


MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Mike Jury, Project Manager, Saginaw Bay District Office
Remediation and Redevelopment Division

FROM: Jeff Pincumbe, Geologist, Geological Services Section
Remediation and Redevelopment Division 

DATE: January 29, 2019

SUBJECT: Oscoda Township Dump, Iosco County, Site ID #35010000
Site Investigation Report, GSS Job #710

This report is for Part 201 site investigation work requested by the Department of Environmental Quality (DEQ), Remediation and Redevelopment Division's (RRD's), Saginaw Bay District office for the subject site located in Oscoda Township, Iosco County, Michigan (Figure 1). It was reported that the Oscoda Township Dump received waste from Wurtsmith Air Force base that may have contained Per- and polyfluoroalkyl (PFAS) compounds. The site is located on the south side of Kings Corner Road, 0.5 miles east of Loud Drive. This is a rural area with residential homes approximately 700 feet to the east and 1,600 feet to the west. The purpose for the investigation was to determine if the groundwater at the site had been impacted with PFAS compounds.

The current PFAS analyses consist of 24 compounds with two being compounds of concern: Perfluoro octane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA). The action level for the compounds of concern 70 parts per trillion (ng/l) for each compound or for a total of the two compounds added together.

This report includes the following:

- Site Location Map (Fig 1)
- Site Map (Fig 2)
- PFOA and PFOS Concentration Map (Fig 3)
- Total PFAS Concentration Map (Fig 4)
- Global Positioning System (GPS) Coordinates of Soil Borings and Monitor Wells (Table 1)
- Volatile Organic Compound (VOC) Laboratory Tables with Comparison to Risk-Based Screening Levels (RBSLs) (Table 2 and Table 3)
- PFC compounds of concern Laboratory Table with comparison to Action Levels (Table 4)
- DEQ Soil Boring Logs (Appendix A)
- DEQ Laboratory Results (Appendix B)
- Vista Analytical Laboratory Results (Appendix C)

Beginning on December 3, 2018, RRD's Geological Services Section (GSS) completed soil borings SB-1 through SB-15 (Fig 2) (Appendix A). The GPS coordinates for each location is included on Table 1. The soil borings and monitor wells were completed using a Geoprobe. Soil samples were collected from SB-1 to a depth of 16 feet to determine the lithology of the site. Soil samples were not collected below 16 feet due to refusal. There were no soil samples submitted to a laboratory for analyses.

Groundwater samples were collected from each location using Geoprobe drop out screens. The screens were set just below the top of groundwater at each location. Groundwater samples were collected from the depth shown on the boring log using a peristaltic pump. The samples were submitted to the MDEQ Laboratory and analyzed for VOCs using the United States Environmental Protection Agency (USEPA) Method 8260 (Table 2) and for metals (Table 3) (Appendix B). Duplicate groundwater samples were submitted to Vista Analytical Laboratory and analyzed for PFAS compounds (Table 4) (Appendix C).

In addition to the soil boring, one existing shallow well (Well-1) was located at the site (Fig 2). The total depth of this well was 27 feet below ground level with a static water level of approximately 17 feet. A groundwater sample was collected from Well-1 and is included in the analyses mentioned above.

A review of the VOC results (Table 2) indicates that low concentrations were detected in the samples from SB-1, SB-2, SB-4, SB-5, SB-6, SB-10, and SB-12. The only compounds detected above RBSLs were vinyl chloride in the sample from SB-2 (5.2 ug/L) and toluene in the sample from SB-5 (6.1 ug/L).

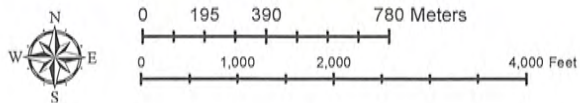
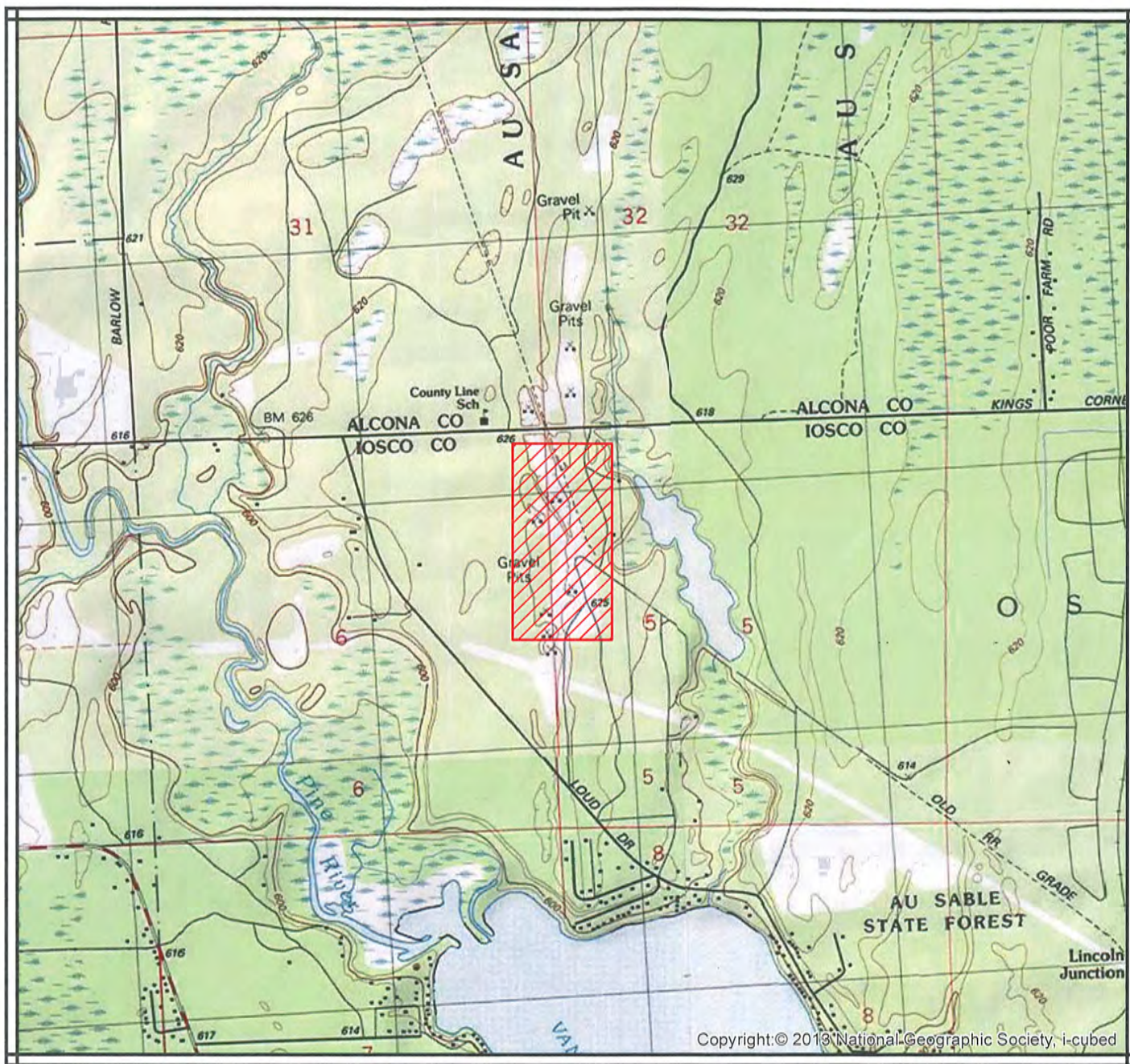
Metals were detected in all the groundwater samples collected from the site. Several metals exceeded at least one of the RBSLs in all the groundwater samples except for the samples collected from SB-14 and SB-15.

The PFOA and PFOS concentrations are included on Figure 3 and the total PFAS concentrations are included on Figure 4. PFAS compounds were detected in all the groundwater samples collected from the site except for SB-11. The combination of PFOA and PFOS exceeded the action level of 70 ng/L in the samples from SB-3, SB-4, and SB-5. These three samples were collected from the southeast corner of the site.

If you have any questions, contact me at 517-243-3171.

Attachments

cc: Burrell P. Shirey, DEQ



LEGEND



Site Location

Datum: NAD83

Projection: Michigan GeoRef

Source: USGS 7.5 minute quadrangle

Oscoda Township Dump
Oscoda Township, Iosco County
T24N R9E Sec 6

SITE LOCATION MAP

GEOLOGIST
Jeff Pincumbe
GEOLOGICAL SERVICES
SECTION

Remediation
and Redevelopment
Division



CREATION DATE

December 2018

FIGURE 1

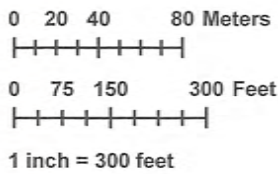


LEGEND

● Soil Boring / Well Location

- DATUM - NAD83
- PROJECTION: MICHIGAN GEOREF
- NORTHING AND EASTING COORDINATES (IN METERS) ARE IN CORNERS OF MAP

AERIAL PHOTO SOURCE: ArcGIS



Oscoda Township Dump
ERNIE ID 35010000
OSCODA TOWNSHIP, IOSCO COUNTY
T24N R9E SECTION 6

SITE MAP

GEOLOGIST
Jeff Pincumbe
Geological Services
Section
Remediation and
Redevelopment
Division



CREATION DATE
December 2018

FIGURE 2



LEGEND

● Soil Boring / Well Location

- DATUM - NAD83
- PROJECTION: MICHIGAN GEOREF
- NORTHING AND EASTING COORDINATES (IN METERS) ARE IN CORNERS OF MAP

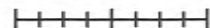
AERIAL PHOTO SOURCE: ArcGIS



0 20 40 80 Meters



0 75 150 300 Feet



1 inch = 300 feet

Oscoda Township Dump
ERNIE ID 35010000
OSCODA TOWNSHIP, IOSCO COUNTY
T24N R9E SECTION 6

PFOA & PFOS CONCENTRATION MAP
results are in ng/L (parts per trillion)

GEOLOGIST
Jeff Pincumbe
Geological Services
Section
Remediation and
Redevelopment
Division



CREATION DATE
January 2019

FIGURE 3

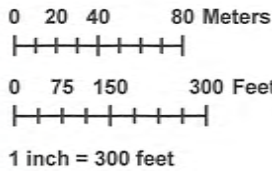


LEGEND

● Soil Boring / Well Location

- DATUM - NAD83
- PROJECTION: MICHIGAN GEOREF
- NORTHING AND EASTING COORDINATES (IN METERS) ARE IN CORNERS OF MAP

AERIAL PHOTO SOURCE: ArcGIS



Oscoda Township Dump ERNIE ID 35010000 OSCODA TOWNSHIP, IOSCO COUNTY T24N R9E SECTION 6		
PFAS CONCENTRATION MAP results are in ng/L (parts per trillion)		
GEOLOGIST Jeff Pincumbe Geological Services Section		CREATION DATE January 2019
Remediation and Redevelopment Division		FIGURE 4

Latitude	Longitude	Northing	Easting	Title	Max_PDOP	Corr_Type	GPS_Date	Unfilt_Pos	Std_Dev
44.504557078	-83.380744977	442556.973	708031.724	SB-1	6.7	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000121
44.504538832	-83.380076746	442556.645	708084.897	SB-2	3.7	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000049
44.504599492	-83.378961648	442566.217	708173.304	SB-3	2.7	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000067
44.505728190	-83.379206423	442690.943	708149.840	SB-4	3.5	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000037
44.506326934	-83.379541704	442756.584	708121.067	SB-5	5.6	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000279
44.507042602	-83.380038138	442834.801	708079.072	SB-6	3.5	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000055
44.507574717	-83.379504286	442895.252	708119.608	SB-7	3.6	Postprocessed Code	12/4/2018	30	0.000305
44.508342135	-83.379512752	442980.457	708116.208	SB-8	2.7	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000038
44.509226107	-83.380155174	443076.993	708062.015	SB-9	2.6	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000068
44.510093529	-83.380641558	443172.089	708020.282	SB-10	2.8	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000066
44.510982461	-83.381155468	443269.504	707976.286	SB-11	2.7	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000034
44.508985458	-83.380853800	443048.492	708007.350	SB-12	2.9	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000042
44.508027528	-83.380861678	442942.089	708010.126	SB-13	2.6	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000060
44.506902544	-83.380987627	442816.833	708004.111	SB-14	4.6	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000057
44.505941726	-83.380907985	442710.332	708013.852	SB-15	6.4	L1L2 Postprocessed Carrier Float	12/4/2018	30	0.000092
44.505010555	-83.378829077	442612.205	708182.380	Well-1	3.9	Postprocessed Code	12/4/2018	30	0.000550

Work Order: 1812039
 Report Date: 1/2/2019 8:59
 Client: MDEQ-RRD-SAGINAW BAY
 Attention: Mike Jury
 Project Name: OSCODA TOWNSHIP DUMP
 Project Number: 3501000

Sample Number			Target Detection Limit (TDL)	Drinking Water Criteria (DWC)	Groundwater Surface Water Interface Criteria (GSIC)	Groundwater Volatilization to Indoor Air Inhalation Criteria (GVIC)	Rule 57 Final Acute Value (FAV)	1812039-01	1812039-02	1812039-03	1812039-04	1812039-05	1812039-06
Sample ID								WELL-1	SB-1	SB-2	SB-3	SB-4	SB-5
Sample Depth									27-31 feet	28-30 feet	22-26 feet	22-26 feet	22-26 feet
Date Collected								12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/4/2018
Date Received								12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018
Analyte	Units	Method	Organics-Volatiles										
1,1,1,2-Tetrachloroethane	ug/L	8260	1	77	ID	15,000	ID	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/L	8260	1	200	89	660,000	1,600	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	8260	1	9	78	12,000	1,800	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/L	8260	1	5	330	17,000	6,400	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	8260	1	880	740	1,000,000	13,000	<1	<1	<1	<1	<1	<1
1,1-Dichloroethylene	ug/L	8260	1	7	130	200	2,300	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	8260	NA	NA	NA	NA	NA	<5	<5	<5	<5	<5	<5
1,2,3-Trichloropropane	ug/L	8260	1	42	NA	8,300	NA	<1	<1	<1	<1	<1	<1
1,2,3-Trimethylbenzene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	8260	5	70	99	300,000	850	<5	<5	<5	<5	<5	<5
1,2,4-Trimethylbenzene	ug/L	8260	1	63	17	56,000	310	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	ug/L	8260	0	0	6	2,400	280	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	8260	1	600	13	160,000	240	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	8260	1	5	360	9,600	16,000	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/L	8260	1	5	230	16,000	4,000	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	8260	1	72	45	61,000	810	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	8260	1	7	28	18,000	200	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/L	8260	1	75	17	16,000	210	<1	<1	<1	<1	<1	<1
2,2,4-Trimethylpentane	ug/L	8260	50	ID	NA	2,300	NA	<5	<5	<5	<5	<5	<5
2-Butanone (MEK)	ug/L	8260	25	13,000	2,200	240,000,000	40,000	<5	<5	<5	<5	<5	<5
2-Methylnaphthalene	ug/L	8260	5	260	19	25,000	340	<5	<5	<5	<5	<5	<5
2-Propanone (acetone)	ug/L	8260	50	730	1,700	1,000,000,000	30,000	<20	<20	<20	<20	<20	<20
4-Methyl-2-pentanone (MIBK)	ug/L	8260	50	1,800	ID	20,000,000	ID	<5	<5	<5	<5	<5	<5
Acrylonitrile	ug/L	8260	2	3	2	34,000	1,200	<5	<5	<5	<5	<5	<5
Benzene	ug/L	8260	1	5	200	5,600	1,900	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	8260	1	80	ID	4,800	ID	<1	<1	<1	<1	<1	<1
Bromoform	ug/L	8260	1	80	ID	470,000	ID	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	8260	5	10	35	4,000	640	<5	<5	<5	<5	<5	<5
Carbon disulfide	ug/L	8260	5	800	ID	250,000	ID	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	8260	1	5	45	370	1,400	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	8260	1	100	25	210,000	450	<1	<1	<1	<1	<1	<1
Chloroethane	ug/L	8260	5	430	1,100	5,700,000	20,000	<5	<5	<5	<5	<5	<5
Chloroform	ug/L	8260	1	80	350	28,000	11,000	<1	<1	<1	<1	<1	<1
Chloromethane	ug/L	8260	5	260	ID	8,600	ID	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	ug/L	8260	1	70	620	93,000	11,000	<1	1.9	<1	<1	<1	<1
cis-1,3-Dichloropropylene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1	<1
Cyclohexane	ug/L	8260	NA	NA	NA	NA	NA	<5	<5	<5	<5	<5	<5
Dibromochloromethane	ug/L	8260	5	80	ID	14,000	ID	<1	<1	<1	<1	<1	<1
Dibromomethane	ug/L	8260	5	80	NA	ID	NA	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	8260	5	1,700	ID	220,000	ID	<5	<5	<5	<5	<5	<5
Diethyl ether	ug/L	8260	10	10	ID	61,000,000	ID	<5	<5	8	<5	<5	<5
Diisopropyl Ether	ug/L	8260	5	30	ID	8,000	ID	<5	<5	<5	<5	<5	<5
Ethylbenzene	ug/L	8260	1	74	18	110,000	320	<1	<1	<1	<1	<1	<1
Ethyltertiarybutylether	ug/L	8260	5	49	ID	2,900,000	ID	<5	<5	<5	<5	<5	<5
Hexachloroethane	ug/L	8260	5	7	7	27,000	210	<5	<5	<5	<5	<5	<5
Hexane	ug/L	8260	NA	3,000	NA	12,000	NA	<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/L	8260	5	800	28	56,000	500	<1	<1	<1	<1	<1	<1
m & p - Xylene	ug/L	8260	NA	NA	NA	NA	NA	<2	<2	<2	<2	<2	<2
Methylene chloride	ug/L	8260	5	5	1,500	220,000	17,000	<5	<5	<5	<5	<5	<5
Methyltertiarybutylether	ug/L	8260	5	40	7,100	47,000,000	420,000	<1	<1	<1	<1	<1	<1
Naphthalene	ug/L	8260	5	520	11	31,000	200	<5	<5	<5	<5	<5	<5
n-Butylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1	<1
Styrene	ug/L	8260	1	100	80	170,000	2,900	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1	<1
tertiary Butyl Alcohol	ug/L	8260	50	3,900	NA	1,000,000,000	NA	<50	<50	<50	<50	<50	<50
tertiaryAmylmeylether	ug/L	8260	5	190	NA	260,000	NA	<5	<5	<5	<5	<5	<5
Tetrachloroethylene	ug/L	8260	1	5	60	25,000	2,900	<1	<1	<1	<1	1.8	6.1
Tetrahydrofuran	ug/L	8260	90	95	11,000	6,900,000	150,000	<5	<5	<5	<5	<5	<5
Toluene	ug/L	8260	1	790	270	530,000	2,600	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethylene	ug/L	8260	1	100	1,500	85,000	28,000	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropylene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1	<1
Trichloroethylene	ug/L	8260	1	5	200	2,200	3,500	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/L	8260	1	2,600	NA	1,100,000	NA	<1	<1	<1	<1	<1	<1
Vinyl chloride	ug/L	8260	1	2	13	1,100	17,000	<1	<1	5.2	<1	<1	<1

Grey indicates contaminant was detected.

Yellow indicates contaminant exceeds DWC.

Blue indicates contaminant exceeds GSIC.

Green indicates contaminant exceeds both FAV and GSIC.

Orange indicates contaminant exceeds one or more criteria: GVIC and/or FAV.

"ID" means insufficient data to develop criterion.

"NA" means a criterion or value is not available or, in the case of background, not applicable.

"NLV" means hazardous substance is not likely to volatilize under most conditions.

Letters in criteria columns refer to Footnotes of the Criteria/RBSLs tables.

Work Order: 1812039
 Report Date: 1/2/2019 8:59
 Client: MDEQ-RRD-SAGINAW BAY
 Attention: Mike Jury
 Project Name: OSCODA TOWNSHIP DUMP
 Project Number: 3501000

Sample Number			Target Detection Limit (TDL)	Drinking Water Criteria (DWC)	Groundwater Surface Water Interface Criteria (GSIC)	Groundwater Volatilization to Indoor Air Inhalation Criteria (GVIC)	Rule 57 Final Acute Value (FAV)	1812039-07	1812039-08	1812039-09	1812039-10	1812039-11	1812039-12	
Sample ID								SB-6	SB-7	SB-8	SB-8 DUP	SB-9	SB-10	
Sample Depth								23-27 feet	23-27 feet	19-23 feet	19-23 feet	15-19 feet	11-15 feet	
Date Collected								12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	
Date Received								12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	
Analyte	Units	Method	Organics-Volatiles											
1,1,1,2-Tetrachloroethane	ug/L	8260	1	77	ID	15,000	ID	<1	<1	<1	<1	<1	<1	
1,1,1-Trichloroethane	ug/L	8260	1	200	89	660,000	1,600	<1	<1	<1	<1	<1	<1	
1,1,2,2-Tetrachloroethane	ug/L	8260	1	9	78	12,000	1,800	<1	<1	<1	<1	<1	<1	
1,1,2-Trichloroethane	ug/L	8260	1	5	330	17,000	6,400	<1	<1	<1	<1	<1	<1	
1,1-Dichloroethane	ug/L	8260	1	880	740	1,000,000	13,000	<1	<1	<1	<1	<1	<1	
1,1-Dichloroethylene	ug/L	8260	1	7	130	200	2,300	<1	<1	<1	<1	<1	<1	
1,2,3-Trichlorobenzene	ug/L	8260	NA	NA	NA	NA	NA	<5	<5	<5	<5	<5	<5	
1,2,3-Trichloropropane	ug/L	8260	1	42	NA	8,300	NA	<1	<1	<1	<1	<1	<1	
1,2,3-Trimethylbenzene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1	<1	
1,2,4-Trichlorobenzene	ug/L	8260	5	70	99	300,000	850	<5	<5	<5	<5	<5	<5	
1,2,4-Trimethylbenzene	ug/L	8260	1	63	17	56,000	310	<1	<1	<1	<1	<1	<1	
1,2-Dibromoethane	ug/L	8260	0	0	6	2,400	280	<1	<1	<1	<1	<1	<1	
1,2-Dichlorobenzene	ug/L	8260	1	600	13	160,000	240	<1	<1	<1	<1	<1	<1	
1,2-Dichloroethane	ug/L	8260	1	5	360	9,600	16,000	<1	<1	<1	<1	<1	<1	
1,2-Dichloropropane	ug/L	8260	1	5	230	16,000	4,000	<1	<1	<1	<1	<1	<1	
1,3,5-Trimethylbenzene	ug/L	8260	1	72	45	61,000	810	<1	<1	<1	<1	<1	<1	
1,3-Dichlorobenzene	ug/L	8260	1	7	28	18,000	200	<1	<1	<1	<1	<1	<1	
1,4-Dichlorobenzene	ug/L	8260	1	75	17	16,000	210	<1	<1	<1	<1	<1	<1	
2,2,4-Trimethylpentane	ug/L	8260	50	ID	NA	2,300	NA	<5	<5	<5	<5	<5	<5	
2-Butanone (MEK)	ug/L	8260	25	13,000	2,200	240,000,000	40,000	<5	<5	<5	<5	<5	<5	
2-Methylnaphthalene	ug/L	8260	5	260	19	25,000	340	<5	<5	<5	<5	<5	<5	
2-Propanone (acetone)	ug/L	8260	50	730	1,700	1,000,000,000	30,000	<20	<20	<20	<20	<20	<20	
4-Methyl-2-pentanone (MIBK)	ug/L	8260	50	1,800	ID	20,000,000	ID	<5	<5	<5	<5	<5	<5	
Acrylonitrile	ug/L	8260	2	3	2	34,000	1,200	<5	<5	<5	<5	<5	<5	
Benzene	ug/L	8260	1	5	200	5,600	1,900	<1	<1	<1	<1	<1	<1	
Bromochloromethane	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1	<1	
Bromodichloromethane	ug/L	8260	1	80	ID	4,800	ID	<1	<1	<1	<1	<1	<1	
Bromoform	ug/L	8260	1	80	ID	470,000	ID	<1	<1	<1	<1	<1	<1	
Bromomethane	ug/L	8260	5	10	35	4,000	640	<5	<5	<5	<5	<5	<5	
Carbon disulfide	ug/L	8260	5	800	ID	250,000	ID	<1	<1	<1	<1	<1	<1	
Carbon tetrachloride	ug/L	8260	1	5	45	370	1,400	<1	<1	<1	<1	<1	<1	
Chlorobenzene	ug/L	8260	1	100	25	210,000	450	<1	<1	<1	<1	<1	<1	
Chloroethane	ug/L	8260	5	430	1,100	5,700,000	20,000	<5	<5	<5	<5	<5	<5	
Chloroform	ug/L	8260	1	80	350	28,000	11,000	<1	<1	<1	<1	<1	<1	
Chloromethane	ug/L	8260	5	260	ID	8,600	ID	<5	<5	<5	<5	<5	<5	
cis-1,2-Dichloroethylene	ug/L	8260	1	70	620	93,000	11,000	<1	<1	<1	<1	<1	<1	
cis-1,3-Dichloropropylene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1	<1	
Cyclohexane	ug/L	8260	NA	NA	NA	NA	NA	<5	<5	<5	<5	<5	<5	
Dibromochloromethane	ug/L	8260	5	80	ID	14,000	ID	<1	<1	<1	<1	<1	<1	
Dibromomethane	ug/L	8260	5	80	NA	ID	NA	<1	<1	<1	<1	<1	<1	
Dichlorodifluoromethane	ug/L	8260	5	1,700	ID	220,000	ID	<5	<5	<5	<5	<5	<5	
Diethyl ether	ug/L	8260	10	10	ID	61,000,000	ID	<5	<5	<5	<5	<5	<5	
Diisopropyl Ether	ug/L	8260	5	30	ID	8,000	ID	<5	<5	<5	<5	<5	<5	
Ethylbenzene	ug/L	8260	1	74	18	110,000	320	<1	<1	<1	<1	<1	<1	
Ethyltertiarybutylether	ug/L	8260	5	49	ID	2,900,000	ID	<5	<5	<5	<5	<5	<5	
Hexachloroethane	ug/L	8260	5	7	7	27,000	210	<5	<5	<5	<5	<5	<5	
Hexane	ug/L	8260	NA	3,000	NA	12,000	NA	<1	<1	<1	<1	<1	<1	
Isopropylbenzene	ug/L	8260	5	800	28	56,000	500	<1	<1	<1	<1	<1	<1	
m & p - Xylene	ug/L	8260	NA	NA	NA	NA	NA	<2	<2	<2	<2	<2	<2	
Methylene chloride	ug/L	8260	5	5	1,500	220,000	17,000	<5	<5	<5	<5	<5	<5	
Methyltertiarybutylether	ug/L	8260	5	40	7,100	47,000,000	420,000	<1	<1	<1	<1	<1	<1	
Naphthalene	ug/L	8260	5	520	11	31,000	200	<5	<5	<5	<5	<5	<5	
n-Butylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1	<1	
n-Propylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1	<1	
o-Xylene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1	<1	
sec-Butylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1	<1	
Styrene	ug/L	8260	1	100	80	170,000	2,900	<1	<1	<1	<1	<1	<1	
tert-Butylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1	<1	
tertiary Butyl Alcohol	ug/L	8260	50	3,900	NA	1,000,000,000	NA	<50	<50	<50	<50	<50	<50	
tertiaryAmylmetylether	ug/L	8260	5	190	NA	260,000	NA	<5	<5	<5	<5	<5	<5	
Tetrachloroethylene	ug/L	8260	1	5	60	25,000	2,900	<1	<1	<1	<1	<1	<1	
Tetrahydrofuran	ug/L	8260	90	95	11,000	6,900,000	150,000	<5	<5	<5	<5	<5	<5	
Toluene	ug/L	8260	1	790	270	530,000	2,600	1.3	<1	<1	<1	1.4	<1	
trans-1,2-Dichloroethylene	ug/L	8260	1	100	1,500	85,000	28,000	<1	<1	<1	<1	<1	<1	
trans-1,3-Dichloropropylene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1	<1	
Trichloroethylene	ug/L	8260	1	5	200	2,200	3,500	<1	<1	<1	<1	<1	<1	
Trichlorofluoromethane	ug/L	8260	1	2,600	NA	1,100,000	NA	<1	<1	<1	<1	<1	<1	
Vinyl chloride	ug/L	8260	1	2	13	1,100	17,000	<1	<1	<1	<1	<1	<1	

Gray indicates contaminant was detected.

Yellow indicates contaminant exceeds DWC.

Blue indicates contaminant exceeds GSIC.

Green indicates contaminant exceeds both LNV and/or FAV.

Orange indicates contaminant exceeds one or more criteria, GVIC and/or FAV.

"ID" means insufficient data to develop criterion.

"NA" means a criterion or value is not available or, in the case of background, not applicable.

"NLV" means hazardous substance is not likely to volatilize under most conditions.

Letters in criteria columns refer to Footnotes of the Criteria/RBSLs tables.

Work Order: 1812039
 Report Date: 1/2/2019 8:59
 Client: MDEQ-RRD-SAGINAW BAY
 Attention: Mike Jury
 Project Name: OSCODA TOWNSHIP DUMP
 Project Number: 3501000

Sample Number			Target Detection Limit (TDL)	Drinking Water Criteria (DWC)	Groundwater Surface Water Interface Criteria (GSIC)	Groundwater Volatilization to Indoor Air Inhalation Criteria (GVIC)	Rule 57 Final Acute Value (FAV)	1812039-13	1812039-14	1812039-15	1812039-16	1812039-17
Sample ID								SB-11	SB-12	SB-13	SB-14	SB-15
Sample Depth								11-15 feet	15-19 feet	27-31 feet	27-31 feet	31-35 feet
Date Collected								12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018
Date Received								12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018
Analyte	Units	Method	Organics-Volatiles									
1,1,1,2-Tetrachloroethane	ug/L	8260	1	77	ID	15,000	ID	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/L	8260	1	200	89	660,000	1,600	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	8260	1	9	78	12,000	1,800	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/L	8260	1	5	330	17,000	6,400	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	8260	1	880	740	1,000,000	13,000	<1	<1	<1	<1	<1
1,1-Dichloroethylene	ug/L	8260	1	7	130	200	2,300	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	8260	NA	NA	NA	NA	NA	<5	<5	<5	<5	<5
1,2,3-Trichloropropane	ug/L	8260	1	42	NA	8,300	NA	<1	<1	<1	<1	<1
1,2,3-Trimethylbenzene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	8260	5	70	99	300,000	850	<5	<5	<5	<5	<5
1,2,4-Trimethylbenzene	ug/L	8260	1	63	17	56,000	310	<1	<1	<1	<1	<1
1,2-Dibromoethane	ug/L	8260	0	0	6	2,400	280	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	8260	1	600	13	160,000	240	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	8260	1	5	360	9,600	16,000	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/L	8260	1	5	230	16,000	4,000	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	8260	1	72	45	61,000	810	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	8260	1	7	28	18,000	200	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/L	8260	1	75	17	16,000	210	<1	<1	<1	<1	<1
2,2,4-Trimethylpentane	ug/L	8260	50	ID	NA	2,300	NA	<5	<5	<5	<5	<5
2-Butanone (MEK)	ug/L	8260	25	13,000	2,200	240,000,000	40,000	<5	<5	<5	<5	<5
2-Methylnaphthalene	ug/L	8260	5	260	19	25,000	340	<5	<5	<5	<5	<5
2-Propanone (acetone)	ug/L	8260	50	730	1,700	1,000,000,000	30,000	<20	<20	<20	<20	<20
4-Methyl-2-pentanone (MIBK)	ug/L	8260	50	1,800	ID	20,000,000	ID	<5	<5	<5	<5	<5
Acrylonitrile	ug/L	8260	2	3	2	34,000	1,200	<5	<5	<5	<5	<5
Benzene	ug/L	8260	1	5	200	5,600	1,900	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	8260	1	80	ID	4,800	ID	<1	<1	<1	<1	<1
Bromoform	ug/L	8260	1	80	ID	470,000	ID	<1	<1	<1	<1	<1
Bromomethane	ug/L	8260	5	10	35	4,000	640	<5	<5	<5	<5	<5
Carbon disulfide	ug/L	8260	5	800	ID	250,000	ID	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	8260	1	5	45	370	1,400	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	8260	1	100	25	210,000	450	<1	<1	<1	<1	<1
Chloroethane	ug/L	8260	5	430	1,100	5,700,000	20,000	<5	<5	<5	<5	<5
Chloroform	ug/L	8260	1	80	350	28,000	11,000	<1	<1	<1	<1	<1
Chloromethane	ug/L	8260	5	260	ID	8,600	ID	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	ug/L	8260	1	70	620	93,000	11,000	<1	<1	<1	<1	<1
cis-1,3-Dichloropropylene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1
Cyclohexane	ug/L	8260	NA	NA	NA	NA	NA	<5	<5	<5	<5	<5
Dibromochloromethane	ug/L	8260	5	80	ID	14,000	ID	<1	<1	<1	<1	<1
Dibromomethane	ug/L	8260	5	80	NA	ID	NA	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	8260	5	1,700	ID	220,000	ID	<5	<5	<5	<5	<5
Diethyl ether	ug/L	8260	10	10	ID	61,000,000	ID	<5	<5	<5	<5	<5
Diisopropyl Ether	ug/L	8260	5	30	ID	8,000	ID	<5	<5	<5	<5	<5
Ethylbenzene	ug/L	8260	1	74	18	110,000	320	<1	<1	<1	<1	<1
Ethyltertiarybutylether	ug/L	8260	5	49	ID	2,900,000	ID	<5	<5	<5	<5	<5
Hexachloroethane	ug/L	8260	5	7	7	27,000	210	<5	<5	<5	<5	<5
Hexane	ug/L	8260	NA	3,000	NA	12,000	NA	<1	<1	<1	<1	<1
Isopropylbenzene	ug/L	8260	5	800	28	56,000	500	<1	<1	<1	<1	<1
m & p - Xylene	ug/L	8260	NA	NA	NA	NA	NA	<2	<2	<2	<2	<2
Methylene chloride	ug/L	8260	5	5	1,500	220,000	17,000	<5	<5	<5	<5	<5
Methyltertiarybutylether	ug/L	8260	5	40	7,100	47,000,000	420,000	<1	<1	<1	<1	<1
Naphthalene	ug/L	8260	5	520	11	31,000	200	<5	<5	<5	<5	<5
n-Butylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1
o-Xylene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1
Styrene	ug/L	8260	1	100	80	170,000	2,900	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	8260	1	80	ID	ID	ID	<1	<1	<1	<1	<1
tertiary Butyl Alcohol	ug/L	8260	50	3,900	NA	1,000,000,000	NA	<50	<50	<50	<50	<50
tertiaryAmylmethylether	ug/L	8260	5	190	NA	260,000	NA	<5	<5	<5	<5	<5
Tetrachloroethylene	ug/L	8260	1	5	60	25,000	2,900	<1	<1	<1	<1	<1
Tetrahydrofuran	ug/L	8260	90	95	11,000	6,900,000	150,000	<5	<5	<5	<5	<5
Toluene	ug/L	8260	1	790	270	530,000	2,600	<1	2.4	<1	<1	1.6
trans-1,2-Dichloroethylene	ug/L	8260	1	100	1,500	85,000	28,000	<1	<1	<1	<1	<1
trans-1,3-Dichloropropylene	ug/L	8260	NA	NA	NA	NA	NA	<1	<1	<1	<1	<1
Trichloroethylene	ug/L	8260	1	5	200	2,200	3,500	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/L	8260	1	2,600	NA	1,100,000	NA	<1	<1	<1	<1	<1
Vinyl chloride	ug/L	8260	1	2	13	1,100	17,000	<1	<1	<1	<1	<1

Grey indicates contaminant was detected.

Yellow indicates contaminant exceeds DWL.

Blue indicates contaminant exceeds GSIC.

Green indicates contaminant exceeds both DWL and GSIC.

Orange indicates contaminant exceeds one or more criteria; GVIC and/or FAV.

"ID" means insufficient data to develop criterion.

"NA" means a criterion or value is not available or, in the case of background, not applicable.

"NLV" means hazardous substance is not likely to volatilize under most conditions.

Letters in criteria columns refer to Footnotes of the Criteria/RBSLs tables.

Michigan Department of Environmental Quality Analytical Testing Report

Work Order: 1812039

Report Date: 1/2/2019 8:59

Client: MDEQ-RRD-SAGINAW BAY

Attention: Mike Jury

Project Name: OSCODA TOWNSHIP DUMP

Project Number: 3501000

Table #3

(Page 1 of 2)

Sample Number			Target Detection Limit (TDL)	Drinking Water Criteria (DWC)	Groundwater Surface Water Interface Criteria (GSIC)	Groundwater Volatilization to Indoor Air Inhalation Criteria (GVIIC)	Rule 57 Final Acute Value (FAV)	1812039-01	1812039-02	1812039-03	1812039-04	1812039-05	1812039-06	1812039-07	1812039-08	1812039-09
Sample ID								WELL-1	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7	SB-8
Sample Depth									27-31 feet	26-30 feet	22-26 feet	22-26 feet	22-26 feet	23-27 feet	23-27 feet	19-23 feet
Date Collected								12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018
Date Received								12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018
Analyte	Units	Method	Inorganics-Metals													
Arsenic	ug/L	200.8	5	10	10	NLV	680	<1	7	13	2.7	1.3	6.6	2.2	5.2	3.5
Barium	ug/L	200.8	100	2,000	G	NLV	Calc	<5	130	120	62	34	130	68	130	64
Cadmium	ug/L	200.8	1	5	G,X	NLV	Calc	1.4	0.3	0.4	0.3	<0.2	1.2	0.3	0.3	0.3
Chromium	ug/L	200.8	10	100	11	NLV	32	<1	94	76	110	53	140	42	190	65
Copper	ug/L	200.8	4	1,000	G	NLV	Calc	2.3	34	54	66	18	120	24	70	24
Lead	ug/L	200.8	3	4	G,X	NLV	Calc	17	9.6	19	4.2	1.5	7.1	3	8	6.1
Mercury	ug/L	245.1	0	2	0	56	3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Selenium	ug/L	200.8	5	50	5	NLV	120	<1	<1	<1	<1	<1	<2	<1	<1	<1
Silver	ug/L	200.8	0	34	0	NLV	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc	ug/L	200.8	50	2,400	G	NLV	Calc	36,000	140	110	220	29	410	35	360	20

Grey indicates contaminant was detected.

Yellow indicates contaminant exceeds DWC.

Blue indicates contaminant exceeds GSIC.

Green indicates contaminant exceeds both DWC and GSIC.

Orange indicates contaminant exceeds one or more criteria: GVIIC and/or FAV.

"Calc" means the FAV must be calculated, see Rule 57 Table.

"ID" means insufficient data to develop criterion.

"NA" means a criterion or value is not available or, in the case of background, not applicable.

"NLV" means hazardous substance is not likely to volatilize under most conditions.

"G" refers to Footnote G of the Criteria/RBSLs tables. The GSI criteria must be calculated.

Letters in criteria columns refer to Footnotes of the Criteria/RBSLs tables.

Michigan Department of Environmental Quality Analytical Testing Report

Work Order: 1812039

Report Date: 1/2/2019 8:59

Client: MDEQ-RRD-SAGINAW BAY

Attention: Mike Jury

Project Name: OSCODA TOWNSHIP DUMP

Project Number: 3501000

Table #3
(Page 2 of 2)

Sample Number			Target Detection Limit (TDL)	Drinking Water Criteria (DWC)	Groundwater Surface Water Interface Criteria (GSIC)	Groundwater Volatilization to Indoor Air Inhalation Criteria (GVIIC)	Rule 57 Final Acute Value (FAV)	1812039-10	1812039-11	1812039-12	1812039-13	1812039-14	1812039-15	1812039-16	1812039-17
Sample ID								SB-8 DUP	SB-9	SB-10	SB-11	SB-12	SB-13	SB-14	SB-15
Sample Depth								19-23 feet	15-19 feet	11-15 feet	11-15 feet	15-19 feet	27-31 feet	27-31 feet	31-35 feet
Date Collected								12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018
Date Received								12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018
Analyte	Units	Method	Inorganics-Metals												
Arsenic	ug/L	200.8	5	10	10	NLV	680	3.6	7.1	5.4	<1	<1	5.3	<1	<1
Barium	ug/L	200.8	100	2,000	G	NLV	Calc	57	150	120	23	21	100	17	25
Cadmium	ug/L	200.8	1	5	G,X	NLV	Calc	0.2	0.7	1.4	<0.2	<0.2	0.4	<0.2	<0.2
Chromium	ug/L	200.8	10	100	11	NLV	32	52	480	280	25	13	69	3.7	<1
Copper	ug/L	200.8	4	1,000	G	NLV	Calc	19	110	70	7.2	6.9	56	1.4	<1
Lead	ug/L	200.8	3	4	G,X	NLV	Calc	5.3	8.8	7.2	<1	<1	6.5	<1	<1
Mercury	ug/L	245.1	0	2	0	56	3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Selenium	ug/L	200.8	5	50	5	NLV	120	<1	<2	<1	<1	<1	<1	<1	<1
Silver	ug/L	200.8	0	34	0	NLV	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc	ug/L	200.8	50	2,400	G	NLV	Calc	19	260	270	7.5	15	730	<5	<5

Grey indicates contaminant was detected.

Yellow indicates contaminant exceeds DWL.

Blue indicates contaminant exceeds GSIC.

Green indicates contaminant exceeds both DWL and GSIC.

Orange indicates contaminant exceeds one or more criteria; GVIIC and/or FAV.

"Calc" means the FAV must be calculated, see Rule 57 Table.

"ID" means insufficient data to develop criterion.

"NA" means a criterion or value is not available or, in the case of background, not applicable.

"NLV" means hazardous substance is not likely to volatilize under most conditions.

"G" refers to Footnote G of the Criteria/RBSLs tables. The GSI criteria must be calculated.

Letters in criteria columns refer to Footnotes of the Criteria/RBSLs tables.

Location:		Well-1	SB-1	SB-2	SB-3	SB-4	SB-5
Depth:			27-31 ft	26-30 ft	22-26 ft	22-26 ft	22-26 ft
Date:		12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/4/2018
	Action Level						
Perfluorooctanoic Acid (PFOA)	70 ng/l	32.1	23.4	22.8	359	273	245
Perfluorooctane Sulfonate (PFOS)	70 ng/l	ND	4.11	2.4	4.2	2.84	10.6
Total PFOA and PFOS	70 ng/l	32.1	27.51	25.2	363.2	275.84	255.6
Total PFAS		203.33	80.9	68.53	618.83	464.58	351.61

Location:		SB-6	SB-7	SB-8	SB-8 DUP	SB-9	SB-10
Depth:		23-27 ft	23-27 ft	19-23 ft	19-23 ft	152-419 ft	10-15 ft
Date:		12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018
	Action Level						
Perfluorooctanoic Acid (PFOA)	70 ng/l	3.62	1.89	22.3	22.4	12	ND
Perfluorooctane Sulfonate (PFOS)	70 ng/l	ND	ND	8.22	10.2	26	1.57
Total PFOA and PFOS	70 ng/l	3.62	1.89	30.52	32.6	38	1.57
Total PFAS		12.25	1.89	60.09	62.13	49.43	4.88

Location:		SB-11	SB-12	SB-13	SB-14	SB-15
Depth:		11-15 ft	15-19 ft	27-31	27-31 ft	31-35 ft
Date:		12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018
	Action Level					
Perfluorooctanoic Acid (PFOA)	70 ng/l	ND	21.5	ND	8.4	11.2
Perfluorooctane Sulfonate (PFOS)	70 ng/l	ND	ND	ND	ND	3.82
Total PFOA and PFOS	70 ng/l	ND	21.5	ND	8.4	15.02
Total PFAS		ND	69.94	2.53	8.4	23.04

ND = Not Detected

APPENDIX A

Otsego Township Dump, Iosco County
Site ID #35010000

DEQ Soil Boring Logs

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-3-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 31 feet

LOCATION DESCRIPTION: SW corner of site

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm 0 1000
		Grd.	0				
		SAND Medium to coarse with gravel, light brown	5				
		SAND Fine to medium, light brown	10				
		SAND Fine to medium, light brown	15				
		Probe to 31 feet with 1.25 inch rods and drop out screen. Collected groundwater sample from 27-31 feet	20				
			25				
			30				
		E.O.B.	35				

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.504557078

LONGITUDE: -83.380744977

DATUM: MichGeoRef

NORTHING: 442556.973

EASTING: 708031.724

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-3-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 30 feet

LOCATION DESCRIPTION: Midpoint of south side

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm
			0				0 1000
		Grd. Probe to 30 feet with 1.25 inch rods and drop out screen. Collected groundwater from 26-30 feet. No soil samples collected. Lithology felt like sand and gravel.	5				
			10				
			15				
			20				
			25				
			30				
		E.O.B.	35				

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.504538832

LONGITUDE: -83.380076746

DATUM: MichGeoRef

NORTHING: 442556.645

EASTING: 708084.897



Remediation and
Redevelopment
Division

BOREHOLE LOG

SITE: Oscoda Township Dump

BORING/WELL: SB/GW-3

COUNTY: Iosco

TOWNSHIP: Oscoda

TOWN: 24N

RANGE: 9E

SECTION: 6

LOCATION DESCRIPTION: SE corner of site

DATE: 10-3-18

DRILLER: Scott Densteadt

GEOLOGIST: Jeff Pincumbe

DRILL METHOD: Geoprobe

TOTAL DEPTH: 26 feet

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm
			0				0
		Grd. Probe to 26 feet with 1.25 inch rods and drop out screen. Collected groundwater sample from 22 - 26 feet.					
		No soil samples collected. Lithology felt like sand and gravel.	5				
			10				
			15				
			20				
			25				
		E.O.B.	30				
			35				

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.504599492

LONGITUDE: -83.378961648

DATUM: MichGeoRef

NORTHING: 442566.217

EASTING: 708173.304



Remediation and
Redevelopment
Division

BOREHOLE LOG

SITE: Oscoda Township Dump

BORING/WELL: SB/GW-4

COUNTY: Iosco

DATE: 10-3-18

TOWNSHIP: Oscoda

DRILLER: Scott Denstead

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 30 feet

LOCATION DESCRIPTION: South half of east side north of SB/GW-3

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm 0 1000
		Grd. Probe to 26 feet with 1.25 inch rods and drop out screen. Collected groundwater sample from 22 - 26 feet, No soil samples collected. Lithology felt like sand and gravel.	0 5 10 15 20 25 30 35				
		E.O.B.					

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.505728190

LONGITUDE: -83.379206423

DATUM: MichGeoRef

NORTHING: 442690.943

EASTING: 708149.840

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 26 feet

LOCATION DESCRIPTION: South half of east side north of SB/GW-4

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm
			0				0 1000
		Grd. Probe to 26 feet with 1.25 inch rods and drop out screen. Collected a groundwater sample from 22 - 26 feet.	5				
		No soil samples collected. Lithology felt like sand and gravel.	10				
			15				
			20				
			25				
		E.O.B.	30				
			35				

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.506326934

LONGITUDE: -83.379541704

DATUM: MichGeoRef

NORTHING: 442756.584

EASTING: 708121.067



Remediation and
Redevelopment
Division

BOREHOLE LOG

BORING/WELL: SB/GW-6

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 27 feet

LOCATION DESCRIPTION: Mid point of east side north of SB/GW-5

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm
			0				0
		Grd. Probe to 27 feet with 1.25 inch rods and drop out screen. Collected groundwater sample from 23 - 27 feet.	5				1000
		No soil samples collected. Lithoogy felt like sand and gravel.	10				
			15				
			20				
			25				
			30				
			35				

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.507042602

LONGITUDE: -83.38038138

DATUM: MichGeoRef

NORTHING: 442834.801

EASTING: 708079.072

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 27 feet

LOCATION DESCRIPTION: North of midpoint on east side north of SB/GW-6

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm
			0				0 1000
		Grd. Probe to 27 feet with 1.25 inch rods and drop out screen. Collected groundwater from 22 -27 feet.	5				
		No soil samples collected. Lithology felt like sand and gravel.	10				
			15				
			20				
			25				
			30				
			35				
		E.O.B.					

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.507574717

LONGITUDE: -83.379504286

DATUM: MichGeoRef

NORTHING: 442895.252

EASTING: 708119.608



Remediation and
Redevelopment
Division

BOREHOLE LOG

SITE: Oscoda Township Dump

BORING/WELL: SB/GW-8

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 23 feet

LOCATION DESCRIPTION: North half of east side north of SB/GW-7

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm 0 1000
		Grd. Probe to 23 feet with 1.25 inch rods and drop out screen. Collected groundwater from 19 -23 feet. No soil samples collected. Lithology felt like sand and gravel.	0 5 10 15 20 25 30 35				
		E.O.B.					

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.508342135

LONGITUDE: -83.379512752

DATUM: MichGeoRef

NORTHING: 442980.457

EASTING: 708116.208



Remediation and
Redevelopment
Division

BOREHOLE LOG

BORING/WELL: SB/GW-9

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 19 feet

LOCATION DESCRIPTION: North half of east side north of SB/GW-8

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm
			0				0
		Grd. Probe to 19 feet with 1.25 inch rods and drop out screen. Collected groundwater sample from 15 - 19 feet.	5				1000
		No soil samples collected. Lithology felt like sand and gravel.	10				
			15				
			20				
		E.O.B.	25				
			30				
			35				

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.509226107

LONGITUDE: -83.380155174

DATUM: MichGeoRef

NORTHING: 443076.993

EASTING: 708062.015

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 15 feet

LOCATION DESCRIPTION: North half of east side near north end

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm 0 1000
		Grd. Probe to 15 feet with 1.25 inch rods and drop out screen. Collected groundwater sample from 11 - 15 feet. No soil samples collected. Lithology felt like sand and gravel.	0 5 10 15 20 25 30 35				
		E.O.B.					

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.510093529

LONGITUDE: -83.380641558

DATUM: MichGeoRef

NORTHING: 443172.089

EASTING: 708020.282

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 15 feet

LOCATION DESCRIPTION: North end of site

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm
			0				0
		Grd. Probe to 15 feet with 1.25 inch rods and drop out screen. Collected groundwater from 11 -15 feet.					
		No soil samples collected. Lithology felt like sand and gravel.	5				
			10				
			15				
		E.O.B.					
			20				
			25				
			30				
			35				

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.510982461

LONGITUDE: -83.381155468

DATUM: MichGeoRef

NORTHING: 443269.504

EASTING: 707976.286

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 19 feet

LOCATION DESCRIPTION: West side of north half

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm
			0				0 1000
		Grd. Probe to 19 feet with 1.25 inch rods and drop out screen. Collected groundwater from 15 - 19 feet.					
		No soil samples collected. Lithology felt like sand and gravel.	5				
			10				
			15				
			20				
		E.O.B.	25				
			30				
			35				

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.508985458

LONGITUDE: -83.380853800

DATUM: MichGeoRef

NORTHING: 443048.492

EASTING: 708007.350



Remediation and
Redevelopment
Division

BOREHOLE LOG

BORING/WELL: SB/GW-13

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Denstead

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 31 feet

LOCATION DESCRIPTION: Mid point of west side of site

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm 0 1000
		Grd. Probe to 31 feet with 1.25 inch rods and drop out screen. Collected groundwater from 27 31 feet. No soil samples collected. Lithology felt like sand and gravel.	0 5 10 15 20 25 30 35				
		E.O.B.					

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.508207528

LONGITUDE: -83.380861678

DATUM: MichGeoRef

NORTHING: 442942.089

EASTING: 708010.126

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 31 feet

LOCATION DESCRIPTION: South half of west side south SB/GW-13

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm
			0				0 1000
		Grd. Probe to 31 feet with 1.25 inch rods and drop out screen. Collected groundwater from 27 31 feet.					
		No soil samples collected. Lithology felt like sand and gravel.	5				
			10				
			15				
			20				
			25				
			30				
		E.O.B.	35				

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.506902544

LONGITUDE: -83.380987627

DATUM: MichGeoRef

NORTHING: 442816.833

EASTING: 708004.111



Remediation and
Redevelopment
Division

BOREHOLE LOG

BORING/WELL: SB/GW-15

SITE: Oscoda Township Dump

COUNTY: Iosco

DATE: 10-4-18

TOWNSHIP: Oscoda

DRILLER: Scott Densteadt

TOWN: 24N

GEOLOGIST: Jeff Pincumbe

RANGE: 9E

DRILL METHOD: Geoprobe

SECTION: 6

TOTAL DEPTH: 35 feet

LOCATION DESCRIPTION: West side of site South half south of SB/GW-14

ERNIE#: 35010000

WELL CONSTRUCTION	LITHOLOGIC LOG	DESCRIPTION	DEPTH	SAMPLE ID	SAMPLE TYPE	FIELD SCREENING RESULTS	PID ppm
			0				0
		Grd. Probe to 35 feet with 1.25 inch rods and drop out screen. Collected groundwater from 31 - 35 feet.					
		No soil samples collected. Lithology felt like sand and gravel.	5				
			10				
			15				
			20				
			25				
			30				
			35				

VERTICAL DATUM: NA

GRD. ELEVATION: NA

T.O.C.: NA

S.W.L.: NA

CASING: NA

SCREEN: NA

WELL DEPTH: NA

COMPLETION NOTES: backfilled with bentonite

LATITUDE: 44.505941726

LONGITUDE: -83.380907985

DATUM: MichGeoRef

NORTHING: 442710.332

EASTING: 708013.852