quarterly LNAPL Removal at Well MW-2 since 02/19/2019**  
 DeBock's Texaco  
 Grandview, Washington



Note: Absorbent sock installed at MW-2 on 02/19/2019.

**CHART 3**  
**Cumulative LNAPL Removal at Well MW-2 since 02/19/2019**  
 DeBock's Texaco  
 Grandview, Washington



■ Total LNAPL Removed    
 - - - Water Table Elevation at MW-2

Note: Absorbent sock installed at MW-2 on 02/19/2019.  
 Instantaneous slope change due to product skimming.