



December 20, 2021
Cardno 031227CX.24L.L37

Regan O'Brien
ExxonMobil Environmental and Property Solutions Company
1900 East Linden Avenue, Building 28A
Linden, NJ 07036
Attn: Regan O'Brien

Cardno

309 South Cloverdale Street
Unit A13
Seattle, WA 98108
USA

Toll-free +1 800 499 8950

SUBJECT **System Operation Memo - 4Q 2021**
Former Exxon Fueling Facilities
Grant County International Airport
7810 Andrews Street Northeast
Moses Lake, Washington

www.cardno.com

Ms. O'Brien:

At the request of ExxonMobil Environmental and Property Solutions, on behalf of ExxonMobil Oil Corporation (ExxonMobil), Cardno operates and maintains a NAPL recovery system at the Former Exxon Fueling Facilities, located at Grant County International Airport, in Moses Lake, Washington. Cardno operated and maintained the NAPL recovery system during the fourth quarter of 2021. On November 15, 2021, Cardno personnel visited the subject site to gauge NAPL thickness, and to confirm that the NAPL recovery system was operational.

SITE DESCRIPTION

Grant County International Airport (Airport) is located immediately north of the City of Moses Lake in Grant County, Washington (Plate 1). The site lies at an elevation of approximately 1,170 feet above msl. Former Exxon-leased facilities include fueling hydrants located in the southern portion of the Airport, two aboveground storage tanks (Storage Tanks #38 and #24, with capacities of 54,390 barrels [bbl] and 27,426 bbl, respectively) located south of the Airport, and associated product piping runs; all of which have historically been used to dispense jet fuel. A generalized site plan for Pumhouse #1 is shown on Plate 2.

SITE STATUS SUMMARY

- > On November 15, 2021, Cardno personnel visited the site for routine NAPL gauging.
- > NAPL thickness was gauged at monitoring wells MW15, MW20, MW21, MW22, MW23, MW24, MW25, MW26, PH1-9301, and PH1-9402 on November 15, 2021.
- > Maximum NAPL thickness of 1.81 feet was measured in MW21 and MW22 on November 15, 2021.
- > Pump # 1 remained operational at a pumping interval of 6 minutes per day online at MW22.
- > Pump #2 was deactivated due to an obstruction in the product return line.

RECOMMENDATION

Cardno recommends continued operation of pump #1 installed in monitoring well MW22 and ongoing monitoring and gauging of NAPL thicknesses at the site.

LIMITATIONS

For any documents cited that were not generated by Cardno, the data taken from those documents is used "as is" and is assumed to be accurate. Cardno does not guarantee the accuracy of this data and makes no warranties for the referenced work performed nor the inferences or conclusions stated in these documents. This report and the works performed have been undertaken in good faith, with due diligence and with the expertise, experience capability and specialized knowledge necessary to perform the Work in a good and workmanlike manner and within all accepted standards pertaining to providers of environmental services, in Washington at the time of investigation. No soil engineering or geotechnical references are implied or should be inferred. The evaluation of the geologic conditions at the site for this investigation is made from a limited number of data points. Subsurface conditions may vary away from these data points.

Please contact Mr. Bobby Thompson, Cardno Project Manager for this site, at 206 510 5855, with any questions.

Sincerely,



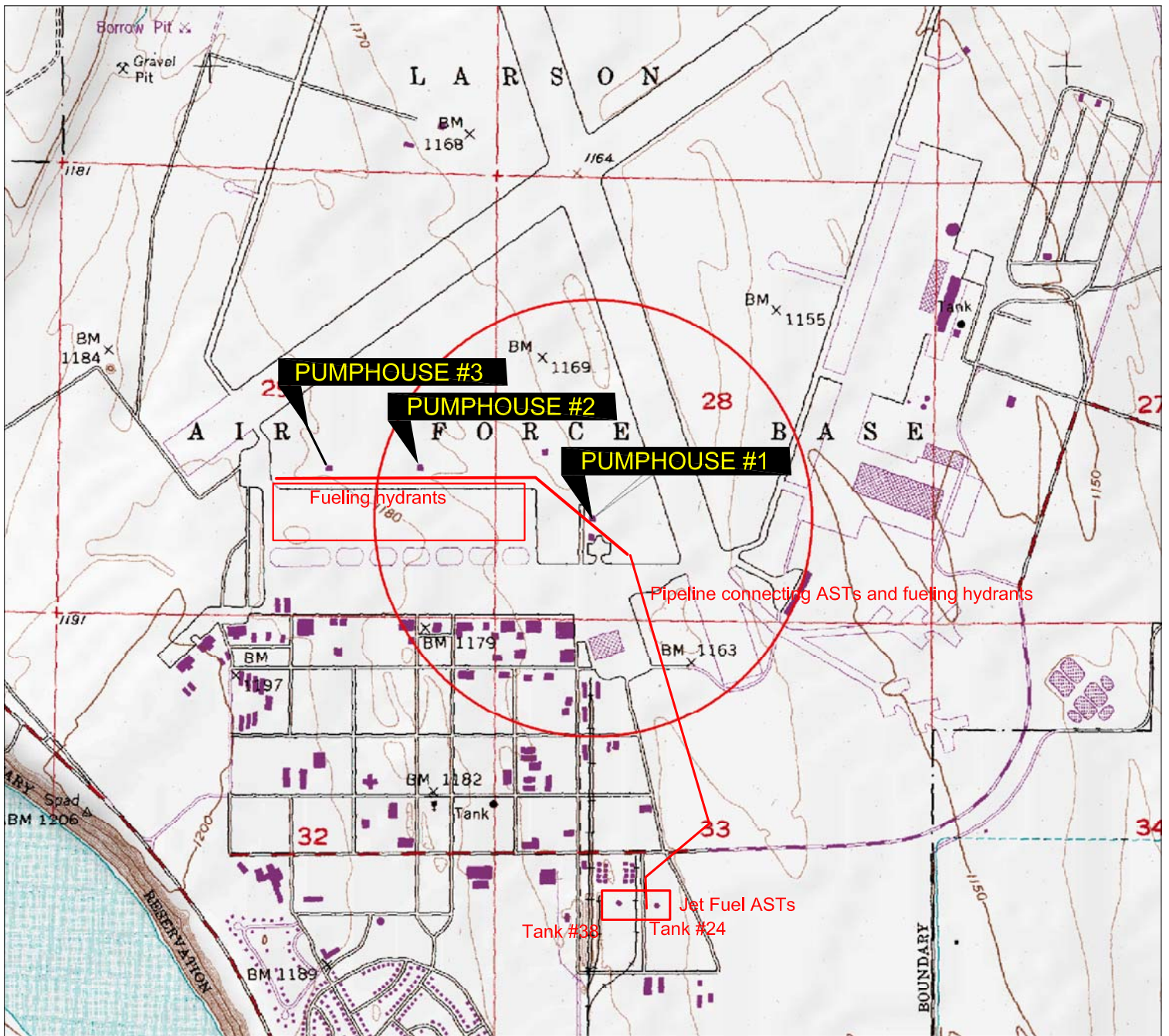
Paul Prevou
Senior Staff Geologist
Cardno
Direct Line +1 817 965 6081
Email: paul.prevou@cardno.com



Bobby Thompson
Project Manager
Cardno
Direct Line +1 206 510 5855
Email: robert.thompson@cardno.com

ENCLOSURES

Plate 1	Site Location Map
Plate 2	Generalized Site Plan (Pumphouse #1)
Table 1	Operations and Maintenance Summary



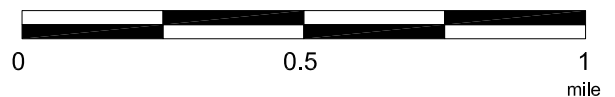
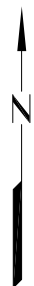
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 e. 3-D TopoQuads ©. Data copyright of content owner.
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FN 0312270001

EXPLANATION

○ 1/2-mile Radius Circle From Pumphouse #1

APPROXIMATE SCALE

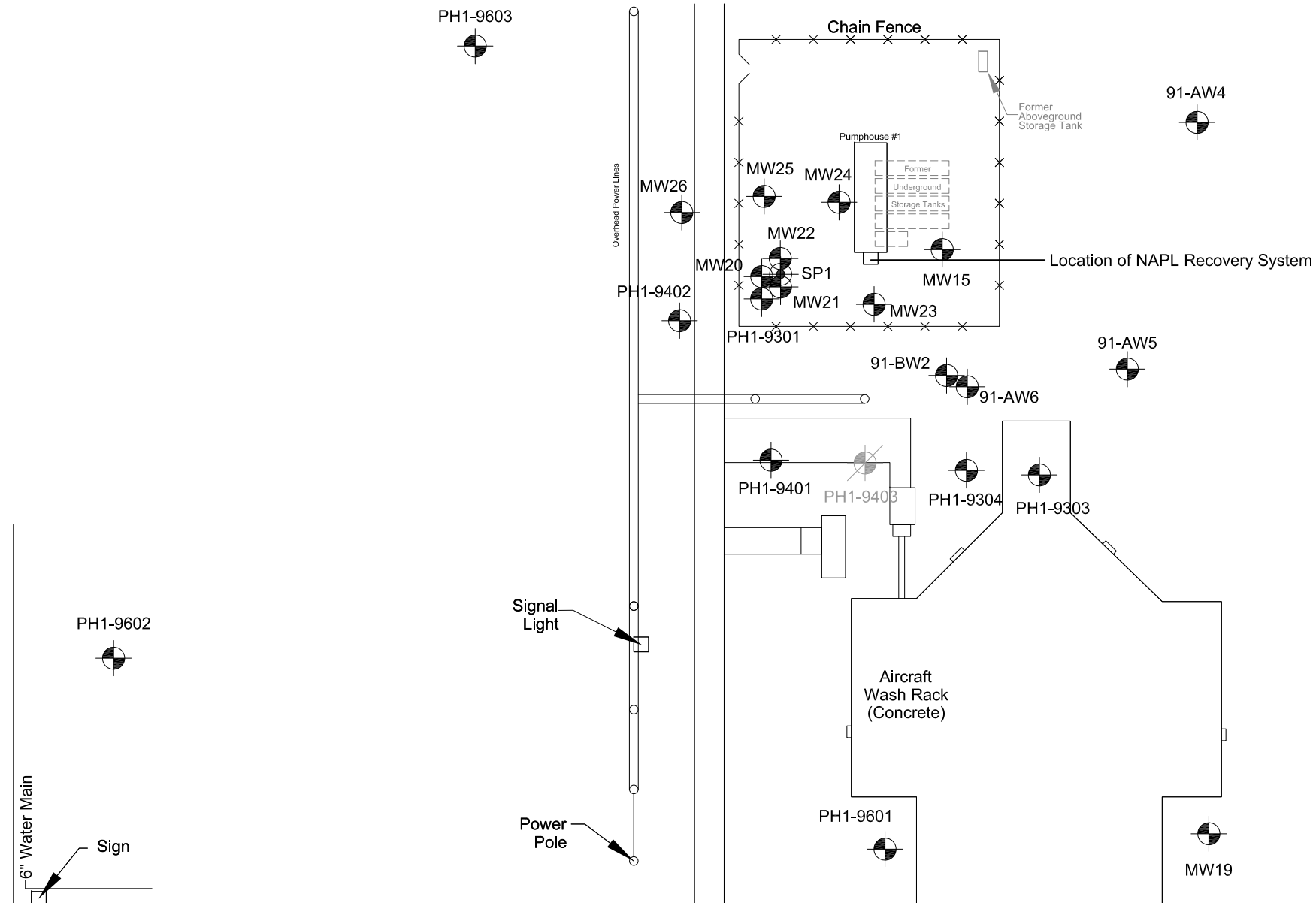


SOURCE:
 Modified from a map
 provided by
 DeLorme 3-D TopoQuads

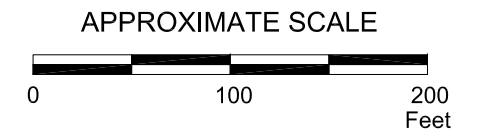


SITE LOCATION MAP
 GRANT COUNTY INTERNATIONAL AIRPORT
 FORMER EXXON FUELING FACILITIES
 7810 Andrews Street Northeast
 Moses Lake, Washington

PROJECT NO.
 031227
PLATE
 1
 NAG: 01/12/12



SOURCE:
Modified from a map provided by
Secor International Inc.



FN 0312270002



**GENERALIZED SITE PLAN
(PUMPHOUSE #1)**
GRANT COUNTY INTERNATIONAL AIRPORT
FORMER EXXON FUELING FACILITIES
7810 Andrews Street Northeast
Moses Lake, Washington

EXPLANATION

- PH1-9603 Groundwater Monitoring Well
- PH1-9403 Destroyed Groundwater Monitoring Well

PROJECT NO.

031227

PLATE

2

EJB: 07/01/13

**TABLE 1
OPERATIONS AND MAINTENANCE SUMMARY**

Grant County International Airport
Former Fueling Facilities
7810 Andrews Street Northeast
Moses Lake, Washington
Page 1 of 14

Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)		
12/02/15	3.5	27.8	MW15	87.90	88.73	0.83	88.32	3	1	01:08	Initial pump depth - 88.62 feet bgs. Initial pumping rate - 3 minutes every 2 days. Pump down on arrival. Adjusted pumping air flow. Pump operational upon departure.
			MW21	91.16	93.31	2.15	92.24	4	1	01:46	Initial pump depth - 92.02 feet bgs. Initial pumping rate - 4 minutes every 2 days. Pump operational upon arrival/departure. Removed snow from exhaust valve.
			MW22	91.28	93.35	2.07	92.32	10	1	04:29	Initial pump depth - 92.01 feet bgs. Initial pumping rate - 10 minutes every 2 days. Pump operational upon arrival/departure. Removed snow from exhaust valve. Unwound NAPL float pulley.
			MW25	91.24	92.92	1.68	92.08	5	1	02:13	Initial pump depth - 91.25 feet bgs. Initial pumping rate - 5 minutes every 2 days. Pump operational upon arrival/departure.
			MW26	90.79	92.02	1.23	91.41	6	1	02:28	Initial pump depth - 91.70 feet bgs. Initial pumping rate - 6 minutes every 2 days. Pump operational upon arrival/departure. Noticed crimping in the exhaust and supply line from the former position of the compression fitting.
03/01/16	13.5	108.7	MW15	87.19	87.22	0.03	87.21	0	0	05:39	Pump operational upon arrival. Pump was shut down on 03/01/16 due to minimal NAPL thickness.
			MW21	90.39	92.30	1.91	91.35	4	1	07:42	Pump operational upon arrival/departure. Removed snow from exhaust valve.
			MW22	90.57	92.17	1.60	91.37	10	1	19:19	Pump operational upon arrival/departure. Cleaned float pulley.
			MW25	90.62	91.47	0.85	91.05	3	1	09:39	Pump operational upon arrival/departure. Cleaned float pulley.
			MW26	90.21	91.20	0.99	90.71	4	1	11:24	Pump was down upon arrival. Adjusted pumping air flow. Pump operational upon departure.
04/28/16	18.3	147.3	MW15	NM	NM	NM	NM	0	0	05:39	Pump down upon arrival/departure.
			MW21	NM	NM	NM	NM	4	1	11:31	Pump was down upon arrival. Adjusted pumping air flow. Pump operational upon departure.
			MW22	NM	NM	NM	NM	10	1	04:52	Pump operational upon arrival/departure.
			MW25	NM	NM	NM	NM	3	1	12:32	Pump operational upon arrival/departure.
			MW26	NM	NM	NM	NM	4	1	15:13	Pump operational upon arrival/departure.
07/27/16	4.25	34.2	MW15	85.77	85.81	0.04	87.21	0	0	19:57	Pump down upon arrival/departure.
			MW21	89.20	90.08	0.88	91.35	4	1	11:31	Pump operational upon arrival. Shut down on 07/27/16 to allow for NAPL recovery.

**TABLE 1
OPERATIONS AND MAINTENANCE SUMMARY**

Grant County International Airport
Former Fueling Facilities
7810 Andrews Street Northeast
Moses Lake, Washington
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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)		
07/27/16	4.25	34.2	MW22	89.44	89.58	0.14	91.37	10	1	04:52	Pump operational upon arrival. Shut down on 07/27/16 to allow for NAPL recovery.
			MW25	--	89.40	0.00	91.05	3	1	12:32	Pump operational upon arrival. Shut down on 07/27/16 to allow for NAPL recovery.
			MW26	88.99	89.08	0.09	90.71	4	1	15:13	Pump operational upon arrival. Shut down on 07/27/16 to allow for NAPL recovery.
04/06/17	NM	NM	MW15	84.02	84.09	0.07	NA	NA	NA	NA	Shut down on 07/27/16 to allow for NAPL recovery.
			MW20	87.80	87.91	0.11	NA	NA	NA	NA	No pump operational.
			MW21	87.48	87.99	0.51	NA	NA	NA	NA	Shut down on 07/27/16 to allow for NAPL recovery.
			MW22	87.69	87.79	0.10	NA	NA	NA	NA	Shut down on 07/27/16 to allow for NAPL recovery.
			MW23	--	87.11	0.00	NA	NA	NA	NA	No pump operational.
			MW24	87.37	88.04	0.67	NA	NA	NA	NA	No pump operational.
			MW25	--	87.57	0.00	NA	NA	NA	NA	Shut down on 07/27/16 to allow for NAPL recovery.
			MW26	87.18	87.20	0.02	NA	NA	NA	NA	Shut down on 07/27/16 to allow for NAPL recovery.
			91-AW6	--	89.78	0.00	NA	NA	NA	NA	No pump operational.
			91-BW2	--	89.34	0.00	NA	NA	NA	NA	No pump operational.
			PH1-9301	86.94	88.18	1.24	NA	NA	NA	NA	No pump operational.
PH1-9303	--	83.76	0.00	NA	NA	NA	NA	No pump operational.			
PH1-9402	86.91	88.55	1.64	NA	NA	NA	NA	No pump operational.			
06/16/17	4.75	38.2	MW15	83.62	83.64	0.02	NA	NA	NA	NA	No pump operational.
			MW20	87.38	87.44	0.06	NA	NA	NA	NA	No pump operational.
			MW21	87.05	87.59	0.54	NA	NA	NA	NA	Moved pump to PH1-9301.
			MW22	87.21	87.41	0.20	NA	NA	NA	NA	No pump operational.
			MW23	--	86.70	0.00	NA	NA	NA	NA	No pump operational.
MW24	86.95	87.57	0.62	NA	NA	NA	NA	No pump operational.			

**TABLE 1
OPERATIONS AND MAINTENANCE SUMMARY**

Grant County International Airport
Former Fueling Facilities
7810 Andrews Street Northeast
Moses Lake, Washington
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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments	
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)			
06/16/17	4.75	38.2	MW25	--	87.15	0.00	NA	NA	NA	NA	No pump operational.	
			MW26	--	86.73	0.00	NA	NA	NA	NA	Moved pump to PH1-9402.	
			91-AW6	--	79.35	0.00	NA	NA	NA	NA	No pump operational.	
			91-BW2	--	89.00	0.00	NA	NA	NA	NA	No pump operational.	
			PH1-9301	86.54	88.59	2.05	87.57	4	1	NA	Pump shutdown on arrival. Pump operational upon departure. Pump rate set at 4 minutes per day.	
			PH1-9303	--	83.38	0.00	NA	NA	NA	NA	No pump operational.	
			PH1-9402	86.36	88.55	2.19	87.46	4	1	NA	Pump installed. Pump operational upon departure. Pump rate set at 4 minutes per day.	
09/07/17	4.77	38.4	MW15	83.43	83.44	0.01	NA	NA	NA	NA	No pump operational.	
			MW20	87.22	87.29	0.07	NA	NA	NA	NA	No pump operational.	
			MW21	86.85	87.42	0.57	NA	NA	NA	NA	No pump operational.	
			MW22	87.00	87.33	0.33	NA	NA	NA	NA	No pump operational.	
			MW23	--	86.51	0.00	NA	NA	NA	NA	No pump operational.	
			MW24	86.76	87.38	0.62	NA	NA	NA	NA	No pump operational.	
			MW25	--	86.95	0.00	NA	NA	NA	NA	No pump operational.	
			MW26	--	86.55	0.00	NA	NA	NA	NA	No pump operational.	
			91-AW6	NM	NM	NM	NA	NA	NA	NA	NA	Not measured due to active wasp nest. No pump operational.
			91-BW2	--	88.80	0.00	NA	NA	NA	NA	NA	No pump operational.
			PH1-9301	--	86.52	0.00	NA	NA	NA	05:32	Pump operational on arrival. Shut down on 09/07/17 to allow for NAPL recovery.	
			PH1-9303	--	83.18	0.00	NA	NA	NA	NA	NA	No pump operational.
			PH1-9402	86.25	87.90	1.65	87.08	4	1	05:32	Pump operational upon departure. Pump rate set at 4 minutes per day.	
01/09/18	4.25	34.2	MW15	--	89.11	0.00	NA	NA	NA	No pump operational.		

**TABLE 1
OPERATIONS AND MAINTENANCE SUMMARY**

Grant County International Airport
Former Fueling Facilities
7810 Andrews Street Northeast
Moses Lake, Washington
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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments	
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)			
01/09/18	4.25	34.2	MW22	87.28	87.90	0.62	87.90	1	1	NA	Pump shutdown on arrival. Pump adjusted and operational upon departure. Pump rate set at 1 minute per day.	
			MW25	--	87.23	0.00	NA	NA	NA	NA	No pump operational.	
			PH1-9301	86.05	87.40	1.35	87.40	3	1	NA	Pump shutdown on arrival. Pump adjusted and operational upon departure. Pump rate set at 3 minutes per day.	
			PH1-9402	86.53	88.28	1.75	88.28	6	1	08:16	Pump operational upon arrival/departure. Pump rate adjusted to 6 minutes per day.	
01/30/19	5.75	46.3	MW15	sheen	84.65	sheen	NA	NA	NA	NA	No pump operational.	
			MW20	88.40	88.53	0.13	NA	NA	NA	NA	No pump operational.	
			MW21	88.07	88.56	0.49	88.80	3	1	NA	Moved pump here from PH1-9301. Pump rate adjusted to 3 minutes per day	
			MW22	88.24	88.45	0.21	88.55	1	1	NA	Pump operational upon arrival/departure. Pump rate adjusted to 1 minutes per day.	
			MW23	--	87.71	0.00	NA	NA	NA	NA	No pump operational.	
			MW24	87.94	88.73	0.79	89.09	2	1	NA	Moved pump here from MW25. Pump rate adjusted to 2 minutes per day	
			MW25	--	88.20	0.00	NA	NA	NA	NA	No pump operational.	
			MW26	87.77	87.78	0.01	NA	NA	NA	NA	No pump operational.	
			91-AW6	90.35	90.37	0.02	NA	NA	NA	NA	No pump operational.	
			91-BW2	--	--	--	NA	NA	NA	NA	NA	Could not access. Well lid is locked.
			PH1-9301	87.69	87.98	0.29	NA	NA	NA	NA	NA	No pump operational.
			PH1-9303	--	84.37	0.00	NA	NA	NA	NA	NA	No pump operational.
PH1-9402	87.48	89.12	1.64	89.94	5	1	NA	Pump operational upon arrival/departure. Pump rate adjusted to 5 minutes per day.				
03/28/19	5.88	47.3	MW21	88.37	88.91	0.54	88.64	4	1	NA	Pump operational on arrival. Pump adjusted and operational upon departure. Pump rate set at 4 minute per day.	

**TABLE 1
OPERATIONS AND MAINTENANCE SUMMARY**

Grant County International Airport
Former Fueling Facilities
7810 Andrews Street Northeast
Moses Lake, Washington
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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments	
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)			
03/28/19	5.88	47.3	MW22	88.53	88.82	0.29	88.67	2	1	NA	Pump shutdown on arrival. Pump adjusted and operational upon departure. Pump rate set at 2 minute per day.	
			MW24	88.25	89.09	0.84	88.67	5	1	NA	Pump shutdown on arrival. Pump replaced with pump from MW15 and operational upon departure. Pump rate set at 5 minutes per day.	
			PH1-9402	87.78	89.35	1.57	88.56	8	1	NA	Pump operational upon arrival/departure. Pump rate adjusted to 8 minutes per day.	
04/30/19	7.00	56.4	MW20	88.67	88.83	0.16	NA	NA	NA	NA	No pump operational.	
			MW21	88.36	88.86	0.50	88.61	5	1	23:54	Pump operational upon arrival/departure. Pump rate adjusted to 5 minutes per day.	
			MW22	88.53	88.81	0.28	88.67	2	1	10:20	Pump operational upon arrival/departure. Pump rate adjusted to 2 minutes per day.	
			MW23	sheen	88.00	sheen	NA	NA	NA	NA	NA	No pump operational.
			MW24	88.39	88.43	0.04	NA	NA	NA	NA	NA	No pump operational. Moved pump to PH1-9301.
			MW25	sheen	88.45	sheen	NA	NA	NA	NA	NA	No pump operational.
			PH1-9301	87.89	88.57	0.68	88.23	5	1	NA	NA	Pump operational upon arrival/departure. Pump rate adjusted to 5 minutes per day.
PH1-9402	88.02	88.19	0.17	88.11	2	1	56:29	NA	Pump operational upon arrival/departure. Pump rate adjusted to 2 minutes per day.			
06/11/19	7.25	58.4	MW21	88.49	88.95	0.46	88.72	5	1	NA	Pump operational upon arrival/departure. Pump rate not adjusted.	
			MW22	88.65	88.90	0.25	88.76	2	1	NA	Pump operational upon arrival/departure. Pump rate not adjusted.	
			MW24	88.48	88.61	0.13	NA	NA	NA	NA	NA	No pump operational.
			PH1-9301	88.14	88.36	0.22	88.25	5	1	NA	NA	Pump operational upon arrival/departure. Pump rate adjusted to 3 minutes per day.
			PH1-9402	88.07	88.58	0.51	88.33	2	1	NA	NA	Pump operational upon arrival/departure. Pump rate adjusted to 5 minutes per day.
			MW21	88.49	88.95	0.46	88.72	5	1	NA	NA	Pump operational upon arrival/departure. Pump rate not adjusted.

**TABLE 1
OPERATIONS AND MAINTENANCE SUMMARY**

Grant County International Airport
Former Fueling Facilities
7810 Andrews Street Northeast
Moses Lake, Washington
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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)		
06/11/19	7.25	58.4	MW22	88.65	88.90	0.25	88.76	2	1	NA	Pump operational upon arrival/departure. Pump rate not adjusted.
			MW24	88.48	88.61	0.13	NA	NA	NA	NA	No pump operational.
			PH1-9301	88.14	88.36	0.22	88.25	5	1	NA	Pump operational upon arrival/departure. Pump rate adjusted to 3 minutes per day.
			PH1-9402	88.07	88.58	0.51	88.33	2	1	NA	Pump operational upon arrival/departure. Pump rate adjusted to 5 minutes per day.
07/18/19	7.50	60.5	MW20	88.91	89.15	0.24	NA	NA	NA	NA	No pump operational.
			MW21	88.60	89.09	0.49	88.85	5	1	03:80	Pump operational upon arrival/departure. Pump rate not adjusted.
			MW22	88.81	88.81	sheen	NA	NA	NA	01:14	Pump operational upon arrival. Pump shut down upon departure due to no measurable LNAPL.
			MW23	88.24	88.24	sheen	NA	NA	NA	NA	No pump operational.
			MW24	88.60	88.75	0.15	NA	NA	NA	NA	No pump operational.
			MW25	88.70	88.70	sheen	NA	NA	NA	NA	No pump operational.
			PH1-9301	88.26	88.56	0.30	88.41	3	1	03:30	Pump operational upon arrival/departure. Pump rate not adjusted.
			PH1-9402	88.24	88.46	0.36	88.35	3	1	03:50	Pump operational upon arrival/departure. Pump rate adjusted to 3 minutes per day.
08/07/19	7.50	60.5	MW20	88.95	89.19	0.24	NA	NA	NA	NA	No pump operational. Temporary shutdown to allow for LNAPL rebound and to consider next steps for remedial approach.
			MW21	88.65	89.10	0.45	NA	NA	NA	NA	No pump operational. Temporary shutdown to allow for LNAPL rebound and to consider next steps for remedial approach.
			MW22	88.85	88.86	0.01	NA	NA	NA	NA	No pump operational. Temporary shutdown to allow for LNAPL rebound and to consider next steps for remedial approach.
			PH1-9301	88.30	88.62	0.32	NA	NA	NA	NA	No pump operational. Temporary shutdown to allow for LNAPL rebound and to consider next steps for remedial approach.
			PH1-9402	88.26	88.60	0.34	NA	NA	NA	NA	No pump operational. Temporary shutdown to allow for LNAPL rebound and to consider next steps for remedial approach.

**TABLE 1
OPERATIONS AND MAINTENANCE SUMMARY**

Grant County International Airport
Former Fueling Facilities
7810 Andrews Street Northeast
Moses Lake, Washington
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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments	
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)			
10/15/19	7.50	60.5	MW15	85.40	85.90	0.50	85.65	4	1	NA	Moved pump here from PH1-9301. Pump rate adjusted to 4 minutes per day.	
			MW19	--	87.56	0.00	NA	NA	NA	NA	No pump operational.	
			MW20	89.22	89.45	0.23	NA	NA	NA	NA	No pump operational.	
			MW21	88.90	89.36	0.46	89.13	4	1	NA	Pump operational upon departure. Pump rate adjusted to 4 minutes per day.	
			MW22	89.11	89.14	0.03	NA	NA	NA	NA	No pump operational.	
			MW23	--	88.52	0.00	NA	NA	NA	NA	No pump operational.	
			MW24	88.90	89.02	0.12	NA	NA	NA	NA	No pump operational.	
			MW25	--	89.01	0.00	NA	NA	NA	NA	No pump operational.	
			MW26	88.57	88.58	0.01	NA	NA	NA	NA	No pump operational.	
			91-AW4	--	89.49	0.00	NA	NA	NA	NA	No pump operational.	
			91-AW5	--	96.00	0.00	NA	NA	NA	NA	No pump operational.	
			91-AW6	91.10	91.21	0.11	NA	NA	NA	NA	No pump operational.	
			91-BW2	--	--	--	NA	NA	NA	NA	NA	Could not access. Well lid is locked.
			PH1-9301	88.50	88.90	0.40	NA	NA	NA	NA	NA	No pump operational.
			PH1-9303	--	85.13	0.00	NA	NA	NA	NA	NA	No pump operational.
			PH1-9304	--	84.37	0.00	NA	NA	NA	NA	NA	Could not access due to wasps.
PH1-9401	--	85.50	0.00	NA	NA	NA	NA	NA	No pump operational.			

**TABLE 1
OPERATIONS AND MAINTENANCE SUMMARY**

Grant County International Airport
Former Fueling Facilities
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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)		
10/15/19	7.50	60.5	PH1-9402	88.51	88.89	0.38	NA	NA	NA	NA	No pump operational.
			PH1-9601	--	87.40	0.00	NA	NA	NA	NA	No pump operational.
			PH1-9602	--	94.90	0.00	NA	NA	NA	NA	No pump operational.
			PH1-9603	--	91.57	0.00	NA	NA	NA	NA	No pump operational.
12/23/19	8.00	64.5	MW15	85.52	85.68	0.16	NA	NA	NA	04:32	No pump operational.
			MW20	89.33	89.54	0.21	NA	NA	NA	NA	No pump operational.
			MW21	89.06	89.30	0.24	89.18	4	1	04:32	Pump operational upon arrival/departure. Pump rate not adjusted.
			MW22	89.25	89.26	0.01	NA	NA	NA	NA	No pump operational.
			PH1-9301	88.60	89.02	0.42	88.81	4	1	NA	Moved pump here from MW15. Pump rate adjusted to 4 minutes per day.
			PH1-9402	88.64	88.76	0.12	NA	NA	NA	NA	No pump operational.
01/29/20	8.13	65.5	MW15	85.63	85.80	0.17	NA	NA	NA	NA	No pump operational.
			MW20	89.42	89.65	0.23	NA	NA	NA	NA	No pump operational.
			MW21	89.18	89.29	0.11	NA	NA	NA	02:28	No pump operational.
			MW22	89.32	89.35	0.03	NA	NA	NA	NA	No pump operational.
			PH1-9301	88.80	88.97	0.17	88.89	4.00	1	02:28	Pump operational upon arrival/departure. Pump rate not adjusted.
			PH1-9402	88.69	89.30	0.61	89.00	4.00	1	NA	Moved pump here from MW21. Pump rate maintained at 4 minutes per day.
02/14/20	8.13	65.5	MW15	85.75	85.92	0.17	85.83	4.00	1	04:36	Moved pump here from PH1-9301. System temporarily shutdown due to potential problem with controller solenoid.

**TABLE 1
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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)		
02/14/20	8.13	65.5	MW20	89.54	89.82	0.28	NA	NA	NA	NA	No pump operational.
			MW21	89.28	89.49	0.21	89.38	4.00	1	07:10	Moved pump here from PH1-9402. System temporarily shutdown due to potential problem with controller solenoid.
			MW22	89.42	89.49	0.07	NA	NA	NA	NA	No pump operational.
			PH1-9301	88.90	89.17	0.27	89.03	4.00	1	04:14	Installed refurbished pump. System temporarily shutdown due to potential problem with controller solenoid.
			PH1-9402	88.82	89.31	0.49	89.06	4.00	1	01:22	Installed refurbished pump. System temporarily shutdown due to potential problem with controller solenoid.
05/07/20	8.13	65.5	MW15	85.98	86.11	0.13	86.04	4.00	1	NA	Pump operational upon arrival/departure. Pump rate adjusted to 4 minutes day.
			MW20	89.75	90.00	0.25	NA	NA	NA	NA	No pump operational.
			MW21	89.45	89.62	0.17	NA	4.00	1	NA	Pump functioning but could not be set to depth for operation because return line was restricted by plastic conduit. Will remove section of conduit during next visit to allow more slack.
			MW22	89.65	89.67	0.02	NA	NA	NA	NA	No pump operational.
			PH1-9301	89.04	89.19	0.15	89.12	4.00	1	05:32	Pump operational upon arrival/departure. Pump rate adjusted to 4 minutes day.
			PH1-9402	89.04	89.29	0.25	89.16	4.00	1	05:32	Pump operational upon arrival/departure. Pump rate adjusted to 4 minutes per day.
06/01/20	8.13	65.5	MW15	--	86.01	0.00	NA	NA	NA	1:48	Pump operational upon arrival. Deactivated pump temporarily due to plume thickness.
			MW20	89.76	90.03	0.27	89.89	3.00	1	NA	Pump and lines (#2) moved here from PH1-9301. Pump rate adjusted to 3 minutes per day.
			MW21	89.52	89.73	0.21	89.63	3.00	1	NA	Pump operational upon departure. Pump rate adjusted to 3 minutes per day. Plastic conduit removed to allow for depth correction.
			MW22	89.67	89.70	0.03	NA	NA	NA	NA	No pump operational.

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OPERATIONS AND MAINTENANCE SUMMARY**

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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments	
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)			
06/01/20	8.13	65.5	PH1-9301	89.15	89.16	0.01	NA	NA	NA	1:48	Pump operational upon arrival. Pump and lines (#2) moved to MW20 due to plume thickness.	
			PH1-9402	89.12	89.34	0.22	89.23	3.00	1	1:48	Pump operational upon arrival/departure.	
06/22/20	8.13	65.5	MW15	--	86.11	0.00	NA	NA	NA	01:40	Pump remained deactivated due to plume thickness.	
			MW20	--	89.91	0.00	NA	NA	NA	02:43	Pump remained deactivated due to plume thickness.	
			MW21	89.62	89.81	0.19	89.72	2.00	1	01:04	Pump operational upon arrival/departure. Pump rate adjusted to 2 minutes per day.	
			MW22	89.75	89.82	0.07	NA	NA	NA	00:01	Pump (#3) deactivated due to plume thickness.	
			MW23	--	89.19	0.00	NA	NA	NA	NA	NA	No pump operational.
			MW24	89.52	89.82	0.30	NA	NA	NA	NA	NA	No pump operational.
			MW25	--	89.66	0.00	NA	NA	NA	NA	NA	No pump operational.
			MW26	89.21	89.41	0.20	NA	NA	NA	NA	NA	No pump operational.
			PH1-9301	89.21	89.24	0.03	NA	NA	NA	NA	NA	No pump operational.
PH1-9402	89.22	89.37	0.15	89.30	2.00	1	2:45	2:45	Pump not operational, replaced with pump from MW20. Operational upon departure. Pump rate adjusted to 2 minutes per day.			
08/10/20	8.13	65.5	MW15	86.17	86.18	0.01	NA	NA	NA	1:40	Pump remained deactivated due to plume thickness. Pump #4.	
			MW20	89.95	89.97	0.02	NA	NA	NA	NA	Pump remained deactivated due to plume thickness.	
			MW21	89.67	89.79	0.12	NA	NA	NA	2:42	Pump operational upon arrival. Pump deactivated due to plume thickness. Pump #3.	
			MW22	89.80	89.88	0.08	NA	NA	NA	NA	Pump (#1) deactivated due to plume thickness.	

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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)		
08/10/20	8.13	65.5	MW23	--	89.21	0.00	NA	NA	NA	NA	No pump operational.
			MW24	89.59	89.79	0.20	NA	NA	NA	NA	No pump operational.
			MW25	--	89.71	0.00	NA	NA	NA	NA	No pump operational.
			MW26	89.26	89.41	0.15	NA	NA	NA	NA	No pump operational.
			PH1-9301	89.25	89.31	0.06	NA	NA	NA	NA	No pump operational.
			PH1-9402	89.27	89.35	0.08	NA	NA	NA	4:21	Pump operational upon arrival. Pump deactivated sue to plume thickness. Pump #5.
12/09/20	8.13	65.5	MW15	86.43	86.49	0.06	NA	NA	NA	1:40	Pump remained deactivated due to plume thickness. Pump #4.
			MW20	90.25	90.27	0.02	NA	NA	NA	2:42	Pump remained deactivated due to plume thickness.
			MW21	89.91	90.32	0.41	90.12	2.00	1	2:42	Pump non-operational upon arrival. Pump reactivated upon departure. Pump #3.
			MW22	90.10	90.18	0.08	NA	NA	NA	NA	Pump (#1) remained deactivated due to plume thickness.
			MW23	--	89.49	0.00	NA	NA	NA	NA	No pump operational.
			MW24	89.90	90.04	0.14	NA	NA	NA	NA	No pump operational.
			MW25	90.01	90.02	0.01	NA	NA	NA	NA	No pump operational.
			MW26	89.59	89.74	0.15	NA	NA	NA	NA	No pump operational.
			PH1-9301	89.54	89.64	0.10	NA	NA	NA	NA	No pump operational.
PH1-9402	89.51	89.66	0.15	NA	NA	NA	4:21	Pump remained deactivated due to plume thickness. Pump #5.			
01/14/21	8.25	66.5	MW15	86.50	86.55	0.05	NA	NA	NA	1:40	Pump (#4) remained deactivated due to plume thickness.
			MW20	90.35	90.40	0.05	NA	NA	NA	2:42	Pump (#2) remained deactivated due to plume thickness.
			MW21	89.98	90.56	0.58	90.27	3.00	1	4:31	Pump (#3) operational upon arrival/departure. Pump rate maintained at 3 minutes/day.
			MW22	90.19	90.40	0.21	NA	NA	NA	0:01	Pump (#1) remained deactivated due to plume thickness.
			MW23	--	89.59	0.00	NA	NA	NA	NA	No pump operational.
			MW24	89.98	90.24	0.26	NA	NA	NA	NA	No pump operational.
			MW25	90.14	90.15	0.01	NA	NA	NA	NA	No pump operational.
			MW26	89.69	89.90	0.21	NA	NA	NA	NA	No pump operational.
			PH1-9301	89.65	89.75	0.10	NA	NA	NA	NA	No pump operational.

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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments	
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)			
01/14/21	8.25	66.5	PH1-9402	89.68	89.78	0.10	NA	NA	NA	5:33	Pump (#5) remained deactivated due to plume thickness.	
04/05/21	8.38	67.5	MW15	86.55	86.56	0.01	NA	NA	NA	1:40	Pump (#4) remained deactivated due to plume thickness.	
			MW20	90.34	90.36	0.02	NA	NA	NA	2:42	Pump (#2) remained deactivated due to plume thickness.	
			MW21	89.95	90.62	0.67	90.27	3.00	1	4:31	Pump (#3) operational upon arrival/departure. Pump rate maintained at 3 minutes/day.	
			MW22	90.16	90.45	0.29	NA	NA	NA	0:01	Pump (#1) remained deactivated due to plume thickness.	
			MW23	--	89.59	0.00	NA	NA	NA	NA	NA	No pump operational.
			MW24	89.98	90.19	0.21	NA	NA	NA	NA	NA	No pump operational.
			MW25	90.12	90.15	0.03	NA	NA	NA	NA	NA	No pump operational.
			MW26	89.69	89.85	0.16	NA	NA	NA	NA	NA	No pump operational.
			PH1-9301	89.62	89.72	0.10	NA	NA	NA	NA	NA	No pump operational.
PH1-9402	--	89.67	0.00	NA	NA	NA	5:33	NA	Pump (#5) remained deactivated due to plume thickness.			
05/12/21	8.50	68.5	MW15	86.75	86.76	0.01	NA	NA	NA	NA	Pump (#4) remained deactivated due to plume thickness.	
			MW20	90.45	90.47	0.02	NA	NA	NA	NA	Pump (#3) remained deactivated due to plume thickness.	
			MW21	90.02	91.02	1.00	90.50	6.00	1	NA	Pump (#2) operational upon arrival/departure. Pump rate increased to 6 minutes/day.	
			MW22	90.22	90.84	0.62	90.52	6.00	1	NA	Pump (#1) reactivated upon departure. Pump rate set at 6 minutes/day.	
			MW23	--	89.72	0.00	NA	NA	NA	NA	NA	No pump operational.
			MW24	90.10	90.31	0.21	NA	NA	NA	NA	NA	No pump operational.
			MW25	90.22	90.30	0.08	NA	NA	NA	NA	NA	No pump operational.
			MW26	89.80	90.04	0.24	NA	NA	NA	NA	NA	No pump operational.
			PH1-9301	89.75	89.89	0.14	NA	NA	NA	NA	NA	No pump operational.
PH1-9402	--	89.82	0.00	NA	NA	NA	NA	NA	Pump (#5) remained deactivated due to plume thickness.			
07/13/21	8.50	68.5	MW15	86.91	86.94	0.03	NA	NA	NA	NA	Pump (#4) remained deactivated due to plume thickness.	
			MW20	90.70	90.73	0.03	NA	NA	NA	NA	Pump (#3) remained deactivated due to plume thickness.	
			MW21	90.16	91.68	1.52	90.92	6.00	1	NA	Pump (#2) operational upon arrival/departure. Pump rate maintained at 6 minutes/day.	
			MW22	90.31	91.68	1.37	91.00	6.00	1	NA	Pump (#1) operational upon arrival/departure. Pump rate maintained at 6 minutes/day.	
			MW23	--	89.94	0.00	NA	NA	NA	NA	NA	No pump operational.
			MW24	90.32	90.52	0.20	NA	NA	NA	NA	NA	No pump operational.

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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)		
07/13/21	8.50	68.5	MW25	90.43	90.53	0.10	NA	NA	NA	NA	No pump operational.
			MW26	89.99	90.31	0.32	NA	NA	NA	NA	No pump operational.
			PH1-9301	89.99	90.12	0.13	NA	NA	NA	NA	No pump operational.
			PH1-9402	90.00	90.22	0.22	NA	NA	NA	NA	Pump (#5) remained deactivated due to plume thickness.
09/29/21	8.50	68.5	MW15	87.33	87.36	0.03	NA	NA	NA	NA	Pump (#4) remained deactivated due to plume thickness.
			MW20	91.08	91.20	0.12	NA	NA	NA	NA	Pump (#3) remained deactivated due to plume thickness.
			MW21	90.52	92.25	1.73	91.39	6.00	1	7:43	Pump (#2) operational upon arrival/departure. Pump rate maintained at 6 minutes/day.
			MW22	90.65	92.37	1.72	91.51	6.00	1	7:44	Pump (#1) operational upon arrival/departure. Pump rate maintained at 6 minutes/day.
			MW23	--	90.35	0.00	NA	NA	NA	NA	No pump operational.
			MW24	90.72	90.98	0.26	NA	NA	NA	NA	No pump operational.
			MW25	90.83	90.97	0.14	NA	NA	NA	NA	No pump operational.
			MW26	90.36	90.89	0.53	NA	NA	NA	NA	No pump operational.
			PH1-9301	90.40	90.45	0.05	NA	NA	NA	NA	No pump operational.
PH1-9402	90.39	90.55	0.16	NA	NA	NA	NA	Pump (#5) remained deactivated due to plume thickness.			
11/15/21	8.50	68.5	MW15	87.30	87.31	0.01	NA	NA	NA	NA	Pump (#4) remained deactivated due to plume thickness.
			MW20	91.08	91.12	0.04	NA	NA	NA	NA	Pump (#3) remained deactivated due to plume thickness.
			MW21	90.48	92.29	1.81	NA	NA	NA	11:38	Pump (#2) operational upon arrival. Pump deactivated upon departure due to line blockage.
			MW22	90.60	92.41	1.81	91.51	6.00	1	12:26	Pump (#1) operational upon arrival/departure. Pump rate maintained at 6 minutes/day.
			MW23	--	90.32	0.00	NA	NA	NA	NA	No pump operational.
			MW24	90.75	90.87	0.08	NA	NA	NA	NA	No pump operational.
			MW25	90.86	90.92	0.08	NA	NA	NA	NA	No pump operational.
			MW26	90.36	90.84	0.48	NA	NA	NA	NA	No pump operational.
			PH1-9301	--	90.40	0.00	NA	NA	NA	NA	No pump operational.
PH1-9402	90.40	90.45	0.05	NA	NA	NA	NA	Pump (#5) remained deactivated due to plume thickness.			

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Date	NAPL Recovery		Well	DTNAPL (feet bgs)	DTW (feet bgs)	NAPL Thickness (feet)	Adjustement to System			Total Pumping Time (hh:mm)	Comments
	Holding Tank (inches)	Total ^a (gallons)					Pump Depth (feet bgs)	Pumping Duration (min)	Days Between Pumping (day)		
feet bgs = feet below ground surface NM = Not measured NA = Not applicable -- = Not detected a = Total volume calculated using know dimensions of holding tank and measured depth converted to gallons											