



**Rose & Westra**  
A Division of GZA

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## MEMORANDUM

To: Abby Hendershott, MDEQ

From: Leslie Nelson, Rose & Westra, a Division of GZA GeoEnvironmental, Inc.

Date: April 1, 2019

File No.: 16.0062677.81 Task 001

Re: Wolverine World Wide, Inc. (Wolverine) – Wolven/Jewell RI – Monthly Progress Report

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This Monthly Progress Report (MPR) is being provided at the request of the MDEQ to provide an update regarding the implementation of the December 13, 2017 Source Area Investigation Work Plan (WP) related to per- and polyfluorinated alkyl substances (PFAS) detected in residential wells in the Wolven/Jewell study area.

## ACTIONS PERFORMED

During this period, February 23, 2019 through March 22, 2019, GZA has done the following:

1. February 22, 2019-March 22, 2019: Drilled at WV-MW-10 and WV-MW-16 locations. Installed two monitoring wells at each location. Boring logs in progress.
2. Continued work to obtain access to additional drilling locations.
3. Data management for groundwater sampling data.

## ANALYTICAL DATA RECEIVED

The analytical data for the groundwater sampling event was received. Tables 1A through 1F present the data. Figure 1 shows the monitoring well locations along with the approximate groundwater plume greater than 70 ppt for PFOA+PFOS.

## ANTICIPATED ACTIONS AND SCHEDULE FOR NEXT REPORTING PERIOD

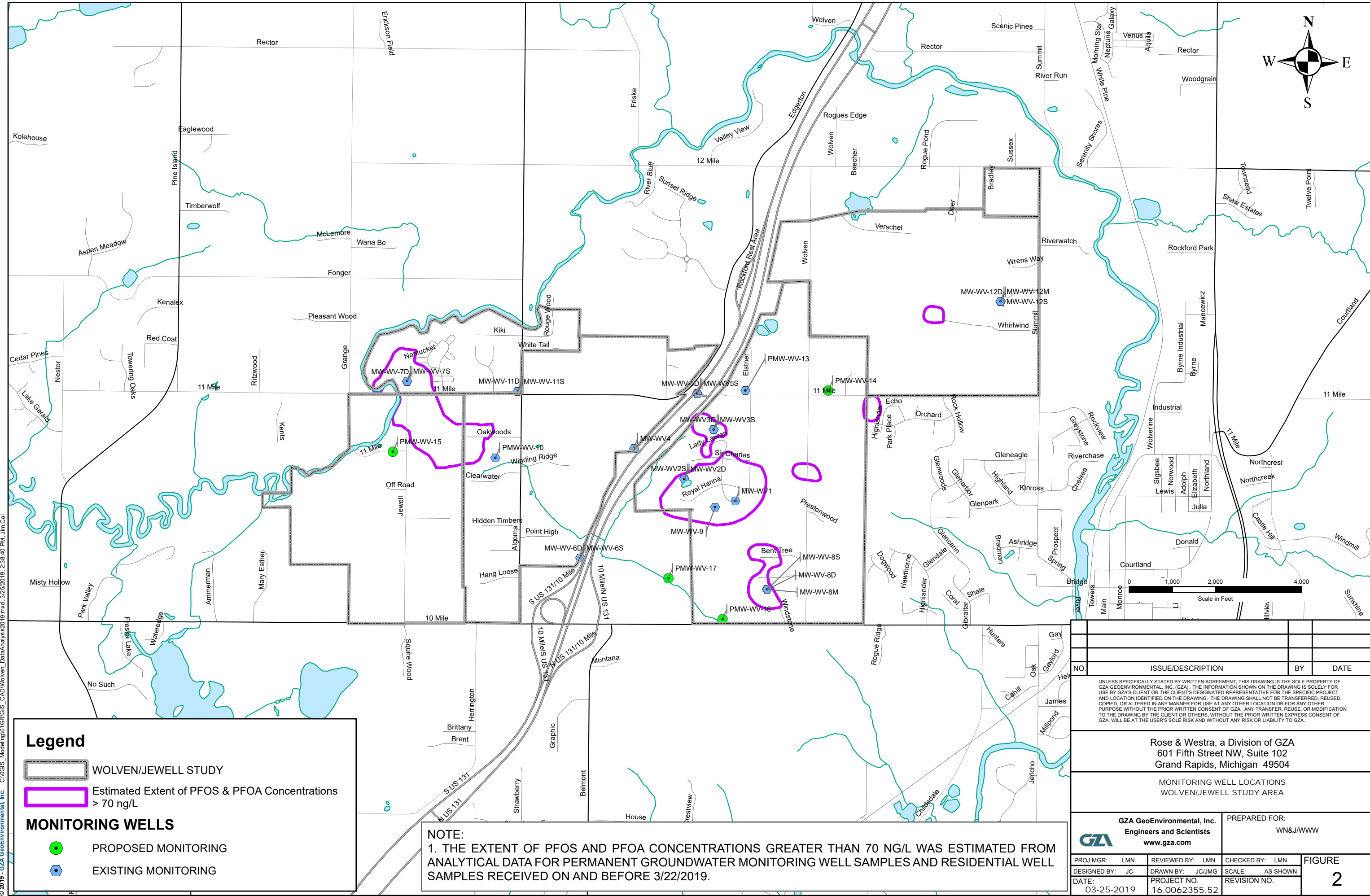
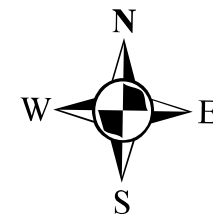
During the next reporting period, March 25, 2019 through April 22, 2019, R&W/GZA anticipates the following activities:

- 1) Conduct additional monitoring well installations at WV-MW-10 and WV-MW-16 if warranted based on vertical profile data.
- 2) Conduct additional drilling at other locations if access is obtained.
- 3) Complete boring logs for WV-MW-10, WV-MW-13, and WV-MW-16 monitoring wells.



- 4) Continue to work for access to other drilling locations for additional monitoring wells.

J:\62000\626xx\62677.81 - Wolven-Jewell Investigation\DEQ Monthly Updates\April 1, 2019 DEQ Monthly Report\Wolven\_Jewell Monthly Update\_040119.docx



© 2019 - GZA GeoEnvironmental, Inc. C:\GIS\_Mapping\01\GRGIS\_CAD\Wolvlen\_DataAnalysis2019.mxd, 3/25/2019, 2:38:40 PM, Jim.Cai

**Legend**

- WOVLEN/JEWELL STUDY
- Estimated Extent of PFOS & PFOA Concentrations > 70 ng/L

**MONITORING WELLS**

- PROPOSED MONITORING
- EXISTING MONITORING

**NOTE:**  
 1. THE EXTENT OF PFOS AND PFOA CONCENTRATIONS GREATER THAN 70 NG/L WAS ESTIMATED FROM ANALYTICAL DATA FOR PERMANENT GROUNDWATER MONITORING WELL SAMPLES AND RESIDENTIAL WELL SAMPLES RECEIVED ON AND BEFORE 3/22/2019.

NO.	ISSUE/DESCRIPTION	BY	DATE
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<b>Rose &amp; Westra, a Division of GZA</b> 601 Fifth Street NW, Suite 102 Grand Rapids, Michigan 49504			
MONITORING WELL LOCATIONS WOVLEN/JEWELL STUDY AREA			
<b>GZA GeoEnvironmental, Inc.</b> Engineers and Scientists <a href="http://www.gza.com">www.gza.com</a>		PREPARED FOR: WN&J/WWW	
PROJ MGR: LMN DESIGNED BY: JC DATE: 03-25-2019	REVIEWED BY: LMN DRAWN BY: JC/JMG PROJECT NO.: 16.0062355.52	CHECKED BY: LMN SCALE: AS SHOWN REVISION NO.	<b>FIGURE</b>  <span style="font-size: 1.5em;">2</span>

**TABLE 1A**  
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - VOCS  
Wolver/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Management Levels <sup>4</sup>	MW-WV-1	MW-WV-2S	MW-WV-2D	MW-WV-3S	MW-WV-3D	MW-WV-4	MW-WV-5S	MW-WV-5D	MW-WV-5D	MW-WV-5D DUP	MW-WV-6S	MW-WV-6D	MW-WV-7S	MW-WV-7D	MW-WV-8S
						MW-WV-1	MW-WV-2S	MW-WV-2D	MW-WV-3S	MW-WV-3D	MW-WV-4	MW-WV-5S	MW-WV-5D	MW-WV-5D DUP	MW-WV-6S	MW-WV-6D	MW-WV-7S	MW-WV-7D	MW-WV-8S	
						135-140	20-25	25-35	5-10	56-61	130-135	60-65	67-72	67-72	13-18	98-103	90.2-95	15.7-20.5	30-35	
						UB20051-010	UB20051-001	UB20051-002	UB16022-007	UB16022-008	UB20051-013	UB16022-004	UB16022-003	UB16022-005	UB20051-004	UB20051-005	UB14084-005	UB14084-007	UB14084-001	
Sample Date						02/20/2019	02/18/2019	02/18/2019	02/15/2019	02/15/2019	02/21/2019	02/14/2019	02/14/2019	02/14/2019	02/19/2019	02/19/2019	02/13/2019	02/13/2019	02/12/2019	
Parameter (µg/L)																				
Acetone	730	1,700	1,000,000,000 (D,S)	12,000,000	42,000	4.5 [J]	3 [J]	21	4.6 [J]	3.5 [J]	<20	3.1 [J]	4 [J]	2.3 [J]	2.9 [J]	2.3 [J]	3.7 [J]	3.9 [J]	2.3 [J]	
Benzene	5.0 (A)	200	5,600	14	46	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Bromodichloromethane	80 (A,W)	ID	4,800	NCL	13	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Bromoform	80 (A,W)	ID	470,000	NCL	330	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Methyl ethyl ketone (2-Butanone)	13,000	2,200	240,000,000 (S)	NCL	17,000	<10	<10	2.8 [J]	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
Bromomethane (Methyl bromide)	10	5.0 (M)	4,000	NCL	23	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	
Carbon disulfide	800	ID	250,000	NCL	2,400	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3.9	<1	<1	<1	
Carbon tetrachloride	5.0 (A)	38	370	NCL	46	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Chlorobenzene	100 (A)	25	210,000	540	230	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Chloroethane	430	1,100	5,700,000 (S)	6,700	63,000	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	
<b>Chloroform</b>	80 (A,W)	350	28,000	7.6	22	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<b>8.3</b>	<1	<1	<1	
Chloromethane (Methyl chloride)	260	ID	8,600	160	560	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Cyclohexane	NCL	NCL	NCL	NCL	38,000	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,2-Dibromo-3-chloropropane (DBCP)	0.20 (A)	ID	220	NCL	0.033	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Dibromochloromethane	80 (A,W)	ID	14,000	NCL	87	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,2-Dibromoethane (Ethylene dibromide)	0.05 (A)	5.7	2,400	NCL	0.75	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,2-Dichlorobenzene	600 (A)	13	160,000 (S)	NCL	910	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,3-Dichlorobenzene	6.6	28	18,000	52	NCL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,4-Dichlorobenzene	75 (A)	17	16,000	120	48	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Dichlorodifluoromethane	1,700	ID	220,000	NCL	590	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	
1,1-Dichloroethane	880	740	1,000,000	67	280	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,2-Dichloroethane	5.0 (A)	360	9,600	NCL	17	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,1-Dichloroethylene	7.0 (A)	130	200	170	850	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
cis-1,2-Dichloroethylene	70 (A)	620	93,000	48	110	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
trans-1,2-Dichloroethylene	100 (A)	1,500	85,000	650	1,100	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,2-Dichloropropane	5.0 (A)	230	16,000	NCL	25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
cis-1,3-Dichloropropene	NCL	NCL	NCL	NCL	NCL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
trans-1,3-Dichloropropene	NCL	NCL	NCL	NCL	NCL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,3-Dichloropropene (Calculated: cis + trans)	8.5	9.0	3,900	NCL	47	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ethylbenzene	74 (E)	18	110,000	45	150	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
2-Hexanone	1,000	ID	4,200,000	NCL	110	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
Isopropyl benzene	800	28	56,000 (S)	NCL	1,400	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Methyl acetate	NCL	NCL	NCL	NCL	60,000	0.41 [BJ]	0.44 [BJ]	0.58 [BJ]	<1	<1	<1	<1	<1	<1	<1	0.44 [BJ]	0.48 [BJ]	<1	<1	
Methyl tertiary butyl ether (MTBE)	40 (E)	7,100	47,000,000 (S)	4,000	1,400	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Methyl isobutyl ketone	1,800	ID	20,000,000 (S)	NCL	19,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
Methylcyclohexane	NCL	NCL	NCL	NCL	NCL	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	
Methylene Chloride	5.0 (A)	1,500	220,000	3,900	320	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.1	<1	<1	<1	
Styrene	100 (A)	80	170,000	NCL	3,600	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,1,2,2-Tetrachloroethane	8.5	78	12,000	NCL	7.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Tetrachloroethylene	5.0 (A)	60	25,000	96	120	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Toluene	790 (E)	270	530,000 (S)	23,000	3,300	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,1,2-Trichloro-1,2,2-trifluoroethane	170,000 (S)	32	170,000 (S)	NCL	31,000	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,2,4-Trichlorobenzene	70 (A)	99	300,000 (S)	95	12	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,1,1-Trichloroethane	200 (A)	89	660,000	8,600	24,000	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,1,2-Trichloroethane	5.0 (A)	330	17,000	NCL	1.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Trichloroethylene	5.0 (A)	200	2,200	6.1	8.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Trichlorofluoromethane	2,600	NA	1,100,000 (S)	NCL	15,000	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Vinyl Chloride	2.0 (A)	13	1,100	0.96 (M)	1.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Xylenes (Total)	280 (E)	49	190,000 (S)	1,200	580	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
m+p - Xylenes	NCL	NCL	NCL	NCL	NCL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
o-Xylene	NCL	NCL	NCL	NCL	580	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Trihalomethanes (Calculation: Bromodichloromethane + Bromoform + Chloroform + Dibromochloromethane)	80 (W)	NCL	NCL	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.3	ND	ND	ND	

**TABLE 1A**  
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - VOCS  
Wolven/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level – Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Removal Management Levels <sup>4</sup>	MW-WV-8M	MW-WV-8D	MW-WV-9	MW-WV-11S	MW-WV-11D	MW-WV-12S	MW-WV-12M	MW-WV-12D
						MW-WV-8M	MW-WV-8D	MW-WV-9	MW-WV-11S	MW-WV-11D	MW-WV-12S	MW-WV-12M	MW-WV-12D
						60-65	115-120	92.3-97.3	28.8-33.6	158.9-163.7	74.6-79.5	144.5-149.4	176.5-181.5
						UB14084-002	UB16022-009	UB20051-012	UB16022-002	UB16022-001	UB14084-003	UB14084-004	UB14084-006
Sample Name	Well Screen Interval (Feet below ground surface)	Laboratory Sample ID(s)	Sample Date	Parameter (µg/L)	02/12/2019	02/15/2019	02/21/2019	02/14/2019	02/14/2019	02/12/2019	02/13/2019	02/13/2019	
Acetone	730	1,700	1,000,000,000 (D,S)	12,000,000	42,000	2.8 [J]	<20	2.4 [J]	4.3 [J]	3.6 [J]	2.6 [J]	5 [J]	2.9 [J]
Benzene	5.0 (A)	200	5,600	14	46	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	80 (A,W)	ID	4,800	NCL	13	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	80 (A,W)	ID	470,000	NCL	330	<1	<1	<1	<1	<1	<1	<1	<1
Methyl ethyl ketone (2-Butanone)	13,000	2,200	240,000,000 (S)	NCL	17,000	<10	<10	<10	<10	<10	<10	<10	<10
Bromomethane (Methyl bromide)	10	5.0 (M)	4,000	NCL	23	<2	<2	<2	<2	<2	<2	<2	<2
Carbon disulfide	800	ID	250,000	NCL	2,400	<1	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	5.0 (A)	38	370	NCL	46	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	100 (A)	25	210,000	540	230	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	430	1,100	5,700,000 (S)	6,700	63,000	<2	<2	<2	<2	<2	<2	<2	<2
<b>Chloroform</b>	80 (A,W)	350	28,000	7.6	22	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane (Methyl chloride)	260	ID	8,600	160	560	<1	<1	<1	<1	<1	<1	<1	<1
Cyclohexane	NCL	NCL	NCL	NCL	38,000	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane (DBCP)	0.20 (A)	ID	220	NCL	0.033	<1	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	80 (A,W)	ID	14,000	NCL	87	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane (Ethylene dibromide)	0.05 (A)	5.7	2,400	NCL	0.75	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	600 (A)	13	160,000 (S)	NCL	910	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	6.6	28	18,000	52	NCL	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	75 (A)	17	16,000	120	48	<1	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	1,700	ID	220,000	NCL	590	<2	<2	<2	<2	<2	<2	<2	<2
1,1-Dichloroethane	880	740	1,000,000	67	280	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	5.0 (A)	360	9,600	NCL	17	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethylene	7.0 (A)	130	200	170	850	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethylene	70 (A)	620	93,000	48	110	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethylene	100 (A)	1,500	85,000	650	1,100	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	5.0 (A)	230	16,000	NCL	25	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	NCL	NCL	NCL	NCL	NCL	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	NCL	NCL	NCL	NCL	NCL	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropene (Calculated: cis + trans)	8.5	9.0	3,900	NCL	47	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	74 (E)	18	110,000	45	150	<1	<1	<1	<1	<1	<1	<1	<1
2-Hexanone	1,000	ID	4,200,000	NCL	110	<10	<10	<10	<10	<10	<10	<10	<10
Isopropyl benzene	800	28	56,000 (S)	NCL	1,400	<1	<1	<1	<1	<1	<1	<1	<1
Methyl acetate	NCL	NCL	NCL	NCL	60,000	<1	<1	0.47 [B]	<1	<1	<1	<1	<1
Methyl tertiary butyl ether (MTBE)	40 (E)	7,100	47,000,000 (S)	4,000	1,400	<1	<1	<1	<1	<1	<1	<1	<1
Methyl isobutyl ketone	1,800	ID	20,000,000 (S)	NCL	19,000	<10	<10	<10	<10	<10	<10	<10	<10
Methylcyclohexane	NCL	NCL	NCL	NCL	NCL	<5	<5	<5	<5	<5	<5	<5	<5
Methylene Chloride	5.0 (A)	1,500	220,000	3,900	320	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	100 (A)	80	170,000	NCL	3,600	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	8.5	78	12,000	NCL	7.6	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethylene	5.0 (A)	60	25,000	96	120	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	790 (E)	270	530,000 (S)	23,000	3,300	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloro-1,2,2-trifluoroethane	170,000 (S)	32	170,000 (S)	NCL	31,000	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	70 (A)	99	300,000 (S)	95	12	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	200 (A)	89	660,000	8,600	24,000	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	5.0 (A)	330	17,000	NCL	1.2	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethylene	5.0 (A)	200	2,200	6.1	8.5	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	2,600	NA	1,100,000 (S)	NCL	15,000	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	2.0 (A)	13	1,100	0.96 (M)	1.9	<1	<1	<1	<1	<1	<1	<1	<1
Xylenes (Total)	280 (E)	49	190,000 (S)	1,200	580	<1	<1	<1	<1	<1	<1	<1	<1
m+p - Xylenes	NCL	NCL	NCL	NCL	NCL	<1	<1	<1	<1	<1	<1	<1	<1
o-Xylene	NCL	NCL	NCL	NCL	580	<1	<1	<1	<1	<1	<1	<1	<1
Trihalomethanes (Calculation: Bromodichloromethane + Bromoform + Chloroform + Dibromochloromethane)	80 (W)	NCL	NCL	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND

**TABLE 1B**  
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - SVOCs  
Wolven/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level – Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Removal Management Levels <sup>4</sup>	MW-WV-1	MW-WV-2S	MW-WV-2D	MW-WV-3S	MW-WV-3D	MW-WV-4	MW-WV-5S	MW-WV-5D	MW-WV-5D	MW-WV-6S	MW-WV-6D	MW-WV-7S	MW-WV-7D	MW-WV-8S
						MW-WV-1	MW-WV-2S	MW-WV-2D	MW-WV-3S	MW-WV-3D	MW-WV-4	MW-WV-5S	MW-WV-5D	MW-WV-5D DUP	MW-WV-6S	MW-WV-6D	MW-WV-7S	MW-WV-7D	MW-WV-8S
						135-140	20-25	25-35	5-10	56-61	130-135	60-65	67-72	67-72	13-18	98-103	90.2-95	15.7-20.5	30-35
						UB20051-010	UB20051-001	UB20051-002	UB16022-007	UB16022-008	UB20051-013	UB16022-004	UB16022-003	UB16022-005	UB20051-004	UB20051-005	UB14084-005	UB14084-007	UB14084-001
Sample Name	Well Screen Interval (Feet below ground surface)	Laboratory Sample ID(s)	Sample Date	Parameter (µg/L)	02/20/2019	02/18/2019	02/18/2019	02/15/2019	02/15/2019	02/21/2019	02/14/2019	02/14/2019	02/14/2019	02/19/2019	02/19/2019	02/13/2019	02/13/2019	02/12/2019	
Acenaphthene	1,300	38	4,200 (S)	NCL	1,600	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	52	ID	3,900 (S)	NCL	NCL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Acetophenone	1,500	ID	6,100,000 (S)	NCL	5,800	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	0.63 [J]	<0.8	<0.8	<0.8
Anthracene	43 (S)	ID	43 (S)	NCL	5,300	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Atrazine	3.0 (A)	7.3	NLV	NCL	30	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Benzidine	0.30 (M)	0.30 (M)	NLV	NCL	0.011	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Benzo[a]anthracene	2.1	ID	NLV	NCL	3.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo[a]pyrene	5.0 (A)	ID	NLV	NCL	2.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo[b]fluoranthene (3,4-Benzofluoranthene)	1.5 (S,AA)	ID	ID	NCL	25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo[g,h,i]perylene	1.0 (M)	ID	NLV	NCL	NCL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo[k]fluoranthene	1.0 (M)	NA	NLV	NCL	250	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Butyl benzyl phthalate	1,200	67	NLV	NCL	1,600	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Caprolactam	5,800	NA	NLV	NCL	30,000	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	1.1 [J]	1 [J]
Carbazole	85	10 (M)	NLV	NCL	NCL	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
p-Chloro-m-cresol	150	7.4	NLV	NCL	4,300	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
bis(2-chloroethyl)ether	2.0	1.0 (M)	38,000	NCL	1.4	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2-Chloronaphthalene	1,800	NA	ID	NCL	2,200	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2-Chlorophenol	45	18	490,000	NCL	270	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Chrysene	1.6 (S)	ID	ID	NCL	2,500	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dibenzo[a,h]anthracene	2.0 (M)	ID	NLV	NCL	2.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dibenzofuran	ID	4.0	10,000 (S)	NCL	24	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
3,3'-Dichlorobenzidine	1.1	0.30 (M)	NLV	NCL	13	<4	<4	<4	<0.8	<0.8	<4	<0.8	<0.8	<0.8	<4	<4	<4	<4	<4
2,4-Dichlorophenol	73	11	NLV	NCL	140	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Diethyl phthalate	5,500	110	NLV	NCL	45,000	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Dimethyl phthalate	73,000	NA	NLV	NCL	NCL	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2,4-Dimethylphenol	370	380	NLV	NCL	1,100	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Di-n-butyl phthalate	880	9.7	NLV	NCL	2,700	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
4,6-Dinitro-o-cresol	20 (M)	NA	NLV	NCL	4.5	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
2,4-Dinitrotoluene	7.7	NA	NLV	NCL	24	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Di-n-octyl phthalate	130	ID	NLV	NCL	600	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Azobenzene	23	ID	6,400 (S)	NCL	12	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
bis(2-Ethylhexyl)phthalate	6.0 (A)	14	NLV	NCL	560	<4	2.1 [BJ]	<4	<4	<4	<4	<4	<4	<4	<4	1.4 [BJ]	<4	<4	<4
Fluoranthene	210 (S)	1.6	210 (S)	NCL	2,400	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluorene	880	12	2,000 (S)	NCL	880	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Hexachlorobenzene	1.0 (A)	0.2 (M)	440	NCL	0.98	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Hexachlorobutadiene	15	0.053	1,600	NCL	14	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Hexachlorocyclopentadiene	50 (A)	ID	130	NCL	1.2	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hexachloroethane	7.3	6.7	27,000.00	NCL	19	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Indeno[1,2,3-cd]pyrene	2.0 (M)	ID	NLV	NCL	25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Isophorone	770	1,300	NLV	NCL	7,800	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2-Methylnaphthalene	260	19	25,000 (S)	NCL	110	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2-Methylphenol	NCL	NCL	NCL	NCL	2,800	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
4-Methylphenol	NCL	NCL	NCL	NCL	5,600	<1.6	<1.6	<1.6	<0.8	<0.8	<1.6	<0.8	<0.8	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Naphthalene	520	11	31,000 (S)	NCL	17	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrobenzene	3.4	180	280,000	NCL	14	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2-Nitrophenol	20	ID	NLV	NCL	NCL	<1.6	<1.6	<1.6	<0.8	<0.8	<1.6	<0.8	<0.8	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
n-Nitroso-di-n-propylamine	5.0 (M)	NA	NLV	NCL	1.1	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
n-Nitrosodiphenylamine	270	NA	NLV	NCL	1,200	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Pentachlorophenol	1.0 (A)	1.8 (G)	NLV	NCL	4.1	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Phenanthrene	52	2.0 (M)	1,000 (S)	NCL	NCL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Phenol	4,400	450	NLV	NCL	17,000	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Pyrene	140 (S)	ID	140 (S)	NCL	360	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2,4,5-Trichlorophenol	730	NA	NLV	NCL	3,500	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2,4,6-Trichlorophenol	120	5.0	NLV	NCL	36	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8

**TABLE 1B**  
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - SVOCs  
Wolven/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level – Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Removal Management Levels <sup>4</sup>	MW-WV-8M	MW-WV-8D	MW-WV-9	MW-WV-11S	MW-WV-11D	MW-WV-12S	MW-WV-12M	MW-WV-12D
						MW-WV-8M	MW-WV-8D	MW-WV-9	MW-WV-11S	MW-WV-11D	MW-WV-12S	MW-WV-12M	MW-WV-12D
						60-65	115-120	92.3-97.3	28.8-33.6	158.9-163.7	74.6-79.5	144.5-149.4	176.5-181.5
						UB14084-002	UB16022-009	UB20051-012	UB16022-002	UB16022-001	UB14084-003	UB14084-004	UB14084-006
Sample Name	Well Screen Interval (Feet below ground surface)	Laboratory Sample ID(s)	Sample Date	Parameter (µg/L)	02/12/2019	02/15/2019	02/21/2019	02/14/2019	02/14/2019	02/12/2019	02/13/2019	02/13/2019	
Acenaphthene	1,300	38	4,200 (S)	NCL	1,600	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	52	ID	3,900 (S)	NCL	NCL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Acetophenone	1,500	ID	6,100,000 (S)	NCL	5,800	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Anthracene	43 (S)	ID	43 (S)	NCL	5,300	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Atrazine	3.0 (A)	7.3	NLV	NCL	30	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Benzidine	0.30 (M)	0.30 (M)	NLV	NCL	0.011 (M)	<20	<20	<20	<20	<20	<20	<20	<20
Benzo[a]anthracene	2.1	ID	NLV	NCL	3.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo[a]pyrene	5.0 (A)	ID	NLV	NCL	2.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo[b]fluoranthene (3,4-Benzofluoranthene)	1.5 (S,AA)	ID	ID	NCL	25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo[g,h,i]perylene	1.0 (M)	ID	NLV	NCL	NCL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo[k]fluoranthene	1.0 (M)	NA	NLV	NCL	250	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Butyl benzyl phthalate	1,200	67	NLV	NCL	1,600	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Caprolactam	5,800	NA	NLV	NCL	30,000	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	1.4 [J]	<1.6
Carbazole	85	10 (M)	NLV	NCL	NCL	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
p-Chloro-m-cresol	150	7.4	NLV	NCL	4,300	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
bis(2-chloroethyl)ether	2.0	1.0 (M)	38,000	NCL	1.4	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2-Chloronaphthalene	1,800	NA	ID	NCL	2,200	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2-Chlorophenol	45	18	490,000	NCL	270	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Chrysene	1.6 (S)	ID	ID	NCL	2,500	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dibenzo[a,h]anthracene	2.0 (M)	ID	NLV	NCL	2.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dibenzofuran	ID	4.0	10,000 (S)	NCL	24	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
3,3'-Dichlorobenzidine	1.1	0.30 (M)	NLV	NCL	13	<4	<0.8	<4	<0.8	<0.8	<4	<4	<4
2,4-Dichlorophenol	73	11	NLV	NCL	140	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Diethyl phthalate	5,500	110	NLV	NCL	45,000	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Dimethyl phthalate	73,000	NA	NLV	NCL	NCL	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2,4-Dimethylphenol	370	380	NLV	NCL	1,100	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Di-n-butyl phthalate	880	9.7	NLV	NCL	2,700	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
4,6-Dinitro-o-cresol	20 (M)	NA	NLV	NCL	4.5	<4	<4	<4	<4	<4	<4	<4	<4
2,4-Dinitrotoluene	7.7	NA	NLV	NCL	24	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Di-n-octyl phthalate	130	ID	NLV	NCL	600	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Azobenzene	23	ID	6,400 (S)	NCL	12	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
bis(2-Ethylhexyl)phthalate	6.0 (A)	14	NLV	NCL	560	<4	0.61 [J]	<4	<4	<4	<4	<4	<4
Fluoranthene	210 (S)	1.6	210 (S)	NCL	2,400	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluorene	880	12	2,000 (S)	NCL	880	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Hexachlorobenzene	1.0 (A)	0.2 (M)	440	NCL	0.98	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Hexachlorobutadiene	15	0.053	1,600	NCL	14	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Hexachlorocyclopentadiene	50 (A)	ID	130	NCL	1.2	<4	<4	<4	<4	<4	<4	<4	<4
Hexachloroethane	7.3	6.7	27,000.00	NCL	19	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Indeno[1,2,3-cd]pyrene	2.0 (M)	ID	NLV	NCL	25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Isophorone	770	1,300	NLV	NCL	7,800	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2-Methylnaphthalene	260	19	25,000 (S)	NCL	110	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2-Methylphenol	NCL	NCL	NCL	NCL	2,800	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
4-Methylphenol	NCL	NCL	NCL	NCL	5,600	<1.6	<0.8	<1.6	<0.8	<0.8	<1.6	<1.6	<1.6
Naphthalene	520	11	31,000 (S)	NCL	17	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrobenzene	3.4	180	280,000	NCL	14	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2-Nitrophenol	20	ID	NLV	NCL	NCL	<1.6	<0.8	<1.6	<0.8	<0.8	<1.6	<1.6	<1.6
n-Nitroso-di-n-propylamine	5.0 (M)	NA	NLV	NCL	1.1	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
n-Nitrosodiphenylamine	270	NA	NLV	NCL	1,200	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Pentachlorophenol	1.0 (A)	1.8 (G)	NLV	NCL	4.1	<4	<4	<4	<4	<4	<4	<4	<4
Phenanthrene	52	2.0 (M)	1,000 (S)	NCL	NCL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Phenol	4,400	450	NLV	NCL	17,000	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Pyrene	140 (S)	ID	140 (S)	NCL	360	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2,4,5-Trichlorophenol	730	NA	NLV	NCL	3,500	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2,4,6-Trichlorophenol	120	5.0	NLV	NCL	36	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8

**TABLE 1C**  
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - METALS  
Wolven/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Removal Management Levels <sup>4</sup>	MW-WV-1	MW-WV-2S	MW-WV-2D	MW-WV-3S	MW-WV-3D	MW-WV-4	MW-WV-5S	MW-WV-5D	MW-WV-5D	MW-WV-6S	MW-WV-6D	MW-WV-7S	MW-WV-7D	MW-WV-8S
Sample Name						MW-WV-1	MW-WV-2S	MW-WV-2D	MW-WV-3S	MW-WV-3D	MW-WV-4	MW-WV-5S	MW-WV-5D	MW-WV-5D DUP	MW-WV-6S	MW-WV-6D	MW-WV-7S	MW-WV-7D	MW-WV-8S
Well Screen Interval (Feet below ground surface)						135-140	20-25	25-35	5-10	56-61	130-135	60-65	67-72	67-72	13-18	98-103	90.2-95	15.7-20.5	30-35
Laboratory Sample ID(s)						UB20051-010 & 1902900-05B	UB20051-001 & 1902900-01B	UB20051-002 & 1902900-02B	UB16022-007 & 1902809-01B	UB16022-008 & 1902809-02B	UB20051-013 & 1902900-07B	UB16022-004 & 1902761-04B	UB16022-003 & 1902761-03B	UB16022-005 & 1902900-03B	UB20051-004 & 1902900-03B	UB20051-005 & 1902900-04B	UB14084-005 & 1902686-03B	UB14084-007 & 1902686-04B	UB14084-001 & 1902602-01B
Sample Date	02/20/2019	02/18/2019	02/18/2019	02/15/2019	02/15/2019	02/21/2019	02/14/2019	02/14/2019	02/14/2019	02/19/2019	02/19/2019	02/13/2019	02/13/2019	02/12/2019					
Parameter (µg/L)																			
<b>Aluminum</b>	50 (V)	NA	NLV	NCL	60,000	<b>2,000</b>	34 [J]	<b>60</b>	<b>670</b>	<40	<b>1,800</b>	<b>200</b>	<40	<40	43	45	15 [J]	<b>66</b>	15 [J]
Antimony	6.0 (A)	130	NLV	NCL	23	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	10 (A)	10	NLV	NCL	5.2	<2	<2	<2	<2	<2	1.7 [J]	<2	<2	<2	<2	<2	<2	<2	<2
Barium	2,000 (A)	1,000 (G)	NLV	NCL	11,000	130	40	90	59	25	84	21	20	20	40	84	8.4	34	20
Beryllium	4.0 (A)	25 (G)	NLV	NCL	74	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Boron (Boron and Borates only)	500 (F)	7,200	NLV	NCL	12,000	16 [J]	33 [J]	7.2 [J]	20 [J]	16 [J]	35 [J]	26 [J]	30 [J]	30 [J]	25 [J]	18 [J]	110 [B]	25 [B]	23 [B]
Cadmium	5.0 (A)	2.5 (G)	NLV	NCL	28	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium (Total)	NCL	NCL	NCL	NCL	NCL	4.5 [J]	3.1 [J]	<5	2.1 [J]	<5	2.7 [J]	<5	<5	<5	<5	<5	<5	<5	<5
Trivalent Chromium (Calculated: Total - Hexavalent)	100 (A)	120 (G)	NLV	NCL	67,000	4.5	3.1	ND	2.1	ND	2.7	ND	ND	ND	ND	ND	ND	ND	ND
Hexavalent Chromium	100 (A)	11	NLV	NCL	3.5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cobalt	40	100	NLV	NCL	18	1.4 [J]	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Copper	1,000 (E)	18 (G)	NLV	NCL	2,400	2.4 [J]	<5	<5	<5	<5	1.6 [J]	<5	<5	<5	<5	<5	<5	<5	<5
<b>Iron</b>	300 (E)	NA	NLV	NCL	42,000	<b>2,000</b>	190	<b>350</b>	<b>4,000</b>	140	<b>2,100</b>	<b>460</b>	150	150	290	270	100	<b>630</b>	200
<b>Lead</b>	4.0 (L)	14 (G)	NLV	NCL	15	0.89 [J]	0.34 [J]	<1	<1	<1	1.5	0.25 [J]	<1	<1	<1	<1	<1	<1	<1
Magnesium	400,000	NA	NLV	NCL	NCL	20,000	26,000	36,000	5,800	23,000	14,000	27,000	26,000	26,000	28,000	22,000	19,000	25,000	33,000
Mercury	2.0 (A)	0.0013	56 (S)	1.4	1.9	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Molybdenum	73	3,200	NLV	NCL	300	3.5 [J]	<10	<10	<10	<10	2.6 [J]	<10	<10	<10	<10	6.3 [J]	<10	<10	<10
Nickel	100 (A)	100 (G)	NLV	NCL	1,200	3.4 [J]	<5	9.3	1.7 [J]	1.3 [J]	2.1 [J]	<5	<5	<5	<5	<5	<5	1.6 [J]	<5
Selenium	50 (A)	5.0	NLV	NCL	300	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Silver	34	0.2 (M)	NLV	NCL	280	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sodium	NCL	NCL	NCL	NCL	NCL	11,000	27,000	18,000	8,900	25,000	11,000	38,000	31,000	31,000	510,000	140,000	12,000	36,000	100,000
Thallium	2.0 (A)	3.7	NLV	NCL	0.60	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium	NCL	NCL	NCL	NCL	NCL	49	<5	<5	9.5	<5	99	6.1	<5	<5	3 [J]	1.6 [J]	<5	2.5 [J]	<5
<b>Vanadium</b>	4.5	27	NLV	NCL	260	3.9 [J]	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc	2,400	230 (G)	NLV	NCL	18,000	4.8 [J]	<10	<10	<10	<10	4.8 [J]	3.2 [J]	<10	<10	<10	<10	<10	<10	<10



**TABLE 1C**  
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - METALS  
Wolven/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level – Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Removal Management Levels <sup>4</sup>	MW-WV-8M	MW-WV-8D	MW-WV-9	MW-WV-11S	MW-WV-11D	MW-WV-12S	MW-WV-12M	MW-WV-12D
Sample Name						MW-WV-8M	MW-WV-8D	MW-WV-9	MW-WV-11S	MW-WV-11D	MW-WV-12S	MW-WV-12M	MW-WV-12D
Well Screen Interval (Feet below ground surface)						60-65	115-120	92.3-97.3	28.8-33.6	158.9-163.7	74.6-79.5	144.5-149.4	176.5-181.5
Laboratory Sample ID(s)						UB14084-002 & 1902602-02B	UB16022-009 & 1902809-03B	UB20051-012 & 1902900-06B	UB16022-002 & 1902761-02B	UB16022-001 & 1902761-01B	UB14084-003 & 1902602-03B	UB14084-004 & 1902686-01B	UB14084-006 & 1902686-02B
Sample Date	02/12/2019	02/15/2019	02/21/2019	02/14/2019	02/14/2019	02/12/2019	02/13/2019	02/13/2019					
Parameter (µg/L)													
<b>Aluminum</b>	50 (V)	NA	NLV	NCL	60,000	<b>350</b>	<b>440</b>	<b>1,600</b>	13 [J]	<40	<40	<b>610</b>	<b>5,100</b>
Antimony	6.0 (A)	130	NLV	NCL	23	<2	<2	<2	<2	<2	<2	0.52 [J]	<2
Arsenic	10 (A)	10	NLV	NCL	5.2	<2	1.8 [J]	2.3	<2	<2	1.7 [J]	3.2	3
Barium	2,000 (A)	1,000 (G)	NLV	NCL	11,000	87	68	70	43	53	110	52	88
Beryllium	4.0 (A)	25 (G)	NLV	NCL	74	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Boron (Boron and Borates only)	500 (F)	7,200	NLV	NCL	12,000	29 [BJ]	28 [J]	26 [J]	25 [J]	21 [J]	18 [BJ]	22 [BJ]	75 [B]
Cadmium	5.0 (A)	2.5 (G)	NLV	NCL	28	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium (Total)	NCL	NCL	NCL	NCL	NCL	3 [J]	<5	6	<5	<5	<5	1.5 [J]	20
Trivalent Chromium (Calculated: Total - Hexavalent)	100 (A)	120 (G)	NLV	NCL	67,000	3	ND	6	ND	ND	ND	ND	ND
Hexavalent Chromium	100 (A)	11	NLV	NCL	3.5	<5	<5	<5	<5	<5	<5	<5	<5
Cobalt	40	100	NLV	NCL	18	<5	<5	<5	<5	<5	<5	<5	4.5 [J]
Copper	1,000 (E)	18 (G)	NLV	NCL	2,400	<5	<5	<5	<5	1.9 [J]	<5	2.4 [J]	9.8
<b>Iron</b>	300 (E)	NA	NLV	NCL	42,000	<b>710</b>	<b>600</b>	<b>1,900</b>	140	<b>910</b>	<b>600</b>	<b>380</b>	<b>16,000</b>
<b>Lead</b>	4.0 (L)	14 (G)	NLV	NCL	15	0.41 [J]	<1	0.59 [J]	<1	<1	<1	0.25 [J]	<b>4.5</b>
Magnesium	400,000	NA	NLV	NCL	NCL	50,000	22,000	31,000	27,000	19,000	27,000	1,200	27,000
Mercury	2.0 (A)	0.0013	56 (S)	1.4	1.9	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Molybdenum	73	3,200	NLV	NCL	300	<10	4.7 [J]	10	<10	<10	<10	7.8 [J]	<10
Nickel	100 (A)	100 (G)	NLV	NCL	1,200	2 [J]	<5	2.2 [J]	<5	<5	1.5 [J]	1.5 [J]	14
Selenium	50 (A)	5.0	NLV	NCL	300	<5	<5	<5	<5	<5	<5	<5	<5
Silver	34	0.2 (M)	NLV	NCL	280	<1	<1	<1	<1	<1	<1	<1	<1
Sodium	NCL	NCL	NCL	NCL	NCL	260,000	11,000	7,700	22,000	4,500	5,600	6,900	13,000
Thallium	2.0 (A)	3.7	NLV	NCL	0.60	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium	NCL	NCL	NCL	NCL	NCL	14	16	49	<5	<5	<5	13	250
<b>Vanadium</b>	4.5	27	NLV	NCL	260	<5	<5	<5	<5	<5	<5	<b>14</b>	<b>14</b>
Zinc	2,400	230 (G)	NLV	NCL	18,000	<10	5.9 [J]	2.6 [J]	<10	<10	4 [J]	4.3 [J]	53

**TABLE 1D**  
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - INORGANICS/GENERAL CHEMISTRY  
Wolven/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Removal Management Levels <sup>4</sup>	MW-WV-1	MW-WV-2S	MW-WV-2D	MW-WV-3S	MW-WV-3D	MW-WV-4	MW-WV-5S	MW-WV-5D	MW-WV-5D	MW-WV-5D DUP	MW-WV-6S	MW-WV-6D	MW-WV-7S	MW-WV-7D	MW-WV-8S
Sample Name						MW-WV-1	MW-WV-2S	MW-WV-2D	MW-WV-3S	MW-WV-3D	MW-WV-4	MW-WV-5S	MW-WV-5D	MW-WV-5D DUP	MW-WV-6S	MW-WV-6D	MW-WV-7S	MW-WV-7D	MW-WV-8S	
Well Screen Interval (Feet below ground surface)						135-140	20-25	25-35	5-10	56-61	130-135	60-65	67-72	67-72	13-18	98-103	90.2-95	15.7-20.5	30-35	
Laboratory Sample ID(s)						UB20051-010 & 1902900-05A/C	UB20051-001 & 1902900-01A/C	UB20051-002 & 1902900-02A/C	UB16022-007 & 1902809-01A/C	UB16022-008 & 1902809-02A/C	UB20051-013 & 1902900-07A/C	UB16022-004 & 1902761-04A/C	UB16022-003 & 1902761-03A/C	UB16022-005 & 1902761-05A/C	UB20051-004 & 1902900-03A/C	UB20051-005 & 1902900-04A/C	UB14084-005 & 1902686-03A/C	UB14084-007 & 1902686-04A/C	UB14084-001 & 1902602-01A/C	
Sample Date	02/20/2019	02/18/2019	02/18/2019	02/15/2019	02/15/2019	02/21/2019	02/14/2019	02/14/2019	02/14/2019	02/14/2019	02/19/2019	02/19/2019	02/13/2019	02/13/2019	02/12/2019					
Parameter (µg/L)																				
Acetic Acid	4,200	8,800 (G)	NLV	NCL	NCL	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000
Formic acid	10,000	ID	7,700,000	NCL	1.9	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000
<b>Cyanide - Total</b>	200	5.2	NLV	NCL	4.4	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
<b>Cyanide, Available</b>	200 (A)	5.2	NLV	NCL	NCL	3	<2	<2	3.5	<2	<2	<2	<2	<2	<b>5.5</b>	<b>6</b>	<2	<2	<2	<2
Hardness (total)	NCL	NCL	NCL	NCL	NCL	280,000	310,000	330,000	68,000	270,000	170,000	330,000	330,000	330,000	360,000	260,000	220,000	310,000	390,000	
Ammonia - N (gas diffusion)	NCL	NCL	NCL	NCL	NCL	180	22 [J]	500	1,600 [B]	41 [BJ]	520	<100	<100	<100	<100	25 [J]	<100	57 [J]	<100	
Nitrate-Nitrite - N	NCL	NCL	NCL	NCL	NCL	63	3,700	<20	58	2,200	<20	5,100	5,000	5,000	1,800	31	6,600	<20	5,500	
Nitrate-Nitrite - N + Ammonia - N (Calculated)	10,000 (N)	NCL	NCL	NCL	NCL	240	3700	500	1700	2200	520	5100	5000	5000	1800	56	6600	57	5500	
<b>Unionized Ammonia (Calculated based on pH 8.0, 20°C)</b>	NCL	29 (CC)	NCL	250,000	NCL	6.9	0.84	19	<b>61</b>	1.6	20	ND	ND	ND	ND	0.96	ND	2.2	ND	
<b>Chloride</b>	250,000 (E)	NCL (FF)	NLV	NCL	NCL	25,000	<b>57,000</b>	<b>92,000</b>	24,000 [B]	<b>62,000 [B]</b>	3,700	<b>65,000 [B]</b>	<b>55,000 [B]</b>	<b>55,000 [B]</b>	<b>680,000</b>	<b>270,000</b>	23,000 [B]	<b>90,000 [B]</b>	<b>220,000 [B]</b>	
Phosphorus (Total)	63,000	1,000 (EE)	NLV	NCL	NCL	41 [J]	33 [J]	7 [J]	78	6 [J]	98	8.3 [J]	13 [J]	<50	6.3 [J]	<50	50	12 [J]	33 [J]	
<b>Sulfate</b>	250,000 (E)	NA	NLV	NCL	NCL	35,000	14,000	46,000	340 [J]	11,000	10,000	13,000	13,000	13,000	19,000	19,000	14,000	33,000	17,000	
Sulfide	NCL	NCL	NCL	NCL	NCL	<1,000	<1,000	1,000 [H]	1,100	<1,000	1,200	<1,000	<1,000	<1,000	<1,000	1,500	1,100	<1,000	<1,000	

**TABLE 1D**  
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - INORGANICS/GENERAL CHEMISTRY  
Wolven/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Removal Management Levels <sup>4</sup>	MW-WV-8M	MW-WV-8D	MW-WV-9	MW-WV-11S	MW-WV-11D	MW-WV-12S	MW-WV-12M	MW-WV-12D
Sample Name						MW-WV-8M	MW-WV-8D	MW-WV-9	MW-WV-11S	MW-WV-11D	MW-WV-12S	MW-WV-12M	MW-WV-12D
Well Screen Interval (Feet below ground surface)						60-65	115-120	92.3-97.3	28.8-33.6	158.9-163.7	74.6-79.5	144.5-149.4	176.5-181.5
Laboratory Sample ID(s)						UB14084-002 & 1902602-02A/C	UB16022-009 & 1902809-03A/C	UB20051-012 & 1902900-06A/C	UB16022-002 & 1902761-02A/C	UB16022-001 & 1902761-01A/C	UB14084-003 & 1902602-03A/C	UB14084-004 & 1902686-01A/C	UB14084-006 & 1902686-02A/C
Sample Date						02/12/2019	02/15/2019	02/21/2019	02/14/2019	02/14/2019	02/12/2019	02/13/2019	02/13/2019
Parameter (µg/L)													
Acetic Acid	4,200	8,800 (G)	NLV	NCL	NCL	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000
Formic acid	10,000	ID	7,700,000	NCL	1.9	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000	<25,000
<b>Cyanide - Total</b>	200	5.2	NLV	NCL	4.4	<10	<10	<10	<10	<10	<10	<10	<b>13</b>
<b>Cyanide, Available</b>	200 (A)	5.2	NLV	NCL	NCL	<2	<2	2.8	<2	<2	<2	<2	<2
Hardness (total)	NCL	NCL	NCL	NCL	NCL	590,000	230,000	310,000	300,000	320,000	340,000	120,000	1,700,000
Ammonia - N (gas diffusion)	NCL	NCL	NCL	NCL	NCL	57 [J]	310 [B]	65 [J]	<100	97 [BJ]	120	520	610
Nitrate-Nitrite - N	NCL	NCL	NCL	NCL	NCL	8,600	270	36	630	15 [J]	14 [J]	39	24
Nitrate-Nitrite - N + Ammonia - N (Calculated)	10,000 (N)	NCL	NCL	NCL	NCL	8700	580	100	630	110	130	560	630
<b>Unionized Ammonia (Calculated based on pH 8.0, 20°C)</b>	NCL	29 (CC)	NCL	250,000	NCL	2.2	12	2.5	ND	3.7	4.6	20	23
<b>Chloride</b>	250,000 (E)	NCL (FF)	NLV	NCL	NCL	<b>510,000 [B]</b>	37,000 [B]	8,200	50,000 [B]	28,000 [B]	6,300 [B]	2,600 [B]	29,000 [B]
Phosphorus (Total)	63,000	1,000 (EE)	NLV	NCL	NCL	18 [J]	23 [J]	44 [J]	10 [J]	16 [J]	8.7 [J]	35 [J]	210
<b>Sulfate</b>	250,000 (E)	NA	NLV	NCL	NCL	110,000	29,000	29,000	14,000	89,000	23,000	71,000	<b>1,300,000</b>
Sulfide	NCL	NCL	NCL	NCL	NCL	<1,000	<1,000	<1,000	1,000	1,200	<1,000	<1,000	1,800

**TABLE 1E**  
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS  
Wolven/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Removal Management Levels <sup>4</sup>	MW-WV-1	MW-WV-2S	MW-WV-2D	MW-WV-3S	MW-WV-3D	MW-WV-4	MW-WV-5S	MW-WV-5D	MW-WV-5D	MW-WV-6S	MW-WV-6D	MW-WV-7S	MW-WV-7D	MW-WV-8S	
						MW-WV-1	MW-WV-2S	MW-WV-2D	MW-WV-3S	MW-WV-3D	MW-WV-4	MW-WV-5S	MW-WV-5D	MW-WV-5D DUP	MW-WV-6S	MW-WV-6D	MW-WV-7S	MW-WV-7D	MW-WV-8S	
						135-140	20-25	25-35	5-10	56-61	130-135	60-65	67-72	67-72	13-18	98-103	90.2-95	15.7-20.5	30-35	
						UB20051-010	UB20051-001	UB20051-002	UB16022-007	UB16022-008	UB20051-013	UB16022-004	UB16022-003	UB16022-005	UB20051-004	UB20051-005	UB14084-005	UB14084-007	UB14084-001	
Sample Date						02/20/2019	02/18/2019	02/18/2019	02/15/2019	02/15/2019	02/21/2019	02/14/2019	02/14/2019	02/14/2019	02/19/2019	02/19/2019	02/13/2019	02/13/2019	02/12/2019	
Parameter (µg/L)																				
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.007	<0.0071	<0.0071	<0.0075	<0.0076	<0.007	<0.0073	<0.0073	<0.0076	<0.0071	<0.0072	<0.0078	<0.0077	<0.0074	
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	0.032	0.014	0.051	0.006	0.006	<0.0035	0.0088	0.0077	0.0074	0.0076	0.016	0.0039	0.012	0.021	
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	0.17	0.062	0.016	0.0044	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	0.013	<0.0037	
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.007	<0.0071	<0.0071	<0.0075	<0.0076	<0.007	<0.0073	<0.0073	<0.0076	<0.0071	<0.0072	<0.0078	<0.0077	<0.0074	
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	0.1	0.015	0.14	0.0052	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	0.0092	0.0042	
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	0.81	0.065	0.32	0.018	0.004	<0.0035	<0.0037	<0.0037	0.0038	<0.0036	<0.0036	0.0044	0.041	0.019	
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.022	0.0081	0.022	0.008	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	0.0072	0.0047	0.0047	0.0056	0.0069	
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	0.17	0.024	0.14	0.0097	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	0.0039	<0.0036	<0.0039	0.012	0.0048	
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	0.065	0.016	0.068	0.007	<0.0038	<0.0035	0.004	<0.0037	<0.0038	0.0063	<0.0036	0.011	0.011	0.0038	
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	0.01	0.0059	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
<b>Perfluorooctanoic acid (PFOA)</b>	0.07 (JJ)	12	NCL	NCL	NCL	<b>2.8</b>	<b>0.29</b>	<b>1.1</b>	<b>0.082</b>	<0.0019	<0.0017	0.005	0.0027	0.0027	0.019	0.0027	0.011	<b>0.11</b>	0.055	
<b>Perfluorooctane sulfonic acid (PFOS)</b>	0.07 (JJ)	0.012	NCL	NCL	NCL	<b>6.1</b>	<b>3.8</b>	<b>0.064</b>	<b>0.15</b>	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	0.0044	<0.0036	<0.0039	<b>0.14</b>	<b>0.058</b>	
<b>PFOA + PFOS (Calculated)</b>			NCL	NCL	NCL	<b>8.9</b>	<b>4.1</b>	<b>1.2</b>	<b>0.23</b>	ND	ND	0.005	0.0027	0.0027	0.023	0.0027	0.011	<b>0.25</b>	<b>0.11</b>	
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	0.025	0.0093	0.027	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	0.0091	0.0049	<0.0037	
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0037	<0.0038	<0.0035	<0.0037	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0038	<0.0037	
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	10	4.3	1.9	0.29	0.01	ND	0.018	0.01	0.014	0.048	0.023	0.044	0.36	0.17	

**TABLE 1E**  
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS  
Wolven/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level – Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Removal Management Levels <sup>4</sup>	MW-WV-8M	MW-WV-8D	MW-WV-9	MW-WV-11S	MW-WV-11D	MW-WV-12S	MW-WV-12M	MW-WV-12D
						MW-WV-8M	MW-WV-8D	MW-WV-9	MW-WV-11S	MW-WV-11D	MW-WV-12S	MW-WV-12M	MW-WV-12D
						60-65	115-120	92.3-97.3	28.8-33.6	158.9-163.7	74.6-79.5	144.5-149.4	176.5-181.5
						UB14084-002	UB16022-009	UB20051-012	UB16022-002	UB16022-001	UB14084-003	UB14084-004	UB14084-006
Sample Name	Well Screen Interval (Feet below ground surface)	Laboratory Sample ID(s)	Sample Date	Parameter (µg/L)	02/12/2019	02/15/2019	02/21/2019	02/14/2019	02/14/2019	02/12/2019	02/13/2019	02/13/2019	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0075	<0.007	<0.0069	<0.0072	<0.0073	<0.0072	<0.0074	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	0.083	<0.0035	0.014	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	0.023	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0075	<0.007	<0.0069	<0.0072	<0.0073	<0.0072	<0.0074	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	0.032	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	0.036	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	0.012	<0.0035	0.13	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.0097	<0.0035	0.0075	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	0.0052	<0.0035	0.047	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	0.011	<0.0035	0.022	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
<b>Perfluorooctanoic acid (PFOA)</b>	0.07 (JJ)	12	NCL	NCL	NCL	0.03	0.0048	<b>0.53</b>	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
<b>Perfluorooctane sulfonic acid (PFOS)</b>	0.07 (JJ)	0.012	NCL	NCL	NCL	0.0065	<0.0035	<b>0.54</b>	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
<b>PFOA + PFOS (Calculated)</b>	0.07	NCL	NCL	NCL	NCL	0.037	0.0048	<b>1.1</b>	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	0.0093	<0.0035	0.0083	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0037	<0.0037
<b>Total PFAS (Calculated)</b>	NCL	NCL	NCL	NCL	NCL	0.17	0.0048	1.4	ND	ND	ND	ND	ND

**TABLE 1F**  
SUMMARY OF TEMPORARY WELL GROUNDWATER SAMPLE ANALYSIS - PFAS  
Wolver/Jewell  
Algoma Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water <sup>2</sup>	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface <sup>2</sup>	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation <sup>2</sup>	MDEQ Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater <sup>3</sup>	U.S. EPA Residential Tap Water Regional Removal Management Levels <sup>4</sup>	PMW-WV-10	PMW-WV-10	PMW-WV-10	PMW-WV-10	PMW-WV-10	PMW-WV-10	PMW-WV-13	PMW-WV-13	PMW-WV-13
						WV-MW-13(0-10)	WV-MW-13(10-20)	WV-MW-10 (8-18)	WV-MW-10 (18-28)	WV-MW-10 (26-36)	WV-MW-10 (66-76)	WV-MW-13 (35-45)	WV-MW-13 (45-55)	WV-MW-13 (53-63)
						0-10	20-Oct	8-18	18-28	26-36	66-76	35-45	45-55	53-63
						UB16023-001	UB16023-002	UB28083-001	UB28083-002	UB28083-003	UB28083-004	UB20051-007	UB20051-008	UB20051-009
Sample Name	Well Screen Interval (Feet below ground surface)	Laboratory Sample ID(s)	Sample Date	Parameter (µg/L)	2/14/2019	2/14/2019	02/25/2019	02/25/2019	02/26/2019	02/27/2019	02/18/2019	02/18/2019	02/18/2019	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0077	<0.0084	<0.0072	<0.0083	<0.0075	<0.0073	<0.007	<0.0073	<0.007
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	0.0045	<0.0042	0.0077	<0.0041	<0.0038	<0.0036	0.0053	0.011	0.01
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	0.0046	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0077	<0.0084	<0.0072	<0.0083	<0.0075	<0.0073	<0.007	<0.0073	<0.007
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	0.0059	<0.0042	0.0098	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.0066	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	0.0042	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	NCL	NCL	NCL	0.029	0.0091	0.023	<0.0021	<0.0019	<0.0018	0.0032	0.0023	0.0025
<b>Perfluorooctane sulfonic acid (PFOS)</b>	0.07 (JJ)	0.012	NCL	NCL	NCL	<b>0.13</b>	<b>0.014</b>	<b>0.31</b>	0.0082	<0.0038	<0.0036	0.0062	<0.0037	<0.0035
<b>PFDA + PFOS (Calculated)</b>	0.07	NCL	NCL	NCL	NCL	<b>0.16</b>	0.023	<b>0.33</b>	0.0082	ND	ND	0.0094	0.0023	0.0025
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0042	<0.0036	<0.0041	<0.0038	<0.0036	<0.0035	<0.0037	<0.0035
<b>Total PFAS (Calculated)</b>	NCL	NCL	NCL	NCL	NCL	0.18	0.023	0.36	0.0082	ND	ND	0.015	0.013	0.013

**TABLES 1A TO 1F NOTES**  
Wolven/Jewell  
Algoma Township, Kent County, MI

**NOTES:**

1. Concentration and criteria units are micrograms per Liter ( $\mu\text{g/L}$ ) or parts per billion (ppb). Calculated criteria and concentrations are rounded to two significant digits. "ND" indicates the parameters used in the calculation were not detected.  
"NC" indicates not calculated.
2. Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; updated June 25, 2018.  
Abbreviations Include:  
"ID" indicates insufficient data to develop criterion.  
"NA" indicates a criterion or value is not available or, in the case of background, not applicable.  
"NCL" indicates no criterion listed in MDEQ Table 1.  
"NLV" indicates the substance is not likely to volatilize under most conditions.  
Footnotes Include:  
(A) - The criterion is the State of Michigan drinking water standard.  
(D) - The calculated criterion exceeds 100 percent, hence it is reduced to 100 percent or 1.0E+9 ppb.  
(E) - Criterion is the aesthetic drinking water value.  
(F) - Criterion is based on adverse impacts to plant life and phytotoxicity.  
(G) - Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water.  
MDEQ's Footnote (G) GSI/GSIPC Calculation spreadsheet was utilized to calculate GSI criterion presented. The Rogue River is the receiving surface water for the Site. Hardness (220 mg CaCO<sub>3</sub>/L) and pH (7.5 standard units) used in the calculations were the lowest (most-conservative) of the calculated mean and median of the Rogue River surface water samples collected in Rockford, MI at the former tannery (TA-SW-01, TA-SW-02, TA-SW-03, TA-SW-05, and TA-SW-07) rounded to two significant digits and water hardness or pH for the Rogue River near Rockford published in United States Geological Survey Circular 323, "Water Resources of the Grand Rapids Area, Michigan," Table 1, 1954.  
(L) - Criteria for lead are derived using a biologically based model. The generic residential drinking water criterion of 4 $\mu\text{g/L}$  is linked to the generic residential soil direct contact criterion of 400 mg/kg.  
(M) - Calculated criterion is below the analytical target detection limit, therefore, the criterion defaults to the target detection limit.  
(N) - The concentrations of all potential sources of nitrate-nitrogen (e.g., ammonia-N, nitrite-N, nitrate-N) in groundwater that is used as a source of drinking water shall not, when added together, exceed the nitrate drinking water criterion of 10,000  $\mu\text{g/L}$ .  
(P) - Amenable cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with all groundwater criteria.  
(S) - Criterion defaults to the hazardous substance-specific water solubility limit.  
(V) - Criterion is the aesthetic drinking water value.  
(W) - Concentrations of trihalomethanes in groundwater shall be added together to determine compliance with the Michigan drinking water standard of 80 $\mu\text{g/L}$ .  
(AA) - Use 10,000  $\mu\text{g/L}$  where groundwater enters a structure through the use of a water well, sump or other device. Use 28,000 $\mu\text{g/L}$  for all other uses.  
(CC) - The generic GSI criteria are based on the toxicity of unionized ammonia (NH<sub>3</sub>); the criteria are 29  $\mu\text{g/L}$  and 53  $\mu\text{g/L}$  for cold water and warm water surface water, respectively. As a result, the GSI criterion shall be compared to the percent of the total ammonia concentration in the groundwater that will become NH<sub>3</sub> in the surface water. This percent NH<sub>3</sub> is a function of the pH and temperature of the receiving surface water and was estimated using the table of this footnote titled "Percent NH<sub>3</sub> in Aqueous Ammonia Solutions for 0-30°C and pH 6-10." This approach uses a default temperature of 68°F and 85°F for cold water and warm water surface water, respectively. The percent conversion factor in the table for cold water (20°C or 68°F) and pH (8.0 standard units) is 3.82%.  
(EE) - The applicable GSI criteria for phosphorus is 1,000  $\mu\text{g/L}$ .  
(FF) - The chloride GSI criteria shall not apply for surface waters of the state that are not designated as a public water supply source.  
(JJ) - Compliance with the drinking water criteria shall require comparing the sum of the PFOA and PFOS groundwater concentrations to the drinking water criterion of 0.07  $\mu\text{g/L}$ .
3. MDEQ Residential Groundwater Recommended Volatilization to Indoor Air Interim Action Screening Levels (RIASLs) for were based on MDEQ's Toxics Steering Group's "Media-Specific Interim Action Screening Levels," published in August 2017. The MDEQ published the RIASLs in August 2017, and recently removed the RIASLs from the MDEQ website. The MDEQ is reportedly evaluating the RIASLs for appropriate use and applicability. These are included for reference.  
Abbreviations Include:  
"NCL" indicates no value listed in the Media-Specific Interim Action Screening Levels table.  
Footnotes Include:  
(M) - Site-specific criterion may be below target detection limits (TDL).
4. U.S. EPA Residential Tap Water Regional Removal Management Levels (RMLs) were based on "Generic RML Tables," updated November 2018.
5. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria or Media-Specific Interim Action Screening Levels. U.S. EPA RMLs are provided for reference only and results detected above the EPA RMLs are not bolded or italicized.
6. Abbreviations include:  
"< RL" indicates the parameter was analyzed for but not detected above the method detection limit; RL = Reporting Limit.  
"DUP" indicates a duplicate sample.  
"B" indicates the parameter was also detected in the method blank.  
"J" indicates the parameter was detected at a concentration greater than the limit of quantitation (LOQ) but less than the detection limit (DL) and the result is estimated.
7. Sample names presented are from Shealy Environmental Services, Inc. laboratory reports. Sample names presented in ALS Environmental lab reports may have minor differences based on laboratory interpretation of the chains of custody.
8. Well screen interval presented is the top of the well screen to the bottom of the well screen in feet below ground surface.