

PNG ENVIRONMENTAL, INC.

MEMORANDUM

To: Nancy Sawka, DEQ Site Manager
From: Brad Berggren & Paul McBeth
Date: May 18, 2023
Subject: H&V Fiber Corporation Remedial System Progress Report

This memorandum and attachments summarize remediation progress for cleanup of the former Evanite Corporation trichloroethene (TCE) plume for the period from February 9 to April 20, 2023. This report will be generated on an approximate bi-monthly basis and includes remedial operations for the unsaturated zone soil vapor extraction (SVE), groundwater extraction and air stripper treatment, offgas treatment with activated carbon adsorption, and other remediation related activities. The site layout and well locations are presented in Figure 1.

Soil Vapor Extraction

The SVE system was operated continuously during the reporting period, with the exception of a system-wide shut down between approximately February 23 and March 1. The system shut down was caused by a blown transformer on the incoming power line and subsequent maintenance to that infrastructure. When active, the combined soil vapor extraction flow rate from both blowers was measured, using direct read digital flow meters, to be in the range of 313 to 325 cfm from the intermediate zone wells. Wells outside of the Submicro Building are currently connected to SVE Blower 1. Wells inside the Submicro Building are currently connected to SVE Blower 2. Currently, outside Submicro wells IMW-3, 16, 17, 24, 25, and 26 and inside Submicro wells IMW-28, 29, 30, and 31 are active in the SVE scheme.

Table Offgas-1 presents offgas quality data for the SVE system. Monitoring data indicates the soil gas is dominated by TCE, consistent with the nature of the VOC groundwater plume. As shown on table Offgas-1 the combined SVE discharge contains at least 98% TCE. A total of 52.7 pounds of TCE was removed by the SVE system over the reporting period, averaging 0.8 pounds per day (Table Mass-1).

Groundwater Extraction and Treatment

Consistent with the SVE system, the Groundwater Extraction and Treatment system was operated continuously during the reporting period except for a system-wide shut down between approximately February 23 and March 1. A total of more than 4.2 M gallons of groundwater has been extracted and treated in 2023. The average combined groundwater extraction rate during the reporting period was approximately 28.9 gpm and involved extraction from wells DMW-2, 3, 23, 24 and 29.

The air stripper was operated simultaneously with operation of the groundwater extraction system. Treatment efficiency is currently calculated at 90.5%. A total of 57.1 pounds of TCE was removed through groundwater extraction over the reporting period, averaging 0.8 pounds per day (Table Mass-1).

Offgas Treatment

Since May 3, 2017, all offgas from the groundwater extraction and SVE systems is treated by activated carbon adsorption rather than the previously used catalytic oxidizer system. In May 2017, two 2000-pound vapor phase activated carbon adsorption canisters were installed in series near the Submicro building. Offgas plumbing was altered to connect these carbon adsorption treatment canisters and vent the treated exhaust to a stack above the Submicro roofline (approximately 40 feet above ground). These vapor treatment system modifications allow for separation of the remediation systems from H&V's process operations.

Offgas treatment using vapor phase activated carbon adsorption continues in a performance optimization phase of operation. Treatment system performance data, including VOC concentrations, flow rates, relative humidity, and temperature, are collected approximately once per month. Modifications are made to the system as needed to optimize system operations and improve effectiveness. An inline duct heater continues to allow reduction of the relative humidity of the influent vapor stream, as needed, to improve carbon adsorption efficiency. Optimization of the heater operation and carbon adsorption performance is ongoing.

The offgas treatment system was operated simultaneously with operation of the SVE and groundwater extraction systems. Influent vapor flow of approximately 458 to 460 cfm (as measured using a direct read digital flow meter) included offgas contributions from the SVE system and groundwater treatment air stripper. During this reporting period, activated carbon was replaced on February 16 (Carbon Vessel 1 only) and March 20 (Carbon Vessel 2 only). Air quality data from performance monitoring of the activated carbon adsorption treatment system are presented in Table Offgas-1.

Physical Mass Removal and Destruction

TCE mass removal is summarized in Table GW-1, Table Mass-1, and Figure 2. TCE mass estimates are calculated using measurements from the exhaust of the SVE system and groundwater influent to the air stripper. An estimated 110 pounds of TCE were recovered during the reporting period from the SVE and Groundwater Extraction and Treatment systems (an average of approximately 1.6 pounds per day).

System Maintenance

Recent and planned future system maintenance and optimization activities include the following:

- Operation of the inline duct heater resumed on November 10. The inline duct heater operates during the cooler months to reduce relative humidity of offgas prior to entering the activated carbon vessels.
- Ongoing monitoring of the activated carbon adsorption offgas treatment, with replacement of spent carbon as needed.
- Ongoing optimization of the SVE scheme.

Future Activities

DEQ released the Record of Decision for the site in 2015, outlining the recommended remedial alternative. The overall remedial scheme is dynamic and performance based with a mix of active remediation including 1) plume hydraulic containment, 2) plume source depletion in the unsaturated and saturated zones using dewatering and SVE, and 3)

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depleted plume area polishing with ERD and engineering controls addressing a less than five-acre portion of the site that has not yet attained cleanup objectives. Treatment of extracted groundwater and soil vapor includes groundwater air stripping and activated carbon adsorption for air stripper and SVE offgas. With continued plume shrinkage and reductions in VOC concentrations in the Source Zone since the 2015 ROD, active remediation will transition from physical source depletion to in-situ treatment with ERD. Performance monitoring will be conducted and the performance monitoring program will be modified to reflect the observed conditions once the ERD systems are constructed and startup operations are completed.

cc: Anita Ragan, H&V Fiber Corporation

TABLES

Offgas - 1
SVE Performance Analytical Results - VOCs (ug/m³)
SVE Pre-Treatment
H&V Fiber Corporation
Covallis, Oregon

Location	Date	PCE	TCE	TCE as % of Total VOCs	cis -1,2-DCE	trans -1,2-DCE	1,1-DCE	Vinyl Chloride
SVE Blower 1 Discharge (PSVE1)	08/04/2010	129,560 U	6,182,368	94%	115,376	75,728 U	75,736 U	6,902 J
	10/14/2011	177,000 U	10,300,000	94%	204,000	103,000 U	103,000 U	66,600 U
	07/19/2012	59,000 U	3,300,000	94%	53,600	34,500 U	34,500 U	22,200 U
	07/24/2012	53,800 U	3,930,000	96%	41,900	31,500 U	31,500 U	20,300 U
	08/01/2012	60,000 U	2,790,000	94%	40,700	35,100 U	35,100 U	22,600 U
	09/06/2012	40,700 U	2,100,000	94%	38,400	23,800 U	23,800 U	15,300 U
	02/15/2013	17,600 U	2,230,000	94%	102,000	10,300 U	10,300 U	6,630 U
	02/19/2013	17,200 U	2,240,000	96%	52,400	10,100 U	10,100 U	6,500 U
	04/09/2013	1,400 U	260,000	92%	17,000	790 U	790 U	2,500
	05/09/2013	1,100 U	39,000	68%	16,000	630 U	630 U	410 U
	05/29/2013	1,100 U	640,000	98%	8,700	630 U	630 U	410 U
	07/03/2013	1,100 U	500,000	98%	7,500	630 U	630 U	410 U
	08/01/2013	240	480,000	98%	7,500	67	63 U	110
	09/04/2013	200	750,000	98%	11,000	100	63 U	170
	10/01/2013	1,100 U	750,000	98%	11,000	630 U	630 U	410 U
	11/06/2013	190	860,000	99%	7,500	75	67	180
	01/08/2014	1,100 U	390,000	95%	17,000	630 U	630 U	410 U
	02/04/2014	1,100 U	460,000	98%	8,300	630 U	630 U	410 U
	03/04/2014	27 U	20,000	95%	990	16 U	16 U	10 U
	04/04/2014	5.4 U	11,000	94%	630	4.8	3.2 U	2.0 U
	05/15/2014	1,100 U	410,000	98%	5,500	630 U	630 U	410 U
	06/03/2014	1,100 U	400,000	98%	5,500	630 U	630 U	410 U
	07/09/2014	1,100 U	400,000	98%	7,100	630 U	630 U	410 U
	08/14/2014	2,700 U	1,100,000	98%	11,000	1,600 U	1,600 U	1,000 U
	09/04/2014	2,700 U	750,000	98%	9,900	1,600 U	1,600 U	1,000 U
	10/07/2014	2,700 U	640,000	97%	12,000	1,600 U	1,600 U	1,000 U
	11/05/2014	1,100 U	290,000	96%	8,300	630 U	630 U	410 U
	12/01/2014	110 U	210,000	98%	4,800	63 U	63 U	130
	01/21/2015	34 U	54,000	97%	1,600	20 U	20 U	13 U
	03/10/2015	110 U	340,000	99%	2,700	63 U	63 U	41 U
	05/18/2015	1,100 U	700,000	96%	29,000	630 U	630 U	410 U
	06/10/2015	150	520,000	98%	7,900	63 U	63 U	49
	07/08/2015	1,600	640,000	98%	11,000	630 U	630 U	410 U
	09/01/2015	1,090 U	435,000	97%	9,510	634 U	634 U	409 U
	11/05/2015	164	371,000	98%	5,410	63 U	63 U	41 U
	12/14/2015	201	432,000	98%	6,430	63 U	63 U	41 U
	01/15/2016	2.7 U	2,400	71%	987	3.8	1.6 U	1.0 U
	03/11/2016	3.4	9,350	95%	525	5.0	1.6 U	1.6
	05/12/2016	77	266,000	99%	3,300	46	20 U	27
	06/21/2016	220	693,000	99%	7,710	63 U	63 U	41 U
08/04/2016	128	499,000	98%	7,460	80	26	38	
09/16/2016	474	470,000	98%	7,950	159 U	159 U	102 U	
11/10/2016	69	262,000	98%	4,750	42	20 U	17	
12/22/2016	2.7 U	6,290	91%	614	2.9	1.6 U	1.1	
02/06/2017	6.5	31,500	98%	743	7.3	2.4	5.6	
03/10/2017	2.7 U	4,570	93%	333	2.2	1.6 U	1.0 U	
05/09/2017	12	37,500	97%	1,060	15	4.4	7.8	
06/27/2017	28	108,000	99%	1,130	14	7.9	8.0	
08/09/2017	109 U	151,000	99%	1,800	63 U	63 U	41 U	
09/20/2017	19 J	32,700	98%	584	9.8 J	7.3 J	5.2 J	
11/14/2017	12	35,600	98%	721	6.9	4.0 U	3.9	
12/12/2017	11 U	27,100	98%	506	6.3 U	6.3 U	4.1 U	
02/27/2018	27 U	29,000	99%	326	16 U	16 U	10 U	

Offgas - 1
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H&V Fiber Corporation
Covallis, Oregon

Location	Date	PCE	TCE	TCE as % of Total VOCs	cis -1,2-DCE	trans -1,2-DCE	1,1-DCE	Vinyl Chloride
SVE Blower 1 Discharge (PSVE1) (cont'd)	03/19/2018	11 U	27,600	97%	846	8.2	6.3 U	4.2
	05/22/2018	15	58,900	98%	1,230	12	6.3 U	5.2
	06/13/2018	27 U	78,400	96%	2,940	18	16 U	10 U
	08/08/2018	36	45,200	96%	1,650	13	13 U	8.2 U
	09/06/2018	34 U	69,900	96%	2,740	20 U	20 U	13 U
	12/05/2018	3.7	14,600	97%	434	1.8	1.6 U	1.1
	01/11/2019	11	43,400	98%	1,010	11	4.4	6.7
	02/14/2019	2.7 U	2,460	92%	214	1.6 U	1.6 U	1.0 U
	03/08/2019	5.5	37,900	99%	432	4.7	2.7	3.3
	04/18/2019	146	2,150	92%	27	1.6 U	1.6 U	1.0 U
	05/07/2019	9.2	7,450	98%	137	1.9	1.6 U	1.0 U
	06/06/2019	10	53,800	99%	794	7.4	3.1	3.2
	07/15/2019*	8.7	18,500	98%	448	6.5	2.6	2.6
	08/14/2019	13	123,000	98%	3,040	6.6	3.9	2.7
	09/10/2019	7.6	30,400	98%	749	3.2	1.8	1.1
	10/29/2019	15	8,360	96%	334	5.1	2.6	1.7
	11/18/2019	16	25,700	97%	808	6.5	3.4	2.6
	12/17/2019	11	17,000	97%	416	6.8	3.6	3.6
	01/09/2020	27 U	45,900	97%	1,230	16 U	16 U	10 U
	02/11/2020	4.1	26,400	99%	349	3.8	1.8	2.4
	03/13/2020	58	67,000	98%	1,010	7.7	3.2	3.4
	** 04/14/2020	23	77,200	99%	868	13	4.6	5.0
	05/20/2020	16	64,800	99%	896	7.9	3.5	3.6
	06/11/2020	7.6	35,800	98%	587	4.8	5.8	2.1
	07/09/2020	12	39,700	98%	646	5.8	2.7	2.3
	08/06/2020	16	25,900	98%	523	6.0	3.2	2.5
	09/16/2020	14	44,100	98%	959	8.2	4.3	3.2
	10/08/2020	17	45,800	98%	820	7.0	3.5	2.8
	11/12/2020	12	19,700	97%	650	6.5	3.2	2.6
	12/09/2020	13	39,700	98%	888	7.9	4.1	3.5
	01/08/2021	3.4	7,930	94%	456	4.3	3.3	3.7
	02/05/2021	1.4 U	3,360	90%	350	1.8	1.1	0.95
	03/12/2021	3.9	6,110	89%	753	4.4	2.0	1.9
	04/16/2021	18	67,000	99%	951	9.7	4.8	4.8
	05/14/2021	27 U	97,000	99%	1,010	16 U	16 U	10 U
	06/09/2021	11	31,800	98%	690	7.9	4.1	3.6 J
	07/08/2021	27 U	36,200	98%	828	16 U	16 U	10 U
	08/12/2021	15	14,900	95%	690	6.8	3.7	2.8
	09/08/2021	12	21,100	97%	610	5.6	3.2	2.0
	10/01/2021	11	16,300	97%	487	5.8	3.2	2.3
11/09/2021	27 U	37,400	96%	1,610	16 U	16 U	10 U	
12/07/2021	9.5	27,200	97%	709	8.0	4.2	3.6	
01/12/2022	2.4	2,610	89%	327	2.3	1.2	1.3	
02/10/2022	7.2	69,700	99%	575	5.7	2.6	2.7	
03/08/2022	8.4	59,500	99%	642	7.3	4.1	4.2	
04/07/2022	11	56,300	99%	690	4.6	2.2	2.3	
05/05/2022	3.9	14,500	98%	249	2.8	1.5	1.6	
06/07/2022	3.4	11,100	98%	267	3.6	1.9	1.8	
07/08/2022	27 U	83,000	98%	1,480	16 U	16 U	10 U	
08/09/2022	15	29,800	98%	694	13	6.5	5.5	
09/07/2022	27 U	51,200	98%	1,080	16 U	16 U	10 U	
10/07/2022	17	18,700	95%	943	5.8	3.1	1.5	
11/10/2022	6.9	24,200	97%	662	6.1	3.5	3.1	

Offgas - 1
SVE Performance Analytical Results - VOCs (ug/m³)
SVE Pre-Treatment
H&V Fiber Corporation
Covallis, Oregon

Location	Date	PCE	TCE	TCE as % of Total VOCs	cis -1,2-DCE	trans -1,2-DCE	1,1-DCE	Vinyl Chloride
SVE Blower 1 Discharge (PSVE1) (cont'd)	12/06/2022	8.6	20,900	98%	487	6.9	4.1	5.0
	01/09/2023	1.9	5,950	96%	203	4.5	4.4	6.5
	02/09/2023	27 U	73,400	99%	701	16 U	16 U	10 U
	03/14/2023	7.7	39,500	98%	765	5.5	3.3	3.2
	04/20/2023	3.2	20,000	98%	440	3.5	2.3	2.0
SVE Blower 2 Discharge (PSVE2)	06/27/2017	155	539,000	97%	13,900	181	44	102
	08/09/2017	1,090 U	1,120,000	98%	23,700	634 U	634 U	409 U
	09/20/2017	153	628,000	99%	8,870	63 U	63 U	42
	11/14/2017	156	1,190,000	99%	10,400	89	79 U	51 U
	12/12/2017	136	688,000	98%	14,000	149	63 U	68
	02/27/2018	1,090 U	1,230,000	98%	19,200	634 U	634 U	409 U
	03/19/2018	150	997,000	99%	8,200	20 U	37	65
	05/22/2018	75	395,000	98%	9,150	139	30	54
	06/13/2018	171	391,000	97%	11,700	99	63 U	42
	08/08/2018	3,360	191,000	96%	4,850	63 U	63 U	41 U
	09/06/2018	109 U	132,000	95%	6,330	63 U	63 U	41 U
	12/05/2018	8,980	290,000	96%	4,390	63 U	63 U	41 U
	01/11/2019	109	484,000	99%	5,050	71	20	29
	02/14/2019	2,720 U	651,000	96%	16,800	1,590 U	1,590 U	1,020 U
	03/08/2019	8.2	60,100	98%	1,310	7.8	2.1	2.8
	04/18/2019	4.1	3,720	93%	269	1.6	1.6 U	1.0 U
	05/07/2019	10	32,500	99%	313	5.1	1.9	3.4
	06/06/2019	69	1,340,000	99%	9,590	69	20 U	27
	07/15/2019*	134	159,000	95%	8,270	65	63 U	41 U
	08/14/2019	89	614,000	99%	5,180	48	40 U	26 U
	09/10/2019	125	509,000	98%	8,510	79	16	29
	10/29/2019	109 U	82,500	97%	1,930	63 U	63 U	41 U
	11/18/2019	27 U	3,960	98%	29	16 U	16 U	10 U
	12/17/2019	1,570	356,000	98%	6,100	63 U	63 U	41 U
	01/09/2020	109 U	203,000	97%	4,990	63 U	63 U	41 U
	02/11/2020	1,090 U	2,450,000	99%	11,900	634 U	634 U	409 U
	03/13/2020	173	1,240,000	99%	7,490	82	63 U	41 U
	05/20/2020	21	54,100	99%	753	16	3.5	4.0
	06/11/2020	34	99,700	98%	1,530	20	4.4	5.5
	07/09/2020	17	47,800	98%	927	16	3.1	4.7
	08/06/2020	17	68,600	98%	1,460	13	2.6	4.9
	09/16/2020	19	100,000	98%	2,070	16	3.6	5.7
	10/08/2020	45	85,700	99%	1,170	21	4.6	6.6
	11/12/2020	23	37,600	98%	666	12	3.3	4.1
	12/09/2020	26	45,000	98%	789	11	2.8	3.4
01/08/2021	4.7	6,970	98%	99	1.3	0.79 U	0.83	
02/05/2021	1.4 U	879	97%	21	0.79 U	0.79	0.59	
03/12/2021	27 U	48,100	99%	390	16 U	16 U	10 U	
04/16/2021	24	65,400	99%	801	14	3.8	6.7	
05/14/2021	27 U	70,200	99%	999	16 U	16 U	10 U	
06/09/2021	29	91,100	98%	1,690	22	5.7	9.2 J	
07/08/2021	28	133,000	98%	2,140	17	16 U	10 U	
08/12/2021	48	66,400	98%	1,420	21	5.5	8.7	
09/08/2021	36	94,300	98%	1,820	26	5.8	7.6	
10/01/2021	30	131,000	97%	3,370	30	16 U	11	
11/09/2021	27 U	100,000	98%	1,720	16 U	16 U	10 U	
12/07/2021	17	41,700	99%	555	11	3.0	3.7	
01/12/2022	1.4 U	4,670	99%	47	0.79 U	0.79 U	0.51 U	
02/10/2022	14	24,100	99%	182	8.5	2.7	2.9	

Offgas - 1
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SVE Pre-Treatment
H&V Fiber Corporation
Covallis, Oregon

Location	Date	PCE	TCE	TCE as % of Total VOCs	cis -1,2-DCE	trans -1,2-DCE	1,1-DCE	Vinyl Chloride
SVE Blower 2 Discharge (PSVE2) (cont'd)	03/08/2022	10	48,200	99%	335	5.6	2.0	1.8
	04/07/2022	17	82,000	99%	579	5.7	1.8	1.8
	05/05/2022	11	36,600	99%	344	3.6	1.5	1.3
	06/07/2022	14 U	46,800	99%	288	7.9 U	7.9 U	5.1 U
	07/08/2022	109 U	124,000	99%	1,320	63 U	63 U	41 U
	08/09/2022	45	110,000	96%	4,800	41	16 U	13
	09/07/2022	86	297,000	98%	5,670	52	16 U	19
	10/07/2022	82	184,000	98%	4,440	38	9.4	9.2
	11/10/2022	65	359,000	99%	4,320	46	16	17
	12/06/2022	53	222,000	99%	2,360	29	7.7	14
	01/09/2023	29	104,000	99%	491	8.9	3.2	2.6
	02/09/2023	27 U	67,000	99%	507	16 U	16 U	10 U
	03/14/2023	10	44,400	99%	273	2.8	1.4	1.3
	04/20/2023	3.3	16,900	99%	117	1.5	0.79 U	0.69
Combined SVE + Stripper at Submicro	08/04/2010	86,825	5,266,748	94%	100,310	50,750 U	50,755 U	32,720 U
	09/29/2010	29,982 U	20,422,086	98%	380,227	26,485 U	30,731 U	14,545 J
	09/28/2011	15,000 U	252,000	78%	9,630 J	15,000 U	15,000 U	15,000 U
	10/14/2011	172,000 U	7,970,000	93%	146,000	100,000 U	100,000 U	64,700 U
	02/27/2012	21,800 U	1,260,000	93%	41,900	12,700 U	12,700 U	1,770 J
	07/19/2012	23,000 U	1,530,000	95%	28,200	13,400 U	13,400 U	8,660 U
	07/24/2012	59,000 U	2,830,000	94%	31,900 J	34,500 U	34,500 U	22,200 U
	08/01/2012	14,800 U	1,720,000	96%	26,200	8,670 U	8,670 U	5,590 U
	09/06/2012	31,700 U	1,760,000	94%	32,300	18,600 U	18,600 U	12,000 U
	09/28/2012	17,200 U	1,660,000	96%	31,900	10,100 U	10,100 U	6,500 U
	02/15/2013	20,400 U	2,550,000	95%	100,000	11,900 U	11,900 U	4,080 U
	02/19/2013	13,900 U	1,840,000	96%	35,900	8,110 U	8,110 U	5,230 U
	05/09/2013	240	960,000	99%	12,000	71	32 U	210
	05/29/2013	1,100 U	800,000	98%	11,000	630 U	630 U	410 U
	07/03/2013	200	270,000	98%	4,800	63 U	63 U	72
	08/01/2013	240	480,000	98%	7,100	67	63 U	110
	09/04/2013	140	330,000	97%	11,000	87	63 U	330
	10/01/2013	150	190,000	97%	6,300	63 U	63 U	120
	11/06/2013	140	310,000	99%	4,000	63 U	63 U	110
	01/08/2014	1,100 U	260,000	94%	13,000	630 U	630 U	410 U
	02/04/2014	1,100 U	350,000	97%	7,900	630 U	630 U	410 U
	03/04/2014	27 U	17,000	96%	630	16 U	16 U	10 U
	04/04/2014	110 U	44,000	93%	2,800	63 U	63 U	51
	05/15/2014	110 U	290,000	99%	3,000	63 U	63 U	49
	06/03/2014	1,100 U	350,000	97%	6,700	630 U	630 U	410 U
	07/09/2014	110 U	260,000	97%	7,900	63 U	63 U	69
	08/14/2014	1,100 U	410,000	97%	8,300	630 U	630 U	410 U
	09/04/2014	1,100 U	350,000	97%	6,700	630 U	630 U	410 U
	10/07/2014	540 U	280,000	97%	7,100	320 U	320 U	200 U
	11/05/2014	140	170,000	97%	4,400	63 U	63 U	69
	12/01/2014	110 U	170,000	97%	4,400	63 U	63 U	49
01/21/2015	110 U	70,000	96%	2,400	63 U	63 U	41 U	
03/10/2015	110 U	160,000	98%	2,700	63 U	63 U	41 U	
05/18/2015	1,100 U	700,000	96%	27,000	630 U	630 U	410 U	
06/10/2015	110 U	380,000	98%	7,100	63 U	63 U	64	
07/08/2015	750	540,000	98%	10,000	87	63 U	87	
09/01/2015	135	303,000	97%	7,820	63 U	63 U	41 U	
11/05/2015	112	253,000	98%	5,330	63 U	63 U	41 U	
12/14/2015	77	483,000	97%	12,600	50	23	65	
03/11/2016	16	46,700	93%	3,450	27	18	36	

Offgas - 1
SVE Performance Analytical Results - VOCs (ug/m³)
SVE Pre-Treatment
H&V Fiber Corporation
Covallis, Oregon

Location	Date	PCE	TCE	TCE as % of Total VOCs	cis -1,2-DCE	trans -1,2-DCE	1,1-DCE	Vinyl Chloride
Combined SVE + Stripper at Submicro (cont'd)	05/12/2016	53	242,000	98%	4,100	39	18	33
	06/21/2016	181	382,000	98%	5,850	63 U	63 U	41 U
	08/04/2016	76	309,000	98%	5,500	44	20 U	30
	09/16/2016	3,340	333,000	97%	7,220	159 U	159 U	102 U
	10/26/2016	61	203,000	98%	4,000	39	16	25
	11/10/2016	51	244,000	98%	4,600	34	20 U	22
	12/22/2016	27 U	56,100	94%	3,350	18	16 U	13
	02/06/2017	35	159,000	98%	3,240	22	16 U	17
	03/10/2017	23	68,800	98%	1,690	14	8.5	7.9
	05/09/2017	16	43,200	95%	2,180	19	10	11
	05/12/2017	624 U	130,000	97%	3,610	365 U	365 U	235 U
	05/17/2017	34 U	106,000	97%	2,800	23	20 U	18
	05/23/2017	109	109,000	97%	3,050	26	16 U	15
	05/30/2017	34 U	186,000	98%	4,290	34	20 U	23
	05/31/2017	41	165,000	98%	3,920	35	17	20
	06/14/2017	15	157,000	98%	3,110	17	7.0	14
	06/27/2017	41	211,000	98%	4,320	34	20 U	19
	07/05/2017	34 U	151,000	97%	4,530	28	20 U	16
	07/19/2017	170	186,000	97%	5,960	63 U	63 U	41 U
	07/26/2017	109 U	139,000	97%	3,730	63 U	63 U	41 U
	08/02/2017	58	242,000	98%	4,750	29	16 U	18
	08/09/2017	66	25,800	84%	4,780	34	15	22
	08/18/2017	508	177,000	98%	3,880	63 U	63 U	41 U
	08/29/2017	70	192,000	98%	4,330	40	20 U	22
	09/07/2017	57	278,000	99%	3,670	26	16 U	17
	09/20/2017	43	114,000	97%	3,860	30	20 U	20
	10/04/2017	185	151,000	98%	2,310	27	12	16
	10/20/2017	31	94,800	97%	2,370	20	10	15
	11/03/2017	21	88,900	97%	2,840	20	10	13
	11/14/2017	34 U	106,000	97%	2,890	21	20 U	13 U
	11/28/2017	15	63,300	98%	1,360	3.2 U	11	11
	12/12/2017	70	61,700	97%	2,010	20 U	20 U	13 U
	12/28/2017	34 U	86,200	96%	3,710	27	20 U	13
	01/11/2018	34 U	42,800	96%	2,000	20 U	20 U	13 U
	01/16/2018	7.9	27,400	95%	1,250	16	8.3	10
	02/27/2018	27 U	41,600	95%	2,280	17	16 U	10 U
	03/19/2018	34 U	53,100	96%	2,240	20 U	20 U	13 U
	04/05/2018	24	53,100	97%	1,860	17	8.0	7.3
	05/07/2018	27 U	62,500	97%	2,120	20	16 U	12
	05/22/2018	17	45,800	96%	1,690	24	10	10
06/13/2018	20	66,400	97%	1,910	31	13	13	
06/27/2018	27 U	59,400	94%	3,670	24	16 U	10	
07/24/2018	28	72,100	97%	2,380	31	16 U	15	
08/08/2018	45	38,200	96%	1,530	29	11	12	
09/06/2018	38	114,000	97%	3,140	21	20 U	13 U	
10/05/2018	109 U	28,600	88%	3,920	63 U	63 U	41 U	
12/05/2018	38	283,000	99%	3,790	24	16 U	13	
01/11/2019	21	137,000	98%	2,900	28	15	17	
02/14/2019	34 U	51,900	94%	3,360	20 U	20 U	13 U	
03/08/2019	12	60,600	98%	1,430	17	10	9.2	
04/18/2019	27 U	30,600	95%	1,460	16 U	16 U	10 U	
05/07/2019	13	30,400	97%	852	8.9	5.4	4.9	
06/06/2019	16	86,400	97%	2,280	25	13	12	

Offgas - 1
SVE Performance Analytical Results - VOCs (ug/m³)
SVE Pre-Treatment
H&V Fiber Corporation
Covallis, Oregon

Location	Date	PCE	TCE	TCE as % of Total VOCs	cis -1,2-DCE	trans -1,2-DCE	1,1-DCE	Vinyl Chloride
Combined SVE + Stripper at Submicro (cont'd)	07/15/2019	23	90,400	98%	1,990	23	11	9.0
	08/14/2019	38	189,000	98%	3,940	31	16 U	17
	09/10/2019	29	50,600	97%	1,280	21	9.9	8.8
	10/29/2019	40	27,400	85%	4,640	27	16 U	16
	11/18/2019	39	73,900	97%	2,450	23	24	12
	12/17/2019	36	124,000	96%	5,110	39	22	22
	01/09/2020	27 U	69,700	95%	3,700	25	16 U	17
	02/11/2020	15	82,000	98%	2,000	21	14	15
	03/13/2020	18	71,300	98%	1,740	26	15	13
	04/14/2020	21	68,000	97%	1,780	20	10	8.5
	05/20/2020	16	32,700	97%	963	16	8.0	7.2
	06/11/2020	19	70,700	97%	2,480	21	12	11
	07/09/2020	17	49,700	97%	1,680	18	9.5	8.8
	08/06/2020	16	31,400	97%	967	17	9.3	8.8
	09/16/2020	11	45,500	97%	1,170	10	5.0	5.0
	10/08/2020	20	57,300	98%	967	13	5.8	5.8
	11/12/2020	22	39,400	97%	1,290	22	13	11
	12/09/2020	21	53,200	97%	1,320	13	8.1	7.3
	01/08/2021	4.6	5,190	93%	400	3.9	3.2	4.1
	02/05/2021	1.5	5,210	92%	424	2.7	4.9	2.6
	03/12/2021	109 U	67,500	96%	2,730	63 U	63 U	41 U
	04/16/2021	27 U	94,800	98%	1,600	16 U	16 U	10 U
	05/14/2021	1,090 U	841,000	100%	2,500	634 U	634 U	409 U
	06/09/2021	24	77,700	97%	2,030	27	16	15 J
	07/08/2021	20	56,300	97%	1,680	16	8.6	7.8
	08/12/2021	23	47,100	97%	1,640	17	9.9	10
	09/08/2021	22	43,200	97%	1,280	15	6.5	5.8
	10/01/2021	14	34,200	97%	1,130	12	6.2	4.8
	11/09/2021	27 U	86,300	96%	3,490	19	16 U	11
	12/07/2021	15	38,000	97%	1,150	18	11	11
	01/12/2022	15	49,100	97%	1,520	17	13	14
	02/10/2022	14	83,600	99%	1,240	17	12	10
	03/08/2022	7.9	40,800	99%	519	5.6	3.7	3.8
04/07/2022	17	77,700	98%	1,640	12	7.3	6.5	
05/05/2022	10	31,300	97%	1,110	11	6.8	6.2	
06/07/2022	6.9	16,300	98%	370	3.6	2.7	0.51 U	
07/08/2022	30	101,000	97%	3,490	25	16	14	
08/09/2022	22	54,700	97%	1,640	25	12	10	
09/07/2022	35	113,000	97%	3,730	28	15	12	
10/07/2022	28	60,000	97%	2,150	16	9.2	7.3	
11/10/2022	15	49,100	98%	832	11	5.3	5.4	
12/06/2022	15	61,100	97%	1,680	14	7.5	11	
01/09/2023	9.4	28,200	99%	362	5.0	3.8	4.6	
02/09/2023	14	27,100	98%	670	13	8.6	6.3	
03/14/2023	5.7	31,600	98%	495	3.7	3.3	3.0	
04/20/2023	3.6	18,000	98%	385	3.4	2.7	2.3	
Between Carbon ^a	05/09/2017	2.7 U	108	95%	5.4	1.6 U	1.6 U	14
	05/12/2017	2.1 U	9.9	42%	14	1.3 U	1.3 U	14
	05/17/2017	2.7 U	13	63%	7.4	1.6 U	1.6 U	13
	05/23/2017	2.7 U	180	97%	5.6	1.6 U	1.6 U	19
	05/30/2017	2.7 U	321	93%	23	1.6 U	1.6 U	15
	05/31/2017	314	320	47%	35	1.6 U	1.6 U	10
	06/14/2017	2.7 U	250	94%	6.2	1.6 U	1.6 U	11
	06/27/2017	2.7 U	276	93%	6.1	1.6 U	1.6 U	14

Offgas - 1
SVE Performance Analytical Results - VOCs (ug/m³)
SVE Pre-Treatment
H&V Fiber Corporation
Covallis, Oregon

Location	Date	PCE	TCE	TCE as % of Total VOCs	cis -1,2-DCE	trans -1,2-DCE	1,1-DCE	Vinyl Chloride
Between Carbon (cont'd)	07/05/2017	2.7 U	372	63%	194	3.6	5.8	19
	07/19/2017	2.7 U	10	22%	1.6 U	1.6 U	1.6 U	37
	07/26/2017	2.7 U	5.2	17%	1.6 U	1.6 U	1.6 U	25
	08/02/2017	2.7 U	406	96%	24	1.6 U	1.6 U	19
	08/09/2017	2.7 U	2,180	49%	2,170	16	34	28
	08/18/2017	2.7 U	11	25%	10	1.6 U	1.6 U	24
	08/29/2017	2.7 U	579	60%	361	2.7	6.6	19
	09/07/2017	2.7 U	27,300	77%	8,100	96	125	22
	09/20/2017	16	149	68%	29	1.6 U	1.6 U	25
	10/04/2017	2.7 U	1,130	64%	564	10	33	23
	10/20/2017	2.7 U	201	75%	52	1.6 U	2.7	11
	11/03/2017	2.7 U	2,810	54%	2,330	11	16	11
	11/14/2017	6.8 U	42,400	88%	5,340	82	101	14
	11/28/2017	2.7 U	502	24%	1,480	20	41	11
	12/12/2017	2.7 U	183	22%	635	5.9	3.9	8.8
	12/28/2017	38	1,570	63%	828	9.2	1.7	26
	01/11/2018	1.4 U	174	61%	96	0.79 U	5.6	11
	01/26/2018	2.7 U	100	87%	3.2	1.6 U	1.6 U	12
	02/27/2018	2.7 U	111	79%	20	1.6 U	3.5	6.4
	03/19/2018	2.7 U	110	91%	3.7	1.6 U	1.6 U	6.6
	04/05/2018	2.7 U	99	90%	3.3	1.6 U	1.6 U	8.2
	05/07/2018	2.7 U	90	87%	2.9	1.6 U	1.6 U	10
	05/22/2018	2.7 U	52	84%	2.6	1.6 U	1.6 U	7.1
	06/13/2018	2.7 U	169	86%	6.3	1.6 U	1.6 U	22
	06/27/2018	3.2	136	86%	5.0	1.6 U	1.6 U	13
	07/24/2018	2.7 U	178	89%	6.4	1.6 U	1.6 U	16
	08/08/2018	2.7 U	224	93%	5.0	1.6 U	1.6 U	13
	09/06/2018	2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	13
	10/05/2018	2.7 U	474	71%	182	1.6 U	3.2	8.3
	12/05/2018	2.7 U	363	43%	444	3.4	10	12
	01/11/2019	2.7 U	195	86%	16	1.6 U	3.1	9.6
	02/14/2019	2.7 U	91	83%	3.8	1.6 U	1.6 U	9.3
	03/08/2019	2.7 U	179	89%	4.6	1.6 U	1.6 U	11
	04/18/2019	4.2	63	40%	48	1.6 U	1.6 U	41
	05/07/2019	2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	9.5
	06/06/2019	2.7 U	27	68%	1.6 U	1.6 U	1.6 U	5.2
	07/15/2019	2.7 U	112	88%	5.8	1.6 U	1.6 U	3.4
	08/14/2019	1.4 U	238	88%	10	0.79 U	0.79 U	19
	09/10/2019	34	2,000	92%	100	27	12	12
	10/29/2019	1.4 U	189	61%	104	0.90	3.9	13
	11/18/2019	1.4 U	151	87%	5.2	0.79 U	0.79 U	14
	12/17/2019	1.4 U	254	90%	7.7	0.79 U	0.79 U	16
	01/09/2020	1.4 U	246	88%	13	0.79 U	0.79 U	16
	02/11/2020	1.4 U	1.1 U	0%	0.79 U	0.79 U	0.79 U	0.62
	03/13/2020	1.4 U	11	43%	0.79 U	0.79 U	0.79 U	11
	04/14/2020	1.4 U	19	60%	0.79 U	0.79 U	0.79 U	9.3
	05/20/2020	1.4 U	1.1 U	0%	0.79 U	0.79 U	0.79 U	0.51 U
	06/11/2020	1.4 U	718	97%	0.79 U	0.79 U	0.79 U	22
	07/09/2020	1.4 U	1.1 U	0%	0.79 U	0.79 U	0.79 U	9.0
	08/06/2020	1.4 U	1.1 U	0%	0.79 U	0.79 U	0.79 U	7.5
	09/16/2020	1.4 U	1.3	16%	0.79 U	0.79 U	0.79 U	3.1
	10/08/2020	1.4 U	1.1 U	0%	0.79 U	0.79 U	0.79 U	6.9
	11/12/2020	1.4 U	24	66%	0.79 U	0.79 U	0.79 U	8.9

Offgas - 1
SVE Performance Analytical Results - VOCs (ug/m³)
SVE Pre-Treatment
H&V Fiber Corporation
Covallis, Oregon

Location	Date	PCE	TCE	TCE as % of Total VOCs	cis -1,2-DCE	trans -1,2-DCE	1,1-DCE	Vinyl Chloride	
Between Carbon (cont'd)	12/09/2020	1.4 U	290	93%	5.9	0.79 U	0.79 U	14	
	01/08/2021	1.4 U	5.3	21%	0.79 U	0.79 U	0.79 U	16	
	02/05/2021	1.4 U	2.3	16%	4.4	0.79 U	0.79 U	4.8	
	03/12/2021	1.4 U	30	11%	210	1.4	13	13	
	04/16/2021	1.4 U	157	4%	3,380	44	24	12	
	05/14/2021	27 U	80,400	98%	1,850	16 U	16 U	10 U	
	06/09/2021	1.4 U	4,410	51%	4,120	41	16	18	
	07/08/2021	1.4 U	13,700	93%	1,040	11	6.7	7.6	
	08/12/2021	1.4 U	43,000	97%	1,500	16	8.1	12	
	09/08/2021	1.4 U	24,400	92%	2,140	25	8.8	8.5	
	10/01/2021	1.4 U	19,900	96%	816	9.8	6.2	5.7	
	11/09/2021	1.4 U	2,700	67%	1,270	16	13	9.4	
	12/07/2021	1.4 U	6,970	86%	1,110	9.5	12	8.4	
	01/12/2022	1.4 U	6,910	53%	5,980	42	28	9.7	
	02/10/2022	1.4 U	13,600	93%	983	20	13	8.5	
	03/08/2022	1.4 U	27	72%	0.79 U	0.79 U	0.79 U	6.9	
	04/07/2022	2.5	34	76%	0.95	0.79 U	0.79 U	5.7	
	05/05/2022	1.4 U	176	93%	5.2	0.79 U	0.79 U	4.8	
	06/07/2022	1.4 U	1.6	7%	0.79 U	0.79 U	0.79 U	19	
	07/08/2022	40	1.6	3%	0.79 U	0.79 U	0.79 U	6.8	
	08/09/2022	1.4 U	2.6	14%	0.79 U	0.79 U	0.79 U	12	
	09/07/2022	1.4 U	1.5	9%	0.79 U	0.79 U	0.79 U	11	
	10/07/2022	5.1	124	89%	2.8	0.79 U	0.79 U	6.3	
	11/10/2022	1.4 U	825	66%	392	3.3	7.8	22	
	12/06/2022	1.4 U	117	86%	0.79 U	0.79 U	0.79 U	16	
	01/09/2023	1.4 U	83	66%	26	0.79 U	0.83	14	
	02/09/2023	7.8	1.1 U	0%	741	4.6	11	6.7	
	03/14/2023	1.4 U	16	63%	0.79 U	0.79 U	0.79 U	5.6	
	04/20/2023	2.5	6.0	36%	0.79 U	0.79 U	0.79 U	5.7	
	Post Carbon ^a	05/09/2017	2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	1.0 U
		05/12/2017	3.2 U	2.5 U	0%	1.9 U	1.9 U	1.9 U	1.4 J
05/17/2017		2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	26	
05/23/2017		2.7 U	5.1	19%	1.6 U	1.6 U	1.6 U	22	
05/30/2017		2.7 U	2.4	17%	1.6 U	1.6 U	1.6 U	12	
05/31/2017		25	2.1 U	0%	1.6 U	1.6 U	1.6 U	10	
06/14/2017		2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	10	
06/27/2017		1.2	1,640	85%	257	2.1	3.0	17	
07/05/2017		2.7 U	3,750	87%	521	3.5	5.1	15	
07/19/2017		2.7 U	3.5	8%	1.6 U	1.6 U	1.6 U	38	
07/26/2017		2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	20	
08/02/2017		2.7 U	8.3	31%	1.6 U	1.6 U	1.6 U	19	
08/09/2017		3.5	3.1	35%	2.3	1.6 U	1.6 U	1.0 U	
(Duplicate)		08/09/2017	4.0	2.1 U	0%	1.6 U	1.6 U	1.6 U	1.0 U
		08/18/2017	2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	10
		08/29/2017	4.1	3.5	13%	1.6 U	1.6 U	1.6 U	20
		09/07/2017	2.7 U	278	92%	5.6	1.6 U	1.6 U	18
		09/20/2017	2.7 U	16	32%	1.6 U	1.6 U	1.6 U	35
		10/04/2017	2.7 U	5.4	23%	3.1	1.6 U	1.6 U	15
		10/20/2017	2.7 U	9.3	50%	1.6 U	1.6 U	1.6 U	9.4
	11/03/2017	2.7 U	5.9	27%	4.0	1.6 U	1.6 U	12	
	11/14/2017	2.7 U	114	64%	44	1.6 U	3.3	17	
	11/28/2017	2.7 U	9.2	40%	4.5	1.6 U	1.6 U	9.1	
12/12/2017	28	32	44%	5.4	1.6 U	1.6 U	7.1		
12/28/2017	25	4.8	14%	1.7	1.6 U	1.6 U	3.5		

Offgas - 1
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SVE Pre-Treatment
H&V Fiber Corporation
Covallis, Oregon

Location	Date	PCE	TCE	TCE as % of Total VOCs	cis -1,2-DCE	trans -1,2-DCE	1,1-DCE	Vinyl Chloride
Post Carbon (cont'd)	01/11/2018	1.4 U	4.3	38%	0.79 U	0.79 U	0.79 U	7.0
	01/16/2018	2.7 U	3.0	30%	1.6 U	1.6 U	1.6 U	7.1
	02/27/2018	2.7 U	61	72%	1.6 U	1.6 U	1.6 U	24
	03/19/2018	2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	1.0 U
	04/05/2018	2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	7.8
	05/07/2018	2.7 U	2.7	16%	1.6 U	1.6 U	1.6 U	14
	05/22/2018	2.7 U	8.3	40%	1.6 U	1.6 U	1.6 U	13
	06/13/2018	2.7 U	7.7	41%	1.6 U	1.6 U	1.6 U	11
	06/27/2018	2.9	4.4	20%	1.6 U	1.6 U	1.6 U	15
	07/24/2018	2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	11
	08/08/2018	2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	6.8
	09/06/2018	2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	20
	10/05/2018	2.7 U	2.1 U	0%	1.6 U	1.6 U	1.6 U	5.9
	12/05/2018	2.9	14	40%	2.6	1.6 U	1.6 U	16
	01/11/2019	2.7 U	6.4	36%	1.8	1.6 U	1.6 U	7.8
	02/14/2019	2.7 U	7.5	34%	1.6 U	1.6 U	1.6 U	13
	03/08/2019	2.7 U	17	61%	1.6 U	1.6 U	1.6 U	9.0
	04/18/2019	3.1	3.1	12%	1.6 U	1.6 U	1.6 U	20
	05/07/2019	2.8	2.6	26%	1.6 U	1.6 U	1.6 U	4.7
	06/06/2019	2.7 U	99	100%	1.6 U	1.6 U	1.6 U	1.0 U
	07/15/2019	2.7 U	4.0	40%	1.6 U	1.6 U	1.6 U	6.1
	08/14/2019	1.4 U	323	91%	0.79 U	0.79 U	0.79 U	31
	09/10/2019	1.4 U	26	53%	0.79 U	0.79 U	0.79 U	22
	10/29/2019	1.4 U	2.1	17%	0.79 U	0.79 U	0.79 U	9.1
	11/18/2019	1.4 U	2.0	100%	0.79 U	0.79 U	0.79 U	0.51 U
	12/17/2019	1.4 U	129	90%	2.6	0.79 U	0.79 U	13
	01/09/2020	1.4 U	4.1	10%	0.79 U	0.79 U	0.79 U	38
	02/11/2020	1.4 U	1.8	8%	0.79 U	0.79 U	0.79 U	21
	03/13/2020	1.4 U	8.5	43%	0.79 U	0.79 U	0.79 U	11
	04/14/2020	1.4 U	2.7	15%	0.79 U	0.79 U	0.79 U	15
	05/20/2020	1.4 U	1.1 U	0%	0.79 U	0.79 U	0.79 U	8.6
	06/11/2020	1.4 U	2.1	20%	0.79 U	0.79 U	0.79 U	8.4
	07/09/2020	1.4 U	1.6	100%	0.79 U	0.79 U	0.79 U	0.51 U
	08/06/2020	1.8	1.6	13%	0.79 U	0.79 U	0.79 U	8.6
	09/16/2020	1.4 U	68	90%	0.79 U	0.79 U	0.79 U	7.8
	10/08/2020	1.4 U	2.4	21%	0.79 U	0.79 U	0.79 U	8.7
	11/12/2020	1.4 U	5.6	45%	0.79 U	0.79 U	0.79 U	6.9
	12/09/2020	1.4 U	15	58%	0.79 U	0.79 U	0.79 U	11
	01/08/2021	1.4 U	1.1 U	0%	0.79 U	0.79 U	0.79 U	17
	02/05/2021	1.4 U	1.4	24%	0.79 U	0.79 U	0.79 U	4.4
03/12/2021	1.4 U	58	81%	4.9	0.79 U	0.79 U	8.3	
04/16/2021	1.4 U	13	45%	6.1	0.79 U	0.79 U	9.3	
05/14/2021	1.4 U	17	1%	2,810	16	18	9.9	
06/09/2021	1.4 U	46	1%	3,620	26	17	17	
07/08/2021	3.8	15	1%	2,200	15	6.3	7.3	
08/12/2021	1.4 U	122	9%	1,150	18	12	9.8	
09/08/2021	35	35	43%	1.8	0.79 U	0.79 U	7.5	
10/01/2021	21	71	8%	812	7.1	11	6.6	
11/09/2021	1.4 U	250	15%	1,380	4.5	14	9.4	
12/07/2021	1.4 U	6.3	1%	828	5.8	8.2	8.8	
01/12/2022	1.4 U	7.1	51%	3.4	0.79 U	0.79 U	0.51 U	
02/10/2022	1.4 U	27	64%	2.3	0.79 U	0.79 U	10	
03/08/2022	1.4 U	38	74%	3.0	0.79 U	0.79 U	7.3	

Offgas - 1
SVE Performance Analytical Results - VOCs (ug/m³)
SVE Pre-Treatment
H&V Fiber Corporation
Covallis, Oregon

Location	Date	PCE	TCE	TCE as % of Total VOCs	cis -1,2-DCE	trans -1,2-DCE	1,1-DCE	Vinyl Chloride
Post Carbon (cont'd)	04/07/2022	4.4	16	52%	0.79 U	0.79 U	0.79 U	8.0
	05/05/2022	1.4 U	1.5	14%	0.79 U	0.79 U	0.79 U	5.5
	06/07/2022	2.8	1.3	17%	0.79 U	0.79 U	0.79 U	1.5
	07/08/2022	5.4	1.1 U	0%	0.79 U	0.79 U	0.79 U	3.0
	08/09/2022	1.4 U	15	73%	0.79 U	0.79 U	0.79 U	1.9
	09/07/2022	1.4 U	1.1 U	0%	0.79 U	0.79 U	0.79 U	9.3
	10/07/2022	4.3	14	66%	0.79 U	0.79 U	0.79 U	0.51 U
	11/10/2022	1.4 U	7.8	35%	0.79 U	0.79 U	0.79 U	11
	12/06/2022	1.4 U	4.3	19%	0.79 U	0.79 U	0.79 U	14
	01/09/2023	1.4 U	3.0	14%	0.79 U	0.79 U	0.79 U	14
	02/09/2023	1.4 U	1.1 U	0%	1.2	0.79 U	0.79 U	5.3
	03/14/2023	1.4 U	9.2	53%	0.79 U	0.79 U	0.79 U	4.6
	04/20/2023	1.4 U	2.2	19%	0.79 U	0.79 U	0.79 U	5.6

Notes:
^a Activated carbon replacement: Carbon Vessel 1 - 6/2/17 (2000 lbs), Carbon Vessels 1 and 2 - 7/12/17 (4000 lbs), Carbon Vessel 1 - 8/15/17 (2000 lbs), Carbon Vessel 2 - 9/15/17 (2000 lbs), Carbon Vessel 1 - 10/13/17 (2000 lbs), Carbon Vessel 2 - 11/17/17 (2000 lbs), Carbon Vessel 1 - 12/19/17 (2000 lbs), Carbon Vessel 2 - 1/15/18 (2000 lbs), Carbon Vessel 1 - 3/13/18 (2000 lbs), Carbon Vessel 2 - 4/19/18 (2000 lbs), Carbon Vessel 1 - 5/29/18 (2000 lbs), Carbon Vessel 2 - 7/10/18 (2000 lbs), Carbon Vessel 1 - 8/27/18 (2000 lbs), Carbon Vessel 2 - 10/11/18 (2000 lbs), Carbon Vessel 1 - 11/20/18 (2000 lbs), Carbon Vessel 2 - 12/27/18 (2000 lbs), Carbon Vessel 1 - 2/6/19 (2000 lbs), Carbon Vessel 2 - 3/11/19 (2000 lbs), Carbon Vessel 1 - 4/22/19 (2000 lbs), Carbon Vessel 2 - 6/4/19 (2000 lbs), Carbon Vessel 1 - 7/18/19 (2000 lbs), Carbon Vessel 2 - 8/29/19 (2000 lbs), Carbon Vessel 1 - 10/3/19 (2000 lbs), Carbon Vessel 2 - 11/15/19 (2000 lbs), Carbon Vessel 1 - 12/19/19 (2000 lbs), Carbon Vessel 2 - 1/20/20 (2000 lbs), Carbon Vessel 1 - 2/24/20 (2000 lbs), Carbon Vessel 2 - 3/26/20 (2000 lbs), Carbon Vessel 1 - 5/1/20 (2000 lbs), Carbon Vessel 2 - 6/3/20 (2000 lbs), Carbon Vessel 1 - 7/6/20 (2000 lbs), Carbon Vessel 2 - 8/10/20 (2000 lbs), Carbon Vessel 1 - 9/21/20 (2000 lbs), Carbon Vessel 2 - 10/29/20 (2000 lbs), Carbon Vessel 1 - 11/25/20 (2000 lbs), Carbon Vessel 2 - 12/29/20 (2000 lbs), Carbon Vessel 1 - 2/3/21 (2000 lbs), Carbon Vessel 2 - 3/11/21 (2000 lbs), Carbon Vessel 1 - 4/15/21 (2000 lbs), Carbon Vessel 2 - 5/19/21 (2000 lbs), Carbon Vessel 1 - 6/23/21 (2000 lbs), Carbon Vessel 2 - 7/28/21 (2000 lbs), Carbon Vessel 1 - 9/3/21 (2000 lbs), Carbon Vessels 1 and 2 - 10/14/21 (4000 lbs), Carbon Vessel 2 - 11/23/21 (2000 lbs), Carbon Vessel 1 - 1/10/22 (2000 lbs), Carbon Vessel 2 - 2/18/22 (2000 lbs), Carbon Vessel 1 - 3/18/22 (2000 lbs), Carbon Vessel 2 - 4/21/22 (2000 lbs), Carbon Vessel 1 - 5/27/22 (2000 lbs), Carbon Vessel 2 - 7/1/22 (2000 lbs), Carbon Vessel 1 - 8/4/22 (2000 lbs), Carbon Vessel 2 - 9/9/22 (2000 lbs), Carbon Vessel 1 - 10/6/22 (2000 lbs), Carbon Vessel 2 - 11/11/22 (2000 lbs), Carbon Vessel 1 - 12/16/2022 (2000 lbs), Carbon Vessel 2 - 01/18/2023 (2000 lbs), Carbon Vessel 1 - 02/16/2023 (2000 lbs), Carbon Vessel 2 - 03/20/2023 (2000 lbs.), Carbon Vessel 1 - 04/28/2023 (2000 lbs)

PCE = Tetrachloroethene

TCE = Trichloroethene

DCE = Dichloroethene

ug/m³ = Micrograms per cubic meter of air

*SVE Blower 1 and 2 Dishcharge samples collected on 7/15/2019 were mislabeled in the field. Sample results were reversed in order to match historical data.

U = Undetected at Method Reporting Limit shown

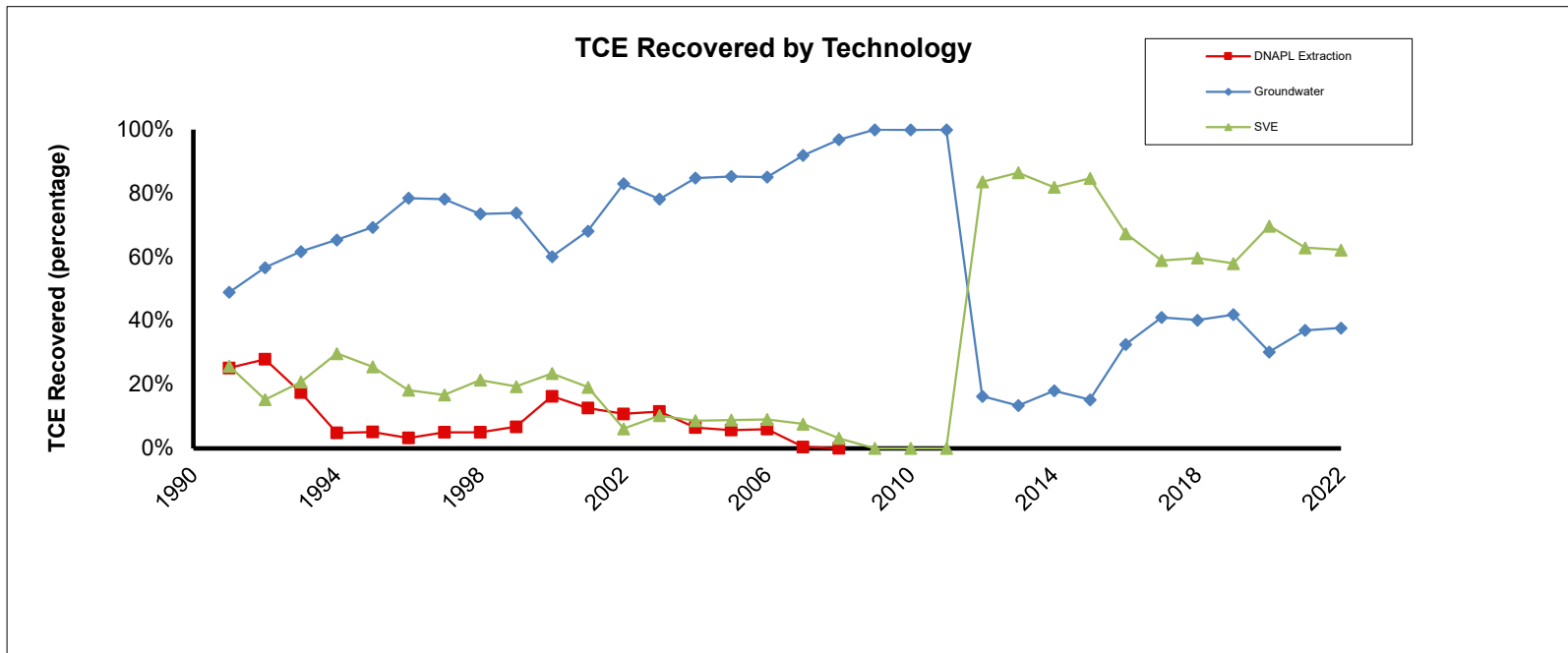
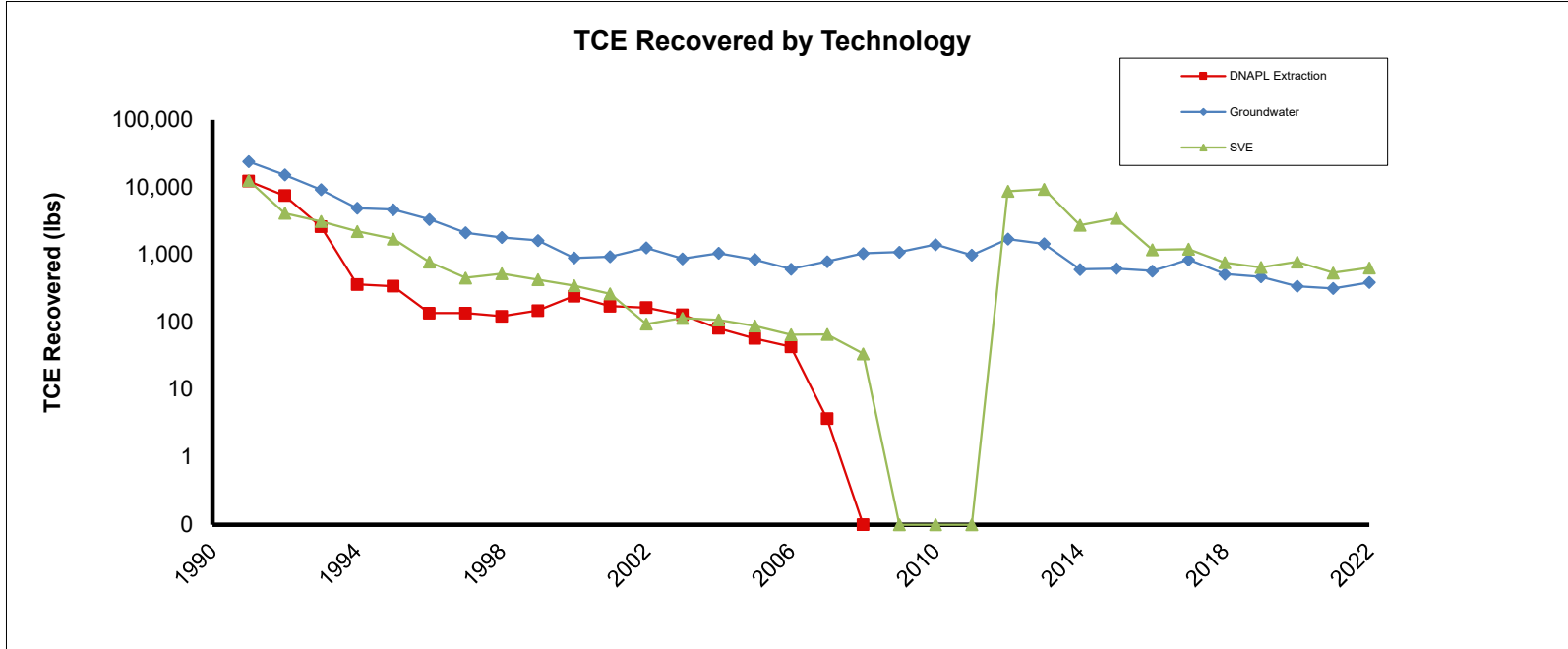
J = Estimated value

Treatment of remediation system offgas using vapor phase activated carbon adsorption began 05/03/2017

SVE Blower 2 start up on 06/22/2017

**Blower 2 went down on March 26, 2020. The system was temporarily modified to run all SVE well locations through Blower 1. A replacement blower was installed at the Blower 2 location on April 27, 2020.

Table GW-1
Groundwater, DNAPL Recovery, and Soil Vapor Extraction Performance Data
H & V Fiber Corporation
Corvallis, Oregon



Time Period	Groundwater		DNAPL Extraction			SVE (lbs)	Total TCE (lbs)	Contribution by Technology			
	Gallons	TCE (lbs)	DNAPL (gallons)	TCE (lbs)	Oil (gallons)			GW%	DNAPL%	SVE%	Total%
1991	21,000,100	23,900	1,484	12,300	478	12,600	48,800	49.0%	25.2%	25.8%	100%
1992	25,349,700	15,200	892	7,500	286	4,100	26,800	56.7%	28.0%	15.3%	100%
1993	25,931,500	9,200	315	2,600	102	3,100	14,900	61.7%	17.4%	20.8%	100%
1994	26,459,400	4,860	40	360	13	2,210	7,430	65.4%	4.8%	29.7%	100%
1995	25,698,500	4,640	41	340	14	1,710	6,690	69.4%	5.1%	25.6%	100%
1996	25,295,100	3,333	16.9	136	5.4	776	4,245	78.5%	3.2%	18.3%	100%
1997	24,324,600	2,110	16.6	136	5.3	452	2,698	78.2%	5.0%	16.8%	100%
1998	24,471,200	1,794	14.7	122	4.6	523	2,439	73.6%	5.0%	21.4%	100%
1999	24,184,200	1,620	17.5	148	5.7	425	2,193	73.9%	6.7%	19.4%	100%
2000	20,990,000	892	29.2	242	9.4	348	1,482	60.2%	16.3%	23.5%	100%
2001	17,967,500	930	20.9	172	6.7	262	1,364	68.2%	12.6%	19.2%	100%
2002	18,150,000	1,259	20.0	164	6.4	94	1,517	83.0%	10.8%	6.2%	100%
2003	16,807,400	868	15	128	5	114	1,110	78.2%	11.6%	10.3%	100%
2004	16,402,400	1,050	9.7	81	3.1	108	1,238	84.8%	6.5%	8.7%	100%
2005	13,624,300	848	6.7	57	2.2	88	994	85.3%	5.7%	8.9%	100%
2006	13,087,100	611	5.1	43	1.6	65	718	85.1%	6.0%	9.1%	100%
2007	14,556,200	790	0.5	4	0.1	66	859	91.9%	0.4%	7.6%	100%
2008	14,379,800	1,045	0.0	0	0.0	34	1,079	96.8%	0.0%	3.2%	100%
2009	14,197,700	1,087	0.0	0	0.0	0	1,088	100.0%	0.0%	0.0%	100%
2010	15,218,100	1,408	0.0	0	0.0	0	1,408	100.0%	0.0%	0.0%	100%
2011	11,895,138	986	0.0	0	0.0	0	986	100.0%	0.0%	0.0%	100%
2012	19,357,192	1,697	0.0	0	0.0	8,692	10,389	16.3%	0.0%	83.7%	100%
2013	15,048,449	1,449	0.0	0	0.0	9,331	10,780	13.4%	0.0%	86.6%	100%
2014	15,910,300	602	0.0	0	0.0	2,734	3,336	18.1%	0.0%	81.9%	100%
2015	15,152,906	621	0.0	0	0.0	3,450	4,071	15.2%	0.0%	84.8%	100%
2016	13,837,730	573	0.0	0	0.0	1,184	1,757	32.6%	0.0%	67.4%	100%
2017	18,841,943	841	0.0	0	0.0	1,209	2,050	41.0%	0.0%	59.0%	100%
2018	17,485,298	513	0.0	0	0.0	762	1,276	40.2%	0.0%	59.8%	100%
2019	18,828,467	469	0.0	0	0.0	648	1,116	42.0%	0.0%	58.0%	100%
2020	18,070,584	339	0.0	0	0.0	781	1,120	30.3%	0.0%	69.7%	100%
2021	17,265,701	316	0.0	0	0.0	536	852	37.0%	0.0%	63.0%	100%
2022	17,131,019	386	0.0	0	0.0	636	1,022	37.8%	0.0%	62.2%	100%
2023	4,257,582	97	0.0	0	0.0	130	227	42.8%	0.0%	57.2%	100%
Totals	601,177,109	86,333	2,945	24,533	949	57,166	168,032	51.4%	14.6%	34.0%	100%

Notes:
Data provided by Evanite 1991-2008
PNG Began Project Management in 2009
TCE = Trichloroethene
SVE = Soil vapor extraction
DNAPL = Dense non-aqueous phase liquids
lbs = Pounds
2023 data through April 20

Table GW-2
TCE Groundwater Treatment System Performance
H&V Fiber Corporation
Corvallis, Oregon

Date	Average Extraction Rate (gpm)	Gallons Extracted for Period	Influent Concentration (ug/L)	Effluent Concentration (ug/L)	Efficiency (%)
09/18/2017	39.1	2,253,864	2,900	41	98.6%
11/14/2017	36.3	2,976,562	3,440	17	99.5%
12/11/2017	40.2	1,564,039	3,420	31	99.1%
02/27/2018	28.2	3,163,183	4,690	52	98.9%
03/07/2018	34.1	392,814	2,690	25	99.1%
05/22/2018	33.0	3,609,842	3,510	33	99.1%
06/06/2018	35.0	755,196	3,150	32	99.0%
08/08/2018	35.1	3,183,271	3,430	30	99.1%
09/10/2018	29.3	1,393,803	3,850	4.1	99.9%
12/04/2018	33.5	4,095,817	3,090	80	97.4%
02/14/2019	34.8	3,606,994	3,010	58	98.1%
03/11/2019	38.1	1,373,115	2,970	161	94.6%
05/07/2019	37.3	3,059,187	3,080	109	96.5%
06/04/2019	36.2	1,461,571	3,100	100	96.8%
07/15/2019	30.0	1,770,301	3,400	36	98.9%
09/10/2019	38.1	3,131,222	3,060	111	96.4%
10/29/2019	37.3	2,633,609	2,800	94	96.6%
12/18/2019	34.8	2,504,412	2,590	141	94.6%
02/11/2020	34.1	2,700,619	1,920	110	94.3%
03/12/2020	35.4	1,529,893	1,820	111	93.9%
04/14/2020	35.0	1,663,610	2,550	36	98.6%
06/02/2020	35.5	2,504,294	1,850	144	92.2%
08/06/2020	34.3	3,211,748	2,500	174	93.0%
09/17/2020	34.5	2,087,579	2,620	262	90.0%
11/12/2020	32.6	2,631,263	2,210	119	94.6%
12/10/2020	33.0	1,330,051	2,150	134	93.8%
02/05/2021	30.9	2,538,835	1,390	98	93.0%
03/12/2021	30.2	1,520,048	6,950	910	86.9%
04/16/2021	37.8	1,902,993	2,580	423	83.6%
06/09/2021	36.6	2,845,407	2,480	320	87.1%
07/08/2021	35.5	1,482,476	2,740	98	96.4%
09/08/2021	34.3	3,062,830	1,110	38	96.6%
12/06/2021	29.4	3,766,065	3,110	323	89.6%
02/10/2022	34.7	3,301,529	3,470	444	87.2%
03/08/2022	34.3	1,282,500	3,770	375	90.1%
04/07/2022	33.4	1,442,735	3,040	322	89.4%
06/07/2022	32.0	2,814,544	2,830	258	90.9%
08/09/2022	31.7	2,879,890	2,430	174	92.8%
09/07/2022	30.3	1,267,187	1,960	220	88.8%
10/07/2022	29.9	1,292,345	1,810	145	92.0%
11/10/2022	30.8	1,508,939	2,760	216	92.2%
12/06/2022	30.2	1,129,867	2,400	243	89.9%
01/09/2023	29.2	1,430,833	2,280	204	91.1%
02/09/2023	30.2	1,348,071	2,980	262	91.2%
03/15/2023	22.8	1,115,899	2,450	257	89.5%
04/20/2023	34.6	1,793,342	2,290	218	90.5%

Notes:

- °F = Degrees Fahrenheit
- ug/L = Micrograms per liter
- % = Percent
- U = undetected at detection limit shown
- = Not available

**Table Mass-1
Mass Removal Estimates**

H&V Fiber Corporation
Corvallis, Oregon

Mass Removed from Groundwater Extraction						
Date	Days in Cycle	Active Days	Gallons Extracted	Average TCE (mg/L)	Mass Removal (lbs/day)	Mass Removal (Total lbs)
2/9/2023						
3/14/2023	33	27	1,115,899	2.5	0.7	22.8
4/20/2023	37	37	1,793,342	2.3	0.9	34.3
Total:						57.1

Mass Removed from Soil Vapor Extraction						
<i>Blower 1</i>						
Date	Days in Cycle	Active Days	Flow Rate (cfm)	Average TCE (mg/m ³)	Mass Removal (lbs/day)	Mass Removal (Total lbs)
2/9/2023						
3/14/2023	33	27	173	39.5	0.6	16.6
4/20/2023	37	37	172	20.0	0.3	11.4
Total:						28.0
<i>Blower 2</i>						
Date	Days in Cycle	Active Days	Flow Rate (cfm)	Average TCE (mg/m ³)	Mass Removal (lbs/day)	Mass Removal (Total lbs)
2/9/2023						
3/14/2023	33	27	149	44.4	0.6	16.1
4/20/2023	37	37	153	16.9	0.2	8.6
Total:						24.7
SVE Blower 1 and Blower 2 Total:						52.7

Total from Groundwater and SVE for Reporting Period					1.6	110
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Notes:

TCE = Trichloroethene

mg/L = Milligrams per liter

lbs/day= pounds per day

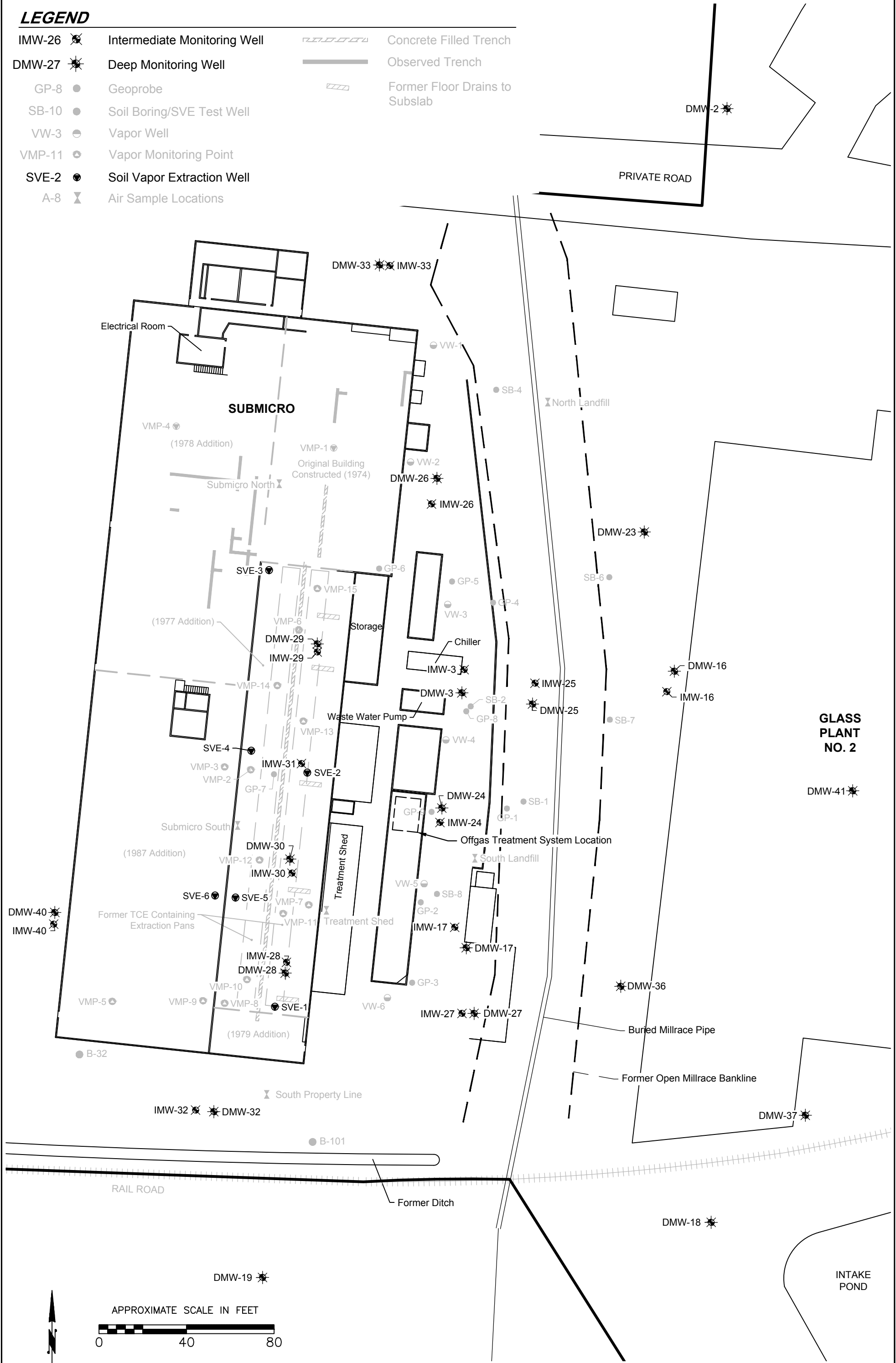
cfm = Cubic feet per minute

mg/m³ = milligrams per cubic meter

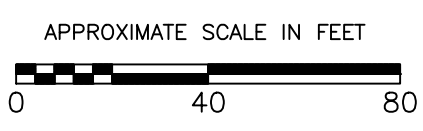
FIGURES

LEGEND

- IMW-26 ☒ Intermediate Monitoring Well
- DMW-27 ☒ Deep Monitoring Well
- GP-8 ● Geoprobe
- SB-10 ● Soil Boring/SVE Test Well
- VW-3 ○ Vapor Well
- VMP-11 ● Vapor Monitoring Point
- SVE-2 ● Soil Vapor Extraction Well
- A-8 ☒ Air Sample Locations
- ▨ Concrete Filled Trench
- ▬ Observed Trench
- ▨ Former Floor Drains to Subslab



GLASS PLANT NO. 2



PNG ENVIRONMENTAL, INC.
 6665 SW Hampton St., Ste. 101 Tigard, OR 97223
 TEL (503) 620-2387 FAX (503) 620-2977

DATE: 6-12-18
 FILE NAME: 1122-03
 DRAWN BY: JJT
 APPROVED BY: SV

H&V FIBER
 1115 SE CRYSTAL LAKE DR.
 CORVALLIS, OREGON

SITE FEATURES
 SUBMICRO DNAPL SOURCE ZONE

Project No. 1122-03
 Figure No. 1

Figure 2
TCE Mass Removal
H&V Fiber Corporation
Corvallis, Oregon

