OCFL Leachate

Pace Analytical Services, LLC
5560 Corporate Exchange Ct. SE
Grand Rapids, MI 49512
(616)975-4500

June 11, 2020

Environmental Manager
Ottawa County Landfill
15550 68th Avenue
Coopersville, MI 49404

RE: Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

Dear Environmental Manager:

Enclosed are the analytical results for sample(s) received by the laboratory on May 27, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Grand Rapids
- Pace Analytical Services - Indianapolis
- Pace Analytical Services - New Orleans

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Rice
jennifer.rice@pacelabs.com
(616)975-4500
Project Manager

Enclosures

cc: Trihyrdro Lab Data, TriHydro

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CERTIFICATIONS

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

Pace Analytical Services New Orleans

California Env. Lab Accreditation Program Branch: 11277CA
Florida Department of Health (NELAC): E87595
Illinois Environmental Protection Agency: 0025721
Kansas Department of Health and Environment (NELAC): E-10266
Louisiana Dept. of Environmental Quality (NELAC/LELAP): 02006
Texas Commission on Env. Quality (NELAC): T104704405-09-TX
U.S. Dept. of Agriculture Foreign Soil Import: P330-10-00119

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Accreditation #: 200074
Indiana Drinking Water Laboratory #: C-49-06
Kansas/TNI Certification #: E-10177
Kentucky UST Agency Interest #: 80226
Kentucky WW Laboratory ID #: 98019
Michigan Drinking Water Laboratory #9050
Ohio VAP Certified Laboratory #: CL0065
Oklahoma Laboratory #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Laboratory #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services Grand Rapids

5560 Corporate Exchange Ct SE, Grand Rapids, MI 49512
Minnesota/TNI Laboratory #026-999-161
Michigan Drinking Water Laboratory #0034

Pace Analytical Services, LLC
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SAMPLE SUMMARY

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50258232001	**Leachate**	Water	05/27/20 16:00	05/27/20 16:55
50258232002	**Trip Blank**	Water	05/27/20 00:00	05/27/20 16:55

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SAMPLE ANALYTE COUNT

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50258232001	**Leachate**		JLR1	3	PASI-GR
		EPA 6010	JPK	5	PASI-I
		EPA 5030B/8260	JPV	50	PASI-I
		EPA 1010	WDB	1	PASI-I
		SM 2320B	SCM	3	PASI-I
		SM 2540C	SKK	1	PASI-I
		SM 2540D	SKK	1	PASI-I
		SW-846 7.3.4.2	LJL	1	PASI-N
		ASTM D516-90,02	TPD	1	PASI-I
		SM 4500-Cl-E	GWA	1	PASI-I
		SM 4500-NH3 G	DAC1	1	PASI-I
		SM 5310C	GWA	1	PASI-I
		SW-846 7.3.3.2	MHM	1	PASI-N

PASI-GR = Pace Analytical Services - Grand Rapids
PASI-I = Pace Analytical Services - Indianapolis
PASI-N = Pace Analytical Services - New Orleans

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
5560 Corporate Exchange Ct. SE
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ANALYTICAL RESULTS

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

Sample: Leachate **Lab ID: 50258232001** Collected: 05/27/20 16:00 Received: 05/27/20 16:55 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Grand Rapids							
Field pH	**7.58**	Std. Units		1		06/03/20 09:00		
Field Temperature	**23.2**	deg C		1		06/03/20 09:00		
Field Specific Conductance	**11200**	umhos/cm		1		06/03/20 09:00		
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis							
Calcium	**90700**	ug/L	1000	1	06/03/20 13:30	06/11/20 01:22	7440-70-2	
Iron	**7600**	ug/L	50.0	1	06/03/20 13:30	06/11/20 01:22	7439-89-6	
Magnesium	**111000**	ug/L	1000	1	06/03/20 13:30	06/11/20 01:22	7439-95-4	
Potassium	**450000**	ug/L	10000	20	06/03/20 13:30	06/11/20 01:45	7440-09-7	
Sodium	**2330000**	ug/L	20000	20	06/03/20 13:30	06/11/20 01:45	7440-23-5	
8260 MSV Low Level	Analytical Method: EPA 5030B/8260 Pace Analytical Services - Indianapolis							
Acetone	**955**	ug/L	200	10		06/02/20 20:09	67-64-1	
Acrylonitrile	**<50.0**	ug/L	50.0	10		06/02/20 20:09	107-13-1	
Benzene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	71-43-2	
Bromochloromethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	74-97-5	
Bromodichloromethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	75-27-4	
Bromoform	**<10.0**	ug/L	10.0	10		06/02/20 20:09	75-25-2	
Bromomethane	**<50.0**	ug/L	50.0	10		06/02/20 20:09	74-83-9	
2-Butanone (MEK)	**1040**	ug/L	50.0	10		06/02/20 20:09	78-93-3	
Carbon disulfide	**<10.0**	ug/L	10.0	10		06/02/20 20:09	75-15-0	
Carbon tetrachloride	**<10.0**	ug/L	10.0	10		06/02/20 20:09	56-23-5	
Chlorobenzene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	108-90-7	
Chloroethane	**<50.0**	ug/L	50.0	10		06/02/20 20:09	75-00-3	
Chloroform	**<10.0**	ug/L	10.0	10		06/02/20 20:09	67-66-3	
Chloromethane	**<50.0**	ug/L	50.0	10		06/02/20 20:09	74-87-3	
1,2-Dibromo-3-chloropropane	**<50.0**	ug/L	50.0	10		06/02/20 20:09	96-12-8	
Dibromochloromethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	124-48-1	
1,2-Dibromoethane (EDB)	**<10.0**	ug/L	10.0	10		06/02/20 20:09	106-93-4	
Dibromomethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	74-95-3	
1,2-Dichlorobenzene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	95-50-1	
1,4-Dichlorobenzene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	106-46-7	
trans-1,4-Dichloro-2-butene	**<50.0**	ug/L	50.0	10		06/02/20 20:09	110-57-6	
1,1-Dichloroethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	75-34-3	
1,2-Dichloroethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	107-06-2	
1,1-Dichloroethene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	75-35-4	
cis-1,2-Dichloroethene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	156-59-2	
trans-1,2-Dichloroethene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	156-60-5	
1,2-Dichloropropane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	78-87-5	
cis-1,3-Dichloropropene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	10061-01-5	
trans-1,3-Dichloropropene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	10061-02-6	
Ethylbenzene	**12.1**	ug/L	10.0	10		06/02/20 20:09	100-41-4	
2-Hexanone	**<50.0**	ug/L	50.0	10		06/02/20 20:09	591-78-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

Sample: Leachate **Lab ID: 50258232001** Collected: 05/27/20 16:00 Received: 05/27/20 16:55 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
	Pace Analytical Services - Indianapolis							
Iodomethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	74-88-4	
Methylene Chloride	**<50.0**	ug/L	50.0	10		06/02/20 20:09	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<50.0**	ug/L	50.0	10		06/02/20 20:09	108-10-1	
Styrene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	100-42-5	
1,1,1,2-Tetrachloroethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	630-20-6	
1,1,2,2-Tetrachloroethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	79-34-5	
Tetrachloroethene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	127-18-4	
Toluene	**61.7**	ug/L	10.0	10		06/02/20 20:09	108-88-3	
1,1,1-Trichloroethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	71-55-6	
1,1,2-Trichloroethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	79-00-5	
Trichloroethene	**<10.0**	ug/L	10.0	10		06/02/20 20:09	79-01-6	
Trichlorofluoromethane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	75-69-4	
1,2,3-Trichloropropane	**<10.0**	ug/L	10.0	10		06/02/20 20:09	96-18-4	
Vinyl acetate	**<50.0**	ug/L	50.0	10		06/02/20 20:09	108-05-4	
Vinyl chloride	**<10.0**	ug/L	10.0	10		06/02/20 20:09	75-01-4	
Xylene (Total)	**38.4**	ug/L	20.0	10		06/02/20 20:09	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	92	%.	85-116	10		06/02/20 20:09	460-00-4	F1
Dibromofluoromethane (S)	106	%.	75-120	10		06/02/20 20:09	1868-53-7	
Toluene-d8 (S)	105	%.	83-111	10		06/02/20 20:09	2037-26-5	
1010 Flashpoint,Closed Cup	Analytical Method: EPA 1010							
	Pace Analytical Services - Indianapolis							
Flashpoint	**>200**	deg F		1		06/03/20 21:56		
2320B Alkalinity	Analytical Method: SM 2320B							
	Pace Analytical Services - Indianapolis							
Alkalinity, Total as CaCO3	**7940**	mg/L	10.0	1		06/04/20 12:33		
Alkalinity,Bicarbonate (CaCO3)	**7940**	mg/L	10.0	1		06/04/20 12:33		
Alkalinity,Carbonate (CaCO3)	**<10.0**	mg/L	10.0	1		06/04/20 12:33		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
	Pace Analytical Services - Indianapolis							
Total Dissolved Solids	**8400000**	ug/L	200000	1		06/02/20 11:42		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
	Pace Analytical Services - Indianapolis							
Total Suspended Solids	**39000**	ug/L	25000	1		05/29/20 17:04		
734S Reactive Sulfide	Analytical Method: SW-846 7.3.4.2 Preparation Method: SW-846 7.3.4.2							
	Pace Analytical Services - New Orleans							
Sulfide, Reactive	**<50.0**	mg/kg	50.0	1	06/02/20 09:47	06/02/20 13:39		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

Sample: Leachate **Lab ID: 50258232001** Collected: 05/27/20 16:00 Received: 05/27/20 16:55 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
ASTM D516-9002 Sulfate Water	Analytical Method: ASTM D516-90,02 Pace Analytical Services - Indianapolis							
Sulfate	**<500000**	ug/L	500000	50		06/03/20 15:22	14808-79-8	D3
4500 Chloride	Analytical Method: SM 4500-Cl-E Pace Analytical Services - Indianapolis							
Chloride	**2090000**	ug/L	50000	50		06/08/20 10:06	16887-00-6	
4500 Ammonia Water, Distilled	Analytical Method: SM 4500-NH3 G Preparation Method: SM 4500-NH3 B Pace Analytical Services - Indianapolis							
Nitrogen, Ammonia	**1260000**	ug/L	30000	5	06/03/20 13:03	06/03/20 14:21	7664-41-7	P4
5310C TOC	Analytical Method: SM 5310C Pace Analytical Services - Indianapolis							
Total Organic Carbon	**769000**	ug/L	50000	100		06/10/20 21:22	7440-44-0	C4,P4
733C S Reactive Cyanide	Analytical Method: SW-846 7.3.3.2 Preparation Method: SW-846 7.3.3.2 Pace Analytical Services - New Orleans							
Cyanide, Reactive	**<25.0**	mg/kg	25.0	1	06/02/20 09:41	06/02/20 14:57		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 564665
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50258232001

METHOD BLANK: 2605031 Matrix: Water
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	<1000	1000	06/10/20 04:48	
Iron	ug/L	<50.0	50.0	06/10/20 04:48	
Magnesium	ug/L	<1000	1000	06/10/20 04:48	
Potassium	ug/L	<500	500	06/10/20 04:48	
Sodium	ug/L	<1000	1000	06/10/20 04:48	

LABORATORY CONTROL SAMPLE: 2605032

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9660	97	80-120	
Iron	ug/L	10000	9130	91	80-120	
Magnesium	ug/L	10000	9200	92	80-120	
Potassium	ug/L	10000	9170	92	80-120	
Sodium	ug/L	10000	9130	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2605033 2605034

Parameter	Units	50258201003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	95400	10000	10000	104000	111000	83	153	75-125	7	20	P6
Iron	ug/L	912	10000	10000	9810	10100	89	91	75-125	3	20	
Magnesium	ug/L	46900	10000	10000	55600	59100	87	122	75-125	6	20	
Potassium	ug/L	3400	10000	10000	12700	13100	93	97	75-125	3	20	
Sodium	ug/L	20300	10000	10000	29400	30700	91	104	75-125	5	20	

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QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 564951
QC Batch Method: EPA 5030B/8260
Analysis Method: EPA 5030B/8260
Analysis Description: 8260 MSV Low Level
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50258232001

METHOD BLANK: 2605940 Matrix: Water
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<1.0	1.0	06/02/20 13:39	
1,1,1-Trichloroethane	ug/L	<1.0	1.0	06/02/20 13:39	
1,1,2,2-Tetrachloroethane	ug/L	<1.0	1.0	06/02/20 13:39	
1,1,2-Trichloroethane	ug/L	<1.0	1.0	06/02/20 13:39	
1,1-Dichloroethane	ug/L	<1.0	1.0	06/02/20 13:39	
1,1-Dichloroethene	ug/L	<1.0	1.0	06/02/20 13:39	
1,2,3-Trichloropropane	ug/L	<1.0	1.0	06/02/20 13:39	
1,2-Dibromo-3-chloropropane	ug/L	<5.0	5.0	06/02/20 13:39	
1,2-Dibromoethane (EDB)	ug/L	<1.0	1.0	06/02/20 13:39	
1,2-Dichlorobenzene	ug/L	<1.0	1.0	06/02/20 13:39	
1,2-Dichloroethane	ug/L	<1.0	1.0	06/02/20 13:39	
1,2-Dichloropropane	ug/L	<1.0	1.0	06/02/20 13:39	
1,4-Dichlorobenzene	ug/L	<1.0	1.0	06/02/20 13:39	
2-Butanone (MEK)	ug/L	<5.0	5.0	06/02/20 13:39	
2-Hexanone	ug/L	<5.0	5.0	06/02/20 13:39	
4-Methyl-2-pentanone (MIBK)	ug/L	<5.0	5.0	06/02/20 13:39	
Acetone	ug/L	<20.0	20.0	06/02/20 13:39	
Acrylonitrile	ug/L	<5.0	5.0	06/02/20 13:39	
Benzene	ug/L	<1.0	1.0	06/02/20 13:39	
Bromochloromethane	ug/L	<1.0	1.0	06/02/20 13:39	
Bromodichloromethane	ug/L	<1.0	1.0	06/02/20 13:39	
Bromoform	ug/L	<1.0	1.0	06/02/20 13:39	
Bromomethane	ug/L	<5.0	5.0	06/02/20 13:39	
Carbon disulfide	ug/L	<1.0	1.0	06/02/20 13:39	
Carbon tetrachloride	ug/L	<1.0	1.0	06/02/20 13:39	
Chlorobenzene	ug/L	<1.0	1.0	06/02/20 13:39	
Chloroethane	ug/L	<5.0	5.0	06/02/20 13:39	
Chloroform	ug/L	<1.0	1.0	06/02/20 13:39	
Chloromethane	ug/L	<5.0	5.0	06/02/20 13:39	
cis-1,2-Dichloroethene	ug/L	<1.0	1.0	06/02/20 13:39	
cis-1,3-Dichloropropene	ug/L	<1.0	1.0	06/02/20 13:39	
Dibromochloromethane	ug/L	<1.0	1.0	06/02/20 13:39	
Dibromomethane	ug/L	<1.0	1.0	06/02/20 13:39	
Ethylbenzene	ug/L	<1.0	1.0	06/02/20 13:39	
Iodomethane	ug/L	<1.0	1.0	06/02/20 13:39	
Methylene Chloride	ug/L	<5.0	5.0	06/02/20 13:39	
Styrene	ug/L	<1.0	1.0	06/02/20 13:39	
Tetrachloroethene	ug/L	<1.0	1.0	06/02/20 13:39	
Toluene	ug/L	<1.0	1.0	06/02/20 13:39	
trans-1,2-Dichloroethene	ug/L	<1.0	1.0	06/02/20 13:39	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

METHOD BLANK: 2605940 Matrix: Water
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
trans-1,3-Dichloropropene	ug/L	<1.0	1.0	06/02/20 13:39	
trans-1,4-Dichloro-2-butene	ug/L	<5.0	5.0	06/02/20 13:39	
Trichloroethene	ug/L	<1.0	1.0	06/02/20 13:39	
Trichlorofluoromethane	ug/L	<1.0	1.0	06/02/20 13:39	
Vinyl acetate	ug/L	<5.0	5.0	06/02/20 13:39	
Vinyl chloride	ug/L	<1.0	1.0	06/02/20 13:39	
Xylene (Total)	ug/L	<2.0	2.0	06/02/20 13:39	
4-Bromofluorobenzene (S)	%.	93	85-116	06/02/20 13:39	
Dibromofluoromethane (S)	%.	106	75-120	06/02/20 13:39	
Toluene-d8 (S)	%.	102	83-111	06/02/20 13:39	

LABORATORY CONTROL SAMPLE: 2605941

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	50	50.6	101	78-120	
1,1,1-Trichloroethane	ug/L	50	59.7	119	78-130	
1,1,2,2-Tetrachloroethane	ug/L	50	55.6	111	64-126	
1,1,2-Trichloroethane	ug/L	50	48.7	97	73-125	
1,1-Dichloroethane	ug/L	50	58.6	117	77-123	
1,1-Dichloroethene	ug/L	50	57.8	116	79-128	
1,2,3-Trichloropropane	ug/L	50	55.5	111	71-131	
1,2-Dibromo-3-chloropropane	ug/L	50	39.5	79	71-133	
1,2-Dibromoethane (EDB)	ug/L	50	48.0	96	76-122	
1,2-Dichlorobenzene	ug/L	50	45.7	91	79-113	
1,2-Dichloroethane	ug/L	50	51.6	103	66-127	
1,2-Dichloropropane	ug/L	50	51.0	102	75-127	
1,4-Dichlorobenzene	ug/L	50	51.9	104	77-117	
2-Butanone (MEK)	ug/L	250	219	88	61-138	
2-Hexanone	ug/L	250	244	98	58-138	
4-Methyl-2-pentanone (MIBK)	ug/L	250	257	103	60-131	
Acetone	ug/L	250	216	86	57-126	
Acrylonitrile	ug/L	200	183	91	65-127	
Benzene	ug/L	50	52.4	105	75-118	
Bromochloromethane	ug/L	50	45.4	91	66-126	
Bromodichloromethane	ug/L	50	50.1	100	75-120	
Bromoform	ug/L	50	47.9	96	61-119	
Bromomethane	ug/L	50	86.1	172	12-184	
Carbon disulfide	ug/L	50	59.3	119	71-123	
Carbon tetrachloride	ug/L	50	59.2	118	73-125	
Chlorobenzene	ug/L	50	52.5	105	80-115	
Chloroethane	ug/L	50	55.9	112	46-133	
Chloroform	ug/L	50	52.4	105	75-117	
Chloromethane	ug/L	50	51.4	103	33-124	
cis-1,2-Dichloroethene	ug/L	50	52.7	105	76-120	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
5560 Corporate Exchange Ct. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

LABORATORY CONTROL SAMPLE: 2605941

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,3-Dichloropropene	ug/L	50	53.4	107	73-130	
Dibromochloromethane	ug/L	50	49.1	98	69-124	
Dibromomethane	ug/L	50	50.8	102	76-124	
Ethylbenzene	ug/L	50	53.6	107	78-120	
Iodomethane	ug/L	100	88.7	89	10-184	
Methylene Chloride	ug/L	50	52.9	106	68-126	
Styrene	ug/L	50	49.2	98	80-121	
Tetrachloroethene	ug/L	50	55.0	110	70-123	
Toluene	ug/L	50	53.3	107	72-114	
trans-1,2-Dichloroethene	ug/L	50	55.9	112	79-126	
trans-1,3-Dichloropropene	ug/L	50	49.9	100	68-122	
trans-1,4-Dichloro-2-butene	ug/L	200	223	111	34-130	
Trichloroethene	ug/L	50	53.3	107	78-120	
Trichlorofluoromethane	ug/L	50	64.7	129	57-156	
Vinyl acetate	ug/L	200	192	96	50-116	
Vinyl chloride	ug/L	50	53.0	106	55-122	
Xylene (Total)	ug/L	150	159	106	81-118	
4-Bromofluorobenzene (S)	%.			98	85-116	
Dibromofluoromethane (S)	%.			106	75-120	
Toluene-d8 (S)	%.			104	83-111	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
5560 Corporate Exchange Ct. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 565404
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50258232001

METHOD BLANK: 2607909 Matrix: Water
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<10.0	10.0	06/04/20 12:13	
Alkalinity,Bicarbonate (CaCO3)	mg/L	<10.0	10.0	06/04/20 12:13	
Alkalinity,Carbonate (CaCO3)	mg/L	<10.0	10.0	06/04/20 12:13	

LABORATORY CONTROL SAMPLE: 2607910

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.0	100	90-110	

SAMPLE DUPLICATE: 2607911

Parameter	Units	50258752001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	2420	2400	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	2420	2400	1	20	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	<10.0		20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 564899
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50258232001

METHOD BLANK: 2605705 Matrix: Water
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	ug/L	<10000	10000	06/02/20 11:41	

LABORATORY CONTROL SAMPLE: 2605706

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	ug/L	300000	283000	94	80-120	

SAMPLE DUPLICATE: 2605707

Parameter	Units	50258170002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	ug/L	566 mg/L	568000	0	10	

SAMPLE DUPLICATE: 2605708

Parameter	Units	50258335005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	ug/L	515 mg/L	507000	2	10	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 564450
QC Batch Method: SM 2540D
Analysis Method: SM 2540D
Analysis Description: 2540D Total Suspended Solids
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50258232001

METHOD BLANK: 2604057 Matrix: Water
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	ug/L	<2500	2500	05/29/20 17:03	

LABORATORY CONTROL SAMPLE: 2604058

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	ug/L	100000	90000	90	80-120	

SAMPLE DUPLICATE: 2604060

Parameter	Units	50258277001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	ug/L	33 mg/L	29000	13	10	R1

SAMPLE DUPLICATE: 2604265

Parameter	Units	50258277004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	ug/L	34 mg/L	31500	6	10	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 187460
QC Batch Method: SW-846 7.3.4.2
Analysis Method: SW-846 7.3.4.2
Analysis Description: 734S Reactive Sulfide
Laboratory: Pace Analytical Services - New Orleans
Associated Lab Samples: 50258232001

METHOD BLANK: 863291 Matrix: Solid
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide, Reactive	mg/kg	<50.0	50.0	06/02/20 13:39	

LABORATORY CONTROL SAMPLE: 863292

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide, Reactive	mg/kg	500	441	88	1-110	

MATRIX SPIKE SAMPLE: 863294

Parameter	Units	50258232001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide, Reactive	mg/kg	<50.0	500	441	84	1-110	

SAMPLE DUPLICATE: 863293

Parameter	Units	50258232001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Reactive	mg/kg	<50.0	<50.0		20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 565212
QC Batch Method: ASTM D516-90,02
Analysis Method: ASTM D516-90,02
Analysis Description: ASTM D516-9002 Sulfate Water
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50258232001

METHOD BLANK: 2607086 Matrix: Water
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	ug/L	<10000	10000	06/03/20 14:02	

LABORATORY CONTROL SAMPLE: 2607087

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	20000	21100	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2607088 2607089

Parameter	Units	50258281002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	ug/L	211 mg/L	500000	500000	711000	685000	100	95	90-110	4	20	

MATRIX SPIKE SAMPLE: 2607090

Parameter	Units	50258486001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	121 mg/L	200000	333000	106	90-110	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
5560 Corporate Exchange Ct. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 565858
QC Batch Method: SM 4500-Cl-E
Analysis Method: SM 4500-Cl-E
Analysis Description: 4500 Chloride
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50258232001

METHOD BLANK: 2610345 Matrix: Water
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	ug/L	<1000	1000	06/08/20 09:37	

LABORATORY CONTROL SAMPLE: 2610346

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	ug/L	20000	20000	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2610347 2610348

Parameter	Units	50258166001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	ug/L	<10.0 mg/L	20000	20000	22300	22500	103	104	90-110	1	20	

MATRIX SPIKE SAMPLE: 2610349

Parameter	Units	50258231001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	ug/L	16600	20000	38600	110	90-110	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 565148
QC Batch Method: SM 4500-NH3 B
Analysis Method: SM 4500-NH3 G
Analysis Description: 4500 Ammonia, Distilled
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50258232001

METHOD BLANK: 2606677 Matrix: Water
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	ug/L	<100	100	06/03/20 14:19	

LABORATORY CONTROL SAMPLE: 2606678

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	ug/L	1670	1790	108	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2606679 2606680

Parameter	Units	50258253001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Ammonia	ug/L	0.16 mg/L	1670	1670	1850	1910	101	105	90-110	3	20	

MATRIX SPIKE SAMPLE: 2606681

Parameter	Units	50258665001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	ug/L	0.14 mg/L	1670	2050	114	90-110	M0

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
5560 Corporate Exchange Ct. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 566201
QC Batch Method: SM 5310C
Analysis Method: SM 5310C
Analysis Description: 5310C Total Organic Carbon
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50258232001

METHOD BLANK: 2611521 Matrix: Water
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	ug/L	<500	500	06/10/20 11:02	

LABORATORY CONTROL SAMPLE: 2611522

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	ug/L	10000	9540	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2611523 2611524

Parameter	Units	50257990008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	ug/L	1.6 mg/L	10000	10000	11100	11200	95	96	80-120	1	20	

MATRIX SPIKE SAMPLE: 2611525

Parameter	Units	50258201015 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	ug/L	ND	10000	9990	95	80-120	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
5560 Corporate Exchange Ct. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

QC Batch: 187463
QC Batch Method: SW-846 7.3.3.2
Analysis Method: SW-846 7.3.3.2
Analysis Description: 733C Reactive Cyanide
Laboratory: Pace Analytical Services - New Orleans
Associated Lab Samples: 50258232001

METHOD BLANK: 863297 Matrix: Solid
Associated Lab Samples: 50258232001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cyanide, Reactive	mg/kg	<25.0	25.0	06/02/20 14:57	

LABORATORY CONTROL SAMPLE: 863298

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide, Reactive	mg/kg	50	<25.0	21	1-110	

MATRIX SPIKE SAMPLE: 863300

Parameter	Units	50258232001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cyanide, Reactive	mg/kg	<25.0	50	<25.0	10	1-110	

SAMPLE DUPLICATE: 863299

Parameter	Units	50258232001 Result	Dup Result	RPD	Max RPD	Qualifiers
Cyanide, Reactive	mg/kg	<25.0	<25.0		20	

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REPORT OF LABORATORY ANALYSIS

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(616)975-4500

QUALIFIERS

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

C4	Sample container did not meet EPA or method requirements.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
F1	The sample was analyzed at a dilution due to foaming of the sample in the purge vessel.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
P4	Sample field preservation does not meet EPA or method recommendations for this analysis.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
5560 Corporate Exchange Ct. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Ottawa County Farms Landfill
Pace Project No.: 50258232

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50258232001	**Leachate**				
50258232001	**Leachate**	EPA 3010	564665	EPA 6010	566290
50258232001	**Leachate**	EPA 5030B/8260	564951		
50258232001	**Leachate**	EPA 1010	565326		
50258232001	**Leachate**	SM 2320B	565404		
50258232001	**Leachate**	SM 2540C	564899		
50258232001	**Leachate**	SM 2540D	564450		
50258232001	**Leachate**	SW-846 7.3.4.2	187460	SW-846 7.3.4.2	187494
50258232001	**Leachate**	ASTM D516-90,02	565212		
50258232001	**Leachate**	SM 4500-Cl-E	565858		
50258232001	**Leachate**	SM 4500-NH3 B	565148	SM 4500-NH3 G	565199
50258232001	**Leachate**	SM 5310C	566201		
50258232001	**Leachate**	SW-846 7.3.3.2	187463	SW-846 7.3.3.2	187545

Pace Analytical
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CHAIN-OF-CUSTODY / Analytical Requ

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant

WO# : 50258232

Section A – Required Client Information:		Section B – Required Project Information:		Section C – Invoice Information:	
Company:	Republic Services - MI	Report To:	Kurt Appledorn	Attention:	
Address:	400 136th Avenue, Building 100	Copy To:		Company Name:	
Holland, MI 49424				Address:	
Email:	kurtis_vanappledorn@golder.com	Purchase Order #:		Pace Quote:	
Phone:	(616)212-0537 Fax	Project Name:	Ottawa County Farms leachate	Pace Project Manager:	jennifer.rice@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	8057

Regulatory Agency

State / Location

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	Requested Analysis Filtered (Y/N): 8260 – Primary VOCs	Cl, SO4, TDS	Ammonia, [illegible]	Total Metals – Fe	Total Metals – Ca, K, Mg, Na	Reactive Sulfide	Cyanide	Hardness	Carb & Bicarb, Alk.	TOC	TSS	Residual Chlorine (Y/N)	(48:33)
1	LEACHATE			5/27/20	4:00				9	3	2	1	3						X	X	X	X	X	X	X	X	X	X		
2																														
3																														
4																														
5																														
6																														
7																														
8																														
9																														
10																														
11																														
12																														

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	[signature] / LET	5/27/20	4:55	[signature]	5/27/20	16:55	

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: James T. Wilson

SIGNATURE of SAMPLER: [signature] DATE Signed: 5/27/20

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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Sample Conditions Upon Receipt Form (SCUR)

Date/Time: 5/27/20	Evaluated by: JN	**WO# : 50258232**			
Client: Republic - Leachate		PM: JLR1 Due Date: 06/11/20			
Project Manager: JLR	Profile ID: 9057	CLIENT: GR-RSC MI			
Rush TAT Requested: YES ✓NO Due Date:					
Lab Notified of Rush or Short Holds: ✓YES NO		Non Conformance Form Required: ✓YES NO			
Samples Received Via: FedEx UPS ✓Client Pace Courier Other: _____					Comments:
Custody Seals Present and Intact:		YES	NO	✓NA	
Received Sample Information Form(s): Drinking Waters Only		YES	NO	✓NA	
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)		YES	NO	✓N/A	
Short Holds Present (< 72 Hours):		YES	✓NO		
Samples Received in Hold:		✓YES	NO		
Custody Signatures Present:		✓YES	NO		
Collector Signature Present:		✓YES	NO		
Packing Material Used:		✓YES	NO		
Samples Collected Today and On Ice:		✓YES	NO	N/A	
IR Gun #: ✓280 281		Digital Thermometer #: 282 283			
Ice Type: WET Bagged / WET Loose BLUE NONE		1. Cooler Temp Upon Receipt: 1.1 / 1.5 °C			
Ice Location: TOP BOTTOM MIDDLE ✓DISPERSED		Temp should be 0-6°C (Initial/Corrected)			
Temp Blank Received:		✓YES	NO		
Containers Intact:		✓YES	NO		
Correct Containers:		YES	✓NO		SEE NCF
Sufficient Volume:		✓YES	NO		
Sample pH Acceptable: All containers needing preservation are found to be in complaince with EPA recommendation Exceptions are VOA, coliform, LLHg, O&G, or any container with a septum cap or preserved with HCl		YES	✓NO	N/A	SEE NCF
Residual Chlorine Absent: (SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)		YES	NO	✓N/A	
VOA Headspace Acceptable (<6mm):		✓YES	NO	N/A	
Trip Blank Received: ✓HCl MeOH TSP OTHER		✓YES	NO		Hold
Comments:		2. Cooler Temp Upon Receipt: _____ °C			
		3. Cooler Temp Upon Receipt: _____ °C			
		4. Cooler Temp Upon Receipt: _____ °C			

Pace Analytical

Sample Receiving Non-Conformance Form (NCF)

WO# : 50258232

PM: JLR1 **Due Date: 06/11/20**
CLIENT: GR-RSC MI

Date: 5/27/20		**COC Integrity Issues:** Check issues below and add details where appropriate		**Sample Intergrity Issues:** Check issues below and add details where appropriate	
Evaluated by: JN	*/✓	COC does not match samples received (missing, additional, etc.)		Custody seal(s) damaged or missing on coolers, samples, or trip blanks	*Insufficient sample volume received
Client: Republic - Leachate		COC sample ID does not match sample label		Cooler or sample container broken or compromised	*Sample contains residual chlorine
***Drinking Water Deficiency:** Samples may be invalid. Analysis must not proceed without client written permission.		*COC collection date/time missing or does not match sample label		*Sample past holding time	✓ Improper preservation
		*Analyses/ analytes missing or clarification needed		*Temperature not within acceptance criteria (typically 0-6°C)	*Sample contains interferences (multi-phasic, solids, color, odor, etc...)
		*Required signatures are missing		*Sample arrived frozen or partially frozen	Vial(s) received with improper headspace (>6mm)
*No Sample Information Form (SIF) received with sample(s)		*Residual Chlorine presence/ absence not indicated on COC		*Incorrect or improper containers received	Other: See notes below

COC					Sample Label					Sample Notes
Sample ID	Date	Time	Container Type	Quantity	Sample ID	Date	Time	Container Type	Quantity	
					Leachate			3P3N		pH = 7
					↓			3P3S		pH = 7
					↓			8G3U		pH = 7 (?)
									*	Missing Containers
										for Sulfide, Cyanide
										+ TOC.

General Comments/ Client Instructions:

Waste Analysis Plan

DRAFT
UNDERGROUND INJECTION CONTROL (UIC) WASTE ANALYSIS PLAN
Class I Deepwell

for
Ottawa County Farms Landfill
Ottawa County Landfill, Inc.

Class I Deepwells
EPA Permit #s TBD

Coopersville, Michigan

July, 2020

Prepared By:
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1.0 INTRODUCTION

1.A Background

The purpose of this Waste Analysis Plan (WAP) is to characterize the non-hazardous landfill leachate waste water to be injected into the Ottawa County Landfill, Inc. injection wells to be located at the Ottawa County Farms Landfill (OCFL) in Ottawa County, Michigan. OCFL will be responsible for implementing this WAP. The injection wells are projected to be constructed in 2020 or 2021. Waste will be injected into the Mt. Simon Formation through Trempealeau Formations.

OCFL intends to operate the wells consistent with Title 40 of the Code of Federal Regulations (40 CFR), Section 146.13 that requires operators of Class I underground injection wells to monitor and analyze the fluids injected into the well "to yield representative data of their characteristics." This waste analysis plan also fulfills the specifications at 40 CFR 146.68 by presenting parameters for which the waste will be analyzed, methods that will be used to test for these parameters, and methods that will be used to obtain representative samples of the waste to be analyzed.

1.B Sources

The OCFL generates non-hazardous leachate. There is no SIC code for sanitary landfill leachate.

The waste waters produced at the landfill include water collected from leachate collection system, which originates from water infiltration through waste, as well as condensate from the gas collection system. Fluids generated during well maintenance or testing activities may also be reinjected into the well. The waste stream is primarily composed of inorganic, non-hazardous compounds such as chloride, and potassium, with a historic total dissolved solids TDS of up to approximately 10,000 ppm.

Waste water is first accumulated in each landfill cell, then piped to a leachate collection tanks. Although some settling may occur and OCFL may elect to filter waste water prior to injection in the future, no waste treatment for regulatory purposes is performed at the tanks.

1.C Summary

The major components of the OCFLs waste characterization and underground injection control (UIC) monitoring program include:

- Volume Monitoring
- Sampling and Analysis
- Quality Assurance/Quality Control

These components are addressed in Sections 2 and 3, below.

The WAP may be reviewed and, if necessary, revised if conditions are identified that may significantly alter the chemical or physical properties of the waste. Revisions to the WAP may also be required if new permit conditions are added by the Agency for cause. Any future revisions to the WAP, upon approval, will become part of the administrative record and constitute a minor modification of the permit. Compatibility issues regarding the subsurface rock matrix and well construction materials are documented in the permit application and are not addressed in this WAP.

2.0 PROCEDURES

2.A Volume Monitoring

As discussed in the text of the Permit Application, flow and pressure recorders are to be used to continuously monitor injection pressure, annulus pressure, and flow rate; totalized cumulative volumes for the wells will be calculated from monitoring data. A summary of recorded data will be provided to the US EPA per applicable permit requirements. The remaining portions of this WAP address physical and chemical characterization of the waste.

2.B Waste Characterization

Waste analysis parameters were selected based on process knowledge, historical analysis, and analysis suggested by US EPA Region 5 guidance. These parameters include pH, TDS, TSS, specific gravity, and applicable organic toxicity characteristics. The pH is generally near neutral to basic (i.e., averaging 7.6 for analysis performed in 2015-2019, and ranging from 6.56 to 9.94). The total dissolved solids (TDS) concentration of the waste is also a useful indicator of fluid properties. Sodium and potassium are among the predominant cations and chloride is the predominant anion, with bicarbonate alkalinity also a major waste component. TDS average (2017-2019) ranges from approximately 5,700 to 10,000 mg/l. Because the native brine present in the injection zone contains relatively high TDS including high cation-anion concentration, injectate will have a lower TDS concentration that natural formation waters.

Testing for pH, specific gravity, and temperature will be performed weekly on days when waste is injected. Although only a limited number of chemical constituents are expected in injectate, a relatively comprehensive analysis will be performed on a quarterly basis. The leachate is non-hazardous and originates from a non-hazardous waste landfill, but a more comprehensive analysis will ensure the non-hazardous nature of injectate. Analysis excludes compounds such as pesticides or herbicides because historical process knowledge indicates that the wastewaters are not expected to contain measurable quantities of these compounds. Wastewater is not expected to be ignitable, reactive, or corrosive, but waste will be analyzed for flashpoint, reactive cyanide, and pH on a quarterly basis as a basic way to confirm the non-hazardous nature of the waste and to ensure any trends or changes are identified.

Table 2-1 of the following section lists the parameters and monitoring frequency used to characterize wastewater to be injected into the wells. Fluid to the injection wells will originate from the same tank, therefore tank sampling would be representative of injectate disposed in each well. The table also summarizes the

applicable analytical method and reporting units for each. Characterization parameters were selected based on historical leachate sampling and identified for characterization needed to satisfy regulatory requirements and applicable specifications listed in typical US EPA Region 5 non-hazardous UIC permits.

2.C Sampling and Analysis

Samples will be collected on a weekly or quarterly basis via grab sample from the waste injection flow line exiting the waste storage tank during calendar days or quarters when injection of waste takes place. The waste analysis to be conducted is designed to acquire representative samples of typical injectate. OCFL personnel, contractor personnel, or contracted analytical laboratory personnel will collect required on-site waste stream samples. Sampling procedures will be conducted at the direction of site representatives and in accordance with the certified or accredited analytical laboratory procedures, and will meet the minimum current standard US EPA procedures. As applicable, the grab sample will be sent to an independent contract laboratory for analysis. Sufficient mixing and residence time in the system will have occurred at this sampling point for the waste to be representative of the waste stream that is being injected. The sampler's name, sampling point, and date sampled will be documented using COC methods specified in Section 3.A.

Table 2-1 presents the parameters, analytical methods, reporting unit and sample frequency for each test parameter. Sampling and analytical methods will meet or exceed the standards cited below or as presented in US EPA “Methods for the Chemical Analysis of Water and Wastes” or “Standard Methods for the Examination of Water and Wastewater”.

TABLE 2-1
OTTAWA COUNTY FARMS LANDFILL
CLASS I WASTE SAMPLING AND ANALYSIS SUMMARY

Test Parameter	Example Test Methods*	Reporting Units	Frequency
Ignitability (flash point)	SW846 1010, SW1010A	---	Quarterly
Alkalinity (carbonate/bicarbonate), total	EPA 310.1	Mg/L	Quarterly
Reactive Sulfide and Cyanide	SW846 9010b, 376.1	---	Quarterly
pH	USEPA 150.1	pH units	Weekly when wells are in operation
Specific Gravity	Hydrometer, ASTM 2710F, D5057		Weekly when wells are in operation
Temperature	Thermometer	^{o}F	Quarterly
TDS	USEPA 160.1	mg/L	Quarterly
TOC	USEPA 415.1	mg/L	Quarterly
Select Characteristic Constituents			
Benzene (D018)	USEPA 8260B/624	mg/L	Quarterly
Carbon Tetrachloride (D019)	USEPA 8260B/8021B	mg/L	Quarterly
Chlorobenzene (D021),	USEPA 8260B/8021B	mg/L	Quarterly
Chloroform (D022),	USEPA 8260B/8021B	mg/L	Quarterly
1,4-Dichlorobenzene (D027)	USEPA 8260B/8021B	mg/L	Quarterly
1,2-Dichloroethane (D028)	USEPA 8260B/8021B	mg/L	Quarterly
Dichloroethylene (D029)	USEPA 8260B/8021B	mg/L	Quarterly
Methyl ethyl ketone (D035)	USEPA 8260B/8261	mg/L (ppm)	Quarterly
Tetrachloroethylene (D039)	USEPA 8260B/8021B	mg/L	Quarterly
Trichloroethylene (D040)	USEPA 8260B/8021B	mg/L	Quarterly
Vinyl Chloride (D043)	USEPA 8260B/8021B	mg/L	Quarterly
Additional Parameters			
Potassium	USEPA 200.8/6010	mg/L	Quarterly
Sodium	USEPA 200.8/6010B, 6020A, 3005A	mg/L	Quarterly

Test Parameter	Example Test Methods*	Reporting Units	Frequency
Chloride	USEPA 325.2/A4500, 300.0	mg/L	Quarterly
Total inorganic nitrogen	USEPA 350.2, 300.0	mg/L	Quarterly
Ammonia (as nitrogen)	USEPA 350.2,300.0	mg/L	Quarterly
Arsenic (D004)	USEPA 6000 series, 7080	mg/L (ppm)	Quarterly
Barium (D005)	USEPA 6000 series	mg/L (ppm)	Quarterly
Cadmium (D006)	USEPA 6000 series	mg/L (ppm)	Quarterly
Chromium (D007)	USEPA 6000 series	mg/L (ppm)	Quarterly
Lead (D008)	USEPA 6000 series	mg/L (ppm)	Quarterly
Mercury (D009)	USEPA 6000 Series	mg/L (ppm)	Quarterly
Selenium (D010)	USEPA 6000 Series	mg/L (ppm)	Quarterly
Silver (D011)	USEPA 6000 Series	mg/L (ppm)	Quarterly

Notes: * Test methods cited are examples; alternative methods with equal or better detection limits may be used

Results of select analyses collected to satisfy Landfill Operating License are presented in Section H of the US EPA UIC Permit Application and are summarized in Section B.9 of the EGLE 625 mineral well application. As shown in these Sections, analysis shows that only a relatively few organic and inorganic constituents are detected, and inorganic parameters are analyzed on an annual basis as required by the Landfill Operating License. In addition, the waste will be sampled and analyzed for other parameters required by this WAP as shown in Table 2-1, including but not limited to pH, specific gravity, and temperature. Therefore, based on process knowledge and historical analytical results, the WAP parameter list provides analysis for 1) US EPA recommended parameters; 2) select TC compounds to ensure non-hazardous compliance, and 3) compounds typically present in injectate at significant concentrations (e.g., chloride).

It is important to note that OCFL is required to perform ongoing leachate analysis as part of landfill operating permits and requirements. OCFL may collect and analyze samples of injectate as described in this WAP, and share resulting data with operations to satisfy landfill operating permit requirements.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

3.A General Sampling and Analytical Information

Sampling protocols outlined in this document are to be followed. OCFL is responsible for obtaining data necessary to comply with this WAP, and will ensure adherence to guidelines set forth in the referenced standards listed in Section 2.C or equivalents, as appropriate. Approved sample collection vessels and preservation techniques from 40 CFR 136.3 or equivalent will be followed as applicable and appropriate. These will include preservation in plastic or glass sample containers provided by the laboratory and storage in a sample refrigerator or cooler for shipment to the laboratory. OCFL reserves the option to choose alternate laboratories for testing provided equivalent QA/QC standards are met. The following applies to samples collected for laboratory analysis (i.e., quarterly analysis).

COC Form Content

Each sample taken will be accompanied by facility or contract laboratory Chain of Custody (COC) form that provides a record of sample handling starting with sample acquisition, documenting the process up to laboratory analysis. Samples taken are to be logged in the field using the COC, sealed, and delivered to the laboratory with a COC form. The COC form shall provide the following items collected by the sampler:

1. Sample ID including code or name, in addition to date and time;
2. Name of sample collector; (include sampling company name if not site personnel);
3. Sample collection method;
4. Sample collection date;
5. Sample collection point; and
6. Sample presentation technique, as applicable

Sample container label will also include a COC seal. Sample chain-of-custody will be followed at all times during the sampling and subsequent analysis. Chain-of-custody will be used to document the handling and control necessary to identify and trace a sample from collection through to final analytical results. Standard laboratory COC forms that document the times and dates of all personnel handling the sample, along with standard labels and container seals sufficient to distinguish between samples and prevent tampering, will be acceptable.

Reporting and Records Retention

Analytical reports and regulatory submittals regarding the nature and composition of injected fluids are to be maintained in the well files until authorization is obtained from

US EPA, in writing, to discard the records. All laboratory reports submitted to US EPA will include, at a minimum, the following:

1. Test description;
2. Analytical method for parameter detection;
3. Identification of analysis date and analyst;
4. Result and units; and
5. Analytical reporting limits.

The following sections present QA/QC parameters which will be followed to help to assure the adequacy of the sampling and analytical techniques for wellhead sampling and analysis described in this plan.

3.B Sampling Controls

1. Equipment Blanks

   Fluid samples will be obtained directly from the sample accumulation container before being sealed in the sample container shipped to the laboratory. In this case, no equipment cleaning blanks will be required. If samples cannot be directly placed in the bottles intended for preservation and shipment, equipment blanks will be taken as deemed appropriate by OCFL.

2. Trip Blanks

   If the laboratory analysis is ever suspect because it contains anomalous parameters, trip blanks will be collected to assess in-transit contamination. The trip blank will consist of sample containers filled and sealed at the laboratory with laboratory-provided deionized (DI) water that accompany the sample containers used throughout the sampling event. The sample containers shall be handled in the same manner as the samples. The trip blank(s) will be sent to the laboratory for analysis of, at a minimum, the same parameters specified in the sampling plan above. A minimum of one (1) trip blank per sampling event will be utilized, when deemed necessary. At the discretion of OCFL, trip blanks may be submitted with any sample to verify representativeness of the sampling program.

3. Sample Duplicates

   On advance written request of US EPA, duplicate samples will be taken to further assess the QA/QC program of the laboratory conducting the analysis. Such samples will be drawn from the same site from which primary samples will be taken consecutively from the same sampling tap or sample location to

ensure representativeness. The duplicate will be labeled with a sample number that will not conflict with the other samples, but will not be discernable to the laboratory as a duplicate sample. Upon the request of US EPA or at the discretion of site representatives, one duplicate sample per selected sampling event will be taken and analyzed for the same parameters as the sampling event.

3.C Analytical Controls

1. Equipment Calibration

   The selected analytical laboratories must maintain QA/QC records of the frequency and type of instrument calibration performed at the laboratory and in the field. Any calibration of thermometers, gauges, chromatographs, spectrometers and other analytical equipment will be conducted according to appropriate instrument manufacturer specifications and manufacturer recommended frequencies or as dictated by applicable laboratory QA/QC plans that have been developed by the laboratory. Valid calibration certificates for instruments used offsite by a certified lab will be maintained at that facility. Calibration data for onsite field testing or continuous monitoring will be maintained as part of the site well records.

2. Data Reduction

   Transcription of the raw data into the reportable units is conducted by the laboratory in accordance with the selected laboratory Q/A plan. Data reduction utilized in the analysis and reporting process is presented in the reports to the US EPA for each sampling and analysis event. Data is recorded on hand written or computer work sheets that include identification data, sample data and all data required for calculations, or on computer print-outs accompanied by operator notes and summaries.

3. Data Verification

   Data verification is conducted after each sampling event by assigned laboratory personnel and includes, at a minimum, review of chain-of-custody forms, equipment calibration records and data completeness. Spot checks of raw data versus reported data are performed to review math accuracy, significant numbers and reporting units. In addition, certified laboratory standard quality assurance/quality control requirements or checklists are utilized to verify individual test methods such as blanks, standards, and for comparisons of internal lab test duplicate results. Problems with any of these items will be indicated in the analytical report presented to the agency.

4. Internal Quality Control

   Per the laboratory QA/QC program, certified quality control samples from appropriate commercial sources or the US EPA, may be run periodically with sample batches. Internal quality control are addressed by disclosure of the laboratory's use of blanks, blind standards, matrix spikes and matrix spike duplicates, preparation of reagents, and laboratory duplicate or replicate analyses.

3.D Actions

1. Corrective Actions

   Corrective actions are implemented by laboratories if the analytical or sampling methods do not achieve plan objectives or data verification identifies inconsistencies in the results. Actions may entail re-sampling the waste stream and/or re-analyzing the fluid for a particular parameter, re-calibrating an analytical device, or other appropriate actions as dictated by the specific situation encountered. Action levels are typically taken in accordance with any applicable standards from USEPA “Methods for the Chemical Analysis of Water and Wastes” or “Standard Methods for the Examination of Water and Wastewater”. OCFL representatives may, at their discretion, require re-sampling and retesting to confirm results that fall outside the historical range of expected analytical results, or outside equipment calibration curves.

2. Reports to US EPA Region 5

   Reports of waste analysis to US EPA will contain a table summarizing the sampling date, units and analytical result for each of the parameters listed in table 2-1 of this document. Additionally, analytical results (i.e., data), including chain of custody forms, will be submitted to US EPA.

3.E Re-Characterization

OCFL shall review the results of quarterly leachate analysis to ensure that injectate is sufficiently characterized. At the discretion of OCFL or at the written request of US EPA, re-characterization efforts may be conducted should a significant change occur in the injectate composition based on quarterly analyses, or if necessitated or required by process changes or new regulations.

The waste stream will be re-characterized as deemed necessary by OCFL if analyses shows a significant change in parameter concentration, particularly toxicity characteristic compound composition that might affect the non-hazardous nature of the waste. In this instance, sampling may be performed more frequently to obtain more

representative analysis of waste composition, to ensure that the overall composition of injectate is still non-hazardous. Any future revisions to the WAP, upon approval, will become part of the administrative record and constitute a minor modification of the permit upon submittal by OCFL.