## 2019 ANNUAL GROUNDWATER MONITORING,

## **CORRECTIVE ACTION REPORT,**

## AND

## STATISTICAL EVALUATION OF DETECTION MONITORING RESULTS

General Waste & Recycling, LLC Coal Combustion Residual Landfill



## PREPARED BY:



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JANUARY 2020

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## PURPOSE

The purpose of this document is to meet U.S. Code of Federal Regulation (CFR) requirements for General Waste & Recycling, LLC's (General Waste's) Keewatin, Minnesota, Coal Combustion Residual (CCR) landfill (the Facility) for preparation of an "Annual Groundwater Monitoring and Corrective Action Report" per CFR §257.90 (e).

## INTRODUCTION

General Waste's Keewatin Facility consists of a composite lined industrial landfill (CCR Unit) and an unlined demolition debris disposal cell. The Facility is located on approximately 70 acres of land in: Township 57 North, Range 22 West, Section 25 of Itasca County, as shown on Figure 1, Site Vicinity Map and Figure 2, Site Location Map. The location of the active CCR Units (Cell A and Cell B), and CCR groundwater monitoring system is shown on Figure 3, Site Detail Map.

## HYDROGEOLOGIC CONCEPTUAL MODEL

Hydrogeologic conditions were investigated while conducting permitting activities for the Facility during 2013. An extensive investigation was completed at that time to refine the hydrologic model of the Facility in preparation of the installation of a groundwater monitoring system. The hydrogeologic investigation and groundwater monitoring system has been certified by a licensed professional engineer (PE) as meeting CRF 257.91 requirements and the certification has been posted on a CCR Website for the Facility per CFR 257.105(h)(3).

## Geologic Units

Three (3) stratigraphic units have been identified for the hydrogeological conceptual model as follows:

- 1. Mine overburden stockpile unit that varies across the landfill footprint in depths ranging from 5 to 80 feet and consists of sand, silty-clayey sand, and sandy silty clay.
- 2. Native soil unit which consists of fine sand and silty sand near the top of the unit and generally grades to a silty medium grained sand with abundant gravel.
- 3. Mine tailings unit which consists of interlayered grey and black silt and fine sand sized taconite tailings. The mine tailings are approximately range from 10 to 26 feet thick and were placed in the tailings basin constructed directly to the west of the mine overburden stockpile.

The location of the mine overburden stockpile and the mine tailings (i.e., the Tailings Basin) are shown on Figure 2.

## Hydrogeologic Setting

An unconfined aquifer exists below the Facility with the water table present within the mine overburden stockpile near the contact of the mine overburden stockpile unit with the native soil unit, except on the western edge of the permitted landfill boundary near MW-7 where the water table is within the tailings. Groundwater flow is generally to the east and southeast towards a ditch (Welcome Creek) located east

adjacent to the Facility. Welcome Creek is considered a groundwater divide and is a discharge point for shallow unconfined groundwater.

## **ENVIRONMENTAL MONITORING SYSTEM**

The CCR Groundwater Monitoring System (GMS) consists of four (4) water table monitoring wells as follows:

- MW-7 is an up-gradient (with respect to general groundwater flow direction) monitoring well; and,
- MW-3R, MW-8 and MW-9 are down-gradient (with respect to general groundwater flow direction) monitoring wells.

The groundwater monitoring system and active CCR Units (Cell A and Cell B) are shown on Figure 3. Groundwater monitoring well details are summarized in Table 1, including static water level and potentiometric surface data (i.e., groundwater elevation data). MW-3R was abandoned during landfill expansion activities prior to the Fall groundwater monitoring event.

## **GROUNDWATER MONITORING SUMMARY**

CCR groundwater monitoring has been conducted semi-annually during the Spring and Fall of each year (i.e., during April and October, respectively). Groundwater monitoring was performed on April 25, 2019 and October 21, 2019 for CCR Appendix III parameters (Table 2) with the exception of MW-3R that was abandoned prior to the Fall monitoring event. Static water levels were obtained and groundwater elevations calculated for both groundwater monitoring events (Table 1), with the exception of MW-3R as indicated above. CCR groundwater monitoring will continue through the active life of the CCR Unit and post closure. CCR Unit post closure monitoring will be conducted for 30 years.

## Groundwater Elevations and General Groundwater Flow Direction

Groundwater elevations summarized in Table 1 were graphed (see Figure 4 Hydrograph). Potentiometric surface (groundwater elevation) contour maps were created and general groundwater flow direction evaluated (Figures 5 and 6). Groundwater elevations fluctuated the most in the upgradient monitoring well MW-7, most likely due to MW-7 being more susceptible to precipitation events affecting surface water within the tailings basin and therefore within groundwater in the area. MW-7 is a relatively shallow well (i.e., screened depth 16.6 to 26.6 feet below the ground surface) installed within the tailings basin (Figure 3).

Based on evaluation of the groundwater data, the general direction of groundwater flow is east-southeast (Figures 5, and 6) towards the ditch (Welcome Creek) and is consistent with historical groundwater flow. As indicated above, MW-3R was abandoned prior to the Fall monitoring event and was not used to evaluate general groundwater flow direction during October 2019 (Figure 6). Evaluation of groundwater elevation trends will continue throughout the active life of the CCR Unit and post closure.

## Quality Assurance and Data Validation

Quality control (QC) samples were included for the CCR monitoring events. QC samples include field blanks and field duplicates analyzed for the same parameters as the respective monitoring well. The QC samples are used to determine the integrity of the field sampling procedures and the validity of the analytical results.

## Groundwater Monitoring Results

Groundwater monitoring results are summarized in Table 3 (CCR Appendix III Lab Results Summary). Statistical analysis of the groundwater monitoring results, including determination of whether or not a Statistically Significant Increase (SSI) has been observed is presented below.

## **STATISTICAL ANALYSIS**

Statistical Analysis was performed using the laboratory analysis results from the April 25, 2019 and October 21, 2019 groundwater monitoring events based on the Statistical Analysis Plan (SAP) written for the facility, with the exception of MW-3R that was abandoned during landfill expansion prior to October 2019. No SSIs were determined to have occurred based on the statistical evaluation of 2019 groundwater monitoring results. The statistical analyses completed for the April and October events are presented in Appendix B.

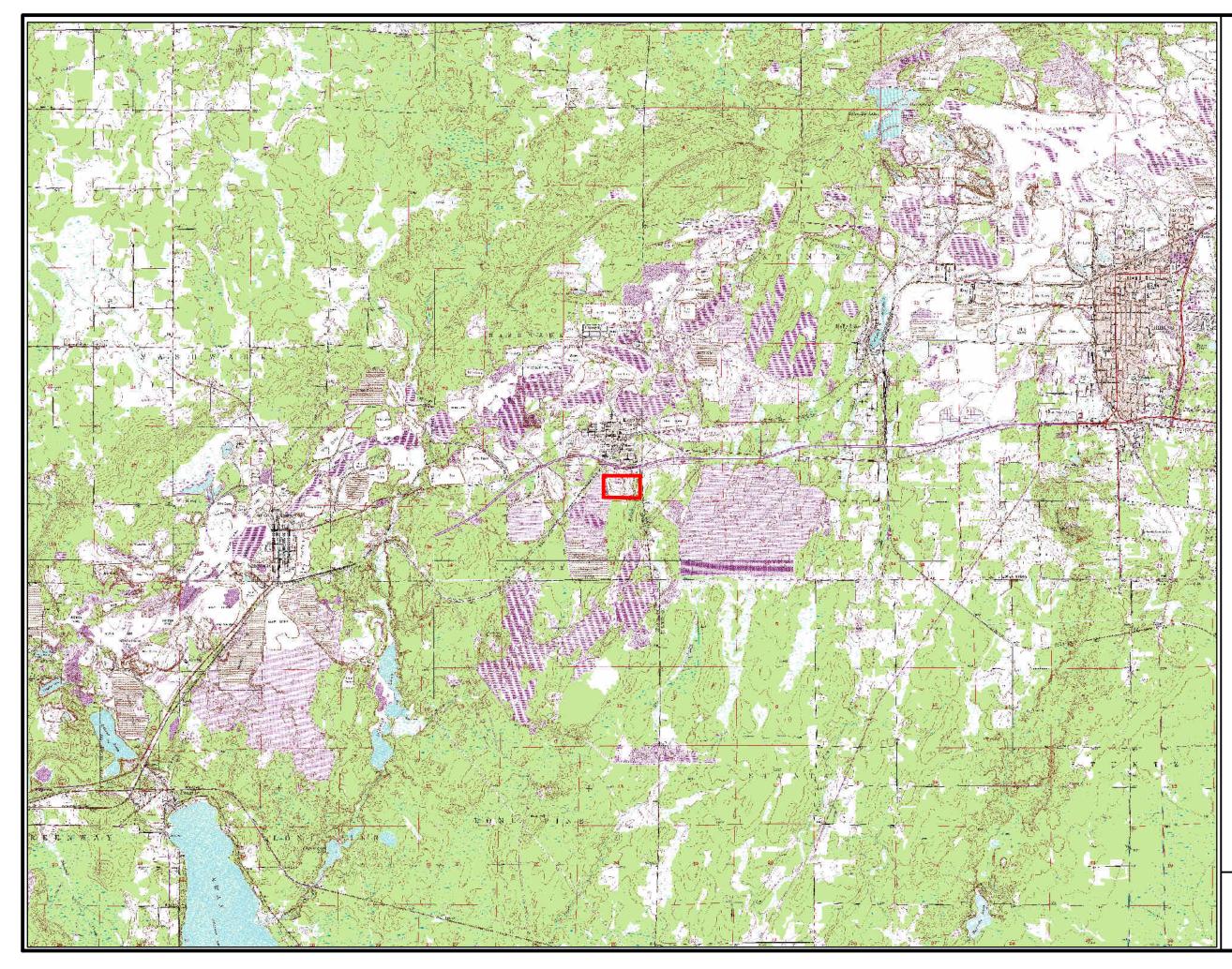
Additionally, following the SAP, the detection monitoring data collected in 2018 and 2019 was assessed and incorporated into the background dataset. After assessing the detection monitoring data, it was determined that intrawell assessment for MW-8 and MW-9 is more appropriate and will provide a higher statistical power than an interwell analysis (comparing upgradient well MW-7 parameters to downgradient wells MW-8 and MW-9 data). The groundwater monitored in MW-7 is very distinct from the groundwater monitored in MW-8 and MW-9, with much higher concentrations of Calcium, Chloride, Sulfate, and Total Dissolved Solids (TDS) observed in the upgradient well MW-7.

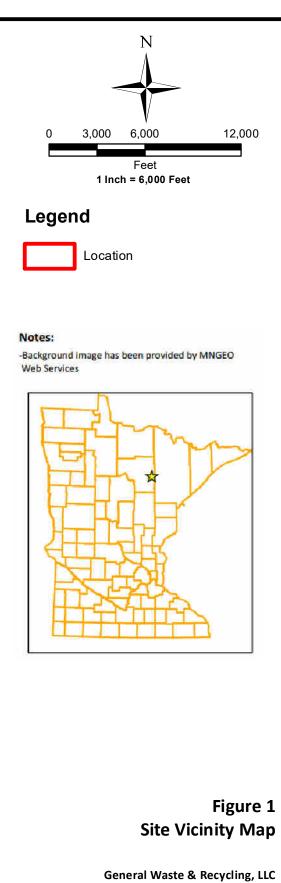
The rationale and workflow utilized to update the background dataset and adjust Upper Prediction Limits (UPLs) for 2020 and 2021 monitoring can be found in Appendix C. The updated UPLs can be seen in Table 4.

## **CONCLUSIONS AND RECOMMENDATIONS**

Review of the collected data indicates that a SSI of CCR Appendix III parameter concentrations has not occurred in the downgradient monitoring wells (see Appendix B). Detection monitoring should continue as described in the Statistical Analysis Plan. MW-3R should be replaced to ensure the GMS meets CRF 257.91 requirements during future monitoring events.

**FIGURES** 

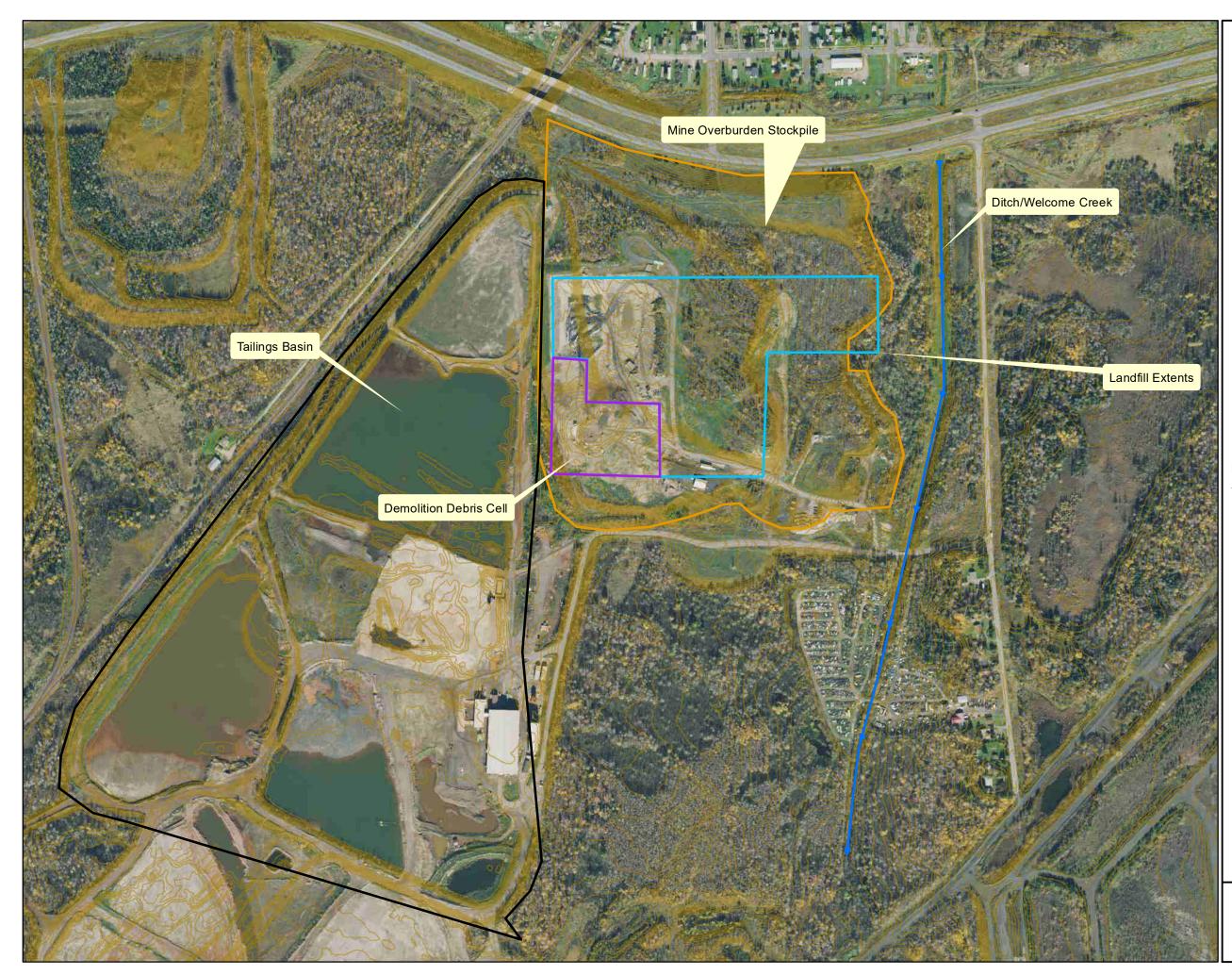


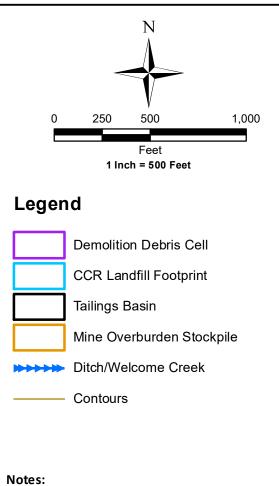


General Waste & Recycling, LLC CCR Landfill Keewatin, MN



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-Background image has been provided by MNGEO Web Services, Image Date 2013

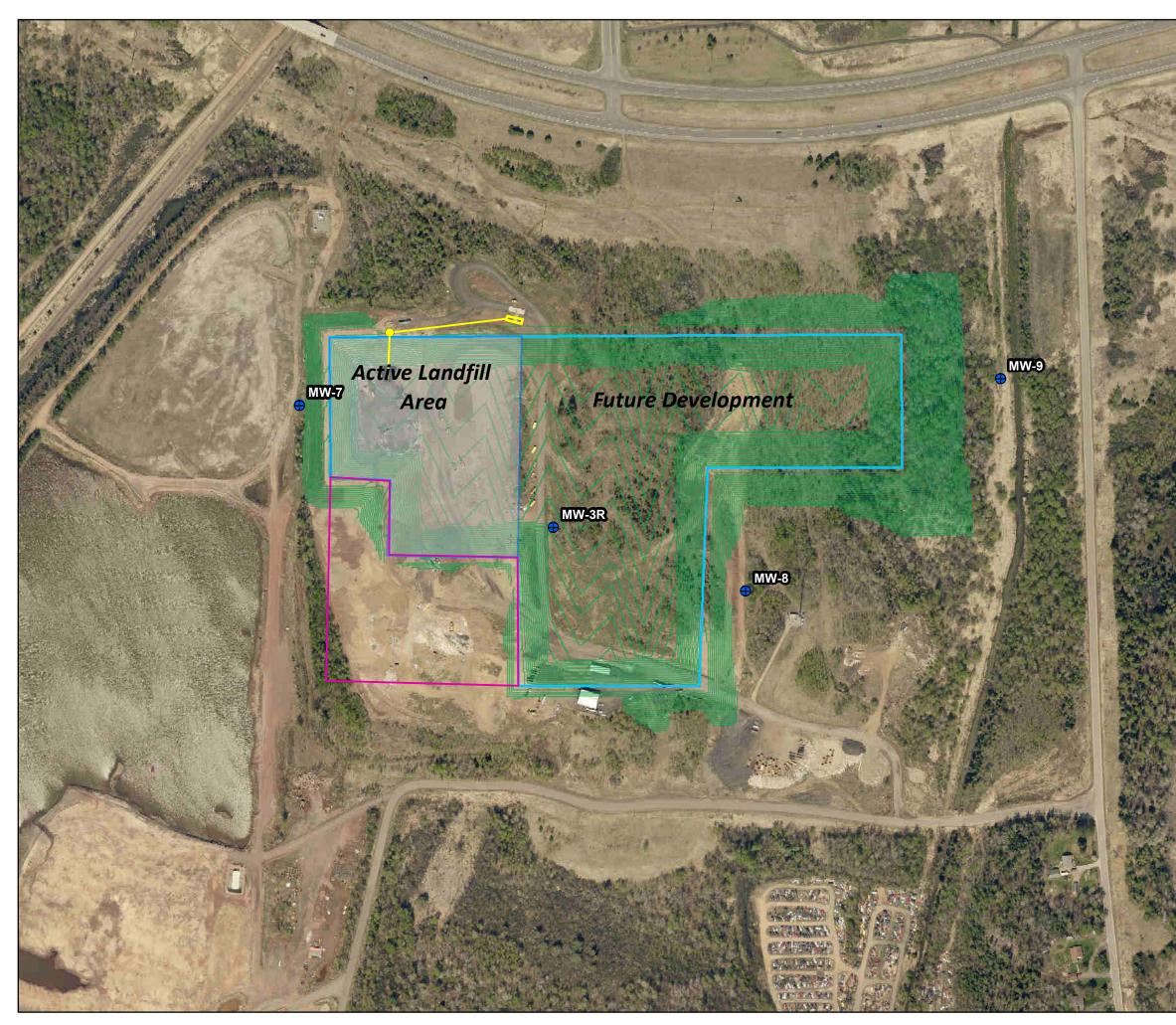
## Figure 2 Site Location Map

General Waste & Recycling, LLC CCR Landfill Keewatin, MN

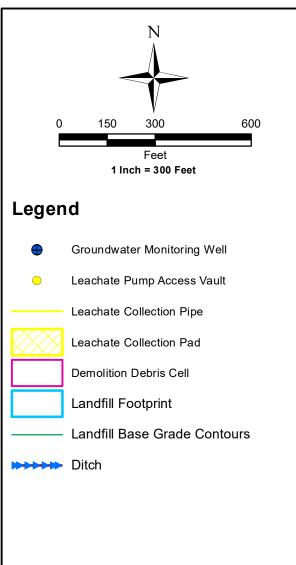


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#### Notes:

-Background image has been provided by St. Louis County Web Services, App Image Date: May, 2016

-MW-3R was abandoned prior to October 2019 during the expansion of the landfill.

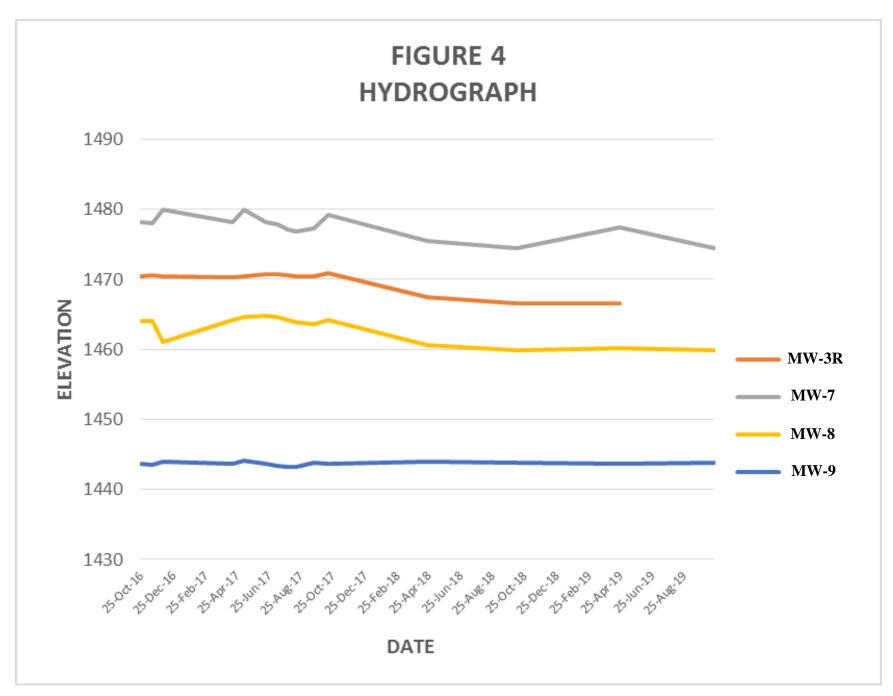
# Figure 3 Site Detail Map

General Waste Industrial Landfill CCR Groundwater Monitoring System Keewatin, MN (Itasca)

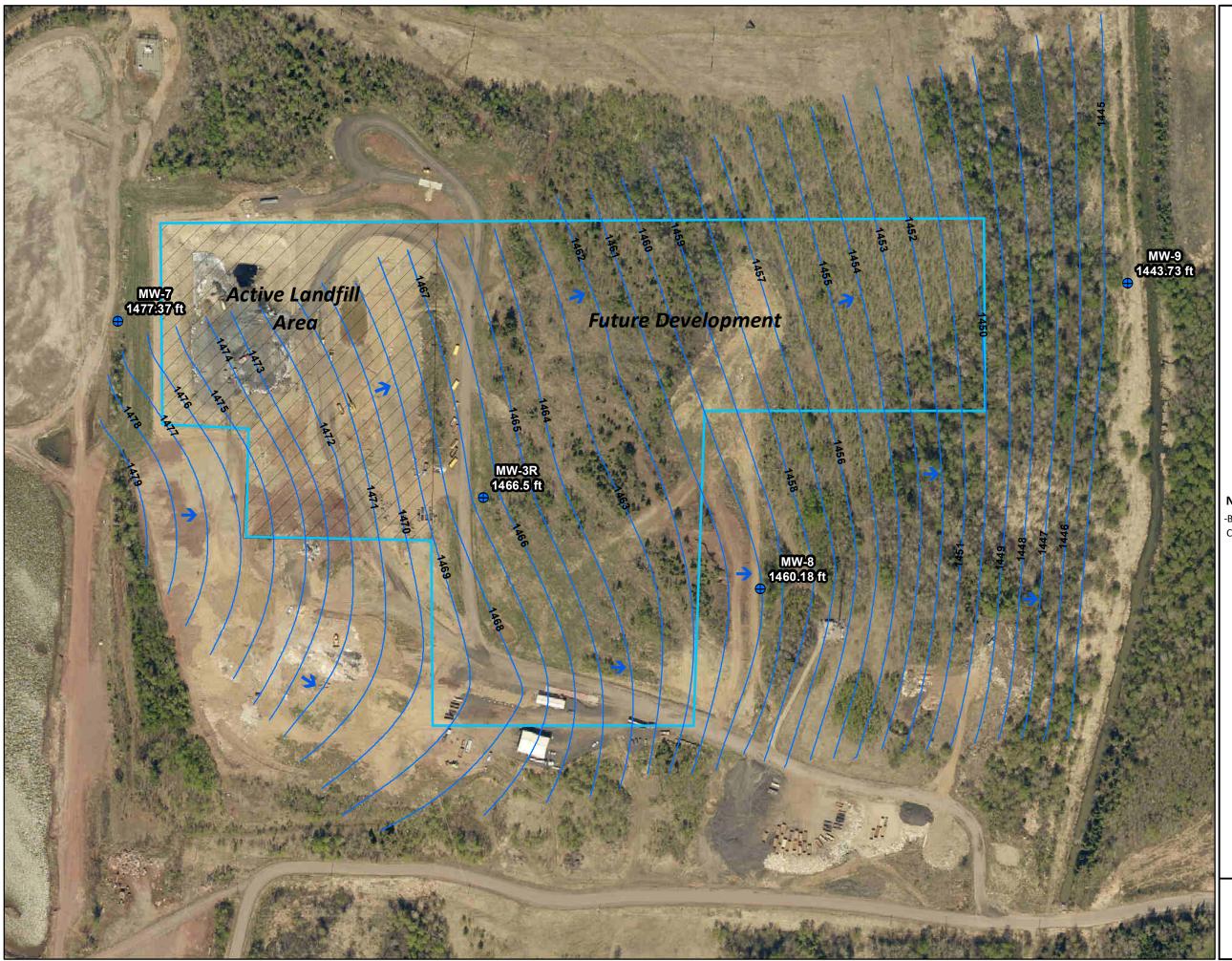


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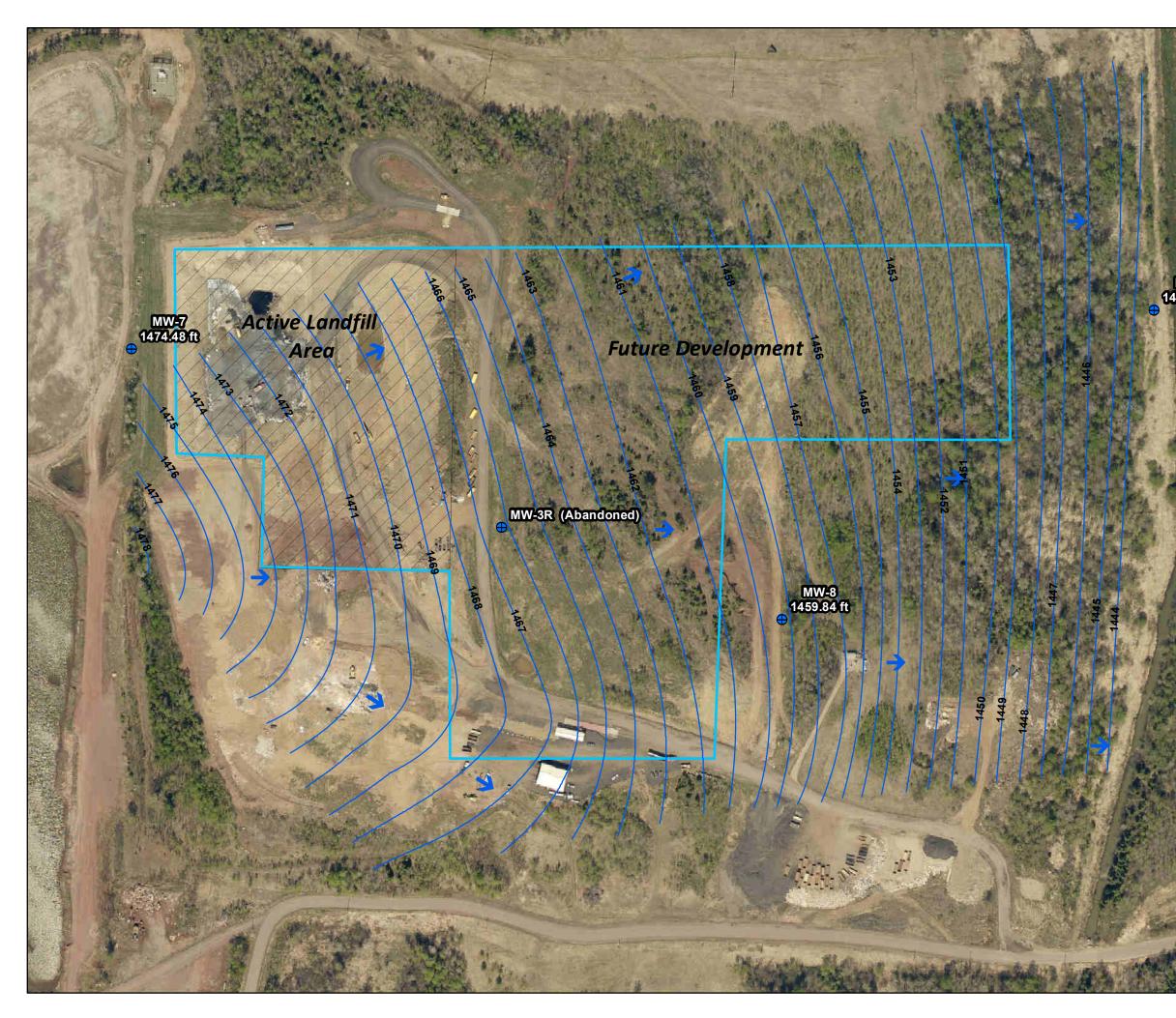
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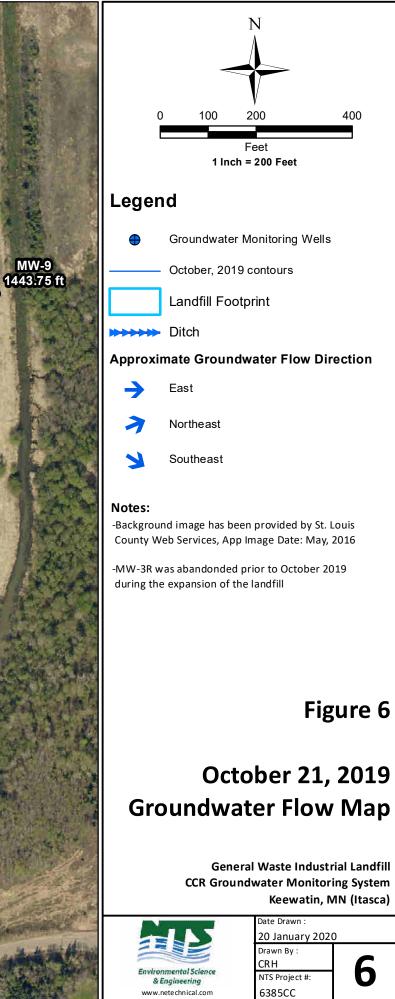


MW-3R was abandoned prior to the October 2019 monitoring event.



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## **TABLES**

## TABLE 1 GROUNDWATER MONITORING WELL DETAILS GENERAL WASTE AND RECYCLING CCR LANDFILL

	MM	/-3R	MW-7		MW-8		MW-9		
MDH Unique Well #	797	239	817979		817978		817980		
Northing (UTM NAD83)	5248332.87		5248449.356		5248271.719		5248474.904		
Easting (Zone 15 Meters)	4942	67.27	494024.588		494451.676		494695.922		
Installation Date	ion Date 7/9/15 9/30/2016		9/29,	9/29/2016		9/30/2016			
Ground Elev. (ft)	153	0.10	1493.62		1491.63		1452.93		
Riser Top Elev. (ft)	153	2.29	1496.13		1494.41		1454.72		
Total Depth (ft)	75	5.0	26.6		41	.3	18.9		
Screened Interval (ft)	65 -	- 75	16.6	16.6 - 26.6		31.3 - 41.3		8.9 - 18.9	
Screened Elevation	1465.10	- 1455.10	1477.02 -	- 1467.02	1460.33	1460.33 - 1450.33		1444.03 - 1434.03	
Date of Measurement	Static Level	GW Elev.	Static Level	GW Elev.	Static Level	GW Elev.	Static Level	GW Elev.	
25-Oct-16	61.90	1470.39	17.92	1478.21	30.42	1463.99	11.07	1443.65	
15-Nov-16	61.75	1470.54	18.11	1478.02	30.31	1464.10	11.16	1443.56	
5-Dec-16	61.90	1470.39	16.22	1479.91	33.40	1461.01	10.69	1444.03	
17-Apr-17	61.95	1470.34	17.93	1478.20	30.18	1464.23	10.98	1443.74	
8-May-17	61.82	1470.47	16.16	1479.97	29.72	1464.69	10.62	1444.10	
20-Jun-17	61.56	1470.73	17.97	1478.16	29.60	1464.81	11.11	1443.61	
11-Jul-17	61.57	1470.72	18.32	1477.81	29.84	1464.57	11.40	1443.32	
1-Aug-17	61.74	1470.55	18.95	1477.18	30.21	1464.20	11.50	1443.22	
16-Aug-17	61.90	1470.39	19.34	1476.79	30.53	1463.88	11.53	1443.19	
18-Sep-17	61.89	1470.40	18.85	1477.28	30.74	1463.67	10.84	1443.88	
16-Oct-17	61.47	1470.82	16.97	1479.16	30.18	1464.23	11.00	1443.72	
23-Apr-18	64.84	1467.45	20.64	1475.49	33.81	1460.60	10.71	1444.01	
11-Oct-18	65.65	1466.64	21.65	1474.48	34.57	1459.84	10.97	1443.75	
25-Apr-19	65.79	1466.50	18.76	1477.37	34.23	1460.18	10.99	1443.73	
*10/21/2019			21.65	1474.48	34.57	1459.84	10.97	1443.75	

\* MW-3R was abandoned during landfill expansion prior to the October 2019 monitoring event.

# TABLE 2CCR APPENDIX III PARAMETERS

Parameter	MCL		
Boron	NA		
Calcium	NA		
Chloride	NA		
Fluoride	4.0 mg/L		
pH	NA		
Sulfate	NA		
Total Dissolved Solids (TDS)	NA		

PARAMETER	UNITS	DATE	MW-3R	MW-7	MW-8	MW-9	Field Dup	Field Blank
Boron	μg/L	17-Apr-17	<160	<160	<160	<160	<160	<40.0
		8-May-17	<160	<160	<160	<160	<160	<40.0
		20-Jun-17	<160	<160	<160	<160	<160	<40.0
		11-Jul-17	124	76.4	70.7	<40.0	<40.0	<40.0
		1-Aug-17	123	75.9	69.5	<40.0	<40.0	<40.0
		16-Aug-17	114	<80.0	<80.0	<80.0	<80.0	<40.0
		18-Sep-17	122	<80.0	<80.0	<80.0	<80.0	<40.0
		16-Oct-17	126	87.8	<80.0	<80.0	<80.0	<40.0
		23-Apr-18	123	73.8	79.5	43.3	39.7	39.3
		11-Oct-18	103	70.8	64.7	<40.0	<40.0	<40.0
		25-Apr-19	96	69.7	75.8	<50.0	<50.0	<10.0
		21-Oct-19	*No Sample	66.9	70.5	<40.0	<50.0	<40.0
Calcium	mg/L	17-Apr-17	563	350	384	197	192	<0.50
		8-May-17	588	404	402	203	209	<1.0
		20-Jun-17	607	524	373	211	207	<0.50
		11-Jul-17	628	355	387	199	199	<0.50
		1-Aug-17	650	375	415	189	185	<0.50
		16-Aug-17	609	341	388	179	178	<0.50
		18-Sep-17	538	316	369	192	191	<100
		16-Oct-17	585	357	448	197	197	<100
		23-Apr-18	551	371	371	229	222	<0.50
		11-Oct-18	532	400	331	193	192	<1.0
		25-Apr-19	484	481	343	206	203	<0.50
		21-Oct-19	*No Sample	539	364	217	219	<0.50

PARAMETER	UNITS	DATE	MW-3R	MW-7	MW-8	MW-9	Field Dup	Field Blank
Chloride	mg/L	25-Oct-16	1.1	109	1	606	606	<1.0
		15-Nov-16	2.2	105	1.2	4.1	4.3	<1.0
		5-Dec-16	1.6	102	1.2	5.8	5.8	<1.0
		17-Apr-17	1.1	63.8	1.1	6.6	7.6	<1.0
		8-May-17	1.1	52.2	<1.0	14.9	13.9	<1.0
		20-Jun-17	1.1	52.5	1	8.9	9	<1.0
		11-Jul-17	1.1	55.6	1	17.6	17.5	<1.0
		1-Aug-17	1.2	61.0	1.3	20.8	20.3	<1.0
		16-Aug-17	1.2	67.5	1.2	19	19.8	<1.0
		18-Sep-17	1.2	82.4	1	10.4	10.7	<1.0
		16-Oct-17	1.1	52.0	1.2	8.7	8.8	<1.0
		23-Apr-18	1.5	124	<1.2	2.8	2.5	<1.2
		11-Oct-18	2.0	91.4	1.4	8.4	8.4	<1.0
		25-Apr-19	2.8	61.4	1.3	2.9	2.8	<1.0
		21-Oct-19	*No Sample	37.4	1.4	6	5.9	<1.0

PARAMETER	UNITS	DATE	MW-3R	MW-7	MW-8	MW-9	Field Dup	Field Blank
Fluoride	mg/L	25-Oct-16	<0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
		15-Nov-16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
		5-Dec-16	< 0.10	< 0.10	<0.10	<0.10	<0.10	<0.10
		17-Apr-17	0.11	0.11	< 0.10	< 0.10	<0.10	< 0.10
		8-May-17	< 0.10	< 0.10	<0.10	<0.10	<0.10	<0.10
		20-Jun-17	< 0.10	< 0.10	<0.10	<0.10	<0.10	<0.10
		11-Jul-17	< 0.10	< 0.10	<0.10	<0.10	<0.10	<0.10
		1-Aug-17	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
		16-Aug-17	<0.10	< 0.10	< 0.10	< 0.10	<0.10	< 0.10
		18-Sep-17	0.1	<0.10	<0.10	<0.10	<0.10	<0.10
		16-Oct-17	< 0.10	< 0.10	<0.10	<0.10	<0.10	<0.10
		23-Apr-18	0.086	0.080	0.053	0.075	0.068	< 0.050
		11-Oct-18	< 0.10	< 0.10	<0.10	<0.10	< 0.10	<0.10
		25-Apr-19	<0.10	< 0.10	<0.10	<0.10	<0.10	<0.10
		21-Oct-19	*No Sample	<0.10	<0.10	<0.10	<0.10	<0.10

PARAMETER	UNITS	DATE	MW-3R	MW-7	MW-8	MW-9	Field Dup	Field Blank
pH, Lab	mg/L	25-Oct-16	7.3	7.4	7.4	7.4	7.3	6.3
		15-Nov-16	7.3	7.2	7.2	7.2	7.2	6.0
		5-Dec-16	6.8	6.6	6.6	6.9	6.8	7.1
		17-Apr-17	7.3	7.4	7.3	7.3	7.3	6.1
		8-May-17	7.2	7.1	7.1	7.2	7.2	6.2
		20-Jun-17	7.1	7.1	7.2	7.2	7.2	5.9
		11-Jul-17	7.1	7.1	7.1	7.2	7.2	6.0
		1-Aug-17	7.1	7.1	7.2	7.2	7.2	6.0
		16-Aug-17	7.1	7.2	7.2	7.2	7.2	5.8
		18-Sep-17	7.2	7.1	7.2	7.2	7.2	5.8
		16-Oct-17	7.3	7.2	7.2	7.3	7.3	6.0
		23-Apr-18	6.8	7.0	7.0	6.3	6.6	8.6
		11-Oct-18	7.2	7.2	7.2	7.2	7.2	6.1
		25-Apr-19	7.4	7.4	7.2	7.5	7.3	6.2
		21-Oct-19	*No Sample	7.2	7.1	7.2	7.2	5.7

PARAMETER	UNITS	DATE	MW-3R	MW-7	MW-8	MW-9	Field Dup	Field Blank
Sulfate	mg/L	25-Oct-16	1980	937	823	462	458	<2.0
		15-Nov-16	1820	929	764	475	470	<2.0
		5-Dec-16	1840	903	778	460	460	<2.0
		17-Apr-17	1710	551	780	454	441	<2.0
		8-May-17	1760	712	731	438	433	<2.0
		20-Jun-17	1810	746	672	459	458	<2.0
		11-Jul-17	1870	548	707	406	412	<2.0
		1-Aug-17	1830	511	700	339	342	<2.0
		16-Aug-17	1840	447	703	354	348	<2.0
		18-Sep-17	1890	441	719	432	436	<2.0
		16-Oct-17	1840	675	1010	443	432	<2.0
		23-Apr-18	1520	488	617	481	464	<1.2
		11-Oct-18	1550	695	589	460	461	<2.0
		25-Apr-19	1300	988	562	423	441	<2.0
		21-Oct-19	*No Sample	1120	630	437	434	<2.0

PARAMETER	UNITS	DATE	MW-3R	MW-7	MW-8	MW-9	Field Dup	Field Blank
Total Dissolved Solids	mg/L	25-Oct-16	3300	2070	1740	1070	1090	<10.0
(TDS)		15-Nov-16	3130	2090	1710	1190	1140	<10.0
		5-Dec-16	3110	1940	1710	1100	1110	<10.0
		17-Apr-17	3160	1500	1760	1180	1120	<10.0
		8-May-17	3010	1610	1630	1050	1040	<10.0
		20-Jun-17	3190	1700	1510	1090	1120	<10.0
		11-Jul-17	3040	1380	1550	1010	1020	<10.0
		1-Aug-17	3290	1300	1560	864	888	12
		16-Aug-17	3360	1300	1610	979	957	32
		18-Sep-17	2580	1310	1580	1100	1000	<10.0
		16-Oct-17	3110	1380	1800	993	1010	<10.0
		23-Apr-18	2870	1420	1400	1080	1080	<10.0
		11-Oct-18	2850	1600	1350	1100	1120	<10.0
		25-Apr-19	2560	1970	1380	1020	1050	<10.0
		21-Oct-19	*No Sample	2250	1490	1100	1090	<10.0

## TABLE 4 UPDATED UPLS BASED ON UNIFIED GUIDANCE TABLE 19 GENERAL WASTE AND RECYCLING, LLC

PARAMETER	MW-7	MW-3R	MW-8	MW-9
Boron (ug/L)	110.01	n/a	119.29	50
Calcium (mg/L)	579.98	n/a	438.4	233.23
Chloride (mg/L)	132.82	n/a	1.52	22.65
Fluoride (mg/L)	0.11	n/a	0.1	0.1
pH (SU)	6.12 - 6.79	n/a	6.23-7.13	6.23-7.13
Sulfate (mg/L)	1197.73	n/a	865.08	527.68
Total Dissolved Solids (mg/L)	2391.34	n/a	1863.13	1243.1

**APPENDICES** 

**APPENDIX A** 

**ANALYTICAL LABORATORY REPORTS & FIELD REPORTS** 



Pace Analytical Services, LLC 315 Chestnut Street Virginia, MN 55792 (218) 742-1042

May 13, 2019

Dennis Schubbe Northeast Technical Services 526 Chestnut Street Virginia, MN 55792

RE: Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report Pace Project No.: 12124076

Dear Dennis Schubbe:

Enclosed are the analytical results for sample(s) received by the laboratory on April 25, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This report was revised to remove the D3 flag on the Field Blank sample.

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

Sincerely,

Carin Jren

Carrie Jensen carrie.jensen@pacelabs.com (218)742-1042 Project Manager

Enclosures

cc: Sample Data, Northeast Technical Services Scott Seeley, NTS Karissa Vosen, NTS





#### CERTIFICATIONS

Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report Pace Project No.: 12124076

#### **Minnesota Certification IDs**

1700 Elm Street SE, Minneapolis, MN 55414-2485 A2LA Certification #: 2926.01 Alabama Certification #: 40770 Alaska Contaminated Sites Certification #: 17-009 Alaska DW Certification #: MN00064 Arizona Certification #: AZ0014 Arkansas DW Certification #: MN00064 Arkansas WW Certification #: 88-0680 California Certification #: 2929 CNMI Saipan Certification #: MP0003 Colorado Certification #: MN00064 Connecticut Certification #: PH-0256 EPA Region 8+Wyoming DW Certification #: via MN 027-053-137 Florida Certification #: E87605 Georgia Certification #: 959 Guam EPA Certification #: MN00064 Hawaii Certification #: MN00064 Idaho Certification #: MN00064 Illinois Certification #: 200011 Indiana Certification #: C-MN-01 Iowa Certification #: 368 Kansas Certification #: E-10167 Kentucky DW Certification #: 90062 Kentucky WW Certification #: 90062 Louisiana DEQ Certification #: 03086 Louisiana DW Certification #: MN00064 Maine Certification #: MN00064 Marvland Certification #: 322 Massachusetts Certification #: M-MN064 Michigan Certification #: 9909 Minnesota Certification #: 027-053-137

#### Virginia Minnesota Certification ID's

315 Chestnut Street, Virginia, MN 55792 Montana Certificate #CERT0103 Alaska Certification UST-107 Minnesota Dept of Health Certification #: 027-137-445 Minnesota Dept of Ag Certifcation #: via MN 027-053-137 Minnesota Petrofund Certification #: 1240 Mississippi Certification #: MN00064 Missouri Certification #: 10100 Montana Certification #: CERT0092 Nebraska Certification #: NE-OS-18-06 Nevada Certification #: MN00064 New Hampshire Certification #: 2081 New Jersey Certification #: MN002 New York Certification #: 11647 North Carolina DW Certification #: 27700 North Carolina WW Certification #: 530 North Dakota Certification #: R-036 Ohio DW Certification #: 41244 Ohio VAP Certification #: CL101 Oklahoma Certification #: 9507 Oregon Primary Certification #: MN300001 Oregon Secondary Certification #: MN200001 Pennsylvania Certification #: 68-00563 Puerto Rico Certification #: MN00064 South Carolina Certification #:74003001 Tennessee Certification #: TN02818 Texas Certification #: T104704192 Utah Certification #: MN00064 Vermont Certification #: VT-027053137 Virginia Certification #: 460163 Washington Certification #: C486 West Virginia DEP Certification #: 382 West Virginia DW Certification #: 9952 C Wisconsin Certification #: 999407970 Wyoming UST Certification #: via A2LA 2926.01

North Dakota Certification: # R-203 Wisconsin DNR Certification # : 998027470 WA Department of Ecology Lab ID# C1007



### SAMPLE SUMMARY

 Project:
 [6385CC\_2019 Apr(1 of 1)]-Revised Report

 Pace Project No.:
 12124076

Lab ID Sam	ple ID	Matrix	Date Collected	Date Received
12124076001 Field	Blank	Water	04/25/19 11:50	04/25/19 15:50
12124076002 Field	d Duplicate	Water	04/25/19 14:35	04/25/19 15:50
12124076003 MW3	BR	Water	04/25/19 12:05	04/25/19 15:50
12124076004 MW7	7	Water	04/25/19 10:52	04/25/19 15:50
12124076005 MW8	3	Water	04/25/19 13:24	04/25/19 15:50
12124076006 MWS	)	Water	04/25/19 14:34	04/25/19 15:50



### SAMPLE ANALYTE COUNT

Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report

Pace Project No.: 12124076

12124076001         Field Blank         EPA 200.7         DM         1           12124076001         Field Blank         EPA 200.7         DM         1           12124076002         Field Duplicate         EPA 300.0         ZJT         3           12124076002         Field Duplicate         EPA 200.7         DM         1           12124076002         Field Duplicate         EPA 200.7         DM         1           12124076003         MW3R         EPA 200.7         DM         1           12124076004         MW7         EPA 200.7         DM         1           12124076004         MW7         EPA 200.7         DM         1           12124076005         MW6         EPA 200.7         DM         1           12124076006         MW9         EPA 200.7         DM         1           12124076006         MW9         EPA 200.7 <t< th=""><th>Lab ID</th><th>Sample ID</th><th>Method</th><th>Analysts</th><th>Analytes Reported</th><th>Laboratory</th></t<>	Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
SM 2540C (1997)KER1SM 4500-H+BZJT312124076002Field DuplicateEPA 300.0ZJT12124076003Field DuplicateEPA 200.7DM12124076003MW3REPA 300.0ZJT312124076003MW3REPA 300.0ZJT312124076003MW3REPA 300.0ZJT312124076004MW3REPA 200.7DM112124076005MW3REPA 300.0ZJT312124076004MW7EPA 300.0ZJT312124076005MW8EPA 300.0ZJT312124076005MW8EPA 300.0ZJT312124076005MW8EPA 200.7DM112124076005MW8EPA 200.7DM112124076005MW8EPA 200.7DM112124076006MW9EPA 200.7DM112124076005MW8EPA 200.7DM112124076005MW8EPA 200.7DM112124076005MW9EPA 200.7DM112124076006MW9EPA 200.7DM112124076007DM11112124076006MW9EPA 200.7DM112124076007MU8EPA 200.7DM112124076006MW9EPA 200.7DM112124076007MU8EPA 200.7DM112124076006MW9EPA 200.7DM1<	12124076001	Field Blank	EPA 200.7	DM	1	PASI-M
SM 4500-H+BZJT112124076002Field DuplicateEPA 300.0ZJT312124076003Field DuplicateEPA 200.7DM112124076003MW3REPA 200.7DM112124076003MW3REPA 200.7DM112124076004EPA 200.7DM112124076005MW3REPA 200.7DM112124076004MW7EPA 200.7DM112124076005MW7EPA 200.7DM112124076006MW7EPA 200.7DM112124076007MW7EPA 200.7DM112124076005MW7EPA 200.7DM112124076005MW6EPA 200.7DM112124076005MW6EPA 200.7DM112124076005MW6EPA 200.7DM112124076005MW6EPA 200.7DM112124076005MW9EPA 200.7 </td <td></td> <td></td> <td>EPA 200.8</td> <td>PW1</td> <td>1</td> <td>PASI-M</td>			EPA 200.8	PW1	1	PASI-M
12124076002Field DuplicateEPA 300.0Z.JT312124076003Field DuplicateEPA 200.7DM1EPA 200.8PW111SM 2540C (1997)KER1SM 4500-H+BZ.JT312124076003MW3REPA 300.0Z.JT12124076004MW3REPA 200.7DM12124076004MW7EPA 300.0Z.JT12124076004MW7EPA 300.0Z.JT12124076005MW8EPA 200.7DM12124076006MW8EPA 200.7DM12124076007DM1EPA 300.0Z.JT312124076006MW8EPA 200.7DM12124076007DM1EPA 300.0Z.JT312124076006MW8EPA 200.7DM12124076006MW8EPA 200.7DM12124076006MW9EPA 200.7DM <tr <td=""></tr>			SM 2540C (1997)	KER	1	PASI-V
12124076002Field DuplicateEPA 200.7DM1EPA 200.8PW11SM 2540C (1997)KER1SM 4500-H+BZJT1EPA 300.0ZJT312124076003MW3REPA 200.7DMEPA 200.7DM1EPA 200.7DM1EPA 200.7DM1SM 2540C (1997)KER1SM 2540C (1997)KER1SM 4500-H+BZJT312124076004MW7EPA 200.7DMMW7EPA 200.7DM1EPA 200.8PW11SM 2540C (1997)KER1SM 4500-H+BZJT1SM 4500-H+BZJT312124076005MW8EPA 200.7DMFPA 300.0ZJT3SM 4500-H+BZJT1SM 4500-H+BZJT1SM 4500-H+BZJT1SM 4500-H+BZJT1SM 4500-H+BZJT1SM 4500-H+BZJT312124076006MW9EPA 200.7DM1SM 4500-H+BZJT3312124076006MW9EPA 200.7DM1EPA 200.7DM11SM 4500-H+BZJT31SM 4500-H+BZJT11SM 4500-H+BZJT11SM 4500-H+BZJT11SM 4500-H+BZJT11SM 4500-H+B </td <td></td> <td></td> <td>SM 4500-H+B</td> <td>ZJT</td> <td>1</td> <td>PASI-V</td>			SM 4500-H+B	ZJT	1	PASI-V
EPA 200.8         PW1         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         3           EPA 300.0         ZJT         3           EPA 200.7         DM         1           EPA 200.8         PW1         1           SM 2540C (1997)         KER         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         3           12124076004         MW7         EPA 300.0         ZJT         3           12124076005         MW7         EPA 200.7         DM         1           SM 2540C (1997)         KER         1         1           SM 2540C (1997)         KER         1         1           SM 2540C (1997)         KER         1         1           SM 4500-H+B         ZJT         1         1           SM 4500-H+B         ZJT         1         1           SM 4500-H+B         ZJT         1         1      124076005         MW9         EPA			EPA 300.0	ZJT	3	PASI-V
SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           EPA 200.7         DM         1           EPA 200.8         PW1         1           SM 4500-H+B         ZJT         1           SM 2540C (1997)         KER         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         3           12124076004         MW7         EPA 200.7         DM         1           SM 2540C (1997)         KER         1         1           SM 2	12124076002	Field Duplicate	EPA 200.7	DM	1	PASI-M
SM 450-H-B         ZJT         1           EPA 300.0         ZJT         3           12124076003         MW3R         EPA 200.7         DM         1           EPA 200.8         PW1         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         1           I12124076004         MW7         EPA 300.0         ZJT         3           I12124076004         MW7         EPA 200.7         DM         1           I12124076004         MW7         EPA 200.7         DM         1           I12124076004         MW7         EPA 200.7         DM         1           I12124076005         MW8         EPA 200.7         DM         1           I12124076005         MW8         EPA 200.7         DM         1           I12124076005         MW8         EPA 200.7         DM         1           I12124076005         MW9         EPA 200.7         DM         1           I12124076006         MW9         EPA 200.7         DM         1           I1214076006         MW9         EPA 200.7         DM         1           I121			EPA 200.8	PW1	1	PASI-M
12124076003         MW3R         EPA 300.0         ZJT         3           12124076003         MW3R         EPA 200.7         DM         1           EPA 200.8         PW11         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           12124076004         MW7         EPA 300.0         ZJT         3           12124076004         MW7         EPA 200.7         DM         1           12124076004         MW7         EPA 200.7         DM         1           12124076005         MW8         EPA 200.7         DM         1           12124076006         MW9         EPA 300.0         ZJT         3           12124076006         MW9         EPA 200.7         DM         1           12124076006         MW9         EPA 200.7         DM         1           12124076006         MW9			SM 2540C (1997)	KER	1	PASI-V
12124076003       MW3R       EPA 200.7       DM       1         EPA 200.8       PW1       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1         EPA 300.0       ZJT       3         EPA 200.7       DM       1         EPA 200.7       DM       1         EPA 200.7       DM       1         SM 4500-H+B       ZJT       3         EPA 200.7       DM       1         SM 2540C (1997)       KER       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       3         12124076005       MW8       EPA 200.7       DM       1         SM 4500-H+B       ZJT       3       3         12124076005       MW8       EPA 200.7       DM       1         SM 2540C (1997)       KER       1       3         12124076006       MW9       EPA 200.7       DM       1         12124076006       MW9       EPA 200.7       DM       1         12124076006       MW9       EPA 200.7       DM       1         12124076006       MW9       EPA 200.7       DM			SM 4500-H+B	ZJT	1	PASI-V
EPA 200.8         PW1         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           EPA 200.7         DM         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         3           I12124076005         MW8         EPA 200.7         DM         1           SM 2540C (1997)         KER         1         1           SM 2540C (1997)         KER         1         1           SM 4500-H+B         ZJT         3         1           I12124076006         MW9         EPA 200.7         DM         1           EPA 200.7         DM         1         1         1           SM 250C (1997)         CER         DM         1           EPA 200.7         DM </td <td></td> <td></td> <td>EPA 300.0</td> <td>ZJT</td> <td>3</td> <td>PASI-V</td>			EPA 300.0	ZJT	3	PASI-V
SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           12124076004         MW7         EPA 200.7         DM         1           EPA 200.8         PW1         1         1           SM 2540C (1997)         KER         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         3           I2124076005         MW8         EPA 200.7         DM         1           SM 2540C (1997)         KER         1         1           SM 4500-H+B         ZJT         1         1           SM 4500-H+B         ZJT         1         1           SM 4500-H+B         ZJT         1         1           I2124076006         MW9         EPA 200.7         DM         1           EPA 200.7         DM         1         1         1           EPA 200.8         PW1         1         1	12124076003	MW3R	EPA 200.7	DM	1	PASI-M
SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           12124076004         MW7         EPA 200.7         DM         1           EPA 200.8         PW1         1         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         1           12124076005         MW8         EPA 200.7         DM         1           12124076005         MW8         ZJT         1         3           12124076005         MW8         EPA 200.7         DM         1           12124076005         MW8         EPA 200.7         DM         1           12124076005         MW8         EPA 200.7         DM         1           12124076005         MW9         EPA 200.7         DM         1           12124076006         MW9         ZJT         3         3           12124076006         MW9         EPA 200.7         DM         1           12124076006         MW9         EPA 200.7         DM         1           12124076006         MW9         EPA 200.7         DM         1           12124			EPA 200.8	PW1	1	PASI-M
12124076004       MW7       EPA 300.0       ZJT       3         12124076004       MW7       EPA 200.7       DM       1         EPA 200.8       PW1       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       3         12124076005       MW8       EPA 300.0       ZJT       3         12124076005       MW8       EPA 200.7       DM       1         EPA 200.7       DM       1       3         12124076005       MW8       EPA 200.7       DM       1         EPA 200.7       DM       1       3         SM 2540C (1997)       KER       1       3         12124076006       MW9       EPA 200.7       DM       1         EPA 300.0       ZJT       3       3       3         12124076006       MW9       EPA 200.7       DM       1         EPA 200.7       DM       1       3       3         12124076006       MW9       EPA 200.7       DM       1         EPA 200.8       PW1       1       3         EPA 200.8       PW1       1       3         EPA 200.8       PW1       1 <td></td> <td></td> <td>SM 2540C (1997)</td> <td>KER</td> <td>1</td> <td>PASI-V</td>			SM 2540C (1997)	KER	1	PASI-V
12124076004       MW7       EPA 200.7       DM       1         EPA 200.8       PW1       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1         EPA 300.0       ZJT       3         EPA 200.7       DM       1         EPA 200.7       DM       1         SM 4500-H+B       ZJT       3         EPA 200.7       DM       1         EPA 200.7       DM       1         SM 4500-H+B       ZJT       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1         12124076006       MW9       EPA 200.7       DM         12124076006       MW9       EPA 200.7       DM       1         EPA 300.0       ZJT       3       3         12124076006       MW9       EPA 200.7       DM       1         EPA 200.8       PW1       1       3         EPA 200.8       PW1       1       3         SM 2540C (1997)       KER       1       3         SM 4500-H+B       ZJT       1       3         SM 4500-H+B       ZJT       1			SM 4500-H+B	ZJT	1	PASI-V
EPA 200.8         PW1         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           EPA 200.7         DM         1           SM 2540C (1997)         KER         1           SM 2540C (1997)         KER         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         3           EPA 200.7         DM         1           SM 4500-H+B         ZJT         3           EPA 200.7         DM         1           EPA 200.7         DM         1           EPA 200.7         DM         1           EPA 200.7         DM         1           EPA 200.8         PW1         1           SM 2500C (1997)         KER         1           SM 4500-H+B         ZJT         1			EPA 300.0	ZJT	3	PASI-V
SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           EPA 200.7         DM         1           EPA 200.8         PW1         1           SM 4500-H+B         ZJT         1           SM 2540C (1997)         KER         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           EPA 300.0         ZJT         1           SM 4500-H+B         ZJT         1           EPA 200.7         DM         1           SM 4500-H+B         ZJT         3           EPA 200.0         ZJT         3           EPA 200.7         DM         1           EPA 200.7         DM         1           EPA 200.7         DM         1           EPA 200.8         PW1         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1	12124076004	MW7	EPA 200.7	DM	1	PASI-M
SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           12124076005         MW8         EPA 200.7         DM         1           EPA 200.8         PW1         1           SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           EPA 300.0         ZJT         3           EPA 200.7         DM         1           EPA 200.7         DM         1           SM 4500-H+B         ZJT         3           EPA 200.7         DM         1           EPA 200.8         PW1         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1			EPA 200.8	PW1	1	PASI-M
12124076005       MW8       EPA 300.0       ZJT       3         12124076005       MW8       EPA 200.7       DM       1         EPA 200.8       PW1       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1         EPA 300.0       ZJT       3         EPA 300.0       ZJT       3         EPA 300.0       ZJT       3         EPA 200.7       DM       1         SM 2500.6       PW1       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1			SM 2540C (1997)	KER	1	PASI-V
12124076005       MW8       EPA 200.7       DM       1         EPA 200.8       PW1       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1         EPA 300.0       ZJT       3         EPA 200.7       DM       1         EPA 200.7       DM       1         SM 4500-H+B       ZJT       3         EPA 200.7       DM       1         EPA 200.7       DM       1         SM 2540C (1997)       KER       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1			SM 4500-H+B	ZJT	1	PASI-V
EPA 200.8         PW1         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           EPA 200.7         DM         1           EPA 200.8         PW1         1           SM 2540C (1997)         KER         1           SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1			EPA 300.0	ZJT	3	PASI-V
SM 2540C (1997)         KER         1           SM 4500-H+B         ZJT         1           EPA 300.0         ZJT         3           EPA 200.7         DM         1           EPA 200.8         PW1         1           SM 4500-H+B         ZJT         1           SM 4500-H+B         ZJT         1	12124076005	MW8	EPA 200.7	DM	1	PASI-M
SM 4500-H+B     ZJT     1       EPA 300.0     ZJT     3       12124076006     MW9     EPA 200.7     DM     1       EPA 200.8     PW1     1       SM 2540C (1997)     KER     1       SM 4500-H+B     ZJT     1			EPA 200.8	PW1	1	PASI-M
EPA 300.0       ZJT       3         12124076006       MW9       EPA 200.7       DM       1         EPA 200.8       PW1       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1			SM 2540C (1997)	KER	1	PASI-V
12124076006       MW9       EPA 200.7       DM       1         EPA 200.8       PW1       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1			SM 4500-H+B	ZJT	1	PASI-V
EPA 200.8       PW1       1         SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1			EPA 300.0	ZJT	3	PASI-V
SM 2540C (1997)       KER       1         SM 4500-H+B       ZJT       1	12124076006	MW9	EPA 200.7	DM	1	PASI-M
SM 4500-H+B ZJT 1			EPA 200.8	PW1	1	PASI-M
			SM 2540C (1997)	KER	1	PASI-V
			SM 4500-H+B	ZJT	1	PASI-V
EPA 300.0 ZJT 3			EPA 300.0	ZJT	3	PASI-V



#### ANALYTICAL RESULTS

#### Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report

12124076

Pace Project No.:

Sample: Field Blank Lab ID: 12124076001 Collected: 04/25/19 11:50 Received: 04/25/19 15:50 Matrix: Water Parameters Results Units Report Limit DF Prepared Analyzed CAS No. Qual 200.7 MET ICP Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Calcium ND mg/L 0.50 1 05/01/19 10:08 05/02/19 16:38 7440-70-2 200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8 Boron ND ug/L 10.0 1 05/01/19 10:08 05/03/19 20:03 7440-42-8 Analytical Method: SM 2540C (1997) 2540C Total Dissolved Solids **Total Dissolved Solids** ND mg/L 10.0 1 04/30/19 17:01 Analytical Method: SM 4500-H+B 4500H+ pH, Electrometric pH at 25 Degrees C 6.2 Std. Units 04/30/19 18:04 H6 0.10 1 Analytical Method: EPA 300.0 300.0 IC Anions 28 Days Chloride ND 1.0 05/01/19 07:13 16887-00-6 mg/L 1 Fluoride ND mg/L 0.10 05/01/19 07:13 16984-48-8 1 Sulfate ND mg/L 2.0 05/01/19 07:13 14808-79-8 1 Sample: Field Duplicate Lab ID: 12124076002 Collected: 04/25/19 14:35 Received: 04/25/19 15:50 Matrix: Water Parameters Results Units Report Limit DF Prepared CAS No. Qual Analyzed 200.7 MET ICP Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 05/01/19 10:08 05/02/19 16:45 7440-70-2 203 0.50 Calcium mg/L 1 Analytical Method: EPA 200.8 Preparation Method: EPA 200.8 200.8 MET ICPMS Boron ND ug/L 50.0 5 05/01/19 10:08 05/03/19 20:15 7440-42-8 D3 2540C Total Dissolved Solids Analytical Method: SM 2540C (1997) 1050 **Total Dissolved Solids** mg/L 20.0 1 04/30/19 17:00 Analytical Method: SM 4500-H+B 4500H+ pH, Electrometric pH at 25 Degrees C 7.3 Std. Units 0.10 04/30/19 17:51 H6 1 Analytical Method: EPA 300.0 300.0 IC Anions 28 Days 2.8 05/01/19 05:29 16887-00-6 Chloride mg/L 1.0 1 Fluoride ND mg/L 0.10 05/01/19 05:29 16984-48-8 1 Sulfate 441 mg/L 8.0 4 05/01/19 12:06 14808-79-8 Sample: MW3R Lab ID: 12124076003 Collected: 04/25/19 12:05 Received: 04/25/19 15:50 Matrix: Water DF CAS No. Parameters Results Units Report Limit Prepared Analyzed Qual 200.7 MET ICP Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Calcium 05/01/19 10:08 05/02/19 16:40 7440-70-2 484 mg/L 0.50 1

## **REPORT OF LABORATORY ANALYSIS**

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### ANALYTICAL RESULTS

#### Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report

Pace Project No.: 12124076

Sample: MW3R	Lab ID: 121	24076003	Collected: 04/25/1	9 12:05	Received: 04	/25/19 15:50	Aatrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Metl	hod: EPA 20	0.8 Preparation Met	hod: EF	PA 200.8			
Boron	96.0	ug/L	50.0	5	05/01/19 10:08	05/03/19 20:06	7440-42-8	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	40C (1997)					
Total Dissolved Solids	2560	mg/L	20.0	1		04/30/19 16:59		
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	00-H+B					
pH at 25 Degrees C	7.4	Std. Units	0.10	1		04/30/19 18:07		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0					
Chloride Fluoride Sulfate	2.8 ND 1300	mg/L mg/L mg/L	1.0 0.10 20.0	1 1 10		05/01/19 04:26 05/01/19 04:26 05/01/19 04:47	16984-48-8	
Sample: MW7	Lab ID: 121	24076004	Collected: 04/25/1	9 10:52	Received: 04	/25/19 15:50 N	Aatrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 MET ICP	Analytical Met	hod: EPA 20	0.7 Preparation Met	hod: EF	PA 200.7			_
Calcium	481	mg/L	0.50	1	05/01/19 10:08	05/02/19 16:37	7440-70-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Preparation Met	hod: EF	PA 200.8			
Boron	69.7	ug/L	50.0	5	05/01/19 10:08	05/03/19 20:00	7440-42-8	
2540C Total Dissolved Solids	Analytical Metl	hod: SM 254	40C (1997)					
Total Dissolved Solids	1970	mg/L	20.0	1		04/30/19 16:56		
4500H+ pH, Electrometric	Analytical Metl	hod: SM 450	00-H+B					
pH at 25 Degrees C	7.4	Std. Units	0.10	1		04/30/19 17:55		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0					
Chloride Fluoride Sulfate	61.4 ND 988	mg/L mg/L mg/L	1.0 0.10 20.0	1 1 10		05/01/19 06:31 05/01/19 06:31 05/01/19 12:27	16984-48-8	
Sample: MW8	Lab ID: 121	24076005	Collected: 04/25/1	9 13:24	Received: 04	/25/19 15:50 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 MET ICP	Analytical Met	hod: EPA 20	0.7 Preparation Met	hod: EF	PA 200.7			
Calcium	343	mg/L	0.50	1	05/01/19 10:08	05/02/19 16:42	7440-70-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Preparation Met	hod: EF	PA 200.8			
Boron	75.8	ug/L	50.0	5	05/01/19 10:08	05/03/19 20:09	7440-42-8	

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### **ANALYTICAL RESULTS**

#### Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report

Pace Project No.:

ect No.: 12124076

Sample: MW8	Lab ID: 121	24076005	Collected: 04/25/2	19 13:24	Received: 04	/25/19 15:50 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	IOC (1997)					
Total Dissolved Solids	1380	mg/L	20.0	1		04/30/19 16:59		
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	)0-H+B					
pH at 25 Degrees C	7.2	Std. Units	0.10	1		04/30/19 17:48		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0					
Chloride Fluoride Sulfate	1.3 ND 562	mg/L mg/L mg/L	1.0 0.10 12.0	1 1 6		05/01/19 05:08 05/01/19 05:08 05/01/19 11:45	16984-48-8	
Sample: MW9	Lab ID: 121	24076006	Collected: 04/25/	19 14:34	Received: 04	1/25/19 15:50 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 MET ICP	Analytical Met	hod: EPA 20	0.7 Preparation Me	thod: EF	PA 200.7			
Calcium	206	mg/L	0.50	1	05/01/19 10:08	05/02/19 16:43	7440-70-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Preparation Me	thod: EF	PA 200.8			
Boron	ND	ug/L	50.0	5	05/01/19 10:08	05/03/19 20:12	7440-42-8	D3
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	IOC (1997)					
Total Dissolved Solids	1020	mg/L	20.0	1		04/30/19 17:00		
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	00-H+B					
pH at 25 Degrees C	7.5	Std. Units	0.10	1		04/30/19 17:58		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0					
Chloride Fluoride Sulfate	<b>2.9</b> ND <b>423</b>	mg/L mg/L mg/L	1.0 0.10 8.0	1 1 4		05/01/19 06:52 05/01/19 06:52 05/01/19 12:47	16984-48-8	



Project: Pace Project No.:	[6385CC_2019 Ap 12124076	r(1 of 1)]-Revised F	Report									
						<b>ED4 000 7</b>						
QC Batch:	602602			sis Meth		EPA 200.7						
QC Batch Method:	EPA 200.7		Analy	sis Desc	ription:	200.7 MET						
Associated Lab San	nples: 12124076	001, 12124076002,	1212407	6003, 12	124076004,	, 121240760	05, 121240	76006				
METHOD BLANK:	3258183			Matrix: \	Water							
Associated Lab San	nples: 12124076	001, 12124076002.	1212407	6003. 12	124076004.	. 121240760	05. 121240	76006				
		,	Blar	,	Reporting		, -					
Paran	neter	Units	Res		Limit	Anal	yzed	Qualifier	S			
Calcium		mg/L		ND	0.8	50 05/02/1	9 16:17					
		0050404										
LABORATORY CON	NTROL SAMPLE:	3258184	Calles		~~		0/ D					
Paran	a a ta r	Units	Spike Conc.		.CS esult	LCS % Rec	% R Limi		Qualifiers			
Paran	leter	Units	Conc.	K		% Rec		15	Quaimers	_		
Calcium		mg/L	2	0	20.0	10	0 8	85-115				
	IATRIX SPIKE DUP	LICATE: 325818	35		325818	6						
		LIOAIL. 323010			525010	0						
MATRIX SPIKE & N			MS	MSD								
MATRIX SPIKE & N		12123002002	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter			MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual

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.



Project: Pace Project No.:	[6385CC_2019 Apt 12124076	r(1 of 1)]-Revised	Report									
QC Batch:	602622		Analy	ysis Metho	d:	EPA 200.8						
QC Batch Method:	EPA 200.8		•	ysis Descri		200.8 MET						
Associated Lab San		001, 12124076002		•			05, 121240	76006				
METHOD BLANK:	3258262			Matrix: W	ater							
Associated Lab San	nples: 121240760	001, 12124076002	2, 1212407	76003, 121	24076004,	, 121240760	05, 121240	76006				
			Blai	nk	Reporting							
Paran	neter	Units	Res	ult	Limit	Analy	yzed	Qualifier	S			
Boron		ug/L		ND	10	0.0 05/03/1	9 19:30					
	NTROL SAMPLE:	3258263										
			Spike	LC	S	LCS	% R	ес				
Paran	neter	Units	Conc.	Res	sult	% Rec	Limi	ts	Qualifiers			
Boron		ug/L	10	00	92.5	92	2 8	85-115		_		
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 32582	64		325826	5						
			MS	MSD								
		12124033020	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	· Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual

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.



Project: [6385CC_2	2019 Apr(1 of 1)]-Revised	Report				
Pace Project No.: 12124076						
QC Batch: 165113		Analysis Met	hod: S	M 2540C (199	07)	
QC Batch Method: SM 2540	C (1997)	Analysis Des	cription: 2	540C Total Dis	solved Solids	
Associated Lab Samples: 12	124076001, 12124076002	2, 12124076003, 1	2124076004, 1	2124076005,	12124076006	
METHOD BLANK: 650643		Matrix:	Water			
Associated Lab Samples: 12	124076001, 12124076002	2, 12124076003, 1	2124076004, 1	2124076005,	12124076006	
_		Blank	Reporting			
Parameter	Units	Result	Limit	Analyzeo	d Qualif	iers
Total Dissolved Solids	mg/L	ND	10.0	04/30/19 16	:55	
METHOD BLANK: 650647		Matrix:	Water			
Associated Lab Samples: 12	124076001, 12124076002	2, 12124076003, 1	2124076004, 1	2124076005,	12124076006	
		Blank	Reporting			
Parameter	Units	Result	Limit	Analyzed	d Qualif	iers
Total Dissolved Solids	mg/L	ND	10.0	04/30/19 17	2:02	
LABORATORY CONTROL SAM	IPLE: 650644					
			LCS	LCS	% Rec	
Parameter	Units	Conc. F	Result	% Rec	Limits	Qualifiers
Total Dissolved Solids	mg/L	255	234	92	80-120	
SAMPLE DUPLICATE: 65064	5	40404400004	Dur		Mari	
Parameter	Units	12124120004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	930	908		2	5 H3
	iiig/∟	550	900		2	0.110
SAMPLE DUPLICATE: 65064	6					
Parameter	Units	12124119002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	356	374		5	5 H1

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Project: Pace Project No.:	[6385CC_2019 Ap 12124076	r(1 of 1)]-Revised	Report				
QC Batch:	165071		Analysis M	ethod:	SM 4500-H+B		
QC Batch Method:	SM 4500-H+B		Analysis De	escription:	4500H+B pH		
Associated Lab San	nples: 12124076	001, 12124076002	2, 12124076003,	12124076004	, 12124076005	, 12124076006	
LABORATORY COM	NTROL SAMPLE:	650392					
			Spike	LCS	LCS	% Rec	
Paran	neter	Units	Conc.	Result	% Rec	Limits	Qualifiers
pH at 25 Degrees C		Std. Units	7	7.0	101	98-102	H6
SAMPLE DUPLICA		Units	12123914004 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C		Std. Units	7.9	) 7	7.9	0	10 H6
SAMPLE DUPLICA	TE: 650394		12124076003	Dup		Мах	
Paran	neter	Units	Result	Result	RPD	RPD	Qualifiers
pH at 25 Degrees C		Std. Units	7.4		7.4	0	10 H6

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.



Associated Lab Samples: 12124076001, 12124076002, 12124076004, 12124076005, 12124076005, 12124076006           METHOD BLANK: 650540           Matrix: Water           Associated Lab Samples: 12124076001, 12124076002, 12124076003, 12124076006, 12124076005, 12124076006, 12124076005, 12124076006, 12124076006, 12124076006, 12124076006, 12124076006, 12124076007, 120, 05/01/19 00:15           Chloride mg/L         ND         1.0         GS/01/19 00:15           LABORATORY CONTROL SAMPLE: 650541           LABORATORY CONTROL SAMPLE: 650541           METRIX SPIKE DUPLICATE: 650542         GS0543           MS         MSD           NS         MSD           MATRIX SPIKE DUPLICATE: 650542         GS0543           MS         MSD           MS         MSD           MATRIX SPIKE DUPLICATE: 650544         GS0543           MS         MSD         MS         MSD           MAT	QC Batch: 165	097		Analy	sis Method	d: E	EPA 300.0						
METHOD BLANK:         650540         Matrix:         Watrix:         Water           Associated Lab Samples:         12124076001, 12124076002, 12124076003, 12124076006, 12124076006, 12124076006, 12124076006, 12124076006, 12124076006, 12124076006, 12124076005, 12124076006, 12124076007, 121240707, 1200, 05/01/19 00:15           LABORATORY CONTROL SAMPLE:         650541         LCS         LCS         % Rec         Qualifiers           LABORATORY CONTROL SAMPLE:         650541            Qualifiers         Qualifiers           LABORATORY CONTROL SAMPLE:         650541            Qualifiers         Qualifiers           Liaborational         mg/L         50         51.1         102         90-110             MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MSD         MSD         MSD         90-110         Qualifiers           Parameter         Units         Result         Conc.         Conc.         Result         Result         % Rec         Max         MAz           Parameter	QC Batch Method: EPA	300.0		Analy	sis Descrip	otion: 3	300.0 IC Ani	ons					
Associated Lab Samples:         12124076001, 12124076002, 12124076003, 12124076005, 12124076005, 12124076006         Qualifiers           Parameter         Units         Result         Limit         Analyzed         Qualifiers           Fluoride         mg/L         ND         1.0         05/01/19 00:15         OS/01/19 00:15           LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec         Qualifiers           Chloride         mg/L         ND         2.0         05/01/19 00:15         Qualifiers         Qualifiers           LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec         Qualifiers           Fluoride         mg/L         50         51.1         102         90-110         90-110           Sulfate         mg/L         50         50.9         102         90-110         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MS         MS         MSD         % Rec         Limits         RPD         Qualifiers           Fluoride         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110         0         20         20	Associated Lab Samples:	121240760	001, 1212407600	2, 1212407	6003, 1212	24076004,	1212407600	5, 121240	76006				
Parameter         Units         Result         Limit         Analyzed         Qualifiers           Chloride Fluoride         mg/L mg/L         ND         1.0         05/01/19         Qualifiers           Limit         MD         1.0         05/01/19         00:15           Sulfate         mg/L         ND         2.0         05/01/19         00:15           LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec         Limits         Qualifiers           LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec         Limits         Qualifiers           Chloride         mg/L         50         51.1         102         90-110         90-110           Fluoride         mg/L         50         50.9         102         90-110         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MSD         MSD         % Rec         Limits         RPD         Qualifiers           Chloride         mg/L         0.6514         Conc.         Conc.         Result         Result         Result         ND         10         90-110         0         20           Spike<	METHOD BLANK: 65054	40			Matrix: Wa	ater							
Parameter         Units         Result         Limit         Analyzed         Qualifiers           Chloride Fluoride         mg/L mg/L         ND         1.0         05/01/19         00:15           Suifate         mg/L         ND         2.0         05/01/19         00:15           LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec         Limits         Qualifiers           Chloride         mg/L         50         51.1         102         90-110         0.90-110           Sulfate         mg/L         50         51.1         102         90-110         0.90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MSD         MSD         MSD         MSC         % Rec         Limits         RPD         Max           Parameter         Units         Result         Conc.         Conc.         Result         % Rec         Limits         RPD         Max           Parameter         Units         Result         Conc.         Conc.         Result         % Rec         Limits         RPD         Qualifiers           Sulfate         mg/L         0.66J         50         50         52.5         5	Associated Lab Samples:	121240760	001, 1212407600	2, 1212407	6003, 1212	24076004,	1212407600	5, 121240	76006				
Chloride Fluoride         mg/L mg/L         ND         1.0         05/01/19         00:15           Sulfate         mg/L         ND         0.10         05/01/19         00:15           LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec           Parameter         Units         Conc.         Result         % Rec         Limits         Qualifiers           Chloride         mg/L         50         51.1         102         90-110           Sulfate         mg/L         5         5.0         100         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MS         MSD         % Rec         Limits         RPD         RPD         Qualifiers           Parameter         Units         Result         Conc.         Conc.         Result         % Rec         Limits         RPD         Qualifiers           Parameter         Units         Result         Conc.         Conc.         Result         Result         % Rec         Limits         RPD         Qualifiers           Sulfate         mg/L         0.66J         50         53.2         53.3         105         105         90-110         2	Demonster		11.5%				<b>A</b> I.		0				
Fluoride       mg/L       ND       0.10       05/01/19 00:15         Sulfate       mg/L       ND       2.0       05/01/19 00:15         LABORATORY CONTROL SAMPLE:       650541       Spike       LCS       LCS       LCS       LCS       Units       Qualifiers         LABORATORY CONTROL SAMPLE:       650541       Spike       LCS       LCS       LCS       LCS       Units       Qualifiers         Chloride       mg/L       50       51.1       102       90-110       Portion         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650542       650543       MSD       MAx       Parameter       Units       Result       Conc.       Conc.       Result       MSD       MSD       MSD       MSD       MSD       MSD       MAX       PPD       Qualifiers         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650542       MSD       MSD       MSD       MSD       MSD       MSD       MSD       MSD       MAx       PPD       Qualifiers         Matrix SPIKE & MATRIX SPIKE DUPLICATE:       650544       650545       Sike       Spike       MSD	Parameter			Res	ult	Limit	Analy	zed	Qualifiers	<u> </u>			
Sulfate         mg/L         ND         2.0         05/01/19 00:15           LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec         Limits         Qualifiers           Parameter         Units         Spike         LCS         Kes         LCS         % Rec         Qualifiers           Chloride         mg/L         50         51.1         102         90-110             MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MSD         MSD         MSD         % Rec         Limits         RPD         Max           Parameter         Units         Result         Conc.         Conc.         Conc.         Result         % Rec         Limits         RPD         Max           Chloride         mg/L         0.66J         50         50.2         53.3         105         105         90-110         0         20         0           Sulfate         mg/L         0.63J         50         50         52.5         52.6         104         104         90-110         0         20         0         0         20         0         0         20         0         0         20	Chloride		-										
LABORATORY CONTROL SAMPLE: 650541           Parameter         Units         Spike         LCS         LCS         % Rec         Limits         Qualifiers           Chloride         mg/L         50         51.1         102         90-110         90-110           Fluoride         mg/L         50         50.9         102         90-110         90-110           Sulfate         mg/L         50         50.9         102         90-110         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MSD         MSD         % Rec         % Rec         Limits         RPD         RPD         Qualifiers           Parameter         Units         Result         Conc.         Conc.         Result         % Rec         % Rec         Limits         RPD         RPD         Qualifiers           Fluoride         mg/L         0.660         50         53.2         53.3         105         90-110         0         20           Sulfate         mg/L         0.63J         50         50         52.5         52.6         104         101         90-110         0         20           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650544			•										
Parameter         Units         Spike Conc.         LCS Result         LCS % Rec         LCS Limits         Qualifiers           Chloride         mg/L         50         51.1         102         90-110           Fluoride         mg/L         50         5.0         100         90-110           Sulfate         mg/L         50         50.9         102         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MS         MSD         MSD         MS         MSD         MSD         % Rec         Limits         RPD         RPD         Qualifiers           Chloride         mg/L         0.660J         50         50.9         102         90-110         0         20           Chloride         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110         0         20           Fluoride         mg/L         0.63J         50         50         52.5         52.6         104         104         90-110         0         20           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650545         MSD         MSD         MSD         MSD         % Rec         Limits         RPD<	Sunate		ing/∟		ND	2.0	0 00/01/18	00.15					
Parameter         Units         Conc.         Result         % Rec         Limits         Qualifiers           Chloride         mg/L         50         51.1         102         90-110         90-110           Fluoride         mg/L         50         5.0         100         90-110         90-110           Sulfate         mg/L         50         50.9         102         90-110         90-110	LABORATORY CONTROL	SAMPLE:	650541										
Chloride Fluoride         mg/L mg/L         50 50         51.1 50         102 50         90-110 90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542 MS         650543 MSD         650543           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542 Conc.         650543           Matrix         NSD         MSD           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542           Max         MSD           Parameter         Units         Result           Chloride         mg/L         0.66J           mg/L         0.66J         50           50         51.1         5.2           Chloride         mg/L         0.66J           mg/L         0.66J         50           50         52.5         52.6         104         104         90-110         0         20           Fluoride         mg/L         0.63J         50         52.5         52.6         104         104         90-110         0         20           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650544         650545         650545         650545         MSD         MSD         % Rec         Max         RPD         Max           Parameter         Units	_			•									
Fluoride Sulfate       mg/L       5       5.0       100       90-110         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650542       650543         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650542       650543         Mark       MSD       MSD       MSD       MSD       MSD       MSD       MSD       MSD       MSD       MAX         Parameter       Units       Result       Conc.       Conc.       Result       Result       % Rec       % Rec       Limits       RPD       RPD       Qua         Chloride       mg/L       0.66J       50       50       53.2       53.3       105       105       90-110       0       20         Sulfate       mg/L       0.63J       50       50       52.5       52.6       104       104       90-110       0       20         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650544       650545       650545       MSD       MSD       MSD       MSD       MSD       MSD       MSD       MAX       MAX       Qua         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650544       650545       650545       MSD       MSD       MSD       MSD       MSD       MSD       MSD       % Rec <t< td=""><td>Parameter</td><td></td><td>Units</td><td>Conc.</td><td>Res</td><td>ult</td><td>% Rec</td><td>Limit</td><td>s (</td><td>Qualifiers</td><td>_</td><td></td><td></td></t<>	Parameter		Units	Conc.	Res	ult	% Rec	Limit	s (	Qualifiers	_		
Sulfate         mg/L         50         50.9         102         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543           MS         MSD         MSD </td <td></td> <td></td> <td>-</td> <td></td>			-										
MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543           MS         MSD	Fluoride		ma/L		5	5.0	100	) 9	90-110				
Parameter         Units         Result         Spike         Spike         MS         MSD	Sulfate		-	5	0	50.9	102	9	0-110				
Parameter         Units         Result         Conc.         Conc.         Result         Result         % Rec         % Rec         Limits         RPD         RPD         Quadity           Chloride         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110         0         20 <td< th=""><th></th><th></th><th>mg/L</th><th></th><th>0</th><th></th><th>102</th><th>2 9</th><th>90-110</th><th></th><th></th><th></th><th></th></td<>			mg/L		0		102	2 9	90-110				
Chloride         mg/L         0.66J         50         53.2         53.3         105         105         90-110         0         20           Fluoride         mg/L         0.099J         5         5         5.1         5.2         100         101         90-110         1         20           Sulfate         mg/L         0.63J         50         50         52.5         52.6         104         104         90-110         0         20           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650544         650545         650545         MS         MSD         MSD         MSD         % Rec         Max         Max           Parameter         Units         Result         Conc.         Conc.         Result         % Rec         % Rec         Limits         RPD         RPD         Quat           Chloride         mg/L         75.2         250         250         340         339         106         105         90-110         0         20           Fluoride         mg/L         3.4         25         25         28.3         28.3         100         100         90-110         0         20			mg/L LICATE: 6505	42 MS	MSD	650543							
Fluoride       mg/L       0.099J       5       5       5.1       5.2       100       101       90-110       1       20         Sulfate       mg/L       0.63J       50       50       52.5       52.6       104       104       90-110       0       20         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650544       650545       650	MATRIX SPIKE & MATRIX		mg/L LICATE: 6505 12124074001	42 MS Spike	MSD Spike	650543 MS	MSD	MS	MSD		PPD		Qual
Sulfate       mg/L       0.63J       50       52.5       52.6       104       104       90-110       0       20         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650544       650545 <td>MATRIX SPIKE &amp; MATRIX Parameter</td> <td>Units</td> <td>mg/L LICATE: 6505 12124074001 Result</td> <td>42 MS Spike Conc.</td> <td>MSD Spike Conc.</td> <td>650543 MS Result</td> <td>MSD Result</td> <td>MS % Rec</td> <td>MSD % Rec</td> <td>Limits</td> <td></td> <td>RPD</td> <td>Qual</td>	MATRIX SPIKE & MATRIX Parameter	Units	mg/L LICATE: 6505 12124074001 Result	42 MS Spike Conc.	MSD Spike Conc.	650543 MS Result	MSD Result	MS % Rec	MSD % Rec	Limits		RPD	Qual
MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650544       650545         MS       MSD       MSD         12124119002       Spike       Spike       MS         Parameter       Units       Result       Conc.       Conc.       Result       % Rec       % Rec       Max         Chloride       mg/L       75.2       250       250       340       339       106       105       90-110       0       20         Fluoride       mg/L       3.4       25       25       28.3       28.3       100       100       90-110       0       20	MATRIX SPIKE & MATRIX Parameter Chloride	Units	mg/L LICATE: 6505 12124074001 Result 0.66J	42 MS Spike Conc. 50	MSD Spike Conc. 50	650543 MS Result 53.2	MSD Result 53.3	MS % Rec 105	MSD % Rec 105	Limits 90-110	0	RPD 20	Qual
MS         MSD	MATRIX SPIKE & MATRIX Parameter Chloride Fluoride	Units mg/L mg/L	mg/L LICATE: 6505 12124074001 Result 0.66J 0.099J	42 MS Spike Conc. 50 5	MSD Spike Conc. 50 5	650543 MS Result 53.2 5.1	MSD Result 53.3 5.2	MS % Rec 105 100	MSD % Rec 105 101	Limits 90-110 90-110	0 1	RPD 20 20	Qual
Parameter         12124119002         Spike Result         Spike Conc.         MS         MSD         MSD         % Rec         Max         Max           Chloride         mg/L         75.2         250         250         340         339         106         105         90-110         0         20           Fluoride         mg/L         3.4         25         25         28.3         28.3         100         100         90-110         0         20	MATRIX SPIKE & MATRIX Parameter Chloride Fluoride	Units mg/L mg/L	mg/L LICATE: 6505 12124074001 Result 0.66J 0.099J	42 MS Spike Conc. 50 5	MSD Spike Conc. 50 5	650543 MS Result 53.2 5.1	MSD Result 53.3 5.2	MS % Rec 105 100	MSD % Rec 105 101	Limits 90-110 90-110	0 1	RPD 20 20	Qual
Parameter         Units         Result         Conc.         Conc.         Result         Result<	MATRIX SPIKE & MATRIX Parameter Chloride Fluoride Sulfate	Units mg/L mg/L mg/L	mg/L LICATE: 6505 12124074001 Result 0.66J 0.099J 0.63J	42 MS Spike Conc. 50 5 50	MSD Spike Conc. 50 5 50	650543 MS Result 53.2 5.1 52.5	MSD Result 53.3 5.2	MS % Rec 105 100	MSD % Rec 105 101	Limits 90-110 90-110	0 1	RPD 20 20	Qual
Chloride         mg/L         75.2         250         250         340         339         106         105         90-110         0         20           Fluoride         mg/L         3.4         25         25         28.3         28.3         100         100         90-110         0         20	MATRIX SPIKE & MATRIX Parameter Chloride Fluoride Sulfate	Units mg/L mg/L mg/L	mg/L LICATE: 6505 12124074001 Result 0.66J 0.099J 0.63J LICATE: 6505	42 MS Spike Conc. 50 5 50 44 MS	MSD Spike Conc. 50 5 50 MSD	650543 MS Result 53.2 5.1 52.5 650545	MSD Result 53.3 5.2 52.6	MS % Rec 105 100 104	MSD % Rec 105 101 104	Limits 90-110 90-110 90-110	0 1	RPD 20 20 20	Qual
Fluoride mg/L 3.4 25 25 28.3 28.3 100 100 90-110 0 20	MATRIX SPIKE & MATRIX Parameter Chloride Fluoride Sulfate MATRIX SPIKE & MATRIX	Units mg/L mg/L (SPIKE DUPI	mg/L LICATE: 6505 12124074001 Result 0.66J 0.099J 0.63J LICATE: 6505 12124119002	42 MS Spike Conc. 50 5 50 44 MS Spike	MSD Spike Conc. 50 5 50 MSD Spike	650543 MS Result 53.2 5.1 52.5 650545 MS	MSD Result 53.3 5.2 52.6 MSD	MS % Rec 105 100 104 MS	MSD % Rec 105 101 104 MSD	Limits 90-110 90-110 90-110 % Rec	0100	RPD 20 20 20 20	
	MATRIX SPIKE & MATRIX Parameter Chloride Fluoride Sulfate MATRIX SPIKE & MATRIX Parameter	Units mg/L mg/L mg/L SPIKE DUPI	mg/L LICATE: 6505 12124074001 Result 0.66J 0.099J 0.63J LICATE: 6505 12124119002 Result	42 MS Spike Conc. 50 5 50 44 MS Spike Conc.	MSD Spike Conc. 50 5 50 MSD Spike Conc.	650543 MS Result 53.2 5.1 52.5 650545 MS Result	MSD Result 53.3 52.6 52.6 MSD Result	MS % Rec 105 100 104 MS % Rec	MSD % Rec 105 101 104 MSD % Rec	Limits 90-110 90-110 90-110 % Rec Limits	0 1 0 RPD	RPD 20 20 20 Max RPD	
Sullate 11g/L 106 250 250 369 367 105 104 90-110 0 20	MATRIX SPIKE & MATRIX Parameter Chloride Fluoride Sulfate MATRIX SPIKE & MATRIX Parameter Chloride	Units mg/L mg/L mg/L SPIKE DUPI	mg/L LICATE: 6505 12124074001 Result 0.66J 0.099J 0.63J LICATE: 6505 12124119002 Result 75.2	42 MS Spike Conc. 50 5 50 44 MS Spike Conc. 250	MSD Spike Conc. 50 5 50 MSD Spike Conc. 250	650543 MS Result 53.2 5.1 52.5 650545 650545 MS Result 340	MSD Result 53.3 52.6 52.6 MSD Result 339	MS % Rec 105 100 104 MS % Rec 106	MSD % Rec 105 101 104 MSD % Rec 105	Limits 90-110 90-110 90-110 % Rec Limits 90-110	0 1 0 RPD 0	RPD 20 20 20 20 20 20 20 20	Qual
	MATRIX SPIKE & MATRIX Parameter Chloride Fluoride Sulfate MATRIX SPIKE & MATRIX Parameter Chloride Fluoride	Units mg/L mg/L mg/L (SPIKE DUPI Units mg/L mg/L	mg/L LICATE: 6505 12124074001 Result 0.66J 0.099J 0.63J LICATE: 6505 12124119002 Result 75.2 3.4	42 MS Spike Conc. 50 5 50 44 MS Spike Conc. 250 25	MSD Spike Conc. 50 5 50 Spike Conc. 250 25	650543 MS Result 53.2 5.1 52.5 650545 650545 MS Result 340 28.3	MSD Result 53.3 5.2 52.6 MSD Result 339 28.3	MS % Rec 105 100 104 MS % Rec 106 100	MSD % Rec 105 101 104 MSD % Rec 105 100	Limits 90-110 90-110 90-110 % Rec Limits 90-110 90-110	0 1 0 RPD 0 0	RPD 20 20 20 20 20 20 20 20 20 20	

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.



#### **QUALIFIERS**

Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report 12124076

#### Pace Project No .:

#### 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.

#### LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-V Pace Analytical Services - Virginia

#### ANALYTE QUALIFIERS

- D3 Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
- H1 Analysis conducted outside the recognized method holding time.
- H3 Sample was received or analysis requested beyond the recognized method holding time.
- H6 Analysis initiated outside of the 15 minute EPA required holding time.



#### QUALITY CONTROL DATA CROSS REFERENCE TABLE

 Project:
 [6385CC\_2019 Apr(1 of 1)]-Revised Report

 Pace Project No.:
 12124076

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
12124076001	Field Blank	EPA 200.7	602602	EPA 200.7	603271
12124076002	Field Duplicate	EPA 200.7	602602	EPA 200.7	603271
12124076003	MW3R	EPA 200.7	602602	EPA 200.7	603271
12124076004	MW7	EPA 200.7	602602	EPA 200.7	603271
12124076005	MW8	EPA 200.7	602602	EPA 200.7	603271
12124076006	MW9	EPA 200.7	602602	EPA 200.7	603271
12124076001	Field Blank	EPA 200.8	602622	EPA 200.8	603644
12124076002	Field Duplicate	EPA 200.8	602622	EPA 200.8	603644
12124076003	MW3R	EPA 200.8	602622	EPA 200.8	603644
12124076004	MW7	EPA 200.8	602622	EPA 200.8	603644
12124076005	MW8	EPA 200.8	602622	EPA 200.8	603644
12124076006	MW9	EPA 200.8	602622	EPA 200.8	603644
12124076001	Field Blank	SM 2540C (1997)	165113		
12124076002	Field Duplicate	SM 2540C (1997)	165113		
12124076003	MW3R	SM 2540C (1997)	165113		
12124076004	MW7	SM 2540C (1997)	165113		
12124076005	MW8	SM 2540C (1997)	165113		
12124076006	MW9	SM 2540C (1997)	165113		
12124076001	Field Blank	SM 4500-H+B	165071		
12124076002	Field Duplicate	SM 4500-H+B	165071		
12124076003	MW3R	SM 4500-H+B	165071		
12124076004	MW7	SM 4500-H+B	165071		
12124076005	MW8	SM 4500-H+B	165071		
12124076006	MW9	SM 4500-H+B	165071		
12124076001	Field Blank	EPA 300.0	165097		
12124076002	Field Duplicate	EPA 300.0	165097		
12124076003	MW3R	EPA 300.0	165097		
12124076004	MW7	EPA 300.0	165097		
12124076005	MW8	EPA 300.0	165097		
12124076006	MW9	EPA 300.0	165097		

NTS 526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290		Comments:			TAT: Stand	ard		Nitric,	Unpreserved	JO#:12124076
PM: Dennis	Schubbe	Report To:	sample	edata@r	netechnical.co	m		ric, N	erver	
Project#: 6	5385CC_2019							Metals		Environmental Science
Event Key: 6385CC_2019 Apr(1 of 1)		<b>]</b> ,					slt	Generals	& Engineering	
Sample ID: Sample Location:		Date:		Time: Mx:		1x: ST:			Required Analyses:	
	Field Blank		4/2	5/19	1150	W	G	X	X	List #1
	Field Duplicate		1	1	1435	W	G	X	X	List #1
	MW3R				1205	W	G	X	X	List #1
	MW7				1052	W	G	X	X	List #1
	MW8				1324	W	G	X	X	List #1
	MW9		]	L	1434	W	G	X	X	List #1
	1									
								-		

Sampled by: Andrew	2 5	Relinquished by:	Date: & 4/25/19 Time: 1550
Received by:	Date:	Relinquished by:	Date:
	Time:		Time:
Received at tab by:	Date: //35/19	Temperature at Receipt:	
in Inh	Time: 15:50	5-8	

List #1		6385CC_2019 Apr(1 of 1)
Field Blank, Field Duplicate, MW3R, N	1W7,MW8,MW9	
Method:	Parameter:	NTS Limit: J-Flag:
EPA 200.7		
	Calcium	
EPA 200.8		
	Boron	
EPA 300.0		
	Chloride	
	Fluoride	
	Sulfate	E)
SM 2540C		
	Solids, Total Dissolved (TDS)	
SM 4500-H+B		
	рН	11

Client Name: Upon Receipt Courier: Fed Ex UPS Courier: Commercial	s		ent No.: 01-Rev.12	
Courier: Fed Ex	S			
Construction of the local states	USPS Other:		Project #	WO#: 12124076 PM: CLJ Due Date: 05/09/19 CLIENT: NTS-Dennis
racking Number:				
ustody Seal on Cooler/Box Present? 🗌 Yes 🛛	No	Seals li	ntact?	Yes No Optional: Proj. Due Date: Proj. Name:
acking Material: 🔄 Bubble Wrap 🔤 Bubble B	ags 🛛 🛛 N	one [	]Other:	Temp Blank? Kes No
ermometer Used: 📮 140792808	Type of	ce: Z	Wet [	Blue None Samples on ice, cooling process has be
Cooler Temp Read °C: 5.5 Cooler Temp mp should be above freezing to 6°C Correction Fac			ာate and	Biological Tissue Frozen? Yes No d Initials of Person Examining Contents: 2H 4/35/19 Comments:
Chain of Custody Present?	Kes		∏N/A	1.
Chain of Custody Filled Out?	<b>D</b> Yes	[]No		2.
Chain of Custody Relinquished?	Yes	[]No	□N/A	3.
Sampler Name and Signature on COC?	<b>V</b> Yes	No	□N/A	à.
Samples Arrived within Hold Time?	Z <sub>Yes</sub>	[]Na	□N/A	5. If Fecal: <8 hours >8, <24 hours >24 hours
Short Hold Time Analysis (<72 hr)?	Tyres			6. ph
Rush Turn Around Time Requested?	Yes	1NO		7.
Sufficient Volume?	Yes	No	DN/A	8:
Correct Containers Used?	Vyes	No	⊡N/A	9.
Pace Containers Used?	ZYes	No		
Containers Intact?	Z Yes	No	DN/A	10.
Filtered Volume Received for Dissolved Tests?	Yes	[]No	ZIN/A	11. Note if sediment is visible in the dissolved containers.
Sample Labels Match COC?	ZY <sub>P5</sub>	No		12
Includes Date/Time/ID/Analysis Matrix:	NT			
All containers needing acid/base preservation will be checked and documented in the pH logbook.	X <sup>Yes</sup>	No	□n/A	See pH log for results and additional preservation documentation
Headspace in Methyl Mercury Container	[]Yes	No	N/A	13.
Headspace in VOA Vials ( >6mm)?	[]Yes	No	ZN/A	14
Trip Blank Present?	Yes	No	ZN/A	15.
Frip Blank Custody Seals Present? Pace Trip Blank Lot # (if purchased):	Yes	NG	ZIN/A	
IENT NOTIFICATION/RESOLUTION Person Contacted: Comments/Resolution:				Field Data Required? Yes No Date/Time:
				Ŧ
OJECAL WAIVER ON FILE Y N	J.			RE WAIVER ON FILE Y N Date: <u>4/25/19</u> Is form will be sent to the North Carolina DE HNR Certification Office ( ).e

# NTS

526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290

# Field Date: Report Created:

4/25/2019 5/3/2019 3:08:42 PM

# Client:

General Waste Disposal & Recovery

# NTS Project Name:

CCR Landfill Monitoring 2019

# **NTS Field Personnel:**

Corey Andrews

# Summary of Services Performed:

Prepped and went to General Waste to conduct April 2019 CCR well monitoring. The following wells were sampled via the low flow method with submersible pumps: MW3R, MW7, MW8, and MW9. Dup obtained at MW9. Considered turbidity stable if three consecutive readings were under 5 NTU.

Samples ceded to PACE Analytical in Virginia, MN.

For additional details see stabilization sheets and fields notes.

I,Corey Andrews, certify that the information in this report is true and correct to the best of my knowledge.

# **Field Report Cover Sheet**

Event Key: 6385CC\_2019 Apr(1 of 1)



NTS Project Manager:

Dennis Schubbe

M	W	3R	

SECTION #1: DATA COLLECTIO	Sample Collected		
Field Duplicate:			

# Field Blank: Field Blank Equip Blank:

Time (HH:MM):	pl (SU)		SpecCond (µS/cm):	Turbidity (NTU):	ORP (mV):	Temp (°C):
12:04	6.35	5 0.00	2983	1.5	144	11.08
65.79 1466.5		<sup>.</sup> Level in Water by W (MSL) in Water				
SECTION #2: O	BSERVATION	S			Tin	ne: 11:15
Turbidity less t	han 5 NTU. C	Considered well sta	able.			
Air Tei	mperature:	51°F to 60°F		Well Depth	(ft): 77.58	
W	/ind Speed:	5-10 mph		SWL	(ft): 65.79	
Wind	d Direction:	W-NW		Pump Rate (gp	om): 0.33	
Pro	ecipitation:	None		Interval (m	nin): 5.83	
Cl	oud Cover:	Mostly Sunny	Pu	mp Start (HH:M	<b>M):</b> 11:23	
Airborne I	Particulate:	Dust	Pu	mp Stop (HH:M	<b>M):</b> 12:12	
Co	olor, Purge: (	Grav/Black	F	Purge Volume (g	gal): 16.17	
	nce, Purge: (			•••	egy: Low-Flow	Stabilization
	dor, Purge:			Well Plug Pres		
	or, Sample: (			Well Loci	ked: ⊻	
Appearance	ce, Sample: (	Clear				
Ode	or, Sample:	Definite				

GW CALCULATIONS:

Total Water Depth 77.58ft - Static Water Level 65.79ft = Water Column 11.79ft Water Column 11.79ft x \*Conversion Factor 0.163gal/ft = Well Volume 1.924gal Well Volume 1.924gal ÷ Pump Rate 0.33gpm = Well Volume Interval 5.83min

\*Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48

Pump Start Time 11:23 - Pump End Time 12:12 = Pump Duration 49min Pump Duration 49min x Pump Rate 0.33gpm = Volume Purged 16.17gal

Top of Casing Elevation 1532.29 - Static Water Level 65.79 = 1466.5ft

SECTION #3: STABILIZATION Well Vol Interval (min): 5.83

Pump Rate (gpm): 0.33

MW3R (Cont'd)

Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	+/- 1.0 NTU	+/- 20 mV	+/- 0.10 °C	
Time	рН	DO	SpecCond	Turbidity	ORP	Temp	SWL
(HH:MM):	(SU):	(mg/L):	(µS/cm):	(NTU):	(mV):	(°C):	(ft):
11:34	6.36	0.19	3019	27.3	216	10.99	66.61
11:40	6.36	0.00	3031	16.6	184	10.93	66.52
11:46	6.35	0.00	3012	9.0	167	10.95	66.52
11:52	6.35	0.00	2997	4.5	155	11.04	66.52
11:58	6.35	0.00	2988	2.6	149	11.11	66.52
12:04	6.35	0.00	2983	1.5	144	11.08	66.52
Stabilization F	Passes NTS Cr	iteria: 🗌					

SECTION #1: DATA COLLECTIO
Field Duplicate:

MW7

Sample Collected

Field Blank: Equip Blank:

Time (HH:MM):	r (SU	DH DO J): (mg/L):	SpecCond (µS/cm):	Turbidity (NTU):	ORP (mV):	Temp (°C):			
10:51	6.2	.9 0.00	2501	13.7	458	11.39			
1477.37	1477.37 Elevation, GW (MSL) in Water by Calculation, ft								
18.76									
SECTION #2: OI	SECTION #2: OBSERVATIONS Time: 09:39								
Air Tei	mperature:	51°F to 60°F		Well Depth	(ft): 26.77				
W	/ind Speed:	5-10 mph		SWL	(ft): 18.76				
Wind	Direction:	W-NW		Pump Rate (gp	om): 0.15				
Pre	ecipitation:	None		Interval (n	nin): 8.71				
CI	oud Cover:	Mostly Sunny	I <b>M):</b> 9:45						
Airborne F	Particulate:	None	Pu	mp Stop (HH:N	IM): 10:55				
C	olor, Purge:	Orango	F	Purge Volume (	gal): 10.50				
	nce, Purge:	0		Purging Strate	egy: Low-Flow	Low-Flow Stabilization			
	dor, Purge:			Well Plug Pres	ent: 🗹				
	or, Sample:			Well Loc	ked: 🗹				
	ce, Sample:								
••	•								
Odor, Sample: None         GW CALCULATIONS:         Total Water Depth 26.77ft - Static Water Level 18.76ft = Water Column 8.01ft         Water Column 8.01ft x *Conversion Factor 0.163gal/ft = Well Volume 1.307gal         Well Volume 1.307gal ÷ Pump Rate 0.15gpm = Well Volume Interval 8.714min         *Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48         Pump Start Time 09:45 - Pump End Time 10:55 = Pump Duration 70min         Pump Duration 70min x Pump Rate 0.15gpm = Volume Purged 10.5gal         Top of Casing Elevation 1496.13 - Static Water Level 18.76 = 1477.37ft									
				ŗ	ump Boto / and	<b>m)</b> , 0.15			
SECTION #3: STABILIZATION Well Vol Interval (min): 8.71 Pump Rate (gpm): 0.15									

MW7 (Cont'd)

Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	+/- 1.0 NTU	+/- 20 mV	+/- 0.10 °C	
Time	рH	DO	SpecCond	Turbidity	ORP	Temp	SWL
(HH:MM):	(SU):	(mg/L):	(µS/cm):	(NTU):	(mV):	(°C):	(ft):
9:58	6.03	1.82	2596	49.3	637	10.09	20.36
10:07	6.22	1.16	2631	20.5	636	11.66	20.37
10:16	6.24	0.00	2575	12.4	613	11.10	20.33
10:25	6.26	0.00	2540	7.6	566	11.98	20.26
10:34	6.29	0.00	2526	20.5	511	10.55	20.30
10:43	6.28	0.00	2510	18.7	489	11.79	20.31
10:51	6.29	0.00	2501	13.7	458	11.39	20.31
10:50	6.29	0.05	2493	14.2	461	11.49	
<b>Stabilization F</b>	Passes NTS Cr	iteria:					

M	W	8	

SECTION #1: DATA COLLECTIO	Sample Collected
Field Duplicate:	

# Field Blank: Equip Blank:

Time	рН	DO	SpecCond	Turbidity	ORP	Temp
(HH:MM):	(SU):	(mg/L):	(µS/cm):	(NTU):	(mV):	(°C):
13:23	6.30	0.00	1821	75.3	215	

1460.18 Elevation, GW (MSL) in Water by Calculation, ft

34.23 Static Water Level in Water by Field Measurement, ft

# **SECTION #2: OBSERVATIONS**

unable to stabilize turbidity. Bounces up and down during stabilization. Purged well dry after sampling.

Air Temperature:	61°F to 70°F	Well Depth (ft):	41.40
Wind Speed:	5-10 mph	SWL (ft):	34.23
Wind Direction:	W-NW	Pump Rate (gpm):	0.25
Precipitation:	Drizzle	Interval (min):	4.68
Cloud Cover:	Mostly Sunny	Pump Start (HH:MM):	12:40
Airborne Particulate:	None	Pump Stop (HH:MM):	13:30
Color, Purge:	Orango	Purge Volume (gal):	12.50
-	0	Purging Strategy:	Low-Flow Stabilization
Appearance, Purge:		Well Plug Present:	$\checkmark$
Odor, Purge:	None	Well Locked:	
Color, Sample:	Orange	Weil Locked.	V
Appearance, Sample:	Turbid		
Odor, Sample:	None		

GW CALCULATIONS:

Total Water Depth 41.40ft - Static Water Level 34.23ft = Water Column 7.17ft Water Column 7.17ft x \*Conversion Factor 0.163gal/ft = Well Volume 1.17gal Well Volume 1.17gal ÷ Pump Rate 0.25gpm = Well Volume Interval 4.68min

\*Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48

Pump Start Time 12:40 - Pump End Time 13:30 = Pump Duration 50min Pump Duration 50min x Pump Rate 0.25gpm = Volume Purged 12.5gal

Top of Casing Elevation 1494.41 - Static Water Level 34.23 = 1460.18ft

SECTION #3: STABILIZATION Well Vol Interval (min): 4.68

Pump Rate (gpm): 0.25

**Time:** 12:28

MW8 (Cont'd)

Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	+/- 1.0 NTU	+/- 20 mV	+/- 0.10 °C		
Time	рН	DO	SpecCond	Turbidity	ORP	Temp	SWL	
(HH:MM):	(SU):	(mg/L):	(µS/cm):	(NTU):	(mV):	(°C):	(ft):	
12:53	6.24	0.00	1837	371.4	247	11.47	37.45	
12:58	6.25	0.00	1812	383.2	231	11.03	37.45	
13:03	6.26	0.00	1825	200.2	224	11.38	37.45	
13:08	6.28	0.00	1837	152.0	221	11.45	37.45	
13:13	6.28	0.00	1833	64.1	217	11.40	37.40	
13:18	6.31	0.00	1793	69.8	215	11.44	37.40	
13:23	6.30	0.00	1821	75.3	215	11.36	37.40	
Stabilization <b>P</b>	Dassas NTS Cr	itoria: 🗆						

Stabilization Passes NTS Criteria:

# SECTION #1: DATA COLLECTIO Sample Collected

рΗ

Field Duplicate: Field Duplicate

Time

Equip Blank:

**Field Blank:** 

Turbidity

ORP

Temp

(HH:MM):	(SI	J): (mg/L	): (μS/cm)	: (NTU):	(mV):	(°C):
14:33	6.!	52 0.00	0 1522	1.2	129	7.65
1443.73	Elevation, G	GW (MSL) in Wat	er by Calculation	<i>,</i> ft		
10.99	Static Wate	er Level in Water	by Field Measur	ement, ft		
SECTION #2: OI	BSERVATION	NS			Tim	e: 14:03
Turbidity less t	han 5 NTU,	considered stable	2.			
Air Tei	mperature:	61°F to 70°F		Well Depth (f	<b>t):</b> 18.95	
W	/ind Speed:	5-10 mph		SWL (f	<b>t):</b> 10.99	
Wind	d Direction:	W-NW		Pump Rate (gpn	n): 0.33	
Pre	ecipitation:	None		Interval (mii	<b>n):</b> 3.94	
CI	oud Cover:	Mostly Sunny	Р	ump Start (HH:MN	<b>1):</b> 14:00	
Airborne F	Particulate:	None	P	ump Stop (HH:MN	<b>1):</b> 14:40	
C	olor, Purge:	Colorless		Purge Volume (ga	<b>I):</b> 13.20	
	nce, Purge:			Purging Strateg	gy: Low-Flow	Stabilization
••	dor, Purge:			Well Plug Preser	nt: 🗹	
	or, Sample:			Well Locke	ed: ⊻	
	ce, Sample:					
••	or, Sample:					
GW CALCULATION	NS:	ic Water Level 10.99	9ft = Water Column	7.96ft		

SpecCond

DO

Water Column 7.96ft x \*Conversion Factor 0.163gal/ft = Well Volume 1.299gal Well Volume 1.299gal ÷ Pump Rate 0.33gpm = Well Volume Interval 3.936min

\*Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48

Pump Start Time 14:00 - Pump End Time 14:40 = Pump Duration 40min Pump Duration 40min x Pump Rate 0.33gpm = Volume Purged 13.2gal

Top of Casing Elevation 1454.72 - Static Water Level 10.99 = 1443.73ft

SECTION #3: STABILIZATION Well Vol Interval (min): 3.94

Pump Rate (gpm): 0.33

MW9 (Cont'd)

Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	+/- 1.0 NTU	+/- 20 mV	+/- 0.10 °C	
Time	рН	DO	SpecCond	Turbidity	ORP	Temp	SWL
(HH:MM):	(SU):	(mg/L):	(µS/cm):	(NTU):	(mV):	(°C):	(ft):
14:05	6.51	0.00	1590	135.8	141	7.46	11.38
14:09	6.46	0.00	1606	81.4	136	7.63	11.38
14:13	6.47	0.00	1573	15.7	134	7.92	11.38
14:17	6.48	0.00	1556	9.5	132	7.70	11.40
14:21	6.50	0.00	1543	6.0	131	7.75	11.40
14:25	6.51	0.00	1539	3.5	130	7.73	11.40
14:29	6.52	0.00	1527	2.1	129	7.68	11.40
14:33	6.52	0.00	1522	1.2	129	7.65	11.40
<b>Stabilization F</b>	asses NTS Cr	iteria:					

Ν	ΤS
Ν	ΤS

**Calibration Report** 

Environmental Science & Engineering

**Event Key:** 6385CC\_2019 Apr(1 of 1)

Staff: Corey Andrews

**Date:** 4/25/2019

Post Cal Check: 🗹

Comments:

526 Chestnut Street

Virginia, MN 55792

Phone: (218) 741-4290

Sonde: R04-B	PreCal	PostCal	PostEvent	
Last Temp Check: 1/7/2019	(HH:MM):	(HH:MM):	(HH:MM):	
<b>Temp Specification:</b> +/-0.1 °C	7:50	7:50	16:45	Specifications:
pH:	4.07	4.0	3.87	+/-0.2 SU
Standard (SU):	4.0	4.0	4.0	
Temperature (°C):	19.5	19.5	20.25	
pH:	7.10	7.0	6.90	+/-0.2 SU
Standard (SU):	7.0	7.0	7.0	17 0.2 30
Temperature (°C):	19.03	19.03	19.83	
pH:	10.03	10.0	9.89	+/-0.2 SU
Standard (SU):	10.0	10.0	10.0	+/-0.2 30
Temperature (°C):	19.36	19.36	19.74	
Conductance, Specific:	0	0	0	Sum of
Standard (µmhos/cm):	0	0	0	+/-1 μmhos/cm
Temperature (°C):	19.0	19.0	16.74	AND
				+/-0.5%
Conductance, Specific:	993	1000	1004	Sum of
Standard (µmhos/cm):	1000	1000	1000	sum or +/-1 μmhos/cm
Temperature (°C):	19.33	19.27	21.27	AND
				+/-0.5%
Turbidity:	0	0	0.4	<100 / 1 NTU
Standard (NTU):	0	0	0	<100 +/-1 NTU >100 AND <400 +/-12 NTU
Temperature (°C):	19.3	19.3	19.72	>400 AND <3000 +/-150 NTU
Turbidity:	106.6	106	107.4	
Standard (NTU):	106	106	106	<100 +/-1 NTU >100 AND <400 +/-12 NTU
Temperature (°C):	19.75	19.75	19.68	>400 AND <3000 +/-150 NTU
L				

# Calibration Report (cont'd)

Sonde: R04-B	PreCal	PostCal	PostEvent	
Last Temp Check: 1/7/2019	(HH:MM):	(HH:MM):	(HH:MM):	
<b>Temp Specification:</b> +/-0.1 °C	7:50	7:50	16:45	Specifications:
Oxygen, Dissolved:	8.63	8.73	8.69	<8 +/-0.1 mg/L
100% Oxygen Saturation:	8.77	8.77	8.61	>8 AND <20 +/-0.2 mg/L
Temperature (°C):	19.0	19.0	19.8	>20 +/-10%
Bar.Pressure (mmHg):	719	719	718	
ORP:	427	445	440	
Standard (mV):	445.8	445.8	442.8	T/ 20 111V
Temperature (°C):	18.9	18.9	20.1	

2385CC	Gen Wa.	ste CCR	Monitoria	9	we W.		4/25/19
orey A.	drews	V#60	62 n	iles	2.3		I - J · · ·
59F)		wind h			71		
Construction of the second second	5 Prepte				1		
3845	0	VIS office	Ð			·	
1935	Conceptual and a second s	egin pumpi		1945 8	mole C	1052	
100 1	5WL	Two pompi		Vol		1052	
	18.76	26.77	we 8.01	The second se	pumpo	ate	( )
			280	1.3gal	0.15		recharge)
AGED	PH	5pc 2596	Temp	ORP	100	SWL	Turb
0958	6.03		10.09	637	1.82	20.36	49.3
1007	6.22	2631 2.575	11.66	636	1.16	20.37	20.5
1016	6.24		11.10	613	0.00	20,33	12,4
1025	6.26	2540	11.98	566	0.00	20.26	7.6
1034	6.29	2.526	10.55	511	0.00	20.30	20.5
043	6.28	2510	11.79	489	0.00	20.32	18.7
051	6.29	2501	11.39	458	0.00	20.31	13.7
	* well die	l not stal	ilize to	NTS Stab.	lization	parameter	5
		RP, TUIG).				sun ? cla	
din sa Marin	19		sell volu		ved, Ke	1 S	li s
110	MW-3R			23 Sampl			50
<b>8</b> 5	JWL	TWD	we	Vol	pump 1		
	65.79	77.58	11.79	1.9gal	10.33	aic	
	PH	SpC	Temp	ORP	400	Turb	JUL
1134	6.36	3019	10.99	216	8.19	27,3	
1140	6.36	3031	10.93	-		100 C 21	60.61
1146	6.35		10.95	184	0,00	16.6	66.52
152	6,35			0.02	0.00	9.0	66.52
158	6,35	0 0 1	11.04	155	0.60	4.5	66.52
			1(, 11	149	0.00	2.6	66.52
LOT	6.35		1(.08		0.00	1.5	66.52
1175	The second se	NTU. Cons		And and in manufacture			
1225		Begin po	X I	10/240	sampl	e @ 132	4
	SWL	This	ive	Vol	pump	rate	1.188
Series	34.23	41.40	7,17	1.2 gal	0.25	GPM	
10.20	6.24	5pC 1837	Temp	ORP	LDO	Turb	SWL
1253			11-47	247	0.00	371.4	37.45
12.58	6:25	1812	11:03	231	0.00		3.7.45
1303	6.26	1825	11.38	224	0.00	200.2	37.45
1308	6.28	1837	11,45	221	0.00	152.0	37.45
1313	6.28		11.40	the second se	0.00	64.1	37,40
318	6.31	Internet second s	11.44	the second se	0,00		37.40
CONTRACTOR OF A	6,30	The second se	11.36		0.00	second	37.40
Competer Camping States - Fail 1 100			11.00	NU	0.00	10.5	ell.). Tork Ked are 21208

Trey Andrews Gen Waste CCR Monitoring 6385CC 4/25/ High 659F Sung/winds WNW 10-20 mpt 1355 MW-9 start pumping & 1400 Sample @ 1434 Dup 1435 SWL TWO WE Vol Pump Rate 10,99 18,95 7.96 1.3gul 0.33 ptt SpS Temp 6RP 200 TV16 SURL 141 0.00 135,8 11.38 High 65%F 1405 6.51 200 141 135.8 11.38 1409 0.00 6.46 1606 7.63 136 81,4 11.38 1413 6.47 1573 7.92 134 0200 15.7 11.38 7.70 1556 1417 6.48 0.00 132 9.5 11.40 1421 6.50 1543 7.75 8,00 131 6.0 11.40 1425 6.51 1539 7.73 130 3.5 0.00 11-40 2.1 1429 6.52 7.68 1527 0.00 129 11,40 1433 6.52 7.65 1522-129 0.00 1.Z 11.40 1505 Depart Gen. Waste 1550 (ede samples to PACE 1 1555 Arrive back at NTS office. Unload Post check Report. train the Page 13 of 17

NTS 526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290	Vehicle Inspection Re Event Key: 6385CC_2019 Ap	
<b>Driver:</b> Corey Andrews <b>Vehicle:</b> V60 - 2013 GMC Sierra 1		4/25/2019 Time: 08:28 Odometer:
Check each Item Inspected		
Driver/Passenger Side External Side Mirrors (Right and Left):	Windows (clean; free of cracks):	
Front/Rear		
Tail Lights: License Plates Comments:	Head Lights Fluid Leaks	
Routine Maintenance		
Oil Change (Current): ☑	Transmission Fluid (Change every 60k):	
Gauges Operational ('check engine' light OFF): ☑	Spare Tire (present, properly inflated):	
Comments:		
Interior Cleanliness:	Brakes:	Windshield Wipers and Fluid: 🗹
Seat Belts (working condition): 🔽	Parking Brake (reset/release):	
Comments:		
General/Safety		
Insurance Card: 🔽	Wheel Chocks:	First Aid Kit: 🔽
Operator's Manual: 🖌	Strobe Light (if needed):	
Comments:		

**Deficiencies Corrected** 



& Engineering

Daily Tailgate Safety

Project: 6385CC	Date: 4/2.5/19
Work Site Hazard Assessment Worksheet PPE Required (List): <u>High</u> Weather Conditions (List):	Level*
<ul> <li>Vehicular Traffic</li> <li>Noise</li> <li>Housekeeping</li> </ul>	<ul> <li>Communications</li> <li>Equipment/Tools</li> <li>Other Site Hazards**</li> </ul>
<ul> <li>I have examined the work place named and found</li> <li>I have examined the work place named and hazar taken</li> <li>Hazards Identified/Safety Items Discussed:</li> </ul>	
Trucks havling Treservatives in 54.	aple containers
Corrective Actions Taken: Bive trucks right of wear nitrile glowing	way

Participants in Safety Discussion:

1 Print Name	lovens C	gnature	<i></i>
2(		0	
3			-
4			
5	$- \bigcirc $	>	- , ,
Signature of Site Supervisor/Exa	miner	Date:	423 (9
*Level D, C, B or A	0		

\*\*Examples: Heavy Equipment, Air Quality, Flammable materials, Wildlife, Work Site Security, Confined Space

02/20/2015

Nevervey aread by:	Doronized at lack have a	Received by: /	Sampled by: 1 6104					6MW	MW8	MW7	MW3R	Field Duplicate	Field Blank	Sample ID: Sample Location:	6385CC_2019 Apr(1 of 1)	Event Key:	Project#: 6385CC_2019	<b>PM:</b> Dennis Schubbe	Phone: (218) 741-4290	526 Chestnut Street	NTS	
			Joeus S												14		L,	Report To:			Comments:	
Date: //3/s	Time:	Date:						F					4/25/19	Date:				sampledata@netechnical.com				
L 31/5.		R	70					1434	1324	1052	1205	1435	1(50	Time:				netechnical.co			TAT: Standard	
Temperature at Receipt:		Relinquished by:	Relinquished by:					×	V	×	W	V	X	Mx:				ä			ard	
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			$ \mathcal{O}_{i} $										_			_						
	Time:	-	Date: & 4/25/19 Time: 1840					List #1	List #1	List #1	List #1	List #1	List #1	<b>Required Analyses:</b>		& Engineering	Environmental Science					

Page 1 of 2

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otal Dissolved (TDS)	SM 4500-H+B
	SM 2540C
	EPA 300.0
Boron	EPA 200.8
Calcium	
	EPA 200.7
Parameter: NTS Limit: J-Flag:	Method:

### NTS

526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290

# **Field Report Peer Review Report**

Event Key: 6385CC\_2019 Apr(1 of 1) Report Date: 4/25/2019 Lab WO#: 12124076

**Report Sections** 

**Cover Sheet:** 



Included:

✓

**Required:** 

✓

Reviewer #1:	Date:
Catherine Hafdahl	4/29/2019

Reviewer #2:	Date:
Terri Sabetti	4/30/2019

Report Sections	Required:	Included:
Cover Sheet:		$\checkmark$
Location Information		
Data Collection:		
Observation:		
Flow or Stabilization:		
Photographs:		
Calibration:		
Field Notes:	$\checkmark$	$\checkmark$
Safety Forms:	$\checkmark$	
	N/A:	OK:
GW Calculations are Accurate:		$\checkmark$
GW Stabilization Criteria met:		
Flow Calculations are Accurate:	$\checkmark$	
Sonde Passed Post Event Check:		
<b>Consistent Values in Notes:</b>		$\checkmark$
Consistent Dates and Times:		
No Deviations from SOPs:		
Cover Sheet provides a complete description of key activities and observations:		

#### **Location Information** Data Collection: ✓ $\checkmark$ **Observation:** $\checkmark$ ✓ Flow or Stabilization: ✓ ✓ Photographs: **Calibration:** $\checkmark$ $\checkmark$ **Field Notes:** $\checkmark$ ✓ Safety Forms: ✓ ✓ N/A: OK: **GW Calculations are Accurate:** ✓ **GW Stabilization Criteria met:** $\square$ Flow Calculations are Accurate: ✓ Sonde Passed Post Event Check: $\square$ ✓ **Consistent Values in Notes:** ✓ **Consistent Dates and Times:** ✓ **Qualifiers added to Data:** ✓ Data under correct Event Key: ✓ All Req'd Parameters Meas'd; ✓

**Reviewer #2 Comments:** 

Limits Met:

### Reviewer #1 Comments:

Turbidity was considered stable when < 5.0 NTU at MW3R, MW7, & MW9. Temperature did not stabilize at MW7. Turbidity did not stabilize at MW8.



Pace Analytical Services, LLC 315 Chestnut Street Virginia, MN 55792 (218) 742-1042

October 29, 2019

Dennis Schubbe Northeast Technical Services 526 Chestnut Street Virginia, MN 55792

RE: Project: 6385CC General Waste Disposal Pace Project No.: 12137390

Dear Dennis Schubbe:

Enclosed are the analytical results for sample(s) received by the laboratory on October 21, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Canin Jen

Carrie Jensen carrie.jensen@pacelabs.com (218)742-1042 Project Manager

Enclosures

cc: Sample Data, Northeast Technical Services Scott Seeley, NTS Karissa Vosen, NTS





#### CERTIFICATIONS

Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

#### Virginia Minnesota Certification ID's

315 Chestnut Street, Virginia, MN 55792 Montana Certificate #CERT0103 Alaska Certification UST-107 Minnesota Dept of Health Certification #: 027-137-445 North Dakota Certification: # R-203 Wisconsin DNR Certification # : 998027470 WA Department of Ecology Lab ID# C1007



#### SAMPLE SUMMARY

Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

Lab ID	Sample ID	Matrix	Date Collected	Date Received
12137390001	MW7	Water	10/21/19 10:00	10/21/19 15:25
12137390002	MW8	Water	10/21/19 11:45	10/21/19 15:25
12137390003	MW9	Water	10/21/19 12:55	10/21/19 15:25
12137390004	Field Duplicate	Water	10/21/19 12:56	10/21/19 15:25
12137390005	Field Blank	Water	10/21/19 12:40	10/21/19 15:25



### SAMPLE ANALYTE COUNT

Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
12137390001		EPA 200.7	AK1	1	PASI-V
		EPA 200.8	DES	1	PASI-V
		SM 2540C (1997)	RC	1	PASI-V
		SM 4500-H+B	ZJT	1	PASI-V
		EPA 300.0	ZJT	3	PASI-V
12137390002	MW8	EPA 200.7	AK1	1	PASI-V
		EPA 200.8	DES	1	PASI-V
		SM 2540C (1997)	RC	1	PASI-V
		SM 4500-H+B	ZJT	1	PASI-V
		EPA 300.0	ZJT	3	PASI-V
12137390003	MW9	EPA 200.7	AK1	1	PASI-V
		EPA 200.8	DES	1	PASI-V
		SM 2540C (1997)	RC	1	PASI-V
		SM 4500-H+B	ZJT	1	PASI-V
		EPA 300.0	ZJT	3	PASI-V
12137390004	Field Duplicate	EPA 200.7	AK1	1	PASI-V
		EPA 200.8	DES	1	PASI-V
		SM 2540C (1997)	RC	1	PASI-V
		SM 4500-H+B	ZJT	1	PASI-V
		EPA 300.0	ZJT	3	PASI-V
12137390005	Field Blank	EPA 200.7	AK1	1	PASI-V
		EPA 200.8	DES	1	PASI-V
		SM 2540C (1997)	RC	1	PASI-V
		SM 4500-H+B	ZJT	1	PASI-V
		EPA 300.0	ZJT	3	PASI-V



#### ANALYTICAL RESULTS

#### Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

Sample: MW7	Lab ID:	12137390001	Collected:	10/21/1	9 10:00	Received:	10/21/19 15:25	Matrix: Water	
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 MET ICP	Analytical	Method: EPA 20	0.7 Prepara	tion Met	hod: EP	A 200.7			
Calcium	539	9 mg/L		0.50	1	10/23/19 13:1	5 10/24/19 10:5	0 7440-70-2	P6
200.8 MET ICPMS	Analytical	Method: EPA 20	0.8 Prepara	tion Met	hod: EP	A 200.8			
Boron	66.9	9 ug/L		40.0	1	10/23/19 13:1	5 10/24/19 12:3	1 7440-42-8	
2540C Total Dissolved Solids	Analytical	Method: SM 254	40C (1997)						
Total Dissolved Solids	225	0 mg/L		20.0	1		10/25/19 08:1	6	
4500H+ pH, Electrometric	Analytical	Method: SM 45	00-H+B						
pH at 25 Degrees C	7.2	2 Std. Units	6	0.10	1		10/22/19 16:2	8	H6
300.0 IC Anions 28 Days	Analytical	Method: EPA 30	0.0						
Chloride Fluoride Sulfate	37.4 NE 1120	D mg/L		1.0 0.10 20.0	1 1 10		10/23/19 15:4	8 16887-00-6 8 16984-48-8 9 14808-79-8	
Sample: MW8	Lab ID:	12137390002	Collected:	10/21/1	9 11:45	Received:	10/21/19 15:25	Matrix: Water	
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 MET ICP	Analytical	Method: EPA 20	0.7 Prepara	tion Met	hod: EP	A 200.7			
Calcium	354	4 mg/L		0.50	1	10/23/19 13:2	1 10/28/19 12:4	7 7440-70-2	
200.8 MET ICPMS	Analytical	Method: EPA 20	0.8 Prepara	tion Met	hod: EP	A 200.8			
Boron	70.	5 ug/L		40.0	1	10/23/19 13:2	1 10/28/19 17:5	4 7440-42-8	
2540C Total Dissolved Solids	Analytical	Method: SM 254	40C (1997)						
Total Dissolved Solids	1490	0 mg/L		20.0	1		10/25/19 17:3	3	
4500H+ pH, Electrometric	Analytical	Method: SM 450	00-H+B						
pH at 25 Degrees C	7.	I Std. Units	6	0.10	1		10/22/19 16:4	4	H6
300.0 IC Anions 28 Days	Analytical	Method: EPA 30	0.0						
Chloride Fluoride Sulfate	1.4 NE 630	) mg/L		1.0 0.10 10.0	1 1 5		10/23/19 17:5	1 16887-00-6 1 16984-48-8 2 14808-79-8	
Sample: MW9	Lab ID:	12137390003	Collected:	10/21/1	9 12:55	Received:	10/21/19 15:25	Matrix: Water	
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 MET ICP	Analytical	 Method: EPA 20	0.7 Prepara	tion Met	hod: EP	A 200.7			-
	,								

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#### ANALYTICAL RESULTS

#### Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

Sample: MW9	Lab ID: 121	37390003	Collected:	10/21/1	9 12:55	Received: 10	)/21/19 15:25	Matrix: Water	
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Prepara	tion Met	hod: EP	A 200.8			
Boron	ND	ug/L		40.0	1	10/23/19 13:15	10/24/19 12:09	7440-42-8	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	IOC (1997)						
Total Dissolved Solids	1100	mg/L		20.0	1		10/25/19 17:34	Ļ	
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	)0-H+B						
pH at 25 Degrees C	7.2	Std. Units		0.10	1		10/22/19 17:04	Ļ	H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0						
Chloride Fluoride Sulfate	6.0 ND 437	mg/L mg/L mg/L		1.0 0.10 10.0	1 1 5		10/23/19 18:53 10/23/19 18:53 10/23/19 19:13	3 16984-48-8	
Sample: Field Duplicate	Lab ID: 121	37390004	Collected:	10/21/1	9 12:56	Received: 10	)/21/19 15:25	Matrix: Water	
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 MET ICP	Analytical Met	hod: EPA 20	0.7 Prepara	tion Met	hod: EP	A 200.7			
Calcium	219	mg/L		0.50	1	10/23/19 13:15	10/24/19 10:56	6 7440-70-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Prepara	tion Met	hod: EP	A 200.8			
Boron	ND	ug/L		40.0	1	10/23/19 13:15	10/24/19 12:3	5 7440-42-8	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	IOC (1997)						
Total Dissolved Solids	1090	mg/L		20.0	1		10/25/19 17:34	ł	
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	)0-H+B						
pH at 25 Degrees C	7.2	Std. Units		0.10	1		10/22/19 16:35	5	H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0						
Chloride Fluoride Sulfate	5.9 ND 434	mg/L mg/L mg/L		1.0 0.10 10.0	1 1 5		10/23/19 16:29 10/23/19 16:29 10/23/19 17:31	16984-48-8	
Sample: Field Blank	Lab ID: 121	37390005	Collected:	10/21/1	9 12:40	Received: 10	)/21/19 15:25	Matrix: Water	
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 MET ICP	Analytical Met	hod: EPA 20	0.7 Prepara	tion Met	hod: EP	A 200.7			
Calcium	ND	mg/L		0.50	1	10/23/19 13:21	10/28/19 12:5 <sup>2</sup>	7440-70-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Prepara	tion Met	hod: EP	A 200.8			
Boron	ND	ug/L		40.0	1	10/23/19 13:21	10/28/19 18.0	7440-42-8	

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#### ANALYTICAL RESULTS

#### Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

Sample: Field Blank	Lab ID: 121	1 <b>37390005</b> Co	ollected: 10/21/	19 12:40	Received: 10	D/21/19 15:25 M	Aatrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540C	(1997)					
Total Dissolved Solids	ND	mg/L	10.0	1		10/25/19 08:24		
4500H+ pH, Electrometric	Analytical Met	thod: SM 4500-H	+B					
pH at 25 Degrees C	5.7	Std. Units	0.10	1		10/22/19 16:49		H6
300.0 IC Anions 28 Days	Analytical Met	thod: EPA 300.0						
Chloride Fluoride Sulfate	ND ND ND	mg/L mg/L mg/L	1.0 0.10 2.0	1 1 1		10/23/19 18:32 10/23/19 18:32 10/23/19 18:32	16984-48-8	



Project: Pace Project No.:	6385CC General W 12137390	/aste Disposal										
QC Batch:	atch: 177775		Anal	ysis Metho	d:	EPA 200.7						
QC Batch Method:	EPA 200.7		Anal	ysis Descri	ption:	200.7 MET						
Associated Lab Sar	nples: 121373900	001, 1213739000	3, 1213739	90004								
METHOD BLANK:	704434			Matrix: W	ater							
Associated Lab Sar	nples: 121373900	01, 1213739000	3, 1213739	90004								
			Bla	nk	Reporting							
Paran	neter	Units	Res	ult	Limit	Anal	yzed	Qualifier	S			
Calcium		mg/L		ND	0.5	0 10/24/1	9 10:41					
LABORATORY COI	NTROL SAMPLE:	704435										
			Spike	LC	S	LCS	% R	ec				
Paran	neter	Units	Conc.	Res	sult	% Rec	Limi	ts	Qualifiers			
Calcium		mg/L	2	25	25.1	10	0 8	35-115				
MATRIX SPIKE & M	IATRIX SPIKE DUPI	_ICATE: 7044	36		704437							
			MS	MSD								
		12137390001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	r Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Calcium	mg/L	539	25	25	559	574	78	140	70-130	3	20	P6

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.



Project: Pace Project No.:	6385CC General V 12137390	Vaste Disposal										
QC Batch:	177777		Analy	sis Metho	d: E	EPA 200.7						
QC Batch Method:	EPA 200.7		Analy	/sis Descri	ption: 2	200.7 MET						
Associated Lab San	nples: 12137390	002, 1213739000	5									
METHOD BLANK:	704448			Matrix: W	ater							
Associated Lab San	nples: 12137390	002, 1213739000	5									
			Blar	nk	Reporting							
Paran	neter	Units	Res	ult	Limit	Anal	yzed	Qualifiers	s			
Calcium		mg/L		ND	0.50	0 10/28/1	9 12:10					
LABORATORY COM	NTROL SAMPLE:	704449										
_			Spike	LC		LCS	% R					
Paran	neter	Units	Conc.	Res	sult	% Rec	Lim	its (	Qualifiers			
Calcium		mg/L	2	:5	24.4	9	8	85-115				
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 7044	50		704451							
			MS	MSD								
_		12137471009	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	<b>.</b> .
Parameter	units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Calcium	mg/L	54.3	25	25	79.5	79.7	101	102	70-130	0	20	
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 7044	52		704453							
			MS	MSD								
		12137471007	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	r Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Calcium	mg/L	41.1	25	25	65.4	66.1	97	100	70-130	1	20	

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.



Project: Pace Project No.:	6385CC General V 12137390	Vaste Disposal										
QC Batch:	177770		Analy	ysis Metho	d: E	PA 200.8						
QC Batch Method:	EPA 200.8		Analy	ysis Descri	otion: 2	00.8 MET						
Associated Lab San	nples: 12137390	001, 1213739000	3, 1213739	90004								
METHOD BLANK:	704418			Matrix: W	ater							
Associated Lab San	nples: 12137390	001, 1213739000	3, 1213739	0004								
			Blar	nk	Reporting							
Paran	neter	Units	Res	ult	Limit	Anal	yzed	Qualifier	S			
Boron		ug/L		ND	40.0	10/24/1	9 12:01					
LABORATORY CON		704419	Spike	LC	-	LCS	% R					
Paran	neter	Units	Conc.	Res		% Rec	Lim		Qualifiers	_		
Boron		ug/L	5	50	51.1	10	2	85-115				
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 7044	20		704421							
			MS	MSD								
		12137390003	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	ND	50	50	90.7	88.8	102	98	70-130	2	20	
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 7044	22		704423							
			MS	MSD								
_		12137471011	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	ND	50	50	83.1	79.7	99	92	70-130	4	20	

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Project:	6385CC General \	Naste Disposal										
Pace Project No.:	12137390											
QC Batch:	177776		Analy	sis Metho	d: E	PA 200.8						
QC Batch Method:	EPA 200.8		Analy	/sis Descri	ption: 2	200.8 MET						
Associated Lab San	nples: 12137390	002, 1213739000	5									
METHOD BLANK:	704439			Matrix: W	ater							
Associated Lab San	nples: 12137390	002, 1213739000	5									
			Blar		Reporting							
Paran	neter	Units	Res	ult	Limit	Anal	yzed	Qualifier	s			
Boron		ug/L		ND	40.0	0 10/28/1	9 16:46					
LABORATORY COM	NTROL SAMPLE:	704440										
			Spike	LC		LCS	% R					
Paran	neter	Units	Conc.	Res	sult	% Rec	Limi	ts (	Qualifiers			
Boron		ug/L	5	50	51.8	10	4 8	85-115				
MATRIX SPIKE & M	IATRIX SPIKE DUF	PLICATE: 7044	41		704442							
			MS	MSD	-							
		12137471008	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	40.4	50	50	88.5	88.4	96	96	70-130	0	20	
MATRIX SPIKE & N	IATRIX SPIKE DUF	LICATE: 7044	43		704444							
			MS	MSD								
		12137471010	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	ND	50	50	71.3	73.5	96	100	70-130	3	20	

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Project: 6385CC Ger	neral Waste Disposal						
Pace Project No.: 12137390							
QC Batch: 177953		Analysis Me	ethod: S	SM 2540C (199	17)		
QC Batch Method: SM 2540C	(1997)	Analysis De		540C Total Dis			
Associated Lab Samples: 1213	37390001, 12137390005						
METHOD BLANK: 705055		Matrix	k: Water				
Associated Lab Samples: 1213	37390001, 12137390005						
_		Blank	Reporting				
Parameter	Units	Result	Limit	Analyzeo	d Qualit	fiers	_
Total Dissolved Solids	mg/L	ND	) 10.0	) 10/25/19 08	3:11		
METHOD BLANK: 705059		Matrix	k: Water				
Associated Lab Samples: 1213	37390001, 12137390005						
		Blank	Reporting				
Parameter	Units	Result	Limit	Analyzed	d Quali	fiers	
Total Dissolved Solids	mg/L	ND	10.0	0 10/25/19 08	:25		_
LABORATORY CONTROL SAMP	LE: 705056						
_		Spike	LCS	LCS	% Rec	_	
Parameter	Units	Conc.	Result	% Rec	Limits	Qu	alifiers
Total Dissolved Solids	mg/L	255	260	102	80-120		
SAMPLE DUPLICATE: 705057							
Gravit LE DOI LIGATE. 103001		12137435003	Dup		Max		
Parameter	Units	Result	Result	RPD	RPD		Qualifiers
Total Dissolved Solids	mg/L	126	5 132	2	5	5	
SAMPLE DUPLICATE: 705249		404074040					
Parameter	Units	12137421017 Result	Dup Result	RPD	Max RPD		Qualifiers
Total Dissolved Solids	mg/L	1850	) 1850	 )	0	5	

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Project:		C General Waste Disposal						
Pace Project No.:	121373	90						
QC Batch:	17806	69	Analysis M	ethod:	SM 2540C (199	97)		
QC Batch Method:	SM 25	540C (1997)	Analysis D	escription:	2540C Total Di	ssolved Solids		
Associated Lab Sar	mples:	12137390002, 12137390003,	12137390004					
METHOD BLANK:	705567	,	Matri	x: Water				
Associated Lab Sar	mples:	12137390002, 12137390003,	12137390004					
			Blank	Reporting				
Parar	meter	Units	Result	Limit	Analyze	d Quali	fiers	
Total Dissolved Soli	ids	mg/L	NE	0 1	0.0 10/25/19 1	7:30		
METHOD BLANK:	705570		Matri	x: Water				
Associated Lab Sar	mples:	12137390002, 12137390003,	12137390004					
			Blank	Reporting				
Parar	meter	Units	Result	Limit	Analyze	d Quali	fiers	
Total Dissolved Soli	ids	mg/L	NE	D 1	0.0 10/25/19 1	7:35		
LABORATORY CO		SAMPLE: 705568						
			Spike	LCS	LCS	% Rec		
Parar	meter	Units	Conc.	Result	% Rec	Limits	Qualifiers	
Total Dissolved Soli	ids	mg/L	255	254	100	80-120		
		5569						
SAMPLE DUPLICA	ATE: 70	0000						
SAMPLE DUPLICA	ATE: 70		12137651001	Dup		Max		
SAMPLE DUPLICA Parar		Units	12137651001 Result	Dup Result	RPD	Max RPD	Qualifiers	

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## **QUALITY CONTROL DATA**

Project: Pace Project No.:	6385CC General \ 12137390	Waste Disposal					
QC Batch:	177675		Analysis M	ethod:	SM 4500-H+B		
QC Batch Method:	SM 4500-H+B		Analysis De	escription:	4500H+B pH		
Associated Lab San	nples: 12137390	001, 1213739000	2, 12137390003,	12137390004	, 12137390005		
LABORATORY COM	NTROL SAMPLE:	704033					
			Spike	LCS	LCS	% Rec	
Paran	neter	Units	Conc.	Result	% Rec	Limits	Qualifiers
pH at 25 Degrees C	:	Std. Units	7	7.0	100	98-102	H6
SAMPLE DUPLICA	TE: 704034						
			12137223001	•		Max	
Paran	neter	Units	Result	Result	RPD	RPD	Qualifiers
pH at 25 Degrees C	;	Std. Units	8.0	3 (	3.0	0	10 H6
SAMPLE DUPLICA	TE: 704035						
			12137390003	Dup		Max	
Paran	neter	Units	Result	Result	RPD	RPD	Qualifiers

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.



## **QUALITY CONTROL DATA**

QC Batch:	1776	98		Anal	sis Method	d: E	PA 300.0						
QC Batch M	ethod: EPA	300.0			, vsis Descrit		00.0 IC An	ions					
	_ab Samples:		01, 1213739000										
METHOD BI	LANK: 70413	2			Matrix: Wa	ater							
Associated L	_ab Samples:	121373900	01, 1213739000	2, 1213739	0003, 1213	37390004, 1	21373900	05					
				Bla	nk I	Reporting							
	Parameter		Units	Res	ult	Limit	Anal	yzed	Qualifier	S			
Chloride			mg/L		ND	1.0	) 10/23/1	9 13:25					
Fluoride			mg/L		ND	0.10	) 10/23/1	9 13:25					
Sulfate			mg/L		ND	2.0	) 10/23/1	9 13:25					
	RY CONTROL		704133										
LADORAIU		OAIVIF LE.	104100	Spike	LC	s	LCS	% Re	ec				
	Parameter		Units	Conc.	Res	-	% Rec	Limi		Qualifiers			
Chloride			mg/L	5	50	48.8	9	8 9	90-110		_		
Fluoride			mg/L		5	4.8	9	6 9	90-110				
Sulfate			mg/L	5	50	47.8	9	6 9	90-110				
MATRIX SP	IKE & MATRIX		-ICATE: 7041	34		704135							
				MS	MSD								
			12137383001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Pa	rameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qua
Chloride		mg/L	ND	50	50	52.3	52.5	104	104	90-110	0	20	
Fluoride		mg/L	ND	5	5	5.1	5.1	100	101	90-110	0		
Sulfate		mg/L	8.5	50	50	59.3	59.5	102	102	90-110	0	20	
	IKE & MATRIX		ICATE: 7041	36		704137							
				MS	MSD								
			12137385001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
<b>D</b> -	rameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qua
Pa		mg/L	200	250	250	451	449	100	99	90-110	1	20	
Pa Chloride		J.						99	100	90-110	0		
		mg/L	0.14	5	5	5.1	5.1	99	100	90-110	0	20	

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**

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#### QUALIFIERS

#### Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

#### 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.

#### LABORATORIES

PASI-V Pace Analytical Services - Virginia

#### ANALYTE QUALIFIERS

H6 Analysis initiated outside of the 15 minute EPA required holding time.

P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.



## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:6385CC General Waste DisposalPace Project No.:12137390

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
12137390001	MW7	EPA 200.7	177775	EPA 200.7	177852
12137390002	MW8	EPA 200.7	177777	EPA 200.7	178102
12137390003 12137390004	MW9 Field Duplicate	EPA 200.7 EPA 200.7	177775 177775	EPA 200.7 EPA 200.7	177852 177852
12137390005	Field Blank	EPA 200.7	177777	EPA 200.7	178102
12137390001	MW7	EPA 200.8	177770	EPA 200.8	177853
12137390002	MW8	EPA 200.8	177776	EPA 200.8	178101
12137390003 12137390004	MW9 Field Duplicate	EPA 200.8 EPA 200.8	177770 177770	EPA 200.8 EPA 200.8	177853 177853
12137390005	Field Blank	EPA 200.8	177776	EPA 200.8	178101
12137390001	MW7	SM 2540C (1997)	177953		
12137390002 12137390003 12137390004	MW8 MW9 Field Duplicate	SM 2540C (1997) SM 2540C (1997) SM 2540C (1997)	178069 178069 178069		
12137390005	Field Blank	SM 2540C (1997)	177953		
12137390001 12137390002 12137390003 12137390004 12137390005	MW7 MW8 MW9 Field Duplicate Field Blank	SM 4500-H+B SM 4500-H+B SM 4500-H+B SM 4500-H+B SM 4500-H+B	177675 177675 177675 177675 177675 177675		
12137390001 12137390002 12137390003 12137390004 12137390005	MW7 MW8 MW9 Field Duplicate Field Blank	EPA 300.0 EPA 300.0 EPA 300.0 EPA 300.0 EPA 300.0	177698 177698 177698 177698 177698 177698		

Environmental Science & Engineering			NTS HESTNUT STR SINIA, MN 58 10 Fax: (2		R	Ī	REQUI	RED 1	rurn-4	CI AROUND TIM	PM: CL	J .J NTS-D	Due D	<b>390</b> ate: 11		
	E and RECYLING L			SCHUBBE, KARIS		_		T I	NTAIN		SEE ATT		ISTRUCTION		IODS	
	NDUSTRIAL LANDF NTY, MINNESOTA		RICF		SEELET		VOC M. 8260 (HCL) GENERAL CHEMISTRY (NO PRES)	GENERAL CHEMISTRY (H2SO4)	TOTAL METALS (HN03) DISSOLVED METALS (HN03)						*	
SAMPLER: Corey An	drews		PERMIT RE	Q.: SW-620-002			VOC M. AL CHE	SAL CH	OLVED	*						
PROJECT: GENERAL WASTE DISPO		G, LLC.		Oct-19	T	filtered	SENER	GENEF	DISSI							
PROJECT NUMBER: 6385CC LOG-IN #:	CCR Monitoirng SAMPLE #	DESCRIPTION:	DATE:	LLECTION: TIME:	LIQ. SOL		0			REQUIR	D ANALYSIS:	AND SO CHARMEN		- Service	ter transf	1
	MW3R	GW WELL	No S.	imple	x	N	1		1	Boron, C	alcium, Chloride, I	louride, pH, S	Sulfate & TD	s		
8	MW7	GW WELL	10/21/19	1800	x	N	1		1	Boron, C	alcium, Chloride, I	louride, pH, \$	Sulfate & TD	S		
	MVV8	GW WELL	6/21/19	1145	x	N	1		1	Boron, C	alcium, Chloride, I	Flouride, pH, S	Sulfate & TD	S		
	MW9	GW WELL	6/2/14	(2.55	x	N	1		1	Boron, (	Calcium, Chloride, I	flouride, pH, \$	Sulfate & TD	S		
	Field Duplicate	GW WELL	10/20/1	9 1256	x	N	1		1	Boron, (	alcium, Chloride,	Flouride, pH, \$	Sulfate & TD	s		
	Field Blank	Field Blank	10/21/19	1240	×	N	1		1	Boron, C	Calcium, Chloride,	Flouride, pH, S	Sulfate & TD	S		
			1997 - 1998 1													
RELINQUISHED BY:		DATE: 10/21/19	RECEIVED BY	<u> </u>				1_1	DATI							
RELINQUISHED TO NTS SAMPLE L	OCK-UP BY:	DATE: TIME:	RECEIVED FR	OM NTS SAMPLE L	OCKUP BY:				DATI	E:						
RECEIVED FORLAB BY:	lad		TEMP.AT ARR		distant.					-						
DATE 12/21/19	TIME: 15:05		14												- 2	24 juna 1997 - 1998

# GENERAL WASTE CCR MONITORING METHODS

PARAMETER	SYMBOL	EPA Method
Boron	В	200.8
Calcium	Са	200.7
Chloride	Chloride	300.0
Fluoride	Flouride	300.0 -
рН	рН	SM 4500 H+B
Sulfate	SO <sub>4</sub>	300.0
TDS	TDS	SM 2540C

USPS Other No Seal ags C Type of Corrected f tor: 1 C Ves Ves Ves Ves Ves Ves Ves Ves	Docum F-VM-C-O : s Intact? None Ice:	□Yes □Other: Wet [ ·3	#: No. Blue d Initials Comme 1. 2. 3. 4.	Pace	Issuing te Virginia Min : 121 UIIIIIII Proj. Due L Samples gical Tissue Fr kamining Cont	373	Proj.	Name:	
Other	: Is Intact? None Ice: / 	Ves Ves Vet Date and N/A N/A N/A N/A N/A	DNO Blue d Initials Comme 1. 2. 3. 4. 5. 1f	1213739 Uptional: None Biolog of Person Ex	O Proj. Due L Samples gical Tissue Fri camining Cont	Date: Temp Bla s on ice, c ozen? [	Proj. ank?	Name: Pres ocess ha	s beg
Other	: Is Intact? None Ice: / 	Ves Ves Vet Date and N/A N/A N/A N/A N/A	DNO Blue d Initials Comme 1. 2. 3. 4. 5. 1f	1213739 Uptional: None Biolog of Person Ex	O Proj. Due L Samples gical Tissue Fri camining Cont	Date: Temp Bla s on ice, c ozen? [	Proj. ank?	Name: Pres ocess ha	s beg
Other	: Is Intact? None Ice: / 	Ves	Blue d Initials Comme 1. 2. 3. 4. 5. If	1213739	O Proj. Due L Samples gical Tissue Fri camining Cont	Date: Temp Bla s on ice, c ozen? [	ank?	∃ves ocess ha	s beg
No Seal ags D Type of Corrected C tor: 4 C Ves Ves Ves Ves Ves Ves Ves Ves	Is Intact? None Ice: / 		Blue d Initials Comme 1. 2. 3. 4. 5. If	1213739	O Proj. Due L Samples gical Tissue Fri camining Cont	Date: Temp Bla s on ice, c ozen? [	ank?	∃ves ocess ha	s beg
ags Type of Corrected Corrected Corr	None Ice: / C: / No No No No No No No No		Blue d Initials Comme 1. 2. 3. 4. 5. If	None Biolog of Person Ex	Samples gical Tissue Fr camining Cont	Temp Bla s on ice, c ozen? [	ank?	∃ves ocess ha	s beg
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tor: <u>7</u> C Ves Ves Ves Ves Ves Ves Ves Ves Ves Ves	2.3 □N0 □N0 □N0 □N0 □N0 □N0	Date and           N/A           N/A           N/A           N/A           N/A           N/A	Comme 1. 2. 3. 4. 5. If	of Person Ex	kamining Cont		Yes:	No	8
tor: <u>7</u> C Ves Ves Ves Ves Ves Ves Ves Ves Ves Ves	2.3 □N0 □N0 □N0 □N0 □N0 □N0	Date and           N/A           N/A           N/A           N/A           N/A           N/A	Comme 1. 2. 3. 4. 5. If	of Person Ex	kamining Cont				
Ves Ves Ves Ves Ves Ves Ves Ves Ves Ves		N/A N/A N/A N/A N/A	Comme 1. 2. 3. 4. 5. If	ents:					
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Ves Ves Ves Ves Ves		□N/A □N/A	5. If	Fecal: 🔲 < 8 F					
Ves Ves Ves	□No ⊉No	□N/A		Fecal: 🔲 < 8 H					
Yes Yes	No	List open	6.		10urs >8, <20	4 hours 🕒	]>24 hour	s	
EYes EYes	No	□N/A		off		20X	0		
Pres			7.	r					
Pres		□N/A	8.						
· /	No		9.						
Yes		□N/A	1550						
Pres	No	N/A	10.						
Yes	No			te if sedimer	nt is visible in th	ne dissolve	ed contair	ners.	
	22.0.720	N N 0	-						
Pres	No	N/A	13. Nc	të samples në	eding adjustme	int:			
Yes	Nc	ZN/A	14.						
Yes	No	N/A	15.						
Yes	No		16.						
Yes	Nc								
									3
					Field Data Re	equired?	Yes	No	
		3	Date/Tim	e:		2.02	85	97-ED	
	Yes Yes Yes Yes	Yes No Yes No Yes No Yes No Yes No	Yes     Nc     N/A	Yes     Nc     N/A     13. NC       Yes     Nc     N/A     14.       Yes     Nc     N/A     15.       Yes     Nc     N/A     16.       Yes     Nc     N/A     16.	Yes     No     N/A     13. Note samples no       Yes     No     N/A     14.       Yes     No     N/A     15.       Yes     No     N/A     16.       Yes     No     N/A	Image: Stress in the stress	Image: Second state sta	Image: Second structure       13. Note samples needing adjustment:         Image: Second structure       13. Note samples needing adjustment:         Image: Second structure       13. Note samples needing adjustment:         Image: Second structure       14.         Image: Second structure       14.         Image: Second structure       15.         Image: Second structure       16.         Image: Second structure       16.         Image: Second structure       17.4         Image: Second structure       16.         Image: Second structure       17.4         Image: Second structure       17.4	Image: Second state sta

Note: Whenever there is a discrepancy affecting Norge Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

# NTS

526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290

# Field Date: Report Created:

10/21/2019 10/21/2019 4:49:01 PM

# Client:

General Waste Disposal & Recovery

# NTS Project Name:

CCR Landfill Monitoring 2019

# **NTS Field Personnel:**

Corey Andrews

# Summary of Services Performed:

Prepped and went to General Waste Demolition Landfill to conduct the Fall 2019 CCR well monitoring. Wells were sampled via the low flow stabilization method. Unable to stabilize for turbidity and ORP per NTS standards at MW-7 and was unable to stabilize turbidity at MW-8. A minimum of 5 well volumes were removed from each well before obtaining samples. Well MW-3R was unable to be located. During the new cell construction it is thought that this well was either buried by material or pushed over by equipment. General Waste personnel will attempt to locate well. Samples ceded to PACE Analytical in Virginia, MN. For additional details see field notes and COC.

Event Key: 6385CC\_2019 Oct(1 of 1)

**Field Report Cover Sheet** 



NTS Project Manager: Dennis Schubbe

## MW3R

# 

# Field Blank: Equip Blank:

	Level in Water by				(°C):
	Level in Water by				
Elevation, GW		Field Measure	ment, ft		
	/ (MSL) in Water	by Calculation,	ft		
Unable to Mo	onitor (Dry, Froze	n, Other) in Wa	ter by Field Obse	ervation, N/A	
SERVATIONS			Ti	<b>me:</b> 13:25	
been buried o	or pushed over w	ith the construc	ction of a new ce	ell. Well Frozen or	Dry.
perature: 4	1°F to 50°F		MC	<b>H#:</b> 797239	
nd Speed: 1	0-20 mph		Well Depth	(ft):	
Direction: N	-NE		SWL	(ft):	
cipitation: R	ain		Pump Rate (gp	om):	
oud Cover: 0	vercast		Interval (m	nin):	
articulate: N	one	Well C	asing Diameter	(in): 2	
lor, Purge:		Pu	mp Start (HH:M	M):	
ce, Purge:		Pu	mp Stop (HH:M	M):	
or, Purge:		F	Purge Volume (g	gal):	
r, Sample:			Purging Strate	egy:	
e, Sample:			Well Plug Pres	ent: 🗆	
r, Sample:			Well Loci	ked: 🗆	
S:					
ns not performe	ed in Field Buddy.				
	Apperature:4Ind Speed:1Direction:Ncipitation:Roud Cover:Oarticulate:Nlor, Purge:ice, Purge:icr, Sample:e, Sample:r, Sample:r, Sample:s:s:s:s:not performednot performed	been buried or pushed over w nperature: 41°F to 50°F ind Speed: 10-20 mph Direction: N-NE cipitation: Rain oud Cover: Overcast articulate: None lor, Purge: ice, Purge: ice, Purge: r, Sample: e, Sample: r, Sample: S: Is not performed in Field Buddy. ns not performed in Field Buddy.	been buried or pushed over with the construct operature: 41°F to 50°F and Speed: 10-20 mph Direction: N-NE cipitation: Rain oud Cover: Overcast articulate: None Well C lor, Purge: Pu lor, Purge: Pu lor, Purge: I r, Sample: e, Sample: r, Sample: S: s not performed in Field Buddy.	been buried or pushed over with the construction of a new centres and speed: 10-20 mph Mell Depth Direction: N-NE SWL cipitation: Rain Pump Rate (groud Cover: Overcast Interval (marticulate: None Well Casing Diameter Pump Start (HH:Marce, Purge: Pump Start (HH:Marce, Purge: Pump Start (HH:Marce, Purge: Pump Start (HH:Marce, Purge: Purge: Purge: Pump Start (Start) Start) Start (Start) Start (Start) Start (Start) Start) Start (Start) Start (Start) Start (Start) Start) Start (Start) Start (Start) Start) Start (Start) Start (Start) Start) Start (Start) Start) Start (Start) Start) Start (Start) Start (Start) Start) Start (Start	been buried or pushed over with the construction of a new cell. Well Frozen or nperature: 41°F to 50°F MDH#: 797239 and Speed: 10-20 mph Well Depth (ft): Direction: N-NE SWL (ft): cipitation: Rain Pump Rate (gpm): bud Cover: Overcast Interval (min): articulate: None Well Casing Diameter(in): 2 lor, Purge: Pump Start (HH:MM): hcce, Purge: Pump Stop (HH:MM): lor, Purge: Purge Volume (gal): r, Sample: Purging Strategy: e, Sample: Well Plug Present: C r, Sample: Well Locked: C S: s not performed in Field Buddy. ns not performed in Field Buddy.

# **SECTION #3: STABILIZATION**

Stabilization not Performed at this Location

Stabilization Passes NTS Criteria:

# MW3R (Cont'd) SECTION #4: PHOTOGRAPHS





#### MW7

# SECTION #1: DATA COLLECTION ☑ Sample Collected Field Duplicate:

# Field Blank: Equip Blank:

Time (HH:MM):	рН (SU):	DO (mg/L):	SpecCond (μS/cm):	Turbidity (NTU):	ORP (mV):	Temp (°C):		
9:57	6.25	0.20	2634	5.2	359	9.14		
1475.94 Elevation, GW (MSL) in Water by Calculation, ft								
20.19       Static Water Level in Water by Field Measurement, ft         SECTION #2: OBSERVATIONS       Time: 09:11								

Unable to stabilize ORP and turbidity per NTS SOP standards. 5 well volumes removed prior to sampling.

Air Temperature:	41°F to 50°F	MDH#:	
Wind Speed:	10-20 mph	Well Depth (ft):	26.77
Wind Direction:	N-NE	SWL (ft):	20.19
Precipitation:	None	Pump Rate (gpm):	0.10
Cloud Cover:	Overcast	Interval (min):	10.74
Airborne Particulate:	None	Well Casing Diameter(in):	2
Color, Purge:	Orange	Pump Start (HH:MM):	9:02
Appearance, Purge:	Turbid	Pump Stop (HH:MM):	10:03
Odor, Purge:	None	Purge Volume (gal):	6.10
Color, Sample:	Colorless	Purging Strategy:	Low-Flow Stabilization
Appearance, Sample:	Clear	Well Plug Present:	$\checkmark$
Odor, Sample:	None	Well Locked:	$\checkmark$

## GW CALCULATIONS:

Total Water Depth 26.77ft - Static Water Level 20.19ft = Water Column 6.58ft Water Column 6.58ft x \*Conversion Factor 0.163gal/ft = Well Volume 1.074gal Well Volume 1.074gal ÷ Pump Rate 0.10gpm = Well Volume Interval 10.738min \*Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48 Pump Start Time 09:02 - Pump End Time 10:03 = Pump Duration 61min Pump Duration 61min x Pump Rate 0.10gpm = Volume Purged 6.1gal Top of Casing Elevation 1496.13 - Static Water Level 20.19 = 1475.94ft

SECTION #3: S	TABILIZATIO	N Well Vol In	terval (min):	10.74	Pump	Rate (gpm):	0.10
Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	<=5 NTU +/- 10 %	+/- 20 mV	+/- 0.2 °C	
Time (HH:MM):	рН (SU):	DO (mg/L):	SpecCond (µS/cm):	Turbidity (NTU):	ORP (mV):	Temp (°C):	SWL (ft):
9:13	6.20	0.37	2700	51.5	497	9.41	21.27
9:24	6.19	0.37	2701	16.0	452	9.33	21.30
9:35	6.21	0.33	2680	22.7	404	9.27	21.31
9:46	6.21	0.27	2656	6.0	377	9.20	21.30
9:57	6.25	0.20	2634	5.2	359	9.14	21.29
<b>Stabilization P</b>	asses NTS Cr	iteria: 🗌					

MW7 (Cont'd)

## **MW8**

SECTION #1: DATA COLLECTION	Sample Collected
Field Duplicate:	

# Field Blank: Equip Blank:

Time (HH:MM):	p (SU	H DO ): (mg/L):	SpecCond (µS/cm):	Turbidity (NTU):		ORP (mV):	Temp (°C):
11:42	6.23	8 0.15	1917	42.8		317	9.20
1460.36	Elevation, G	W (MSL) in Water	by Calculation, t	ft			
34.05	Static Water	<sup>r</sup> Level in Water by	Field Measurer	nent, ft			
SECTION #2: OI	BSERVATION	S		Ti	me:	11:08	
Unable to stab	ilize well for t	turbidity. 7 well vo	lumes removed				
Air Ter	mperature:	41°F to 50°F		MD	H#:		
W	ind Speed:	10-20 mph		Well Depth	(ft):	41.40	
Winc	Direction:	N-NE		SWL	(ft):	34.05	
Pre	ecipitation:	None		Pump Rate (gp	m):	0.20	
Cl	oud Cover:	Overcast		Interval (m	in):	6.00	
Airborne F	Particulate:	None	Well C	asing Diameter(	(in):	2	
Co	olor, Purge:	Orange	Pu	mp Start (HH:M	M):	11:00	
Appeara	nce, Purge:	Turbid	Pu	mp Stop (HH:M	M):	11:47	
0	dor, Purge:	None	F	Purge Volume (g	gal):	9.40	
Colo	or, Sample:	Colorless		Purging Strate	egy:	Low-Flow Stabi	lization
Appearanc	ce, Sample:	Silty		Well Plug Prese	ent:		
Odd	or, Sample:	None		Well Lock	ced:		

## GW CALCULATIONS:

Total Water Depth 41.40ft - Static Water Level 34.05ft = Water Column 7.35ft Water Column 7.35ft x \*Conversion Factor 0.163gal/ft = Well Volume 1.199gal Well Volume 1.199gal ÷ Pump Rate 0.20gpm = Well Volume Interval 5.997min \*Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48 Pump Start Time 11:00 - Pump End Time 11:47 = Pump Duration 47min Pump Duration 47min x Pump Rate 0.20gpm = Volume Purged 9.4gal Top of Casing Elevation 1494.41 - Static Water Level 34.05 = 1460.36ft

# SECTION #3: STABILIZATION Well Vol Interval (min): 6.00

Pump Rate (gpm): 0.20

MW8 (Cont'd)

Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	<=5 NTU +/- 10 %	+/- 20 mV	+/- 0.2 °C					
Time (HH:MM):	рН (SU):	DO (mg/L):	SpecCond (µS/cm):	Turbidity (NTU):	ORP (mV):	Temp (°C):	SWL (ft):				
11:06	6.16	1.21	1908	542	381	8.98	35.02				
11:12	6.22	0.89	1853	250.1	370	9.47	35.04				
11:18	6.24	0.54	1886	117.6	354	9.54	35.04				
11:24	6.26	0.34	1909	56.8	340	9.40	35.06				
11:30	6.26	0.25	1908	50.2	322	9.34	35.05				
11:36	6.27	0.21	1909	47.9	327	9.27	35.05				
11:42	6.28	0.15	1917	42.8	317	9.20	35.05				
Stabilization I	Stabilization Passes NTS Criteria:										

# SECTION #1: DATA COLLECTION Sample Collected

Field Duplicate: Field Duplicate

# Field Blank: Field Blank Equip Blank:

Time (HH:MM):	-	рН (J):	DO (mg/L):	SpecCond (µS/cm):	Turbidity (NTU):		ORP (mV):	Temp (°C):
12:54	6.5	53	0.05	1531	3.8		166	7.95
1443.6	Elevation, G	in Water	by Calculation,	ft				
11.12	Static Wate	er Level in	Water by	Field Measurer	ment, ft			
SECTION #2: O	BSERVATION	IS			Ti	ime:	12:32	
Air Te	mperature:	51°F to 6	50°F		M	OH#:	817980	
N	10-20 mph Well Depth (ft):				(ft):	18.95		
Wind	N-NE	N-NE SWL (ft)				11.12		
Pro	ecipitation:	Rain			Pump Rate (gr	om):	0.33	
C	oud Cover:	Overcas	t		Interval (n	nin):	3.87	
Airborne I	Particulate:	None		Well C	asing Diameter	(in):	2	
Co	olor, Purge:	Colorles	S	Pu	mp Start (HH:N	1M):	12:30	
Appeara	nce, Purge:	Clear		Pu	mp Stop (HH:N	1M):	13:00	
Odor, Purge: None		F	Purge Volume (	gal):	9.90			
Col	or, Sample:	Colorles	S		Purging Strat	egy:	Low-Flow S	tabilization
Appearan	ce, Sample:	Clear			Well Plug Pres	ent:	$\checkmark$	
Ode	or, Sample:	None			Well Loc	ked:	$\checkmark$	

## GW CALCULATIONS:

Total Water Depth 18.95ft - Static Water Level 11.12ft = Water Column 7.83ft Water Column 7.83ft x \*Conversion Factor 0.163gal/ft = Well Volume 1.278gal Well Volume 1.278gal ÷ Pump Rate 0.33gpm = Well Volume Interval 3.872min \*Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48 Pump Start Time 12:30 - Pump End Time 13:00 = Pump Duration 30min Pump Duration 30min x Pump Rate 0.33gpm = Volume Purged 9.9gal Top of Casing Elevation 1454.72 - Static Water Level 11.12 = 1443.6ft

SECTION #3: ST	TABILIZATIO	N Well Vol In	Pump	Rate (gpm):	0.33				
Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	<=5 NTU +/- 10 %	+/- 20 mV	+/- 0.2 °C			
Time (HH:MM):	рН (SU):	DO (mg/L):	SpecCond (µS/cm):	Turbidity (NTU):	ORP (mV):	Temp (°C):	SWL (ft):		
12:34	6.50	0.09	1620	27.0	204	7.93	11.15		
12:38	6.51	0.06	1583	13.3	185	7.92	11.15		
12:42	6.51	0.06	1564	8.1	178	7.94	11.15		
12:46	6.52	0.06	1547	4.9	173	7.95	11.15		
12:50	6.53	0.06	1538	4.0	169	7.95	11.15		
12:54	6.53	0.05	1531	3.8	166	7.95	11.15		
Stabilization Pa	tabilization Passes NTS Criteria: 🔽								

MW9 (Cont'd)

# NTS

**Calibration Report** 

526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290

Event Key: 6385CC\_2019 Oct(1 of 1)



Staff: Corey Andrews

**Date:** 10/21/2019

Post Cal Check: 🗹

# Comments:

Sonde: R04-D	PreCal	PostCal	PostEvent		
Last Temp Check: 6/26/2019	(HH:MM):	(HH:MM):	(HH:MM):		
<b>Temp Specification:</b> +/-0.1 °C	7:10	7:10	15:55	Specifications:	
pH:	4.03	4.0	3.85	+/-0.2 SU	
Standard (SU):	4.0	4.0	4.0	17-0.2 30	
Temperature (°C):	19.09	19.09	19.37		
pH:	7.07	7.0	6.87	+/-0.2 SU	
Standard (SU):	7.0	7.0	7.0	17-0.2 30	
Temperature (°C):	19.55	19.55	18.61		
pH:	9.97	10.0	9.89	+/-0.2 SU	
Standard (SU):	10.0	10.0	10.0	17-0.2 30	
Temperature (°C):	19.16	19.16	19.03		
Conductance, Specific:	0.5	0	0	Sum of	
Standard (µmhos/cm):	0	0	0	+/-1 μmhos/cm	
Temperature (°C):	19.42	19.42	19.23	AND	
				+/-0.5%	
Conductance, Specific:	982.2	1000	1005	Sum of	
Standard (µmhos/cm):	1000	1000	1000	+/-1 μmhos/cm	
Temperature (°C):	19.37	19.37	19.89	AND	
				+/-0.5%	
Turbidity:	0.0	0.0	0.2	<100 +/-1 NTU	
Standard (NTU):	0	0	0	>100 AND <400 +/-12 NTU	
Temperature (°C):	17.37	17.37	18.54	>400 AND <3000 +/-150 NTU	
Turbidity:	111.5	114	113.7	<100 +/-1 NTU	
Standard (NTU):	114	114	114	>100 AND <400 +/-12 NTU	
Temperature (°C):	19.92	19.92	19.62	>400 AND <3000 +/-150 NTU	

# Calibration Report (cont'd)

Sonde: R04-D	PreCal	PostCal	PostEvent	
Last Temp Check: 6/26/2019	(HH:MM):	(HH:MM):	(HH:MM):	
Temp Specification: +/-0.1 °C	7:10	7:10	15:55	Specifications:
Oxygen, Dissolved:	8.57	8.63	8.63	<8 +/-0.1 mg/L
100% Oxygen Saturation:	8.65	8.65	8.73	>8 AND <20 +/-0.2 mg/L
Temperature (°C):	19.5	19.5	18.4	>20 +/-10%
Bar.Pressure (mmHg):	717	717	708	
ORP:	450	455	450	 +/-20 mV
Standard (mV):	455.5	455.5	447.2	·/-20111v
Temperature (°C):	15.0	15.0	18.3	

G385CC Gen Wuste Fall 2019 CCR well Monitoring 10/21/2019
Corey Hadrews V#60
High 47°F/Overcast w/ rain/winds NE 10-15 mph
0850 Arrive @ Gen Waste Demo Landfill.
0854 (MW-7) Begin pumping @ 0902. Key #2104. 1000 sample obtained
SWL TWD WC Vol pump rate
20.19' 26.77' 6.58' I.Igal O. 10 6PM
PH SpC Temp DRP LDO TSIB SUL
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
0935 6.21 2680 9.27 404 0.33 22.7 21.31 0946 6.21 2656 9.20 377 0.27 6.0 21.30
acter lac Arail Chill Arth
* Unable to stubilize ORP Turb per NTS SOP. standards. 5 well volumes
1015 (1) and lack of the cost
1015 Could not locate well Mw-3R. Well has appeared to be covered
or pushed over with landfill expansion. obtained photos.
JO55 (nw-8) 1100 Begin pumping. Key #2106, 1145 sample abtained
34.05 41.40 7.35 1.2gal 0.20 GPM
106 6.16 1908 8.98 381 1.21 542 35.02
1106 6.16 1908 8.98 381 1.21 542 35.02 1112 6.22 1853 9.47 370 0.89 250.1 35.04
1118 6.24 1886 9.54 354 0.54 117.6 35.04
1124 6.26 1909 9.40 340 0.34 56.8 35.06
1130 6.26 1908 9.34 332 0.25 50.2 35.05
1136 6.27 1909 9.27 327 0.21 47.9 35.04
1142 6.28 1917 9.20 317 0.15 42.8 35.05
1217 MW-9 1230 Begin pumping, Key #0410.1240 FB, 1255 sample. 1256 Dup
Stud the line later
11.12 18.95 7.83 (, 3ga) 0.33CPM
A pH Spc Temp ORP LDO Torb SWL
12.34 6.50 1620 7.93 204 0.09 27.0 11.15
1238 6.51 1583 7.92 185 0.06 13.3 11.15
1242 6.51 1564 7.94 178 0.06 8.1 11.15
- 1246 6.52 1547 7.95 173 0.06 4.9 11.15
1250 6.53 1539 7.95 169 0.06 4.0 11.15
1254 6.53 1531 7,95 166 0,05 3.8 11.15
1323 went around w/ gen, waste personnel & staken where MW-ZP used take
1440 separt
1525 cede samples to PACE, (very and
Scale: 1 square = 1530 A mixe back at NTS. Unload Post check/ Report Rep
Page 13 of 17

<b>NTS</b> 526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290	Vehicle Inspection Re Event Key: 6385CC_2019 Oc							
Driver: Corey Andrews Vehicle: V60 - 2013 GMC Sierra 15		.0/21/2019 Time: 08:00 Odometer:						
Check each Item Inspected								
Driver/Passenger Side								
External Side Mirrors (Right and Left): 🔽	Windows (clean; free of cracks):	Tires ✓ (properly inflated, adequate tread): ✓						
Comments:	· · · · · ·							
Front/Rear								
Tail Lights: 🗹	Head Lights							
License Plates 🔽	Fluid Leaks	✓ Turn Signals						
Comments:								
Routine Maintenance								
Oil Change (Current): ☑	Transmission Fluid (Change every 60k):	Air Filter ✓ (Change every 30k): ✓						
Gauges Operational	Spare Tire							
('check engine' light OFF): ☑	(present, properly inflated):							
Comments:								
Interior								
Cleanliness: 🗹	Brakes:							
Seat Belts (working condition): 🔽	Parking Brake (reset/release):	Rearview Mirror: 🗹						
Comments:								
General/Safety								
Insurance Card: 🗹	Wheel Chocks:	✓ First Aid Kit: ✓						
Operator's Manual: 🔽	Strobe Light (if needed):	Buggy Whip ✓ (if needed): ✓						
Comments:								

**Deficiencies Corrected** 



& Engineering

# **Daily Tailgate Safety**

Project:	63856	Date: 10/21/2019
Work Site	e Hazard Assessment Worksheet	
U	PPE Required (List): High viz, salely	. glasses Level* D
U	PPE Required (List): <u>High viz, safety</u> Weather Conditions (List): <u>High 48°F</u> ,	rain, NE 200 mph
	Vehicular Traffic	Communications
Г	Noise	Equipment/Tools
D	Housekeeping	Other Site Hazards**
Hazards	Identified/Safety Items Discussed: Vehicle Safety Stips, Trips, Falls	
	proposition salls	
Carlor and the second	ve Actions Taken:	ē
	Once de Ensurely Maintain Proper Footing	

Participants in Safety Discussion:

	Print Name	Signature
	1. Jan Strasburg	ch Stype
	2. Corey Andrews	Corend man
	3	0
	4	
	5	
		(1())
Sig	nature of Site Supervisor/Examiner	Date: 10/21/2019

\*Level D, C, B or A

\*\*Examples: Heavy Equipment, Air Quality, Flammable materials, Wildlife, Work Site Security, Confine Space

Environmental Science & Engineering	526 C invironmental Science & Engineering (218) 741-42							PAGE 1 OF 1 CHAIN OF CUSTODY RECORD REQUIRED TURN-AROUND TIME: 2 Weeks from submittal date				
DEMOLITION &	TE and RECYLING INDUSTRIAL LAND UNTY, MINNESOTA	FILL	REPORT TO DENNIS S RICK (	CHUBBE, KAR CRUM & SCOT	ISSA VOS T SEELEY	EN,	-	GENERAL CHEMISTRY (NO PRES)		(HN03)	SEE ATTACHED LIST WITH METHODS	
MPLER: Corey A.	POSAL and RECYCLIN	IG, LLC.	PERMIT REQ.:	SW-620-002 Oct-19			VOC M. 8	ERAL CHEM	GENERAL CHEMISTRY (H2SO4) TOTAL METALS (HN03)	DISSOLVED METALS	*	
OJECT NUMBER: 6385CC OG-IN #:	CCR Monitoirng	EBESORIERION	COLL		MATRIX	filtered		GEN	j	ă		
	MW3R	GW WELL	11 5	nple	X	N		1	1		REQUIRED ANALYSIS Boron, Calcium, Chloride, Flouride, pH, Sulfate & TDS	
	MW7	GW WELL	10/21/19	1600	x	Ň		1	1		Boron, Calcium, Chloride, Flouride, pH, Sulfate & TDS	
	MVV8	GW WELL	6/21/19	1145	x	N		1	1		Boron, Calcium, Chloride, Flouride, pH, Sulfate & TDS	
	MW9	GW WELL	6/2./19	(2.55	×	N		1	1		Boron, Calcium, Chloride, Flouride, pH, Sulfate & TDS	
	Field Duplicate	GW WELL	10/21/19	1256	×	N		1	1			
	Field Blank	Field Blank	10/2/19	1240	x	N		1	1		Boron, Calcium, Chloride, Flouride, pH, Sulfate & TDS Boron, Calcium, Chloride, Flouride, pH, Sulfate & TDS	
NOUISHED BY:	l l	DATE: <b>(-/2./ (*</b> IME: <b>(* 52.5</b> *	RECEIVED BY:							ATE:		
NQUISHED TO NTS SAMPLE L	OCK-UP BY:	DATE: IME:	RECEIVED FROM N	NTS SAMPLE LO	CKUP BY:				DA	ME: ATE: ME:		
EIVERFORMABBY:	lad		TEMP.AT ARRIVAL				ALT COMP					
0121/19	IS 25				1							

# GENERAL WASTE CCR MONITORING METHODS

PARAMETER	SYMBOL	EPA Method
Boron	В	200.8
Calcium	Ca	200.7
Chloride	Chloride	300.0
Fluoride	Flouride	300.0
рН	рН	SM 4500 H+B
Sulfate	SO <sub>4</sub>	300.0
TDS	TDS	SM 2540C

# NTS

526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290

# **Field Report Peer Review Report**

Event Key: 6385CC\_2019 Oct(1 of 1) Report Date: 10/21/2019 Lab WO#: 12137390



Reviewer #1:	Date:
Karissa Vosen	10/22/2019

Reviewer #2:	Date:
Terri Sabetti	10/22/2019

Report Sections	Required:	Included:
Cover Sheet:	$\checkmark$	$\checkmark$
Location Information		
Data Collection:		
Observation:	$\checkmark$	$\checkmark$
Flow or Stabilization:	$\checkmark$	$\checkmark$
Photographs:		$\checkmark$
Calibration:	$\checkmark$	$\checkmark$
Field Notes:	$\checkmark$	$\checkmark$
Safety Forms:	$\checkmark$	$\checkmark$
	N/A:	OK:
GW Calculations are Accurate:		$\checkmark$
GW Stabilization Criteria met:		
Flow Calculations are Accurate:	$\checkmark$	
Sonde Passed Post Event Check:		$\checkmark$
Consistent Values in Notes:		
<b>Consistent Dates and Times:</b>		$\checkmark$
No Deviations from SOPs:		$\checkmark$
Cover Sheet provides a complete description of key activities and observations:		

## **Reviewer #1 Comments:**

Stabilization criteria was not met for ORP and turbidity at MW7 and turbidity at MW8. A minumum of 5 well volumes was removed prior to sampling per NTS SOP. Results were qualified.

Report Sections	<b>Required:</b>	Included:
Cover Sheet:	$\checkmark$	$\checkmark$
Location Information		
Data Collection:	$\checkmark$	$\checkmark$
Observation:	$\checkmark$	$\checkmark$
Flow or Stabilization:	$\checkmark$	$\checkmark$
Photographs:	$\checkmark$	$\checkmark$
Calibration:	$\checkmark$	$\checkmark$
Field Notes:	$\checkmark$	$\checkmark$
Safety Forms:	$\checkmark$	$\checkmark$
	N/A:	OK:
GW Calculations are Accurate:		$\checkmark$
GW Stabilization Criteria met:		
Flow Calculations are Accurate:	$\checkmark$	
Sonde Passed Post Event Check:		$\checkmark$
<b>Consistent Values in Notes:</b>		$\checkmark$
<b>Consistent Dates and Times:</b>		$\checkmark$
Qualifiers added to Data:		$\checkmark$
Data under correct Event Key:		$\checkmark$
All Req'd Parameters Meas'd; Limits Met:		

**Reviewer #2 Comments:** 

**APPENDIX B** 

**STATISTICAL ANALYSIS** 



July 17, 2019

Mr. Jon Penheiter Dem-Con Companies 13020 Dem-Con Drive Shakopee, MN 55379 jonpenheiter@dem-con.com

Sent Via Email

# **RE:** Statistical Analysis for April 2019 groundwater monitoring event for CCR compliance at the Keewatin, MN facility

Mr. Penheiter,

NTS is pleased to submit this report summarizing the CCR monitoring data collected in April, 2019 as well as the statistical analysis completed in accordance with the facility Statistical Analysis Plan (SAP).

Review of the data shows that no downgradient wells (MW-3R, MW-8, MW-9) indicated any exceedance of trigger values. The facility up-gradient well (MW-7) did show two parameters (Sulfate, TDS) in exceedance of the trigger value. However, MW-7 is not a compliance well and therefore this would not be assessed in regards to determining if a Statistically Significant Increase (SSI) has occurred due to the CCR facility. This is the 1<sup>st</sup> occurrence of elevated Sulfate and Total Dissolved Solids (TDS) in MW-7. Chloride concentrations in MW-7 had been elevated above the trigger value in both the April, 2018 and October, 2018 events, but was measured below the trigger value in the April, 2019 event.

MW-7 continues to show significant variability in water quality. It is recommended that detection monitoring continue per the SAP and the potentially changing up-gradient conditions be assessed when the background dataset is updated following 2 years of detection monitoring (After October, 2019 event).

## **Detection Monitoring**

Detection monitoring at the Keewatin facility includes monitoring of 4 groundwater wells, one up-gradient well (MW-7) and three downgradient wells (MW-3R, MW-8, and MW-9). Field parameters and laboratory samples were collected on April 25, 2019. Laboratory results were received from PACE Analytical on May 13, 2019. Lab analyses completed includes those found in the CCR guidance Appendix III table (See Appendix C). The monitoring results and the established detection monitoring trigger values can be seen in Tables 1 and 2, respectively. The highlighted cells in Table 1 indicate monitored results above the trigger value (MW-7 Sulfate & Total Dissolved Solids (TDS)).



2017 April Detection Monitoring Event Results							
Parameter	MW-7 MW-3R		<b>MW-8</b>	MW-9			
Boron (ug/L)	69.7	96	75.8	<50			
Calcium (mg/L)	481	484	343	206			
Chloride (mg/L)	61.4	2.8	4.3	2.9			
Fluoride (mg/L)	<0.10	<0.10	<0.10	<0.10			
pH (SU)	6.29	6.35	6.30	6.52			
Sulfate (mg/L)	988	1300	562	423			
Total Dissolved Solids (mg/L)	1970	2560	1380	1020			

Table 12019 April Detection Monitoring Event Results

Table 2
<b>Detection Monitoring Trigger Values</b>

Parameter	<b>MW-7</b>	MW-3R	<b>MW-8</b>	MW-9			
Boron (ug/L)	87.8	130.1	87.8	87.8			
Calcium (mg/L)	506.7	06.7 667.5 506.7		506.7			
Chloride (mg/L)	81.94	81.94	81.94	81.94			
Fluoride (mg/L)	0.11	0.11 0.11		0.11			
pH (SU)	6.286 - 6.814	6.286 - 6.814	6.286 - 6.814	6.286 - 7.318			
Sulfate (mg/L)	811.1	1937	811.1	811.1			
Total Dissolved Solids (mg/L)	1742	3571	1742	1742			



## **Statistical Analysis**

The Statistical Analysis Plan (SAP) for the facility and CCR guidance details that only downgradient wells (compliance wells) are to be analyzed for Statistically Significant Increases (SSIs). The SAP also specifies a 2-sample test be used to determine if an SSI has occurred.

No SSI has occurred in the April, 2019 monitoring event.

A review of the 2017 annual report detailed a few points of interest that were to be further assessed following additional monitoring. The following is an excerpt from the annual report with responses in light of the 2018 and April, 2019 monitoring events:

"Review of Sulfate concentrations in MW-3R indicated a statistically significant increasing trend. Due to the narrow range (1710-1890 mg/L) of measured values, no correction for trending was completed. This should be further assessed following additional monitoring events."

The April and October, 2018 events indicated a sulfate value of 1520 mg/L and 1550 mg/L in MW-3R. The April, 2019 event indicated a value of 1300 mg/L. These values do not support the measured increasing trend in the background dataset, but rather suggest a decreasing trend. This further indicates the observed trend in the background dataset to be coincidental.

If you have any questions, please contact me at (218) 742-1022.

Sincerely, Northeast Technical Services, Inc.

7-16-19

Evan C. Johnson, PE Geotechnical Engineer MN License # 53755

Appendix A: April 2019 Monitoring Results Appendix B: Statistical Analysis Plan Appendix C: Appendix III Parameters

# **Appendix A** Laboratory Results and Field Report



Pace Analytical Services, LLC 315 Chestnut Street Virginia, MN 55792 (218) 742-1042

May 13, 2019

Dennis Schubbe Northeast Technical Services 526 Chestnut Street Virginia, MN 55792

RE: Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report Pace Project No.: 12124076

Dear Dennis Schubbe:

Enclosed are the analytical results for sample(s) received by the laboratory on April 25, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This report was revised to remove the D3 flag on the Field Blank sample.

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

Sincerely,

Carin Jren

Carrie Jensen carrie.jensen@pacelabs.com (218)742-1042 Project Manager

Enclosures

cc: Sample Data, Northeast Technical Services Scott Seeley, NTS Karissa Vosen, NTS





#### CERTIFICATIONS

Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report Pace Project No.: 12124076

#### **Minnesota Certification IDs**

1700 Elm Street SE, Minneapolis, MN 55414-2485 A2LA Certification #: 2926.01 Alabama Certification #: 40770 Alaska Contaminated Sites Certification #: 17-009 Alaska DW Certification #: MN00064 Arizona Certification #: AZ0014 Arkansas DW Certification #: MN00064 Arkansas WW Certification #: 88-0680 California Certification #: 2929 CNMI Saipan Certification #: MP0003 Colorado Certification #: MN00064 Connecticut Certification #: PH-0256 EPA Region 8+Wyoming DW Certification #: via MN 027-053-137 Florida Certification #: E87605 Georgia Certification #: 959 Guam EPA Certification #: MN00064 Hawaii Certification #: MN00064 Idaho Certification #: MN00064 Illinois Certification #: 200011 Indiana Certification #: C-MN-01 Iowa Certification #: 368 Kansas Certification #: E-10167 Kentucky DW Certification #: 90062 Kentucky WW Certification #: 90062 Louisiana DEQ Certification #: 03086 Louisiana DW Certification #: MN00064 Maine Certification #: MN00064 Marvland Certification #: 322 Massachusetts Certification #: M-MN064 Michigan Certification #: 9909 Minnesota Certification #: 027-053-137

#### Virginia Minnesota Certification ID's

315 Chestnut Street, Virginia, MN 55792 Montana Certificate #CERT0103 Alaska Certification UST-107 Minnesota Dept of Health Certification #: 027-137-445 Minnesota Dept of Ag Certifcation #: via MN 027-053-137 Minnesota Petrofund Certification #: 1240 Mississippi Certification #: MN00064 Missouri Certification #: 10100 Montana Certification #: CERT0092 Nebraska Certification #: NE-OS-18-06 Nevada Certification #: MN00064 New Hampshire Certification #: 2081 New Jersey Certification #: MN002 New York Certification #: 11647 North Carolina DW Certification #: 27700 North Carolina WW Certification #: 530 North Dakota Certification #: R-036 Ohio DW Certification #: 41244 Ohio VAP Certification #: CL101 Oklahoma Certification #: 9507 Oregon Primary Certification #: MN300001 Oregon Secondary Certification #: MN200001 Pennsylvania Certification #: 68-00563 Puerto Rico Certification #: MN00064 South Carolina Certification #:74003001 Tennessee Certification #: TN02818 Texas Certification #: T104704192 Utah Certification #: MN00064 Vermont Certification #: VT-027053137 Virginia Certification #: 460163 Washington Certification #: C486 West Virginia DEP Certification #: 382 West Virginia DW Certification #: 9952 C Wisconsin Certification #: 999407970 Wyoming UST Certification #: via A2LA 2926.01

North Dakota Certification: # R-203 Wisconsin DNR Certification # : 998027470 WA Department of Ecology Lab ID# C1007



## SAMPLE SUMMARY

 Project:
 [6385CC\_2019 Apr(1 of 1)]-Revised Report

 Pace Project No.:
 12124076

Lab ID	Sample ID	Matrix	Date Collected	Date Received
12124076001	Field Blank	Water	04/25/19 11:50	04/25/19 15:50
12124076002	Field Duplicate	Water	04/25/19 14:35	04/25/19 15:50
12124076003	MW3R	Water	04/25/19 12:05	04/25/19 15:50
12124076004	MW7	Water	04/25/19 10:52	04/25/19 15:50
12124076005	MW8	Water	04/25/19 13:24	04/25/19 15:50
12124076006	MW9	Water	04/25/19 14:34	04/25/19 15:50



## SAMPLE ANALYTE COUNT

Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report

Pace Project No.: 12124076

Lab ID Sample ID		Method	Analysts	Analytes Reported	Laboratory	
12124076001	Field Blank	EPA 200.7	DM	1	PASI-M	
		EPA 200.8	PW1	1	PASI-M	
		SM 2540C (1997)	KER	1	PASI-V	
		SM 4500-H+B	ZJT	1	PASI-V	
		EPA 300.0	ZJT	3	PASI-V	
12124076002	Field Duplicate	EPA 200.7	DM	1	PASI-M	
		EPA 200.8	PW1	1	PASI-M	
		SM 2540C (1997)	KER	1	PASI-V	
		SM 4500-H+B	ZJT	1	PASI-V	
		EPA 300.0	ZJT	3	PASI-V	
12124076003	MW3R	EPA 200.7	DM	1	PASI-M	
		EPA 200.8	PW1	1	PASI-M	
		SM 2540C (1997)	KER	1	PASI-V	
		SM 4500-H+B	ZJT	1	PASI-V	
		EPA 300.0	ZJT	3	PASI-V	
12124076004	MW7	EPA 200.7	DM	1	PASI-M	
		EPA 200.8	PW1	1	PASI-M	
		SM 2540C (1997)	KER	1	PASI-V	
		SM 4500-H+B	ZJT	1	PASI-V	
		EPA 300.0	ZJT	3	PASI-V	
12124076005	MW8	EPA 200.7	DM	1	PASI-M	
		EPA 200.8	PW1	1	PASI-M	
		SM 2540C (1997)	KER	1	PASI-V	
		SM 4500-H+B	ZJT	1	PASI-V	
		EPA 300.0	ZJT	3	PASI-V	
12124076006	MW9	EPA 200.7	DM	1	PASI-M	
		EPA 200.8	PW1	1	PASI-M	
		SM 2540C (1997)	KER	1	PASI-V	
		SM 4500-H+B	ZJT	1	PASI-V	
		EPA 300.0	ZJT	3	PASI-V	



## **ANALYTICAL RESULTS**

#### Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report

Pace Project No.: 12124076

Sample: Field Blank	Lab ID: 121	24076001	Collected: 04/25/1	9 11:50	Received: 04	4/25/19 15:50	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
200.7 MET ICP	Analytical Met	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	ND	mg/L	0.50	1	05/01/19 10:08	05/02/19 16:38	7440-70-2		
200.8 MET ICPMS	Analytical Metl	hod: EPA 20	0.8 Preparation Met	thod: EP	PA 200.8				
Boron	ND	ug/L	10.0	1	05/01/19 10:08	05/03/19 20:03	7440-42-8		
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	0C (1997)						
Total Dissolved Solids	ND	mg/L	10.0	1		04/30/19 17:01			
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	0-H+B						
pH at 25 Degrees C	6.2	Std. Units	0.10	1		04/30/19 18:04		H6	
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0						
Chloride	ND	mg/L	1.0	1		05/01/19 07:13	16887-00-6		
Fluoride	ND	mg/L	0.10	1		05/01/19 07:13			
Sulfate	ND	mg/L	2.0	1		05/01/19 07:13	14808-79-8		
Sample: Field Duplicate	Lab ID: 121	24076002	Collected: 04/25/1	19 14:35	6 Received: 04	4/25/19 15:50 N	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua	
200.7 MET ICP	Analytical Met	hod: EPA 20	0.7 Preparation Met	thod: EP	PA 200.7				
Calcium	203	mg/L	0.50	1	05/01/19 10:08	05/02/19 16:45	7440-70-2		
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Preparation Met	thod: EP	PA 200.8				
Boron	ND	ug/L	50.0	5	05/01/19 10:08	05/03/19 20:15	7440-42-8	D3	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	0C (1997)						
Total Dissolved Solids	1050	mg/L	20.0	1		04/30/19 17:00			
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	0-H+B						
pH at 25 Degrees C	7.3	Std. Units	0.10	1		04/30/19 17:51		H6	
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0						
Chloride	2.8	mg/L	1.0	1		05/01/19 05:29	16887-00-6		
Fluoride	ND	mg/L	0.10	1		05/01/19 05:29	16984-48-8		
Sulfate	441	mg/L	8.0	4		05/01/19 12:06	14808-79-8		
Sample: MW3R	Lab ID: 121	24076003	Collected: 04/25/1	19 12:05	Received: 04	4/25/19 15:50 N	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua	
200.7 MET ICP		hod: EPA 200	0.7 Preparation Met						
							7440 70 0		
Calcium	484	mg/L	0.50	1	05/01/19 10:08	05/02/19 16:40	7440-70-2		

## **REPORT OF LABORATORY ANALYSIS**

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## ANALYTICAL RESULTS

#### Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report

Pace Project No.: 12124076

Sample: MW3R	Lab ID: 121	24076003	Collected:	04/25/1	19 12:05	Received: 04	/25/19 15:50	Matrix: Water	
Parameters	Results	Units	Report	t Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Prepara	tion Met	thod: EP	A 200.8			
Boron	96.0	ug/L		50.0	5	05/01/19 10:08	05/03/19 20:06	7440-42-8	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	40C (1997)						
Total Dissolved Solids	2560	mg/L		20.0	1		04/30/19 16:59		
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	00-H+B						
pH at 25 Degrees C	7.4	Std. Units		0.10	1		04/30/19 18:07		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0						
Chloride Fluoride Sulfate	2.8 ND 1300	mg/L mg/L mg/L		1.0 0.10 20.0	1 1 10		05/01/19 04:26 05/01/19 04:26 05/01/19 04:47	16984-48-8	
Sample: MW7	Lab ID: 121	24076004	Collected:	04/25/1	19 10:52	Received: 04	/25/19 15:50	Matrix: Water	
Parameters	Results	Units	Report	t Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 MET ICP	Analytical Met	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	481	mg/L		0.50	1	05/01/19 10:08	05/02/19 16:37	7440-70-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Prepara	tion Met	thod: EP	A 200.8			
Boron	69.7	ug/L		50.0	5	05/01/19 10:08	05/03/19 20:00	7440-42-8	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	40C (1997)						
Total Dissolved Solids	1970	mg/L		20.0	1		04/30/19 16:56		
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	00-H+B						
pH at 25 Degrees C	7.4	Std. Units		0.10	1		04/30/19 17:55		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0						
Chloride Fluoride Sulfate	61.4 ND 988	mg/L mg/L mg/L		1.0 0.10 20.0	1 1 10		05/01/19 06:31 05/01/19 06:31 05/01/19 12:27	16984-48-8	
Sample: MW8	Lab ID: 121	24076005	Collected:	04/25/1	19 13:24	Received: 04	/25/19 15:50	Matrix: Water	
Parameters	Results	Units	Report	t Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 MET ICP	Analytical Met	hod: EPA 20	0.7 Prepara	tion Met	thod: EP	A 200.7			
Calcium	343	mg/L		0.50	1	05/01/19 10:08	05/02/19 16:42	7440-70-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Prepara	tion Met	thod: EP	A 200.8			
Boron	75.8	ug/L		50.0	5	05/01/19 10:08	05/03/19 20:09	7440-42-8	

## **REPORT OF LABORATORY ANALYSIS**

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## **ANALYTICAL RESULTS**

#### Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report

Pace Project No.: 12124076

Sample: MW8	Lab ID: 121	124076005	Collected: 04/25/1	9 13:24	Received: 04	/25/19 15:50 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Met	thod: SM 254	OC (1997)					
Total Dissolved Solids	1380	mg/L	20.0	1		04/30/19 16:59		
4500H+ pH, Electrometric	Analytical Met	thod: SM 450	0-H+B					
pH at 25 Degrees C	7.2	Std. Units	0.10	1		04/30/19 17:48		H6
300.0 IC Anions 28 Days	Analytical Met	thod: EPA 30	0.0					
Chloride Fluoride Sulfate	1.3 ND 562	mg/L mg/L mg/L	1.0 0.10 12.0	1 1 6		05/01/19 05:08 05/01/19 05:08 05/01/19 11:45	16984-48-8	
Sample: MW9	Lab ID: 121	124076006	Collected: 04/25/1	9 14:34	Received: 04	1/25/19 15:50 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 MET ICP	Analytical Met	thod: EPA 20	0.7 Preparation Met	hod: EF	PA 200.7			
Calcium	206	mg/L	0.50	1	05/01/19 10:08	05/02/19 16:43	7440-70-2	
200.8 MET ICPMS	Analytical Met	thod: EPA 20	0.8 Preparation Met	hod: EF	PA 200.8			
Boron	ND	ug/L	50.0	5	05/01/19 10:08	05/03/19 20:12	7440-42-8	D3
2540C Total Dissolved Solids	Analytical Met	thod: SM 254	0C (1997)					
Total Dissolved Solids	1020	mg/L	20.0	1		04/30/19 17:00		
4500H+ pH, Electrometric	Analytical Met	thod: SM 450	0-H+B					
pH at 25 Degrees C	7.5	Std. Units	0.10	1		04/30/19 17:58		H6
300.0 IC Anions 28 Days	Analytical Met	thod: EPA 30	0.0					
Chloride Fluoride Sulfate	<b>2.9</b> ND <b>423</b>	mg/L mg/L mg/L	1.0 0.10 8.0	1 1 4		05/01/19 06:52 05/01/19 06:52 05/01/19 12:47	16984-48-8	



Project: Pace Project No.:	[6385CC_2019 Ap 12124076	r(1 of 1)]-Revised F	Report									
						<b>ED4 000 7</b>						
QC Batch:	602602			sis Meth		EPA 200.7						
QC Batch Method:	EPA 200.7		Analy	sis Desc	ription:	200.7 MET						
Associated Lab San	nples: 12124076	001, 12124076002,	1212407	6003, 12	124076004,	, 121240760	05, 121240	76006				
METHOD BLANK:	3258183			Matrix: \	Water							
Associated Lab San	nples: 12124076	001, 12124076002.	1212407	6003. 12	124076004.	. 121240760	05. 121240	76006				
		,	Blar	,	Reporting		, -					
Paran	neter	Units	Res		Limit	Anal	yzed	Qualifier	S			
Calcium		mg/L		ND	0.8	50 05/02/1	9 16:17					
		0050404										
LABORATORY CON	NTROL SAMPLE:	3258184	Calles		~~		0/ D					
Paran	a a ta r	Units	Spike Conc.		.CS esult	LCS % Rec	% R Limi		Qualifiers			
Paran	leter	Units	Conc.	K		% Rec		15	Quaimers	_		
Calcium		mg/L	2	0	20.0	10	0 8	85-115				
	IATRIX SPIKE DUP	LICATE: 325818	35		325818	6						
		LIOAIL. 323010			525010	0						
MATRIX SPIKE & N			MS	MSD								
MATRIX SPIKE & N		12123002002	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter			MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual

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.



,	[6385CC_2019 Apr	(1 of 1)]-Revised F	Report									
Pace Project No.:	12124076											
QC Batch:	602622		Analys	sis Method	1:	EPA 200.8						
QC Batch Method:	EPA 200.8		Analys	sis Descrip	otion:	200.8 MET						
Associated Lab Sam	nples: 121240760	01, 12124076002	12124076	6003, 1212	24076004,	121240760	05, 121240	76006				
METHOD BLANK:	3258262		ſ	Matrix: Wa	ater							
Associated Lab Sam	ples: 121240760	01, 12124076002	12124076	6003, 1212	24076004,	121240760	05, 121240	76006				
			Blanl	k F	Reporting							
Param	neter	Units	Resu	lt	Limit	Analy	/zed	Qualifier	rs			
Boron		ug/L		ND	10	.0 05/03/19	9 19:30					
LABORATORY CON	ITROL SAMPLE:	3258263	0.11									
			Spike	LC	-	LCS	% Re		Qualifiara			
LABORATORY CON		3258263 Units	Spike Conc.	LC: Res	-	LCS % Rec	% Re Limi		Qualifiers			
			•	Res	-		Limi		Qualifiers	_		
Param	neter	Units ug/L	Conc. 100	Res	ult 92.5	% Rec 92	Limi	ts	Qualifiers	_		
Param Boron	neter	Units ug/L	Conc. 100	Res	ult	% Rec 92	Limi	ts	Qualifiers	_		
Param Boron	neter	Units ug/L LICATE: 325820	Conc. 100	Res	ult 92.5	% Rec 92	Limi	ts	Qualifiers	_	Max	
Param Boron	ATRIX SPIKE DUPI	Units ug/L LICATE: 325820 12124033020	Conc. 100 64 MS	MSD	ult 92.5 325826	% Rec 92	 2 {8	ts 35-115		RPD	Max RPD	Qual

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.



Project: [63	385CC_2019 Ap	or(1 of 1)]-Revised I	Report				
Pace Project No.: 12	124076						
QC Batch: 1	65113		Analysis Me	ethod:	SM 2540C (199	7)	
QC Batch Method: S	SM 2540C (1997	7)	Analysis De	escription: 2	2540C Total Dis	solved Solids	
Associated Lab Sample	es: 12124076	001, 12124076002	, 12124076003,	12124076004,	12124076005,	12124076006	
METHOD BLANK: 65	0643		Matrix	: Water			
Associated Lab Sample	es: 12124076	001, 12124076002	, 12124076003,	12124076004,	12124076005,	12124076006	
			Blank	Reporting			
Paramete	er	Units	Result	Limit	Analyzeo	l Qualif	iers
Total Dissolved Solids		mg/L	ND	10.0	0 04/30/19 16	:55	
METHOD BLANK: 65	0647		Matrix	: Water			
Associated Lab Sample	es: 12124076	001, 12124076002	, 12124076003,	12124076004,	12124076005,	12124076006	
			Blank	Reporting			
Paramete	er	Units	Result	Limit	Analyzed	l Qualif	iers
Total Dissolved Solids		mg/L	ND	10.0	0 04/30/19 17	:02	
LABORATORY CONTR	ROL SAMPLE:	650644					
			Spike	LCS	LCS	% Rec	0 ""
Paramete	er	Units	Conc	Result	% Rec	Limits	Qualifiers
Total Dissolved Solids		mg/L	255	234	92	80-120	
SAMPLE DUPLICATE:	650645						
			12124120004	Dup		Max	
Paramete	er	Units	Result	Result	RPD	RPD	Qualifiers
Total Dissolved Solids		mg/L	930	908	8	2	5 H3
	650646						
SAMPLE DUPLICATE:	000040						
			12124119002	Dup		Max	
Paramete		Units	12124119002 Result	Dup Result	RPD	Max RPD	Qualifiers

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.



Project: Pace Project No.:	[6385CC_2019 Ap 12124076	r(1 of 1)]-Revised	Report				
QC Batch:	165071		Analysis M	ethod:	SM 4500-H+B		
QC Batch Method:	SM 4500-H+B		Analysis De	escription:	4500H+B pH		
Associated Lab San	nples: 12124076	001, 12124076002	2, 12124076003,	12124076004	, 12124076005	, 12124076006	
LABORATORY COM	NTROL SAMPLE:	650392					
			Spike	LCS	LCS	% Rec	
Paran	neter	Units	Conc.	Result	% Rec	Limits	Qualifiers
pH at 25 Degrees C		Std. Units	7	7.0	101	98-102	H6
SAMPLE DUPLICA		Units	12123914004 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C		Std. Units	7.9	)	7.9	0	10 H6
SAMPLE DUPLICA	TE: 650394		12124076003	Dup		Мах	
Paran	neter	Units	Result	Result	RPD	RPD	Qualifiers
pH at 25 Degrees C		Std. Units	7.4	+	7.4	0	10 H6

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.



METHOD BLANK:         650540         Matrix:         Water           Associated Lab Samples:         12124076001, 12124076002, 12124076003, 12124076004, 12124076005, 12124076006         Blank         Reporting           Parameter         Units         Result         Limit         Analyzed         Qualifiers           Chloride         mg/L         ND         1.0         05/01/19         00:15           Fluoride         mg/L         ND         0.10         05/01/19         00:15           LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec         Limits         Qualifiers           Chloride         mg/L         ND         2.0         05/01/19         00:15            LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec         Limits         Qualifiers           Chloride         mg/L         50         50         100         90-110             Sulfate         mg/L         50         50.9         102         90-110             MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MS         MSD         NSD         NSD         NS <td< th=""><th></th><th></th><th></th><th></th><th></th><th>PA 300.0</th><th></th><th>sis Method</th><th>7 11 101 9</th><th></th><th>01</th><th>atch: 1650</th><th>QC Batc</th></td<>						PA 300.0		sis Method	7 11 101 9		01	atch: 1650	QC Batc
METHOD BLANK:         650540         Matrix:         Water           Associated Lab Samples:         12124076001, 12124076002, 12124076003, 12124076004, 12124076005, 12124076006         Blank         Reporting           Parameter         Units         Result         Limit         Analyzed         Qualifiers           Chloride         mg/L         ND         1.0         05/01/19         00:15           Sulfate         mg/L         ND         2.0         05/01/19         00:15           LABORATORY CONTROL SAMPLE:         650541         ECS         LCS         % Rec         Limits         Qualifiers           Chloride         mg/L         50         51.1         102         90-110         Sulfate           Fluoride         mg/L         50         50.9         102         90-110         Sulfate         Qualifiers         Qualifiers           Sulfate         mg/L         50         50.9         102         90-110         Sulfate         Spike         MS         MSD         MSD         % Rec         Limits         Qualifiers         Qualifiers         Spike         Spike         Spike         MS         MSD         Spike         MS         MSD         Spike         MSD         Spike         MSD					ons	0.0 IC Anio	otion: 30	sis Descrip	Analy		300.0	atch Method: EPA	QC Batc
Associated Lab Samples:       12124076001, 12124076002, 12124076003, 12124076004, 12124076005, 12124076005       12124076005, 12124076005         Parameter       Units       Result       Limit       Analyzed       Qualifiers         Chloride       mg/L       ND       1.0       05/01/19 00:15       05/01/19 00:15         Fluoride       mg/L       ND       2.0       05/01/19 00:15         LABORATORY CONTROL SAMPLE:       650541       Spike       LCS       LCS       % Rec       Qualifiers         Chloride       mg/L       Spike       LCS       LCS       % Rec       Qualifiers         Chloride       mg/L       50       51.1       102       90-110         Sulfate       mg/L       50       51.1       102       90-110         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650542       650543       MSD       MSD       MSD       % Rec       Limits       RPL         Parameter       Units       Result       Conc.       Conc.       Result       Result       % Rec       MSD       % Rec       % Rec       MSD       % Rec       MSD       % Rec       % Rec       % R				76006	5, 121240	2124076005	4076004, 12	6003, 1212	2, 1212407	001, 12124076002	121240760	iated Lab Samples:	Associat
ParameterUnitsBlank ResultReporting LimitAnalyzedQualifiersChloridemg/LND1.005/01/1900:15Fluoridemg/LND0.1005/01/1900:15Sulfatemg/LND2.005/01/1900:15LABORATORY CONTROL SAMPLE:650541SpikeLCSLCS% RecParameterUnitsConc.Result% RecLimitsQualifiersChloridemg/L5051.110290-110Fluoridemg/L5050.910290-110Sulfatemg/L5050.910290-110MATRIX SPIKE & MATRIX SPIKE DUPLICATE:650542650543MSMSDParameterUnitsResultConc.Conc.Result% RecLimitsParameterUnitsResultConc.Conc.Result% RecLimitsRPEChloridemg/L0.66J505053.253.310510590-110Sulfatemg/L0.66J505052.552.610410490-110MATRIX SPIKE & MATRIX SPIKE DUPLICATE:65054465054510410490-110							ater	Matrix: Wa			C	IOD BLANK: 65054	METHO
Parameter         Units         Result         Limit         Analyzed         Qualifiers           Chloride         mg/L         ND         1.0         05/01/19         00:15         05/01/19         00:15           Fluoride         mg/L         ND         0.10         05/01/19         00:15         05/01/19         00:15           Sulfate         mg/L         ND         2.0         05/01/19         00:15         00:00:00:00:00:00:00:00:00:00:00:00:00:				76006	5, 121240	2124076005	4076004, 12	6003, 1212	2, 1212407	001, 1212407600	121240760	iated Lab Samples:	Associat
Chloride         mg/L         ND         1.0         05/01/19         00:15           Fluoride         mg/L         ND         0.10         05/01/19         00:15           Sulfate         mg/L         ND         0.10         05/01/19         00:15           LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec           Parameter         Units         Conc.         Result         % Rec         Limits         Qualifiers           Chloride         mg/L         50         51.1         102         90-110           Sulfate         mg/L         50         50.9         102         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MSD         MSD         MSD         MSD         MSD         % Rec         Limits         Rec           Parameter         Units         Result         Conc.         Conc.         Conc.         Result         % Rec         Limits         Pinotide           Parameter         Units         Result         Conc.         Conc.         Conc.         Result         % Rec         Limits         90-110           Sulfate         mg/L         0.66J				o ""								-	
Fluoride         mg/L         ND         0.10         05/01/19         00:15           Sulfate         mg/L         ND         2.0         05/01/19         00:15           LABORATORY CONTROL SAMPLE:         650541         LCS         LCS         % Rec         Limits         Qualifiers           Parameter         Units         Conc.         Result         % Rec         Limits         Qualifiers           Fluoride         mg/L         50         51.1         102         90-110           Fluoride         mg/L         50         50.9         102         90-110           Sulfate         mg/L         50         50.9         102         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MS         MSD         MSD         MSD         % Rec         Limits         RPE           Parameter         Units         Result         Conc.         Result         Result         % Rec         Limits         RPE           Chloride         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110           Sulfate         mg/L         0.63J         50         50         <				Qualifiers	zed	Analyz	Limit	ult	Resu	Units		Parameter	
Sulfate         mg/L         ND         2.0         05/01/19         00:15           LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         % Rec         Limits         Qualifiers           Parameter         Units         Conc.         Result         % Rec         Limits         Qualifiers           Fluoride         mg/L         5         5.0         100         90-110           Sulfate         mg/L         50         50.9         102         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MS         MSD         % Rec         Limits         % Rec           Parameter         Units         Result         Conc.         Conc.         Result         % Rec         Limits         % Rec           Parameter         Units         Result         Conc.         Conc.         Result         % Rec         Limits         RPE           Chloride         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110           Sulfate         mg/L         0.63J         50         50         52.5         52.6         104         104         90-110 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td>Chloride</td>										-			Chloride
LABORATORY CONTROL SAMPLE:         650541         Spike         LCS         LCS         LCS         Limits         Qualifiers           Chloride         mg/L         50         51.1         102         90-110         Qualifiers           Fluoride         mg/L         5         5.0         100         90-110         90-110           Sulfate         mg/L         50         50.9         102         90-110         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         MS         MSD         MSD         MSD         % Rec         Limits         Rec           Parameter         Units         Result         Conc.         Conc.         Result         % Rec         Limits         RPE           Chloride         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110           Sulfate         mg/L         0.66J         50         50         52.5         52.6         104         104         90-110										-			
Parameter         Units         Spike Conc.         LCS Result         LCS % Rec         % Rec Limits         Qualifiers           Chloride Fluoride Sulfate         mg/L         50         51.1         102         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543           Matrix SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543           Matrix SPIKE & MATRIX SPIKE DUPLICATE:         6505         50         53.2         53.3         105         90-110           Matrix SPIKE & MATRIX SPIKE DUPLICATE:         0.66J         50         50         53.2         53.3         105         90-110           MATRIX SPIKE & may be an analysis         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650543         50         50         52.5         52.6         104         104         90-110					00:15	05/01/19	2.0	ND		mg/L		9	Sulfate
Parameter         Units         Conc.         Result         % Rec         Limits         Qualifiers           Chloride         mg/L         50         51.1         102         90-110         90-110           Fluoride         mg/L         5         5.0         100         90-110         90-110           Sulfate         mg/L         50         50.9         102         90-110         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         650543         650543           Matrix Spike         MS         MSD         MS         MSD         % Rec         % Rec         Limits         RPE           Chloride         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110           Fluoride         mg/L         0.63J         50         50         52.5         52.6         104         104         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650544         650545         650545         650545         650545         650545										650541	SAMPLE:	RATORY CONTROL	LABORA
Chloride         mg/L         50         51.1         102         90-110           Fluoride         mg/L         5         5.0         100         90-110           Sulfate         mg/L         50         50.9         102         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650542         650543         650543           Matrix Spike         MS         MSD         MSD         MS         MSD           Parameter         Units         Result         Conc.         Conc.         Result         % Rec         Limits         RPE           Chloride         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110           Fluoride         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110           Sulfate         mg/L         0.63J         50         50         52.5         52.6         104         104         90-110					% Re			LC	Spike				
Fluoride       mg/L       5       5.0       100       90-110         Sulfate       mg/L       50       50.9       102       90-110         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650542       650543       650543         Matrix Spike       MS       MSD       MSD       MS       MSD         Parameter       Units       Result       Conc.       Conc.       Result       % Rec       Limits       RPE         Chloride       mg/L       0.66J       50       50       53.2       53.3       105       105       90-110         Fluoride       mg/L       0.63J       50       50       52.5       52.6       104       104       90-110         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650544       650545       650545       650545			Qualifiers	s Q	Limit	% Rec	ult	Res	Conc.	Units		Parameter	
Sulfate       mg/L       50       50.9       102       90-110         MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650542       650543         MS       MSD       SSD       SSD		-		0-110	9	102	51.1	0	5	mg/L		de	Chloride
MATRIX SPIKE & MATRIX SPIKE DUPLICATE:       650542       650543         MS       MSD       MSD         Parameter       Units       Result       Conc.       Conc.       Result       Result       % Rec       Limits       RPI         Chloride       mg/L       0.66J       50       50       53.2       53.3       105       105       90-110         Sulfate       mg/L       0.63J       50       50       52.5       52.6       104       104       90-110				0-110	9	100	5.0	5		mg/L		de	Fluoride
MS         MSD         MSD <td></td> <td></td> <td></td> <td>90-110</td> <td>9</td> <td>102</td> <td>50.9</td> <td>0</td> <td>5</td> <td>mg/L</td> <td></td> <td>e</td> <td>Sulfate</td>				90-110	9	102	50.9	0	5	mg/L		e	Sulfate
MS         MSD         MSD <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>650543</td> <td></td> <td>42</td> <td>ICATE: 65054</td> <td></td> <td>IX SPIKE &amp; MATRIX</td> <td>MATRIX</td>							650543		42	ICATE: 65054		IX SPIKE & MATRIX	MATRIX
Parameter         Units         Result         Conc.         Result         Result         Result         Result         % Rec         % Rec         Limits         RPE           Chloride         mg/L         0.66J         50         50         53.2         53.3         105         105         90-110           Fluoride         mg/L         0.099J         5         5         5.1         5.2         100         101         90-110           Sulfate         mg/L         0.63J         50         50         52.5         52.6         104         104         90-110							000010	MSD					
Chloride         mg/L         0.66J         50         53.2         53.3         105         105         90-110           Fluoride         mg/L         0.099J         5         5         5.1         5.2         100         101         90-110           Sulfate         mg/L         0.63J         50         50         52.5         52.6         104         104         90-110	Max		% Rec	MSD	MS	MSD	MS	Spike	Spike	12124074001			
Fluoride         mg/L         0.099J         5         5         5.1         5.2         100         101         90-110           Sulfate         mg/L         0.63J         50         50         52.5         52.6         104         104         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650544         650545         650545         650545	RPD	RPD	Limits	% Rec	% Rec	Result	Result	Conc.	Conc.	Result	Units	Parameter	
Sulfate         mg/L         0.63J         50         52.5         52.6         104         104         90-110           MATRIX SPIKE & MATRIX SPIKE DUPLICATE:         650544         650545	20	0	90-110	105	105	53.3	53.2	50	50		mg/L	de	Chloride
MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 650544 650545	20	1	90-110	101	100	5.2	5.1	5	5	0.099J	mg/L	de	Fluoride
	) 20	0	90-110	104	104	52.6	52.5	50	50	0.63J	mg/L	e	Sulfate
							650545		44	LICATE: 65054		IX SPIKE & MATRIX	
								MSD					
12124119002 Spike Spike MS MSD MS MSD % Rec	Max		% Rec	MSD	MS	MSD	MS			12124119002			
Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPE	RPD	RPD	Limits	% Rec	% Rec	Result	Result	Conc.	Conc.	Result	Units	Parameter	
Chloride mg/L 75.2 250 250 340 339 106 105 90-110	20	0	90-110	105	106	339	340	250	250	75.2	mg/L	de	Chloride
Fluoride mg/L 3.4 25 25 28.3 28.3 100 100 90-110	) 20												
	) 20		90-110	104					250			e	Sulfate

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.



## **QUALIFIERS**

Project: [6385CC\_2019 Apr(1 of 1)]-Revised Report 12124076

#### Pace Project No .:

#### 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.

#### LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-V Pace Analytical Services - Virginia

#### ANALYTE QUALIFIERS

- D3 Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
- H1 Analysis conducted outside the recognized method holding time.
- H3 Sample was received or analysis requested beyond the recognized method holding time.
- H6 Analysis initiated outside of the 15 minute EPA required holding time.



## QUALITY CONTROL DATA CROSS REFERENCE TABLE

 Project:
 [6385CC\_2019 Apr(1 of 1)]-Revised Report

 Pace Project No.:
 12124076

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
12124076001	Field Blank	EPA 200.7	602602	EPA 200.7	603271
12124076002	Field Duplicate	EPA 200.7	602602	EPA 200.7	603271
12124076003	MW3R	EPA 200.7	602602	EPA 200.7	603271
12124076004	MW7	EPA 200.7	602602	EPA 200.7	603271
12124076005	MW8	EPA 200.7	602602	EPA 200.7	603271
12124076006	MW9	EPA 200.7	602602	EPA 200.7	603271
12124076001	Field Blank	EPA 200.8	602622	EPA 200.8	603644
12124076002	Field Duplicate	EPA 200.8	602622	EPA 200.8	603644
12124076003	MW3R	EPA 200.8	602622	EPA 200.8	603644
12124076004	MW7	EPA 200.8	602622	EPA 200.8	603644
12124076005	MW8	EPA 200.8	602622	EPA 200.8	603644
12124076006	MW9	EPA 200.8	602622	EPA 200.8	603644
12124076001	Field Blank	SM 2540C (1997)	165113		
2124076002	Field Duplicate	SM 2540C (1997)	165113		
2124076003	MW3R	SM 2540C (1997)	165113		
2124076004	MW7	SM 2540C (1997)	165113		
2124076005	MW8	SM 2540C (1997)	165113		
12124076006	MW9	SM 2540C (1997)	165113		
12124076001	Field Blank	SM 4500-H+B	165071		
2124076002	Field Duplicate	SM 4500-H+B	165071		
2124076003	MW3R	SM 4500-H+B	165071		
2124076004	MW7	SM 4500-H+B	165071		
2124076005	MW8	SM 4500-H+B	165071		
2124076006	MW9	SM 4500-H+B	165071		
12124076001	Field Blank	EPA 300.0	165097		
12124076002	Field Duplicate	EPA 300.0	165097		
12124076003	MW3R	EPA 300.0	165097		
12124076004	MW7	EPA 300.0	165097		
12124076005	MW8	EPA 300.0	165097		
12124076006	MW9	EPA 300.0	165097		

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fra /Mh	Received attab by:		Received by:	1 brey Madrews	Sampled by:	
Time: 1 54.50	Date: //25/19	Time:	Date:			
8,0	Temperature at Receipt:		Relinquished by:	( freed del	Relinquished by:	$\mathcal{C}$
		Time:	Date:	Time: 1550	Date: & 4/25/10	

NITC		Commonte							5	010V0V0V0V0
CINI		comments:		IAI: standard	a				Σ	0/047777: #(
526 Chestnut Street	Street							n		
Virginia, MN 55792	55792							dur	-	
Phone: (218) 741-4290	741-4290						1!N	səı	1212	
PM: Dennis Schubbe	Schubbe	Report To:	sampledata@netechnical.com	etechnical.com	-		i , ji	iə/uə	-	
Project#: 6385CC_2019	385CC_2019						stelv	P C		<b>Environmental Science</b>
Event Key:							sli	3Der		& Engineering
6385CC_2019 Apr(1 of 1)	∂ Apr(1 of 1)	÷						sje		
Sample ID:	Sample Location:		Date:	Time:	Mx:	ST:				Required Analyses:
	Field Blank		4/26/19	1(50)	٤	G	×	×		List #1
	Field Duplicate		1 I	5241	V	G	×	×		List #1
	MW3R			1205	Ś	G	×	×		List #1
	MW7			1052	×	G	×	×		List #1
	8MM			1324	V	G	×	×		List #1
	6MM		F	1434	8	G	×	×		List #1

	PH	
		SM 4500-H+B
	Solids, Total Dissolved (TDS)	
		SM 2540C
	Sulfate	
	Fluoride	
	Chloride	
		EPA 300.0
	Boron	
		EPA 200.8
	Calcium	
		EPA 200.7
NTS Limit: J-Flag:	Parameter:	Method:
6385CC_2019 Apr(1 of 1)	V7,MW8,MW9	List #1 Field Blank,Field Duplicate,MW3R,MW7,MW8,MW9

e)	Sample C		nt Name: Upon Rece	Document Revised: 03Apr2019 Page 1 of 1
Pace Analytical		Docum	ent No.:	Issuing Authority:
	1	-VM-C-0	01-Rev.12	
Client Name:	S USPS Other:		Project i	#: WO#: 12124076 PM: CLJ Due Date: 05/09/19 CLIENT: NTS-Dennis
racking Number:				
ustody Seal on Cooler/Box Present? 🗌 Yes 🛛	No	Seals I	ntact?	Yes No Optional: Proj. Due Date: Proj. Name:
acking Material: Bubble Wrap Bubble I	Bags 🛛 N	one [	]Other:	Temp Blank? Yes No
ermometer Used: 📮 140792808	Type of	Ice: Z	]Wet [	Blue None Samples on ice, cooling process has be
Cooler Temp Read °C: 5.5 Cooler Temp mp should be above freezing to 6°C Correction Fa				Biological Tissue Frozen? Yes No Initials of Person Examining Contents: 2H 4/05/19 Comments:
Chain of Custody Present?	Vies	No	□N/A	1.
Chain of Custody Filled Out?	/Yes	No	N/A	2.
Chain of Custody Relinquished?	<b>V</b> es	No	□N/A	3.
Sampler Name and Signature on COC?	<b>K</b> Yes	No	□N/A	á.
Samples Arrived within Hold Time?	The second	( <sup>1</sup> )		
Short Hold Time Analysis (<72 hr)?	Yes			5. If Fecal: <a></a> <li>6. ρk</li>
Rush Turn Around Time Requested?	Ves	No.		7.
Sufficient Volume?	ZYes	No		8.
Correct Containers Used?	Z Yes	No	N/A	9.
-Pace Containers Used?	Z Yes	□ No		
Containers Intact?	VYes	No		10.
Filtered Volume Received for Dissolved Tests?	Yes			<ol> <li>Note if sediment is visible in the dissolved containers.</li> </ol>
Sample Labels Match COC?	Z Yes			12
-Includes Date/Time/ID/Analysis Matrix:	NT	Line	Linky	4.2.1
All containers needing acid/base preservation will be checked and documented in the pH logbook.	Zives	No	□n/A	See pH log for results and additional preservation documentation
Headspace in Methyl Mercury Container	Ye5	No	N/A	13.
Headspace in VOA Vials ( >6mm)?	[]Yes	No	ZN/A	14.
Trip Blank Present?	[]Yes	No	N/A	15.
Frip Blank Custody Seals Present?	Yes	No	ZIN/A	
Pace Trip Blank Lot # (if purchased): IENT NOTIFICATION/RESOLUTION Person Contacted: Comments/Resolution:				Field Data Required? Yes No
ECAL WAIVER ON FILE Y N		TEM	PERATU	RE WAIVER ON FILE Y N
roject Manager Review: te: Whenever there is a discrepancy affecting North Carr d, incorrect preservative, out of temp, incorrect contained		e samples,	a copy of t	Date: 4/25/19 his form will be sent to the North Carolina DEHNR Certification Office ( i.e

	Page	17	of	17
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NTS	Laboratory	/ Data Verificati	on Checklist	
526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290	Event Key:	6385CC_2019 Ap	or(1 of 1)	Environmental Science
Filone. (218) 741-4290	<b>Collection Date:</b>	4/25/2019		& Engineering
Lab: Pace Analytical	Report Date:	5/8/2019	Reviewer #1:	Catherine Hafdahl
Lab WO#: 12124076	<b>Review Date:</b>	5/8/2019	Reviewer #2:	Karissa Vosen

N/A:

 $\square$ 

OK:

✓

✓

 $\checkmark$ 

✓

# SAMPLE HANDLING AND PRESERVATION A copy of the chain of custody (COC) is provided with the final report A sample condition upon receipt form was included with the final report Samples were received by the laboratory with proper preservation--i.e. on ice and/or in correct container types Samples were received and analyzed by the laboratory within method required holding times

Any results associated with incorrect preservation or missed hold time are qualified in the body of the report

Comments: A qualifier was added to pH results (method 4500 H+B) indicating that the analysis was initiated outside of the 15 minutes EPA required holding time. Qualifiers are in SWX.

CALIBRATION	N/A:	ОК:
The report narrative or data qualifiers indicate there were calibration failures for any of the required analyses		
METHOD BLANKS	N/A:	OK:
A method blank was analyzed for all applicable analytical methods		$\checkmark$
All method blanks are free of target analytes		$\checkmark$
If any method blanks had a detect, were the detected analytes present in associated samples?	$\checkmark$	
LABORATORY CONTROL SAMPLES	N/A:	OK:
An LCS was prepared and analyzed for each analytical method and contains all target analytes being reported		$\checkmark$
Laboratory control limits are listed on the report and seem reasonable when compared to the suggested guidelines in the MPCA QC Policy		$\checkmark$
The percent recovery of all target analytes are within laboratory control limits		$\checkmark$
Any analytes with a percent recovery outside of laboratory control limits are qualified (flagged) in the associated samples		
MATRIX SPIKES/MATRIX SPIKE DUPLICATES	N/A:	OK:
An MS/MSD was prepared and analyzed for each applicable analytical method and contains all target analytes being reported		$\checkmark$
If no, was an alternate spiked sample processed instead? (Such as an LCSD)	$\checkmark$	
Laboratory control limits are listed on the report and seem reasonable when compared to the suggested guidelines in the MPCA QC Policy		$\checkmark$
The percent recovery of all target analytes are within laboratory control limits		$\checkmark$
The RPD is within laboratory control limits for all target analytes		
Any analytes with a % recovery or RPD outside of laboratory control limits are qualified (flagged) in the parent sample		
LABORATORY DUPLICATES	N/A:	OK:
A Laboratory Duplicate was prepared and analyzed for each applicable analytical method		$\checkmark$
The RPD for the duplicate pair is within laboratory limits		$\checkmark$
Any analytes with an RPD outside of laboratory control limits are qualified (flagged) in the associated parent sample	$\checkmark$	
SURROGATES	N/A:	ОК:
Laboratory control limits are listed on the report and seem reasonable when compared to the suggested guidelines in the	✓	
MPCA QC Policy		
The percent recovery of all surrogate compounds are within laboratory control limits	$\checkmark$	
FIELD DUPLICATES	N/A:	OK:
A field duplicate was required for this this project		$\checkmark$
The RPD for the duplicate pair is within the NTS control limits		
Any analytes with an RPD outside of NTS control limits are qualified (flagged) in the parent sample	$\checkmark$	
FIELD and TRIP BLANKS	N/A:	OK:

A field blank and/or trip blank was required for this project		$\checkmark$
The blank is free of target analytes		$\checkmark$
If an analyte was detected in the blank, was it present in the associated samples?		$\checkmark$
If yes, was the associated data qualified in SWX?	✓	

ADDITIONAL CHECKS	N/A:	ОК:
This project has been uploaded into SWX and correctly reflects the results reported within the laboratory report		$\checkmark$
Analysis to the MDL was required for this project		
If analysis to the MDL was required, data was appropriately qualified with J flags?	$\checkmark$	
Dilution factors are typical of past events and non-detects are not reported off dilutions		$\checkmark$
Total and dissolved parameters are in agreement	$\checkmark$	
All lab results were evaluated against the associated permit limits or appear typical of past monitoring events		$\checkmark$
All lab QC calculations were accurate against SWX calculations		$\checkmark$

Comments: Qualifiers were added to Boron (Field Duplicate and MW9) indicating that the sample was diluted due to the presence of high levels of non-target analytes or other matrix intererence.

# NTS

526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290

# Field Date: Report Created:

4/25/2019 5/3/2019 3:08:42 PM

# Client:

General Waste Disposal & Recovery

# NTS Project Name:

CCR Landfill Monitoring 2019

# **NTS Field Personnel:**

Corey Andrews

# Summary of Services Performed:

Prepped and went to General Waste to conduct April 2019 CCR well monitoring. The following wells were sampled via the low flow method with submersible pumps: MW3R, MW7, MW8, and MW9. Dup obtained at MW9. Considered turbidity stable if three consecutive readings were under 5 NTU.

Samples ceded to PACE Analytical in Virginia, MN.

For additional details see stabilization sheets and fields notes.

I,Corey Andrews, certify that the information in this report is true and correct to the best of my knowledge.

# **Field Report Cover Sheet**

Event Key: 6385CC\_2019 Apr(1 of 1)



NTS Project Manager:

Dennis Schubbe

M	W	3R	

SECTION #1: DATA COLLECTIO	Sample Collected
Field Duplicate:	

# Field Blank: Field Blank Equip Blank:

Time (HH:MM):	pl (SU)		SpecCond (µS/cm):	Turbidity (NTU):	ORP (mV):	Temp (°C):
12:04	6.35	5 0.00	2983	1.5	144	11.08
65.79 1466.5		<sup>.</sup> Level in Water by W (MSL) in Water		-		
SECTION #2: O	BSERVATION	S			Tin	ne: 11:15
Turbidity less t	han 5 NTU. C	Considered well sta	able.			
Air Tei	mperature:	51°F to 60°F		Well Depth	(ft): 77.58	
W	/ind Speed:	5-10 mph		SWL	(ft): 65.79	
Wind	d Direction:	W-NW		Pump Rate (gp	om): 0.33	
Pro	ecipitation:	None		Interval (m	nin): 5.83	
Cl	oud Cover:	Mostly Sunny	Pu	mp Start (HH:M	<b>M):</b> 11:23	
Airborne I	Particulate:	Dust	Pu	mp Stop (HH:M	<b>M):</b> 12:12	
Co	olor, Purge: (	Grav/Black	F	Purge Volume (g	gal): 16.17	
	nce, Purge: (			•••	egy: Low-Flow	Stabilization
	dor, Purge:			Well Plug Pres		
	or, Sample: (			Well Loci	ked: ⊻	
Appearance	ce, Sample: (	Clear				
Ode	or, Sample:	Definite				

GW CALCULATIONS:

Total Water Depth 77.58ft - Static Water Level 65.79ft = Water Column 11.79ft Water Column 11.79ft x \*Conversion Factor 0.163gal/ft = Well Volume 1.924gal Well Volume 1.924gal ÷ Pump Rate 0.33gpm = Well Volume Interval 5.83min

\*Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48

Pump Start Time 11:23 - Pump End Time 12:12 = Pump Duration 49min Pump Duration 49min x Pump Rate 0.33gpm = Volume Purged 16.17gal

Top of Casing Elevation 1532.29 - Static Water Level 65.79 = 1466.5ft

SECTION #3: STABILIZATION Well Vol Interval (min): 5.83

Pump Rate (gpm): 0.33

MW3R (Cont'd)

Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	+/- 1.0 NTU	+/- 20 mV	+/- 0.10 °C	
Time	рН	DO	SpecCond	Turbidity	ORP	Temp	SWL
(HH:MM):	(SU):	(mg/L):	(µS/cm):	(NTU):	(mV):	(°C):	(ft):
11:34	6.36	0.19	3019	27.3	216	10.99	66.61
11:40	6.36	0.00	3031	16.6	184	10.93	66.52
11:46	6.35	0.00	3012	9.0	167	10.95	66.52
11:52	6.35	0.00	2997	4.5	155	11.04	66.52
11:58	6.35	0.00	2988	2.6	149	11.11	66.52
12:04	6.35	0.00	2983	1.5	144	11.08	66.52
Stabilization F	Passes NTS Cr	iteria: 🗌					

SECTION #1: DATA COLLECTIO
Field Duplicate:

MW7

Sample Collected

Field Blank: Equip Blank:

Time (HH:MM):	r (SU	DH DO J): (mg/L):	SpecCond (µS/cm):	Turbidity (NTU):	ORP (mV):	Temp (°C):	
10:51	6.2	.9 0.00	2501	13.7	458	11.39	
1477.37 Elevation, GW (MSL) in Water by Calculation, ft							
18.76	Static Wate	r Level in Water by	/ Field Measurer	ment, ft			
SECTION #2: OI	BSERVATION	IS			Tin	ne: 09:39	
Air Tei	mperature:	51°F to 60°F		Well Depth	(ft): 26.77		
W	/ind Speed:	5-10 mph		SWL	(ft): 18.76		
Wind	Direction:	W-NW		Pump Rate (gp	om): 0.15		
Pre	ecipitation:	None		Interval (n	nin): 8.71		
CI	oud Cover:	Mostly Sunny	Pu	mp Start (HH:N	I <b>M):</b> 9:45		
Airborne F	Particulate:	None	Pu	mp Stop (HH:N	IM): 10:55		
C	olor, Purge:	Orango	F	Purge Volume (	gal): 10.50		
	nce, Purge:	0		Purging Strategy: Low-Flow		v Stabilization	
	dor, Purge:			Well Plug Pres	ent: 🗹		
	or, Sample:			Well Loc	ked: 🗹		
	ce, Sample:						
••	or, Sample:						
GW CALCULATIONS: Total Water Depth 26.77ft - Static Water Level 18.76ft = Water Column 8.01ft Water Column 8.01ft x *Conversion Factor 0.163gal/ft = Well Volume 1.307gal Well Volume 1.307gal ÷ Pump Rate 0.15gpm = Well Volume Interval 8.714min *Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48 Pump Start Time 09:45 - Pump End Time 10:55 = Pump Duration 70min Pump Duration 70min x Pump Rate 0.15gpm = Volume Purged 10.5gal Top of Casing Elevation 1496.13 - Static Water Level 18.76 = 1477.37ft							
SECTION #3: STABILIZATION Well Vol Interval (min): 8.71 Pump Rate (gpm): 0.15							

MW7 (Cont'd)

Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	+/- 1.0 NTU	+/- 20 mV	+/- 0.10 °C	
Time	рH	DO	SpecCond	Turbidity	ORP	Temp	SWL
(HH:MM):	(SU):	(mg/L):	(µS/cm):	(NTU):	(mV):	(°C):	(ft):
9:58	6.03	1.82	2596	49.3	637	10.09	20.36
10:07	6.22	1.16	2631	20.5	636	11.66	20.37
10:16	6.24	0.00	2575	12.4	613	11.10	20.33
10:25	6.26	0.00	2540	7.6	566	11.98	20.26
10:34	6.29	0.00	2526	20.5	511	10.55	20.30
10:43	6.28	0.00	2510	18.7	489	11.79	20.31
10:51	6.29	0.00	2501	13.7	458	11.39	20.31
10:50	6.29	0.05	2493	14.2	461	11.49	
<b>Stabilization F</b>	Passes NTS Cr	iteria:					

M	W	8	

SECTION #1: DATA COLLECTIO	Sample Collected
Field Duplicate:	

# Field Blank: Equip Blank:

Time	рН	DO	SpecCond	Turbidity	ORP	Temp
(HH:MM):	(SU):	(mg/L):	(µS/cm):	(NTU):	(mV):	(°C):
13:23	6.30	0.00	1821	75.3	215	

1460.18 Elevation, GW (MSL) in Water by Calculation, ft

34.23 Static Water Level in Water by Field Measurement, ft

# **SECTION #2: OBSERVATIONS**

unable to stabilize turbidity. Bounces up and down during stabilization. Purged well dry after sampling.

Air Temperature:	61°F to 70°F	Well Depth (ft):	41.40
Wind Speed:	5-10 mph	SWL (ft):	34.23
Wind Direction:	W-NW	Pump Rate (gpm):	0.25
Precipitation:	Drizzle	Interval (min):	4.68
Cloud Cover:	Mostly Sunny	Pump Start (HH:MM):	12:40
Airborne Particulate:	None	Pump Stop (HH:MM):	13:30
Color, Purge:	Orango	Purge Volume (gal):	12.50
-	0	Purging Strategy:	Low-Flow Stabilization
Appearance, Purge:		Well Plug Present:	$\checkmark$
Odor, Purge:	None	Well Locked:	
Color, Sample:	Orange	Weil Locked.	V
Appearance, Sample:	Turbid		
Odor, Sample:	None		

GW CALCULATIONS:

Total Water Depth 41.40ft - Static Water Level 34.23ft = Water Column 7.17ft Water Column 7.17ft x \*Conversion Factor 0.163gal/ft = Well Volume 1.17gal Well Volume 1.17gal ÷ Pump Rate 0.25gpm = Well Volume Interval 4.68min

\*Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48

Pump Start Time 12:40 - Pump End Time 13:30 = Pump Duration 50min Pump Duration 50min x Pump Rate 0.25gpm = Volume Purged 12.5gal

Top of Casing Elevation 1494.41 - Static Water Level 34.23 = 1460.18ft

SECTION #3: STABILIZATION Well Vol Interval (min): 4.68

Pump Rate (gpm): 0.25

**Time:** 12:28

MW8 (Cont'd)

	1						
Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	+/- 1.0 NTU	+/- 20 mV	+/- 0.10 °C	
Time	рН	DO	SpecCond	Turbidity	ORP	Temp	SWL
(HH:MM):	(SU):	(mg/L):	(µS/cm):	(NTU):	(mV):	(°C):	(ft):
12:53	6.24	0.00	1837	371.4	247	11.47	37.45
12:58	6.25	0.00	1812	383.2	231	11.03	37.45
13:03	6.26	0.00	1825	200.2	224	11.38	37.45
13:08	6.28	0.00	1837	152.0	221	11.45	37.45
13:13	6.28	0.00	1833	64.1	217	11.40	37.40
13:18	6.31	0.00	1793	69.8	215	11.44	37.40
13:23	6.30	0.00	1821	75.3	215	11.36	37.40
Stabilization <b>F</b>	Dassas NTS Cr	itoria: 🗆					

Stabilization Passes NTS Criteria:

# SECTION #1: DATA COLLECTIO Sample Collected

рΗ

Field Duplicate: Field Duplicate

Time

Equip Blank:

**Field Blank:** 

Turbidity

ORP

Temp

(HH:MM):	(SI	J): (mg/L	): (μS/cm)	: (NTU):	(mV):	(°C):
14:33	6.!	52 0.00	0 1522	1.2	129	7.65
1443.73	Elevation, G	GW (MSL) in Wat	er by Calculation	<i>,</i> ft		
10.99	Static Wate	er Level in Water	by Field Measur	ement, ft		
SECTION #2: OI	BSERVATION	NS			Tim	e: 14:03
Turbidity less t	han 5 NTU,	considered stable	2.			
Air Tei	mperature:	61°F to 70°F		Well Depth (f	<b>t):</b> 18.95	
W	/ind Speed:	5-10 mph		SWL (f	<b>t):</b> 10.99	
Wind	d Direction:	W-NW		Pump Rate (gpn	n): 0.33	
Pre	ecipitation:	None		Interval (mii	<b>n):</b> 3.94	
CI	oud Cover:	Mostly Sunny	Р	ump Start (HH:MN	<b>1):</b> 14:00	
Airborne F	Particulate:	None	P	ump Stop (HH:MN	<b>1):</b> 14:40	
C	olor, Purge:	Colorless		Purge Volume (ga	<b>I):</b> 13.20	
	nce, Purge:			Purging Strateg	gy: Low-Flow	Stabilization
••	dor, Purge:			Well Plug Preser	nt: 🗹	
	or, Sample:			Well Locke	ed: ⊻	
	ce, Sample:					
••	or, Sample:					
GW CALCULATION	NS:	ic Water Level 10.99	9ft = Water Column	7.96ft		

SpecCond

DO

Water Column 7.96ft x \*Conversion Factor 0.163gal/ft = Well Volume 1.299gal Well Volume 1.299gal ÷ Pump Rate 0.33gpm = Well Volume Interval 3.936min

\*Conversion Factor Formula: ((Pi(([Casing Diameter ft]/2)^2)12)/(12^3))7.48

Pump Start Time 14:00 - Pump End Time 14:40 = Pump Duration 40min Pump Duration 40min x Pump Rate 0.33gpm = Volume Purged 13.2gal

Top of Casing Elevation 1454.72 - Static Water Level 10.99 = 1443.73ft

SECTION #3: STABILIZATION Well Vol Interval (min): 3.94

Pump Rate (gpm): 0.33

MW9 (Cont'd)

Spec:	+/- 0.2 SU	+/- 0.2 mg/L	+/- 5 %	+/- 1.0 NTU	+/- 20 mV	+/- 0.10 °C	
Time	рН	DO	SpecCond	Turbidity	ORP	Temp	SWL
(HH:MM):	(SU):	(mg/L):	(µS/cm):	(NTU):	(mV):	(°C):	(ft):
14:05	6.51	0.00	1590	135.8	141	7.46	11.38
14:09	6.46	0.00	1606	81.4	136	7.63	11.38
14:13	6.47	0.00	1573	15.7	134	7.92	11.38
14:17	6.48	0.00	1556	9.5	132	7.70	11.40
14:21	6.50	0.00	1543	6.0	131	7.75	11.40
14:25	6.51	0.00	1539	3.5	130	7.73	11.40
14:29	6.52	0.00	1527	2.1	129	7.68	11.40
14:33	6.52	0.00	1522	1.2	129	7.65	11.40
<b>Stabilization F</b>	asses NTS Cr	iteria:					

Ν	ΤS
Ν	ΤS

**Calibration Report** 

Environmental Science & Engineering

**Event Key:** 6385CC\_2019 Apr(1 of 1)

Staff: Corey Andrews

**Date:** 4/25/2019

Post Cal Check: 🗹

Comments:

526 Chestnut Street

Virginia, MN 55792

Phone: (218) 741-4290

Sonde: R04-B	PreCal	PostCal	PostEvent	
Last Temp Check: 1/7/2019	(HH:MM):	(HH:MM):	(HH:MM):	
<b>Temp Specification:</b> +/-0.1 °C	7:50	7:50	16:45	Specifications:
pH:	4.07	4.0	3.87	+/-0.2 SU
Standard (SU):	4.0	4.0	4.0	
Temperature (°C):	19.5	19.5	20.25	
pH:	7.10	7.0	6.90	+/-0.2 SU
Standard (SU):	7.0	7.0	7.0	17 0.2 30
Temperature (°C):	19.03	19.03	19.83	
pH:	10.03	10.0	9.89	+/-0.2 SU
Standard (SU):	10.0	10.0	10.0	+/-0.2 30
Temperature (°C):	19.36	19.36	19.74	
Conductance, Specific:	0	0	0	Sum of
Standard (µmhos/cm):	0	0	0	+/-1 μmhos/cm
Temperature (°C):	19.0	19.0	16.74	AND
				+/-0.5%
Conductance, Specific:	993	1000	1004	Sum of
Standard (µmhos/cm):	1000	1000	1000	sum or +/-1 μmhos/cm
Temperature (°C):	19.33	19.27	21.27	AND
				+/-0.5%
Turbidity:	0	0	0.4	<100 / 1 NTU
Standard (NTU):	0	0	0	<100 +/-1 NTU >100 AND <400 +/-12 NTU
Temperature (°C):	19.3	19.3	19.72	>400 AND <3000 +/-150 NTU
Turbidity:	106.6	106	107.4	
Standard (NTU):	106	106	106	<100 +/-1 NTU >100 AND <400 +/-12 NTU
Temperature (°C):	19.75	19.75	19.68	>400 AND <3000 +/-150 NTU
L				

# Calibration Report (cont'd)

Sonde: R04-B	PreCal	PostCal	PostEvent	
Last Temp Check: 1/7/2019	(HH:MM):	(HH:MM):	(HH:MM):	
<b>Temp Specification:</b> +/-0.1 °C	7:50	7:50	16:45	Specifications:
Oxygen, Dissolved:	8.63	8.73	8.69	<8 +/-0.1 mg/L
100% Oxygen Saturation:	8.77	8.77	8.61	>8 AND <20 +/-0.2 mg/L
Temperature (°C):	19.0	19.0	19.8	>20 +/-10%
Bar.Pressure (mmHg):	719	719	718	
ORP:	427	445	440	
Standard (mV):	445.8	445.8	442.8	T/ 20 111V
Temperature (°C):	18.9	18.9	20.1	

2385CC	Gen Wa	ste CCR	Monitoria	9	and the		4/25/19
orey A.	drews	V#60	62 n	riles	23		1-1-1
259F)	Sunny/		UNW IC		D.		
700-084	5 Prepto				14		5.0
3845		NTS offi	e			•	
1935	Constant and a state of the sta	regin pumpi		0945 5	imple C	1052	
	SWL	The dep	we	Vol	/		
	18.76	26.77	8.01	1.3gal	pump c		recharge)
	PH		Temp	ORP	LDO	SWL SWL	Turb
0958	16.03	500	10.09	637	1.82	20.36	49.3
1007	6.22	2631	11.66	636	1.16	20.37	20.5
1016	6.24	2.575	11.10	613	0.00		A COMPANY OF THE OWNER OWNER OF THE OWNER
1025	6.26	2540				20,33	12,24
1034	6.29	2.526	11.98	566	0.00	20.26	7.6
043			10.55	511	0.00	20.30	20.5
	6.28	2510	11.79	489	0.00	20.32	18.7
051	6.29	2501	11.39	458	0.00	20.31	13.7
		a not stal			ilization	parameter	
	(Temp, O	RP, TUIG)				sun ? cl	ouds.
			well volu	1	oved, Ke		
110	MW-3R)	Begin por	nping @ 10	23 Sampl	e @ 120	5 FB 11	50
	JWL	TWD	we	Vol	pump 1	rate	
History	65.79	77.58	11.79	1,9gal	10.33		
San Astal	py	SpC	Temp	ORP	600	Turb	302
1134	6.36	3019	10.99	216	0.19	27,3	66.61
1140	6.36	3031	10.93	184	0.00	16.6	66.52
1146	6.35	3012	10.95	167	0.00	9.0	66,52
152	6,35	2997	11.04	155	0.00	4.5	66.52
158	6,35	2988	11.11	149	0.00	2.6	66.52
204	6.35	the second se	11.08	144	0.00	1.5	66.52
		NTU. Cons		1 C C C C C C C C C C C C C C C C C C C		(	New Color
1225		Begin pu		10 1240		0 122	el
	JUL	This	we	Vol	1	e @ 132	/
	34.23	41.40	7.17	1.2 gal	- PUMP 0.25	rate GPM	
	H	5.0			100		Sult
1253	6.24	5pC 1837	Temp 11-47	247	0.00	Turb	SWL
1258	6.25	1812	11:03	231		371.4	37,45
1303	6.26		11.38		0.00		
1308	6.28	1825		224	0.00	200.2	37.45
313	6.28	1837	11,45	221	0.00	152.0	37.45
212	6.31	1833	11.40		0.00	64.1	37.40
	0121	1793	11.44		0.00	69.8	37.40
318	6.30	1821	11.36	215			

Trey Hadrews Gen Waste CCR Monitoring 6385CC 4/25/ High 65% Sung/winds WNW 10-20 mph 1355 [MW-9] start pumping & 1400 Sample @ 1434 Dup 1435 SWL TWO WE Vol Pump Rate 10,99 13,95 7.96 1.3gul 0.33 ptt SpS Temp SRP 200 Tub SUL 1405 1.51 1595 7.46 141 0.00 135,8 11.38 High 65%F 1405 6.51 200 141 135.8 11.38 1409 0.00 6.46 1606 7.63 136 81,4 11.38 1413 6.47 1573 7.92 134 0200 15.7 11.38 7.70 1556 1417 6.48 0.00 132 9.5 11.40 1421 6.50 1543 7.75 131 8,00 6.0 11.40 1425 6.51 1539 7.73 130 3.5 0.00 11.40 1429 6.52 7.68 2.1 1527 0.00 129 11,40 1433 6.52 7.65 1522-129 0.00 1.2 11.40 1505 Depart Gen. Waste. 1550 (ede samples to PACE 1 1555 Arrive back at NTS office. Unload Post check Report. train the Page 13 of 17

NTS 526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290	Vehicle Inspection Re Event Key: 6385CC_2019 Ap	
Driver: Corey Andrews Vehicle: V60 - 2013 GMC Sierra 1		4/25/2019 Time: 08:28 Odometer:
Check each Item Inspected		
Driver/Passenger Side External Side Mirrors (Right and Left):	Windows ] (clean; free of cracks):	
Front/Rear		
Tail Lights: License Plates Comments:		
Routine Maintenance		
Oil Change (Current): 🔽	Transmission Fluid (Change every 60k):	
Gauges Operational ('check engine' light OFF): ☑	Spare Tire (present, properly inflated):	
Comments:		
Interior Cleanliness:	Brakes:	Windshield Wipers and Fluid:
Seat Belts (working condition):	Parking Brake (reset/release):	
Comments:		
General/Safety		
Insurance Card: 🔽	Wheel Chocks:	✓ First Aid Kit: ✓
Operator's Manual: 🔽	Strobe Light (if needed):	
Comments:		

**Deficiencies Corrected** 



& Engineering

# **Daily Tailgate Safety**

	, 0	entres des constants configures	
Project: 6385CC		Date: <u>4/2</u> .	5/19
Work Site Hazard Assessment Works	heet Hinh	Viz.	Level*
Weather Conditions (List):			Level
Vehicular Traffic		Communication	15
🗖 Noise		<b>D</b> Equipment/Toc	ols

Other Site Hazards\*\*

□I have examined the work place named and found no hazards

**D**I have examined the work place named and hazards found are listed below with corrective action taken

## Hazards Identified/Safety Items Discussed:

Housekeeping

Trucks havling sample containers reserv

**Corrective Actions Taken:** Give trucks right of ile glowing wear

Participants in Safety Discussion:

1. Print Name	Indrews	Signature		
2(		σ		
3				
4				
5				, ,
Signature of Site Supervisor,	Examiner	<u>ze</u>	Date:	425 (9
*Level D, C, B or A	$\mathcal{O}$			

\*\*Examples: Heavy Equipment, Air Quality, Flammable materials, Wildlife, Work Site Security, Confined Space

02/20/2015

the log by.	Renaived at Lak hu	Received by: / /	Sampled by: 1 6rey 14					6MW	MW8	MW7	MW3R	Field Duplicate	Field Blank	Sample ID: Sample Location:	6385CC_2019 Apr(1 of 1)	Event Key:	Project#: 6385CC_2019	PM: Dennis Schubbe	Phone: (218) 741-4290	Virginia, MN 55792	NTS	
			adrews												ž			Report To:			Comments:	
Time: / 5.50	Time:	Date:						$\vdash$					4/25/19	Date:				sampledata@netechnical.com				
	5	R	R				×	14.34	1324	1052	1205	1435	1(50	Time:				netechnical.com			TAT: Standard	
lemperature at Receipt:	4 21	Relinquished by:	Relinquished by:					٤	V	X	W	W	V	Mx:				Э			ard	
re at F		ed by:	ed by:	\ \				ഹ	۵	G	G	G	G	ST:								
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5, S		9	ert (				_	×	×	×	×	×	×		sle	Jaue	q e	i9V16	orese	IUΠ		
$\propto$			r -	)																		
		Č								_		_	-			_						
	Time:	-	Date: & 4/25/19 Time: 1970					List #1	List #1	List #1	List #1	List #1	List #1	Required Analyses:		& Engineering	Environmental Science					

Method:	Parameter:	NTS limit: 1-Elao:
EPA 200.7		
	Calcium	
EPA 200.8	Boron	
EPA 300.0		
	Chloride	
	Fluoride	
	Sulfate	
	Colide Total Dissolved /TDCI	
SM 4500-H+B		
	ΡH	

## NTS

526 Chestnut Street Virginia, MN 55792 Phone: (218) 741-4290

# **Field Report Peer Review Report**

Event Key: 6385CC\_2019 Apr(1 of 1) Report Date: 4/25/2019 Lab WO#: 12124076

**Report Sections** 

**Cover Sheet:** 



Included:

✓

**Required:** 

✓

Reviewer #1:	Date:
Catherine Hafdahl	4/29/2019

Reviewer #2:	Date:
Terri Sabetti	4/30/2019

Report Sections	Required:	Included:
Cover Sheet:		$\checkmark$
Location Information		
Data Collection:		
Observation:		
Flow or Stabilization:		
Photographs:		
Calibration:	$\checkmark$	
Field Notes:	$\checkmark$	
Safety Forms:	$\checkmark$	$\checkmark$
	N/A:	OK:
GW Calculations are Accurate:		$\checkmark$
GW Stabilization Criteria met:		
Flow Calculations are Accurate:	$\checkmark$	
Sonde Passed Post Event Check:		
<b>Consistent Values in Notes:</b>		
Consistent Dates and Times:		
No Deviations from SOPs:		
Cover Sheet provides a complete description of key activities and observations:		

#### **Location Information** Data Collection: ✓ $\checkmark$ **Observation:** $\checkmark$ ✓ Flow or Stabilization: ✓ ✓ Photographs: **Calibration:** $\checkmark$ ✓ **Field Notes:** $\checkmark$ ✓ Safety Forms: ✓ ✓ N/A: OK: **GW Calculations are Accurate:** ✓ **GW Stabilization Criteria met:** $\square$ Flow Calculations are Accurate: ✓ Sonde Passed Post Event Check: $\square$ ✓ **Consistent Values in Notes:** ✓ **Consistent Dates and Times:** ✓ **Qualifiers added to Data:** ✓ Data under correct Event Key: ✓ All Req'd Parameters Meas'd; ✓

**Reviewer #2 Comments:** 

Limits Met:

# Reviewer #1 Comments:

Turbidity was considered stable when < 5.0 NTU at MW3R, MW7, & MW9. Temperature did not stabilize at MW7. Turbidity did not stabilize at MW8. Appendix B Statistical Analysis Plan

## GENERAL WASTE & RECYCLING, LLC SW-620 INDUSTRIAL WASTE LANDFILL

## Statistical Analysis Plan for Groundwater Monitoring Data

Prepared For:

## **GENERAL WASTE & RECYCLING, LLC**

Prepared by:

Northeast Technical Services, Inc. 526 Chestnut Street Virginia, Minnesota 55792

(218) 741-4290

**October 6, 2017** 

Project Number: 6385CC

"I certify under penalty of law that this document and all attachments were prepared under my direct supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete." I certify that this groundwater stasistical analysis plan for the General Waste Industrial Waste Landfill described in this report meets all requirements put forth by 40 CFR §257.93 'Groundwater Sampling and Analysis Requirements.'

Evan Johnson, P.E. Geotechnical Engineer Minnesota License No. 53648

10-13-17

Date



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TABLE 1: APPENDIX III PARAMETERSTABLE 2: APPENDIX IV PARAMETERS

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# 1.0 Purpose

Per 40 CFR 257.93 'Groundwater Sampling and Analysis Requirements' (the rule), a statistical procedure for assessing collected groundwater data as to whether or not a release has occurred must implemented at all CCR units. The rule outlines five (5) statistical methods that may be utilized for analyzing collected data. The statistical procedure utilized should account for spatial variance, temporal trends, and address the handling of non-detect data. This Statistical Analysis Plan has been prepared to meet the requirements of the rule and provide the framework for analyzing the collected groundwater data at the General Waste & Recycling, LLC facility (the facility) in Keewatin, Minnesota.

## 2.0 Initial Background Monitoring

## 2.1 Background Monitoring Parameters

The rule requires background monitoring of all CCR monitoring wells and eight (8) groundwater monitoring events must be completed prior to October 17, 2017. For this Statistical Analysis Plan, background monitoring includes monitoring for all parameters listed in Appendix III and Appendix IV of 40 CFR 257.93 (see Table 1 and Table 2, respectively).

## 2.2 Background Data Analysis

Per the rule, within 90 days of collecting the final background dataset, statistical analysis of the data is to be completed. Statistical analysis can be any of those allowed by the rule and should establish a means of determining if a Statistically Significant Inscrease (SSI) of a monitored parameter occurs during operation of the CCR unit to help determine if a leak or release has occurred from the CCR unit.

## 2.3 Establishing Background Dataset

## 2.3.1 Summary Statistics and Distribution

Once the final background dataset has been collected, summary statistics should be computed, including mean and variance. An analysis of the data set be conducted to see if data is parametric (normally distributed). A Shapiro-Wilk analysis should be completed to make this determination. This should be completed for each parameter at each well installation. If the data is skewed and does not pass the normality test, the data may be able to be transformed to a normal distribution via lognormal plotting.

If a normal distribution cannot be achieved naturally or by transformation, non-paremetric statistics may be utilized.



# 2.3.2 Interwell and Intrawell Analysis

It is recommended that the primary method of determining if a SSI has occurred at the site utilize an interwell analysis. This analysis will look at the dataset of the upgradient well (background well) to determine the Upper Prediction Limit (UPL), for the downgradient well concentrations. However, if spatial variation is present in the monitoring system, it may be necessary to assess data from an intrawell analysis. This analysis looks at the background dataset for a specific parameter in the same well to determine if a SSI has occurred. Both methods are viable and can be used for specific parameters. It is not necessary to have a single analysis type for all wells for all parameters at the facility.

Care should be taken when conducting an interwell analysis when the background dataset for downgradient wells may be affected by pre-existing CCR impacts. Given the timeframe of placed CCR materials at the facility, the estimated groundwater velocity, and the monitoring well locations, none of the existing monitoring wells would be expected to exhibit any signs of CCR impact. However, analysis should be completed for any future wells installed.

## 2.3.3 Upper Prediction Limit

Per the recommendation from the USEPA "Statistical Analysis of Groundwater Monitoring Data At RCRA Facilities Unified Guidance (2009)" (Unified Guidance) document, Upper Prediction Limits (UPL) will be utilized to assess for a SSI in the downgradient wells the facility. The UPL is calculated as follows:

$$UPL = x + ks$$

Where:

x = mean parameter concentration of background dataset

s = standard deviation of background dataset

k = site specific multiplier provided by the Unified Guidance Tables 19, depends on number of wells, number of parameters to be analyzed, size of background dataset

The UPL statistical method allows for both interwell and intrawell comparison.

## 2.4 Analyzing for Trends

Trends in data may occur due to natural temporal factors, but are not expected to be seen in the initial background dataset. Trend analysis should be completed for the background datasets. If a trend does exist, this should trigger an analysis to assess the potential cause of the trend (especially upward trends of monitored concentrations) and determination of the method to correct for the trend in the statistical approach.

Trend analysis to determine if a statistically significant trend exists can be completed by utilizing the Theil-Sen slope analysis with Mann-Kendall trend test ( $\alpha = 0.05$ ) (non-parametric, more suitable for datasets with >20% non-detect results) or a Ordinary Least Squares (OLS) linear regression with Student's t-test ( $\alpha = 0.01$ ) (parametric dataset, <20% non-detect results).



## 2.5 Non-Detect Data

Datasets that have less than 20% non-detect data may substitute the reporting limit divided by 2 (RL/2 method) for non-detect results for statistical analysis.

Datasets that contain 20-50% non-detect data must utilize the Kaplan-Meier method to compute summary statistics for the dataset.

Datasets that contain more than 50% non-detect data will not be able to compute summary statistics data reliably. It is recommended that the UPL be set to the highest or second highest observed value.

If all background data are non-detect, than the UPL shall be set to the highest Reporting Limit (RL) (assuming a reasonable RL have been reported that are below MCL concentrations).

## 2.6 Outliers

The dataset should be analyzed for outlier datapoints. This can be done visually by examining a time series plot of the data or by a box-and-whisker plot. If a datapoint appears to be an outlier, field notes, lab reports, and analysis programs should be checked for indications of erroneous data or transcription erros.

Numerical methods of determining an outlier may include a 3-sigma analaysis for parametric data (data point outside of 3 standard deviations) or the following for non-parametric data if the data point x is:

Where:

$$x > x'_{.75} + 3 * IQR$$

X = individual data point x'.75 = Third Quartile IQR = x'.75 - x'.25 (InterQuartile Range)

Datapoints determined to be outliers due to erroneous data collection may be removed from the dataset. Datapoints that appear to be representative data but are extreme may be excluded from the statistical analysis, but should remain in the data for future evaluation if the data set significantly changes.

## 2.7 Duplicate Samples

Duplicate samples collected for quality control means should not be included in the statistically analyzed dataset as they are not physically independent and will inappropriately skew the data.

## **3.0 Detection Monitoring**

Following the completion of the background monitoring, detection monitoring will be initiated at the facility. Detection monitoring is to be conducted semiannually (preferably in the spring and



fall) and analyzed for Appendix III parameters only. Statisitcal analysis of the data must be completed within 90 days of receiving laboratory data.

## 3.1 Stastically Significant Increase

## 3.1.1 Two Sample Test

Two sample testing indicates that if a UPL (either interwell or intrawell) is exceeded for a parameter, then a second sample should be collected and analyzed. If analysis of the second sample indicates a concentration below the UPL, then a SSI has not occurred. If the second sample indicates a value above the UPL, then a SSI has occurred.

Three Sample Testing which would require 3 consecutive samples to indicate concentrations above the UPL for a SSI to be indicated may be appropriate for specific situations. One situation would be if False Positive readings (Type II error) appears to be exceeding 10% of the total dataset.

## 3.1.2 Pracitical monitoring Practice

Downgradient constituents should be compared to the established UPL determined from the upgradient well data (for interwell comparisons) or compared to the UPL determined from the segregated background dataset for the individual well (intrawell comparison). If a parameter exceeds a UPL, a second sample should be collected from the well and analyzed. If the second sample indicates a value above the UPL, then it can be determined that a SSI has occurred and Assessment monitoring should be initiated.

## 3.1.3 Responding to an SSI

If the statistical evaluation indicates a SSI has occurred, the data should be further evaluated to determine if the the SSI is likely caused by a CCR unit release and assessment monitoring should be initiated or if other factors of influence can be demonstrated to be taking effect. This demonstration must be certified by a qualified professional engineer within 90 days of completing the statistical evaluation (in addition to the 90 day requirement for conducting the statistical analysis).

## 4.0 Assessment Monitoring

Assessment monitoring occurs once evaluation of Detection Monitoring parameters (Appendix III) indicates a SSI and there is reason to believe that the SSI could indicate a release from a CCR unit. Assessment monitoring must begin within 90 days of determining that a SSI related to a potential release of the CCR unit has occurred.

## 4.1 Monitoring Parameters

The initial assessment monitoring event must include all parameters listed in Appendix III and Appendix IV of 40 CFR 257.93 at all monitoring well locations. Subsequent monitoring events may include Appendix III parameters and only the Appendix IV parameters that were detected in the initial monitoring event. Assessment monitoring will also be conducted on a semi-annual basis (e.g., spring and fall monitoring events).



## 4.2 Groundwater Protection Standard

A Groundwater Protection Standard (GWPS) must be established for each Appendix IV parameter. For parameters for which the USEPA has established a Maximum Contaminant Level (MCL), the MCL (shown on Tables 1 and 2) shall be used for the GWPS. For the parameters for which a MCL has not been established, then the Upper Tolerance Limit (UTL) ( $\alpha = 0.05$ , 95% coverage) of the parameter utilizing the upgradient (background) well(s) shall be utilized to establish a GWPS for the specific parameter. This determined UTL concentration shall be applied site-wide for all downgradient wells.

## 4.3 Move to Corrective Action

The UPL and UTL are useful to assess for a SSI or measurable increase above background. However, in order to assess if a dataset has stastically exceeded a set value (the GWPS), Confidence Limits would be the most appropriate. If the Lower Confidence Limit (LCL) of the Assessment Monitoring dataset exceeds the GWPS, then movement into Corrective Action is warranted.

This Statistical Analysis Plan does not address Corrective Action methods of monitoring. Corrective Action methods will be developed if required per the rule..

## 4.4 Return to Detection Monitoring

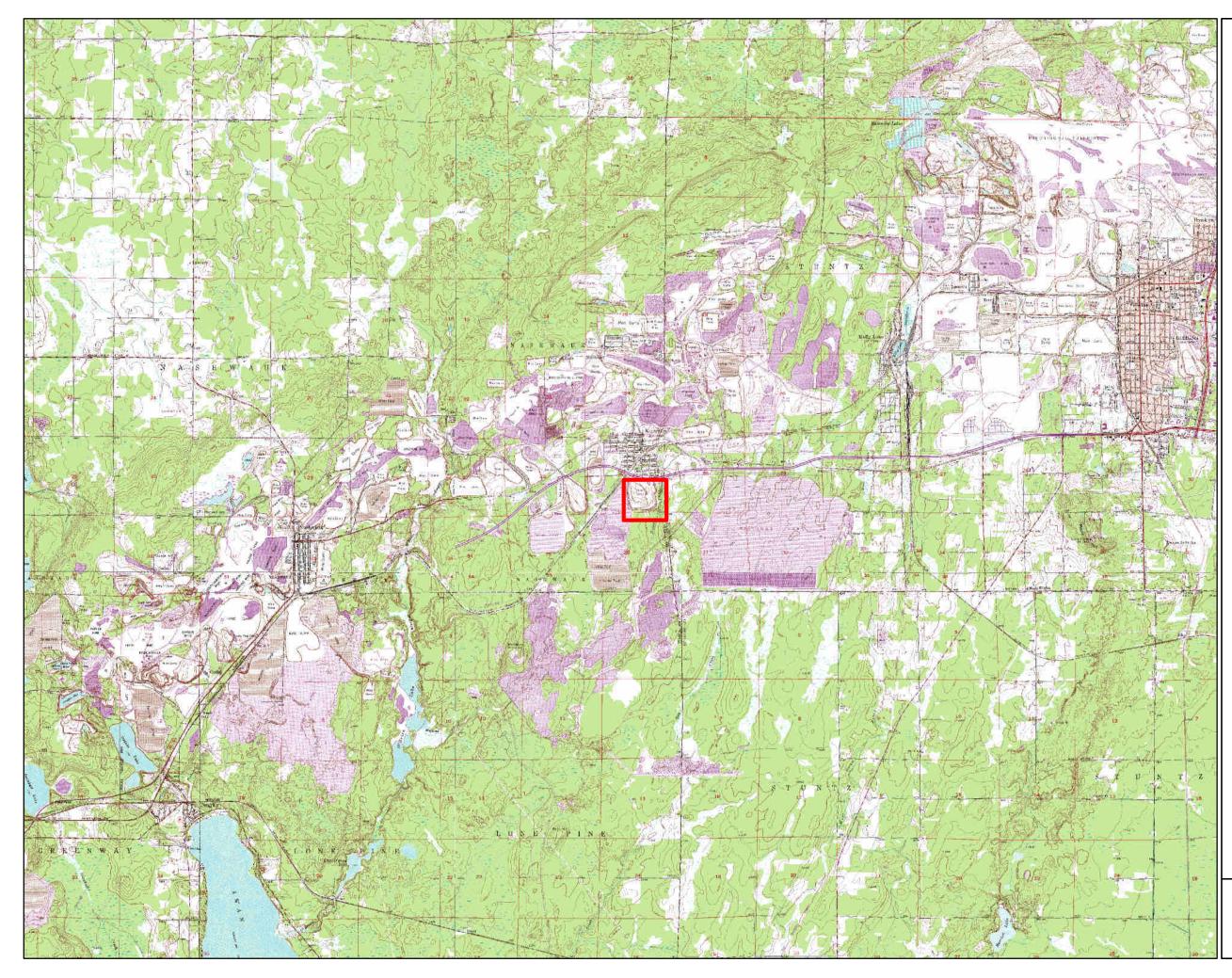
Assessment monitoring may cease and detection monitoring be re-initiated when all Appendix III and monitored Appendix IV parameters are below background (upgradient well) concentrations.

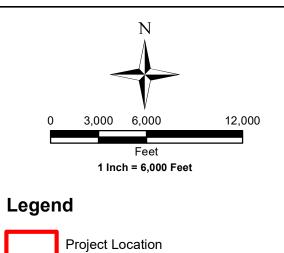
## 5.0 Updating Background Data

Background datasets should be updated every 2 years assuming that a SSI has not occurred. A Student t-test ( $\alpha$ =0.01, parametric) or Mann-Whitney ( $\alpha$  = 0.05, non-parametric) should be utilized to assess if the existing background dataset and the dataset to be added to the background dataset are statiscically different. If the data is shown not to be significantly different, the dataset should be pooled and the background dataset updated. If analysis of the data using the t-test or Mann-Whitney test indicates a statistical difference, the data should be analyzed to determine a potential cause for the statistically significant difference.

TABLE 1 Appendix III Parameters					
Parameter	MCL				
Boron	NA				
Calcium	NA				
Chloride	NA				
Fluoride	4.0 mg/L				
pH	NA				
Sulfate	NA				
Total Dissolved Solids (TDS)	NA				

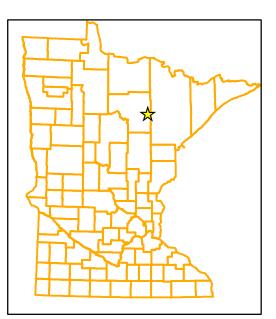
TABLE 2 Appendix	IV Parameters
Parameter	MCL
Antimony	0.006 mg/L
Arsenic	0.01 mg/L
Barium	2.0 mg/L
Beryllium	0.004 mg/L
Cadmium	0.10 mg/L
Chromium	0.10 mg/L
Cobalt	NA
Fluoride	4.0 mg/L
Lead	0.015 mg/L
Lithium	NA
Mercury	0.002 mg/L
Molybdenum	NA
Selenium	0.05 mg/L
Thallium	0.002 mg/L
Radium 226 and 228 combined	5 pCi/L





#### Notes:

-Background image has been provided by MNGEO Web Services



# Figure 1 Site Location Map

General Waste Industrial Landfill Statistical Analysis Plan Certification Keewatin, MN (St. Louis)



Date Drawn :	
October 4, 201	7
Drawn By :	
Evan Johnson	
NTS Project #:	
6385CC	

# Appendix C CCR Appendix III Parameters

CCR Appendix III Parameters					
Parameter MCL					
Boron	NA				
Calcium	NA				
Chloride	NA				
Fluoride	4.0 mg/L				
рН	NA				
Sulfate	NA				
Total Dissolved Solids (TDS)	NA				



January 3, 2019

Mr. Jon Penheiter Dem-Con Companies 13020 Dem-Con Drive Shakopee, MN 55379 jonpenheiter@dem-con.com

Sent Via Email

# **RE:** Statistical Analysis for October 2019 groundwater monitoring event for CCR compliance at the Keewatin, MN facility

Mr. Penheiter,

NTS is pleased to submit this report summarizing the CCR monitoring data collected in October, 2019 as well as the statistical analysis completed in accordance with the facility Statistical Analysis Plan (SAP).

MW-3R was abandoned during landfill expansion prior to the monitoring event on October 21, 2019. Therefore, this well was not monitored during the October event. Since MW-3R, a compliance/downgradient well, was unable to be monitored during the October 2019 event, a complete evaluation of a Statistically Significant Increase (SSI) as outlined by the site specific Statistical Analysis Plan (SAP) cannot be determined. Therefore, only MW-8 and MW-9 will be assessed.

Review of the data shows that 1 monitoring trigger value was intersected during the October, 2019 monitoring event at the compliance/downgradient wells (MW-8, MW-9). MW-8 indicated a pH of 6.28 with a lower trigger limit set to 6.286. This is the first occurrence at this location and therefore this is not considered an SSI. This location will be further assessed following the April, 2020 monitoring event.

In the up-gradient well MW-7, three parameters were measured above (or outside the range) of determined trigger limits. pH was measured to be 6.25 SU, which is below the facility lower trigger limit of 6.286. Sulfate was measured to be at 1120 mg/L, which is above the established trigger value of 811.1 mg/L. Lastly, Total Dissolved Solids (TDS) was measured to be 2250 mg/L, which is above the established trigger value of 1742 mg/L. MW-7 is not a compliance well and therefore this would not be assessed in regards to determining if a statistically significant increase (SSI) has occurred due to the CCR facility. However, this is the 2<sup>nd</sup> consecutive occurrence of elevated Sulfate and TDS observed in this well (988 mg/L Sulfate, 1970 mg/L TDS in April, 2019) and may indicate changing hydrologic/environmental conditions that may affect the hydrology/groundwater quality at the CCR facility and established detection monitoring trigger values. It is recommended that detection monitoring continue per the SAP and the potentially changing up-gradient conditions be assessed when the background dataset is updated.



## **Detection Monitoring**

Detection monitoring at the Keewatin facility includes monitoring of 4 groundwater wells, one upgradient well (MW-7) and three downgradient wells (MW-3R, MW-8, and MW-9). MW-3R was not monitored in the October event due to it being abandoned prior to the event. Field parameters and laboratory samples were collected on October 21, 2019. Laboratory results were received from PACE Analytical on October 29, 2019. Lab analyses completed includes those found in the CCR guidance Appendix III table (See Appendix C). The monitoring results and the established detection monitoring trigger values can be seen in Tables 1 and 2, respectively. The highlighted cells in Table 1 indicate monitored results above the trigger value (MW-7 pH, Sulfate, TDS; MW-8 pH).

Parameter	MW-7	MW-7 MW-3R MW-8		MW-9				
Boron (ug/L)	66.9	n/a	70.5	< 40.0 (Non-Detect)				
Calcium (mg/L)	539	n/a	354	217				
Chloride (mg/L)	37.4	n/a	1.4	6.0				
Fluoride (mg/L)	<0.10 (Non-Detect)	n/a	<0.10 (Non-Detect)	<0.10 (Non-Detect)				
pH (SU)	6.25	n/a	6.28	6.53				
Sulfate (mg/L)	1120	n/a	630	437				
Total Dissolved Solids (mg/L)	2250	n/a	1490	1100				

Table 12019 October Detection Monitoring Event Results

Table 2
<b>Detection Monitoring Trigger Values</b>

Detection wontoning mgger values								
Parameter	arameter MW-7 MW-3R		MW-8	MW-9				
Boron (ug/L)	87.8	130.1	87.8	87.8				
Calcium (mg/L)	506.7	667.5	506.7	506.7				
Chloride (mg/L)	81.94	81.94	81.94	81.94				
Fluoride (mg/L)	0.11	0.11	0.11	0.11				
pH (SU)	6.286 - 6.814	6.286 - 6.814	6.286 - 6.814	6.286 - 7.318				
Sulfate (mg/L)	811.1	1937	811.1	811.1				
Total Dissolved Solids (mg/L)	1742	3571	1742	1742				



## **Statistical Analysis**

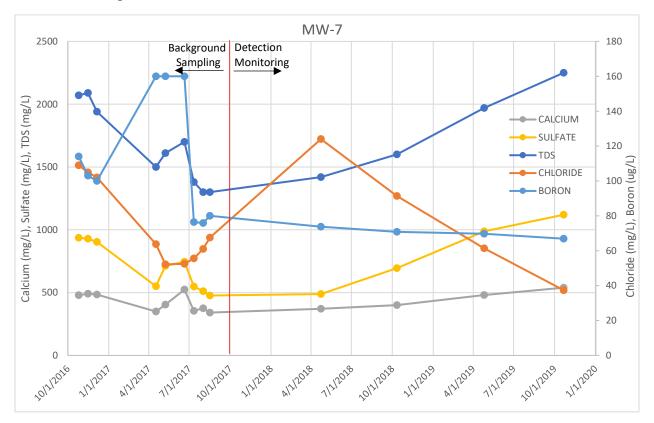
The Statistical Analysis Plan (SAP) for the facility and CCR guidance details that only downgradient wells (compliance wells) are to be analyzed for Statistically Significant Increases (SSIs). The SAP also specifies a 2-sample test be used to determine if an SSI has occurred. The lower trigger value exceedance at MW-8 is the first occurrence and therefore is not considered an SSI. Additionally, the accuracy of the utilized instrument (Hydrolab MS5) is reported to be 0.2 SU, and typically is only reported to the tenth SU though the instrument reports to the hundredth. Therefore the observed exceedance of 0.006 SU is not highly defensible.

The October 2019 monitoring data does not indicate that an SSI has occurred at the Keewatin facility. However, the analysis is incomplete since MW-3R was unable to be monitored.

In review of the April 2019 Statistical Analysis submitted for the facility, the following statement was made:

"MW-7 continues to show significant variability in water quality. It is recommended that detection monitoring continue per the SAP and the potentially changing up-gradient conditions be assessed when the background dataset is updated following 2 years of detection monitoring (After October, 2019 event)."

MW-7 continues to show significant variability with trending concentrations of Chloride, Sulfate, and TDS observed. Boron and Calcium are also trending, but to a lesser extent. Figure 1 below illustrates these parameters for MW-7.





It can be seen that while Calcium, TDS, and Sulfate indicate increasing trends, Chloride and Boron indicate decreasing trends. All 5 parameters have exceeded the observed range of values collected while completing the background sampling for the facility. These observed trends and changes in the water chemistry are not reflected in the downgradient wells. The monitored parameters in the downgradient locations have remained consistent with the background dataset.

The SAP for the facility indicates that the background dataset shall be updated every two years provided an SSI has not occurred. The completion of the October, 2019 monitoring event completes the initial two years of detection monitoring with the exception of MW-3R which was not monitored. The 2019 annual report for the facility will further discuss the collected data, updated background datasets, and MW-7 behavior.

If you have any questions, please contact me at (218) 742-1022.

Sincerely, Northeast Technical Services, Inc.

En Johnson 1-3-20

Evan C. Johnson, PE Geotechnical Engineer

Appendix A: October 2019 Monitoring Results Appendix B: Statistical Analysis Plan



Pace Analytical Services, LLC 315 Chestnut Street Virginia, MN 55792 (218) 742-1042

October 29, 2019

Dennis Schubbe Northeast Technical Services 526 Chestnut Street Virginia, MN 55792

RE: Project: 6385CC General Waste Disposal Pace Project No.: 12137390

Dear Dennis Schubbe:

Enclosed are the analytical results for sample(s) received by the laboratory on October 21, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Canin Jen

Carrie Jensen carrie.jensen@pacelabs.com (218)742-1042 Project Manager

Enclosures

cc: Sample Data, Northeast Technical Services Scott Seeley, NTS Karissa Vosen, NTS





#### CERTIFICATIONS

Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

#### Virginia Minnesota Certification ID's

315 Chestnut Street, Virginia, MN 55792 Montana Certificate #CERT0103 Alaska Certification UST-107 Minnesota Dept of Health Certification #: 027-137-445 North Dakota Certification: # R-203 Wisconsin DNR Certification # : 998027470 WA Department of Ecology Lab ID# C1007



#### SAMPLE SUMMARY

Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

Lab ID	Sample ID	Matrix	Date Collected	Date Received
12137390001	MW7	Water	10/21/19 10:00	10/21/19 15:25
12137390002	MW8	Water	10/21/19 11:45	10/21/19 15:25
12137390003	MW9	Water	10/21/19 12:55	10/21/19 15:25
12137390004	Field Duplicate	Water	10/21/19 12:56	10/21/19 15:25
12137390005	Field Blank	Water	10/21/19 12:40	10/21/19 15:25



#### SAMPLE ANALYTE COUNT

Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
12137390001		EPA 200.7	AK1	1	PASI-V
		EPA 200.8	DES	1	PASI-V
		SM 2540C (1997)	RC	1	PASI-V
		SM 4500-H+B	ZJT	1	PASI-V
		EPA 300.0	ZJT	3	PASI-V
12137390002	MW8	EPA 200.7	AK1	1	PASI-V
		EPA 200.8	DES	1	PASI-V
		SM 2540C (1997)	RC	1	PASI-V
		SM 4500-H+B	ZJT	1	PASI-V
		EPA 300.0	ZJT	3	PASI-V
12137390003	MW9	EPA 200.7	AK1	1	PASI-V
		EPA 200.8	DES	1	PASI-V
		SM 2540C (1997)	RC	1	PASI-V
		SM 4500-H+B	ZJT	1	PASI-V
		EPA 300.0	ZJT	3	PASI-V
12137390004	Field Duplicate	EPA 200.7	AK1	1	PASI-V
		EPA 200.8	DES	1	PASI-V
		SM 2540C (1997)	RC	1	PASI-V
		SM 4500-H+B	ZJT	1	PASI-V
		EPA 300.0	ZJT	3	PASI-V
12137390005	Field Blank	EPA 200.7	AK1	1	PASI-V
		EPA 200.8	DES	1	PASI-V
		SM 2540C (1997)	RC	1	PASI-V
		SM 4500-H+B	ZJT	1	PASI-V
		EPA 300.0	ZJT	3	PASI-V



#### ANALYTICAL RESULTS

#### Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

Sample: MW7	Lab ID:	12137390001	Collected:	10/21/1	9 10:00	Received:	10/21/19 15:25	Matrix: Water	
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 MET ICP	Analytical	Method: EPA 20	0.7 Prepara	tion Met	hod: EP	A 200.7			
Calcium	539	9 mg/L		0.50	1	10/23/19 13:1	5 10/24/19 10:5	0 7440-70-2	P6
200.8 MET ICPMS	Analytical	Method: EPA 20	0.8 Prepara	tion Met	hod: EP	A 200.8			
Boron	66.9	9 ug/L		40.0	1	10/23/19 13:1	5 10/24/19 12:3	1 7440-42-8	
2540C Total Dissolved Solids	Analytical	Method: SM 254	40C (1997)						
Total Dissolved Solids	225	0 mg/L		20.0	1		10/25/19 08:1	6	
4500H+ pH, Electrometric	Analytical	Method: SM 45	00-H+B						
pH at 25 Degrees C	7.2	2 Std. Units	6	0.10	1		10/22/19 16:2	8	H6
300.0 IC Anions 28 Days	Analytical	Method: EPA 30	0.0						
Chloride Fluoride Sulfate	37.4 NE 1120	D mg/L		1.0 0.10 20.0	1 1 10		10/23/19 15:4	8 16887-00-6 8 16984-48-8 9 14808-79-8	
Sample: MW8	Lab ID:	12137390002	Collected:	10/21/1	9 11:45	Received:	10/21/19 15:25	Matrix: Water	
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 MET ICP	Analytical	Method: EPA 20	0.7 Prepara	tion Met	hod: EP	A 200.7			
Calcium	354	4 mg/L		0.50	1	10/23/19 13:2	1 10/28/19 12:4	7 7440-70-2	
200.8 MET ICPMS	Analytical	Method: EPA 20	0.8 Prepara	tion Met	hod: EP	A 200.8			
Boron	70.	5 ug/L		40.0	1	10/23/19 13:2	1 10/28/19 17:5	4 7440-42-8	
2540C Total Dissolved Solids	Analytical	Method: SM 254	40C (1997)						
Total Dissolved Solids	1490	0 mg/L		20.0	1		10/25/19 17:3	3	
4500H+ pH, Electrometric	Analytical	Method: SM 450	00-H+B						
pH at 25 Degrees C	7.	I Std. Units	6	0.10	1		10/22/19 16:4	4	H6
300.0 IC Anions 28 Days	Analytical	Method: EPA 30	0.0						
Chloride Fluoride Sulfate	1.4 NE 630	) mg/L		1.0 0.10 10.0	1 1 5		10/23/19 17:5	1 16887-00-6 1 16984-48-8 2 14808-79-8	
Sample: MW9	Lab ID:	12137390003	Collected:	10/21/1	9 12:55	Received:	10/21/19 15:25	Matrix: Water	
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 MET ICP	Analytical	 Method: EPA 20	0.7 Prepara	tion Met	hod: EP	A 200.7			-
	,								

#### **REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC.



#### ANALYTICAL RESULTS

#### Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

Sample: MW9	Lab ID: 121	37390003	Collected:	10/21/1	9 12:55	Received: 10	)/21/19 15:25	Matrix: Water		
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qual	
200.8 MET ICPMS	Analytical Met	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Boron	ND	ug/L		40.0	1	10/23/19 13:15	10/24/19 12:09	7440-42-8		
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	IOC (1997)							
Total Dissolved Solids	1100	mg/L		20.0	1		10/25/19 17:34	Ļ		
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	)0-H+B							
pH at 25 Degrees C	7.2	Std. Units		0.10	1		10/22/19 17:04	Ļ	H6	
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0							
Chloride Fluoride Sulfate	6.0 ND 437	mg/L mg/L mg/L		1.0 0.10 10.0	1 1 5		10/23/19 18:53 10/23/19 18:53 10/23/19 19:13	3 16984-48-8		
Sample: Field Duplicate	Lab ID: 121	37390004	Collected:	10/21/1	9 12:56	Received: 10	)/21/19 15:25	Matrix: Water		
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qual	
200.7 MET ICP	Analytical Met	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	219	mg/L		0.50	1	10/23/19 13:15	10/24/19 10:56	6 7440-70-2		
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Prepara	tion Met	hod: EP	A 200.8				
Boron	ND	ug/L		40.0	1	10/23/19 13:15	10/24/19 12:3	5 7440-42-8		
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	IOC (1997)							
Total Dissolved Solids	1090	mg/L		20.0	1		10/25/19 17:34	ł		
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	)0-H+B							
pH at 25 Degrees C	7.2	Std. Units		0.10	1		10/22/19 16:35	5	H6	
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 30	0.0							
Chloride Fluoride Sulfate	5.9 ND 434	mg/L mg/L mg/L		1.0 0.10 10.0	1 1 5		10/23/19 16:29 10/23/19 16:29 10/23/19 17:31	16984-48-8		
Sample: Field Blank	Lab ID: 121	37390005	Collected:	10/21/1	9 12:40	Received: 10	)/21/19 15:25	Matrix: Water		
Parameters	Results	Units	Report	Limit	DF	Prepared	Analyzed	CAS No.	Qual	
200.7 MET ICP	Analytical Met	hod: EPA 20	0.7 Prepara	tion Met	hod: EP	A 200.7				
Calcium	ND	mg/L		0.50	1	10/23/19 13:21	10/28/19 12:5 <sup>2</sup>	7440-70-2		
200.8 MET ICPMS	Analytical Met	hod: EPA 20	0.8 Prepara	tion Met	hod: EP	A 200.8				
Boron	ND	ug/L		40.0	1	10/23/19 13:21	10/28/19 18.0	7440-42-8		

#### **REPORT OF LABORATORY ANALYSIS**

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#### ANALYTICAL RESULTS

#### Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

Sample: Field Blank	Lab ID: 121	37390005 Co	ollected: 10/21/	9 12:40	Received: 10	)/21/19 15:25 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540C	(1997)					
Total Dissolved Solids	ND	mg/L	10.0	1		10/25/19 08:24		
4500H+ pH, Electrometric	Analytical Met	hod: SM 4500-H	+B					
pH at 25 Degrees C	5.7	Std. Units	0.10	1		10/22/19 16:49		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300.0						
Chloride Fluoride Sulfate	ND ND ND	mg/L mg/L mg/L	1.0 0.10 2.0	1 1 1		10/23/19 18:32 10/23/19 18:32 10/23/19 18:32		



Project: Pace Project No.:	6385CC General W 12137390	/aste Disposal										
QC Batch:	177775		Anal	ysis Metho	d:	EPA 200.7						
QC Batch Method:	EPA 200.7		Anal	ysis Descri	ption:	200.7 MET						
Associated Lab Sar	nples: 121373900	001, 1213739000	3, 1213739	90004								
METHOD BLANK:	704434			Matrix: W	ater							
Associated Lab Sar	nples: 121373900	01, 1213739000	3, 1213739	90004								
			Bla	nk	Reporting							
Paran	neter	Units	Res	ult	Limit	Anal	yzed	Qualifier	S			
Calcium		mg/L		ND	0.5	0 10/24/1	9 10:41					
LABORATORY COI	NTROL SAMPLE:	704435										
			Spike	LC	S	LCS	% R	ec				
Paran	neter	Units	Conc.	Res	sult	% Rec	Limi	ts	Qualifiers			
Calcium		mg/L	2	25	25.1	10	0 8	35-115				
MATRIX SPIKE & M	IATRIX SPIKE DUPI	_ICATE: 7044	36		704437							
			MS	MSD								
		12137390001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	r Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Calcium	mg/L	539	25	25	559	574	78	140	70-130	3	20	P6

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.



Project: Pace Project No.:	6385CC General V 12137390	Vaste Disposal										
QC Batch:	177777		Analy	/sis Method	d: E	EPA 200.7						
QC Batch Method:	EPA 200.7		Analy	/sis Descri	otion: 2	200.7 MET						
Associated Lab San	nples: 12137390	002, 1213739000	5									
METHOD BLANK:	704448			Matrix: W	ater							
Associated Lab San	nples: 12137390	002, 1213739000	5									
			Blar	nk	Reporting							
Paran	neter	Units	Res	ult	Limit	Anal	yzed	Qualifiers	s			
Calcium		mg/L		ND	0.50	0 10/28/1	9 12:10					
LABORATORY COM	NTROL SAMPLE:	704449										
_			Spike	LC		LCS	% R					
Paran	neter	Units	Conc.	Res	sult	% Rec	Lim	its (	Qualifiers			
Calcium		mg/L	2	25	24.4	9	8	85-115				
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 7044	50		704451							
			MS	MSD								
_		12137471009	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Calcium	mg/L	54.3	25	25	79.5	79.7	101	102	70-130	0	20	
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 7044	52		704453							
			MS	MSD								
_		12137471007	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Calcium	mg/L	41.1	25	25	65.4	66.1	97	100	70-130	1	20	

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.



Project: Pace Project No.:	6385CC General V 12137390	Vaste Disposal										
QC Batch:	177770		Analy	sis Metho	d: E	PA 200.8						
QC Batch Method:	EPA 200.8		Analy	/sis Descri	ption: 2	00.8 MET						
Associated Lab Sam	nples: 12137390	001, 1213739000	3, 1213739	0004								
METHOD BLANK:	704418			Matrix: W	ater							
Associated Lab Sam	nples: 12137390	001, 1213739000	3, 1213739	0004								
			Blar	nk	Reporting							
Param	neter	Units	Res	ult	Limit	Anal	yzed	Qualifier	S			
Boron		ug/L		ND	40.0	10/24/1	9 12:01					
LABORATORY CON		704419	Spike	LC	-	LCS	% R					
Param	neter	Units	Conc.	Res	sult	% Rec	Lim	its (	Qualifiers			
Boron		ug/L	5	0	51.1	10	2	85-115				
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 7044	20		704421							
			MS	MSD								
_		12137390003	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	<b>.</b> .
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	ND	50	50	90.7	88.8	102	98	70-130	2	20	
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 7044	22		704423							
			MS	MSD								
_		12137471011	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	ND	50	50	83.1	79.7	99	92	70-130	4	20	

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.



Project:	6385CC General V	Vaste Disposal										
Pace Project No.:	12137390											
QC Batch:	177776		Analy	sis Metho	d: E	EPA 200.8						
QC Batch Method:	EPA 200.8		Analy	/sis Descri	ption: 2	200.8 MET						
Associated Lab San	nples: 12137390	002, 1213739000	5									
METHOD BLANK:	704439			Matrix: W	ater							
Associated Lab San	nples: 12137390	002, 1213739000	5									
			Blar		Reporting							
Paran	neter	Units	Res	ult	Limit	Anal	yzed	Qualifier	S			
Boron		ug/L		ND	40.0	0 10/28/1	9 16:46					
LABORATORY COM	NTROL SAMPLE:	704440										
			Spike	LC	S	LCS	% R					
Paran	neter	Units	Conc.	Res	sult	% Rec	Limi	ts (	Qualifiers			
Boron		ug/L	5	50	51.8	10	4	85-115				
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 7044	41		704442							
			MS	MSD	-							
		12137471008	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	40.4	50	50	88.5	88.4	96	96	70-130	0	20	
MATRIX SPIKE & M	IATRIX SPIKE DUP	LICATE: 7044	43		704444							
	_	-	MS	MSD								
		12137471010	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	ND	50	50	71.3	73.5	96	100	70-130	3	20	

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.



Project:	6385CC Gene	ral Waste Disposal						
Pace Project No.:	12137390							
QC Batch:	177953		Analysis Me	ethod: S	SM 2540C (199	97)		
QC Batch Method:	SM 2540C (1	997)	Analysis De		2540C Total Dis			
Associated Lab Sar	mples: 12137	390001, 12137390005						
METHOD BLANK:	705055		Matrix	: Water				
Associated Lab Sar	mples: 12137	390001, 12137390005						
_			Blank	Reporting				
Parar	meter	Units	Result	Limit	Analyze	d Qualit	fiers	-
Total Dissolved Soli	ids	mg/L	ND	) 10.0	0 10/25/19 08	3:11		
METHOD BLANK:	705059		Matrix	« Water				
Associated Lab Sar	mples: 12137	390001, 12137390005						
		·	Blank	Reporting				
Parar	meter	Units	Result	Limit	Analyze	d Qualit	fiers	
Total Dissolved Soli	ids	mg/L	ND	) 10.0	0 10/25/19 08	3:25		-
LABORATORY CO	NTROL SAMPLE	E: 705056						
			Spike	LCS	LCS	% Rec		
Parar	meter	Units	Conc.	Result	% Rec	Limits	Qua	lifiers
Total Dissolved Soli	ids	mg/L	255	260	102	80-120		
SAMPLE DUPLICA	TE: 705057			_				
Doror	m etc r	Linito	12137435003	Dup	חחח	Max		Qualifiers
	meter	Units	Result	Result	RPD	RPD		Qualifiers
Total Dissolved Soli	ids	mg/L	126	5 132	2	5	5	
SAMPLE DUPLICA	TE: 705249							
			12137421017	Dup		Max		
Parar	meter	Units	Result	Result	RPD	RPD		Qualifiers

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.

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Project:		General Waste Disposal						
Pace Project No.:	12137390	)						
QC Batch:	178069		Analysis M	ethod:	SM 2540C (199	97)		
QC Batch Method:	SM 254	0C (1997)	Analysis D	escription:	2540C Total Di	ssolved Solids		
Associated Lab Sar	mples: 1	2137390002, 12137390003,	12137390004					
METHOD BLANK:	705567		Matri	x: Water				
Associated Lab Sar	mples: 1	2137390002, 12137390003,	12137390004					
			Blank	Reporting				
Parar	neter	Units	Result	Limit	Analyze	d Quali	fiers	
Total Dissolved Soli	ids	mg/L	NE	0 10	0.0 10/25/19 1	7:30		
METHOD BLANK:	705570		Matri	x: Water				
Associated Lab Sar	mples: 1	2137390002, 12137390003,	12137390004					
			Blank	Reporting				
Parar	neter	Units	Result	Limit	Analyze	d Quali	fiers	
Total Dissolved Soli	ids	mg/L	NE	D 10	0.0 10/25/19 17	7:35		
LABORATORY CO	NTROL SA	MPLE: 705568						
			Spike	LCS	LCS	% Rec		
Parar	neter	Units	Conc.	Result	% Rec	Limits	Qualifiers	
Total Dissolved Soli	ids	mg/L	255	254	100	80-120		
SAMPLE DUPLICA	TE: 7055	69						
			12137651001	Dup		Max		
				•				
Parar	neter	Units	Result	Result	RPD	RPD	Qualifiers	

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.



Project: Pace Project No.:	6385CC General \ 12137390	Waste Disposal					
QC Batch:	177675		Analysis M	ethod:	SM 4500-H+B		
QC Batch Method:	SM 4500-H+B		Analysis De	escription:	4500H+B pH		
Associated Lab San	nples: 12137390	001, 1213739000	2, 12137390003,	12137390004	, 12137390005		
LABORATORY COM	NTROL SAMPLE:	704033					
			Spike	LCS	LCS	% Rec	
Paran	neter	Units	Conc.	Result	% Rec	Limits	Qualifiers
pH at 25 Degrees C	:	Std. Units	7	7.0	100	98-102	H6
SAMPLE DUPLICA	TE: 704034						
			12137223001	•		Max	
Paran	neter	Units	Result	Result	RPD	RPD	Qualifiers
pH at 25 Degrees C	;	Std. Units	8.0	3 (	3.0	0	10 H6
SAMPLE DUPLICA	TE: 704035						
			12137390003	Dup		Max	
Paran	neter	Units	Result	Result	RPD	RPD	Qualifiers

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.



QC Batch:	1776	98		Anal	sis Method	d: E	PA 300.0						
QC Batch M	ethod: EPA	300.0			, vsis Descrit		00.0 IC An	ions					
	_ab Samples:		01, 1213739000										
METHOD BI	LANK: 70413	2			Matrix: Wa	ater							
Associated L	_ab Samples:	121373900	01, 1213739000	2, 1213739	0003, 1213	37390004, 1	21373900	05					
				Bla	nk I	Reporting							
	Parameter		Units	Res	ult	Limit	Anal	yzed	Qualifier	S			
Chloride			mg/L		ND	1.0	) 10/23/1	9 13:25					
Fluoride			mg/L		ND	0.10	) 10/23/1	9 13:25					
Sulfate			mg/L		ND	2.0	) 10/23/1	9 13:25					
	RY CONTROL		704133										
LADORAIU		OAIVIF LE.	104100	Spike	LC	s	LCS	% Re	ec				
	Parameter		Units	Conc.	Res	-	% Rec	Limi		Qualifiers			
Chloride			mg/L	5	50	48.8	9	8 9	90-110		_		
Fluoride			mg/L		5	4.8	9	6 9	90-110				
Sulfate			mg/L	5	50	47.8	9	6 9	90-110				
MATRIX SP	IKE & MATRIX		-ICATE: 7041	34		704135							
				MS	MSD								
			12137383001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Pa	rameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qua
Chloride		mg/L	ND	50	50	52.3	52.5	104	104	90-110	0	20	
Fluoride		mg/L	ND	5	5	5.1	5.1	100	101	90-110	0		
Sulfate		mg/L	8.5	50	50	59.3	59.5	102	102	90-110	0	20	
	IKE & MATRIX		ICATE: 7041	36		704137							
				MS	MSD								
			12137385001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
<b>D</b> -	rameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qua
Pa		mg/L	200	250	250	451	449	100	99	90-110	1	20	
Pa Chloride		J.						99	100	90-110	0		
		mg/L	0.14	5	5	5.1	5.1	99	100	90-110	0	20	

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#### QUALIFIERS

#### Project: 6385CC General Waste Disposal

Pace Project No.: 12137390

#### 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.

#### LABORATORIES

PASI-V Pace Analytical Services - Virginia

#### ANALYTE QUALIFIERS

H6 Analysis initiated outside of the 15 minute EPA required holding time.

P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.



#### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:6385CC General Waste DisposalPace Project No.:12137390

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
12137390001	MW7	EPA 200.7	177775	EPA 200.7	177852
12137390002	MW8	EPA 200.7	177777	EPA 200.7	178102
12137390003 12137390004	MW9 Field Duplicate	EPA 200.7 EPA 200.7	177775 177775	EPA 200.7 EPA 200.7	177852 177852
12137390005	Field Blank	EPA 200.7	177777	EPA 200.7	178102
12137390001	MW7	EPA 200.8	177770	EPA 200.8	177853
12137390002	MW8	EPA 200.8	177776	EPA 200.8	178101
12137390003 12137390004	MW9 Field Duplicate	EPA 200.8 EPA 200.8	177770 177770	EPA 200.8 EPA 200.8	177853 177853
12137390005	Field Blank	EPA 200.8	177776	EPA 200.8	178101
12137390001	MW7	SM 2540C (1997)	177953		
12137390002 12137390003 12137390004	MW8 MW9 Field Duplicate	SM 2540C (1997) SM 2540C (1997) SM 2540C (1997)	178069 178069 178069		
12137390005	Field Blank	SM 2540C (1997)	177953		
12137390001 12137390002 12137390003 12137390004 12137390005	MW7 MW8 MW9 Field Duplicate Field Blank	SM 4500-H+B SM 4500-H+B SM 4500-H+B SM 4500-H+B SM 4500-H+B	177675 177675 177675 177675 177675 177675		
12137390001 12137390002 12137390003 12137390004 12137390005	MW7 MW8 MW9 Field Duplicate Field Blank	EPA 300.0 EPA 300.0 EPA 300.0 EPA 300.0 EPA 300.0	177698 177698 177698 177698 177698 177698		

Environmental Science & Engineering			NTS HESTNUT STR SINIA, MN 55 10 Fax: (21		R	-	REQUI	RED 1	rurn-/	C AROUND TIM	HI PM: C	<b>#:1</b>	Due		<b>O</b> 11/04/19	Page 18 of 20
DEMOLITION & IN	E and RECYLING L IDUSTRIAL LANDF NTY, MINNESOTA			SCHUBBE, KARIS CRUM & SCOTT		199		1 1	NTAIN (EONH) S		SEE ATT		LIST W		THODS	
SAMPLER: Corey An PROJECT: GENERAL WASTE DISPO		G, LLC.		.: SW-620-002 Oct-19		filtered	VOC M. 8260 (HCL) GENERAL CHEMISTRY (NO PRES)	GENERAL CHEMISTRY (H2SO4)	TOTAL METALS (HN03) DISSOLVED METALS (HN03)							
PROJECT NUMBER: 6385CC LOG-IN #:	CCR Monitoirng SAMPLE #	DESCRIPTION:	DATE:	LECTION: TIME:	LIQ. SO		-	+		REQUIR	ED ANALYSIS:	A Selling of the selling		1	and the second	
	MW3R	GW WELL	No Sa	imple	×	N	1		1	Boron,	Calcium, Chloride,	Flouride, pH	, Sulfate &	TDS		
	MW7	GW WELL	10 21 19	1000	×	N	1		1	Boron,	Calcium, Chloride,	Flouride, pH	, Sulfate &	TDS		
	MVV8	GW WELL	6/21/19	1145	x	N	1		1	Boron,	Calcium, Chloride,	Flouride, pH	, Sulfate &	TDS		
	MW9	GW WELL	6/2/19	(2.55	x	N	1		1	Boron,	Calcium, Chloride,	Flouride, pH	l, Sulfate &	TDS		
	Field Duplicate	GW WELL	10/20/19	1 1256	×	N	1		1	Boron,	Calcium, Chloride,	Flouride, pH	I, Sulfate &	TDS		
	Field Blank	Field Blank	10/2/19	1240	×	N	1		1	Boron,	Calcium, Chloride,	Flouride, pH	I, Sulfate &	TDS		
RELINQUISHED BY:		DATE: <b>10/21/1</b> 4 TIME: 1525	RECEIVED BY:						DAT							
RELINQUISHED TO NTS SAMPLE L	OCK-UP BY:	DATE: TIME:	RECEIVED FRO	M NTS SAMPLE LO	OCKUP BY:				DAT TIMI	E:						
RECEIVED FORLAB BY:	lad		TEMP.AT ARRIV	/AL:	45.55		- 10			100						
DATE 12-(119	15125															2 100

## GENERAL WASTE CCR MONITORING METHODS

PARAMETER	SYMBOL	EPA Method
Boron	В	200.8
Calcium	Са	200.7
Chloride	Chloride	300.0
Fluoride	Flouride	300.0 -
рН	рН	SM 4500 H+B
Sulfate	SO <sub>4</sub>	300.0
TDS	TDS	SM 2540C

Document No::       Issuing Authority:         Prode Condition point Reciptor       Client Name:       Project #:         String Authority:       Project #:         Open Reciptor       Client Name:       Project #:         Courier:       Fred £x       UPS         Commercial       Project #:       WO/# : 1 221373900         Courier:       Fred £x       UPS         Commercial       Project #:       Project #:         Ing Material:       Bubble Wrap       Bubble Bags       None         Type of Ice:       Ives       No       Uptional:         Informeter Used:       1:a10732000       Type of Ice:       Ives       No         Type of Ice:       Ives       No       Data and Initials of Person Examining Contents:         main of Custody Present?       Fres       No       N/A       1         main of Custody Freent?       Fres       No	Page look tight	Sample C		nt Name: Upon Rece	ipt Form	Document Revised: 30Apr2019 Page 1 of 1
Jpon Receipt   Lourie:	FaceAnalytical		Docum	ent No.:		Issuing Authority:
Jpon Receipt   Lourie:   Courie:   Courie:   Commercial   Pace   Other:     Ling Number:   ody Seal on Cooler/Box Present?   Yes   Bubble Bags   Momenter Used:   Data Receipt   Yes   Data Receipt   Immercial:   Bubble Wrap   Data Receipt   Yes   Data Receipt   Present?	Sample Condition Client Name			Project	t.	
Commercial       Pace       Other:       IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Upon Receipt			riojecti	h	0#:12137390
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Note: Whenever there is a discrepancy affecting Norge Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

## GENERAL WASTE & RECYCLING, LLC SW-620 INDUSTRIAL WASTE LANDFILL

#### Statistical Analysis Plan for Groundwater Monitoring Data

Prepared For:

#### **GENERAL WASTE & RECYCLING, LLC**

Prepared by:

Northeast Technical Services, Inc. 526 Chestnut Street Virginia, Minnesota 55792

(218) 741-4290

**October 6, 2017** 

Project Number: 6385CC

"I certify under penalty of law that this document and all attachments were prepared under my direct supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete." I certify that this groundwater stasistical analysis plan for the General Waste Industrial Waste Landfill described in this report meets all requirements put forth by 40 CFR §257.93 'Groundwater Sampling and Analysis Requirements.'

Evan Johnson, P.E. Geotechnical Engineer Minnesota License No. 53648

10-13-17

Date



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## 1.0 Purpose

Per 40 CFR 257.93 'Groundwater Sampling and Analysis Requirements' (the rule), a statistical procedure for assessing collected groundwater data as to whether or not a release has occurred must implemented at all CCR units. The rule outlines five (5) statistical methods that may be utilized for analyzing collected data. The statistical procedure utilized should account for spatial variance, temporal trends, and address the handling of non-detect data. This Statistical Analysis Plan has been prepared to meet the requirements of the rule and provide the framework for analyzing the collected groundwater data at the General Waste & Recycling, LLC facility (the facility) in Keewatin, Minnesota.

## 2.0 Initial Background Monitoring

## 2.1 Background Monitoring Parameters

The rule requires background monitoring of all CCR monitoring wells and eight (8) groundwater monitoring events must be completed prior to October 17, 2017. For this Statistical Analysis Plan, background monitoring includes monitoring for all parameters listed in Appendix III and Appendix IV of 40 CFR 257.93 (see Table 1 and Table 2, respectively).

## 2.2 Background Data Analysis

Per the rule, within 90 days of collecting the final background dataset, statistical analysis of the data is to be completed. Statistical analysis can be any of those allowed by the rule and should establish a means of determining if a Statistically Significant Inscrease (SSI) of a monitored parameter occurs during operation of the CCR unit to help determine if a leak or release has occurred from the CCR unit.

## 2.3 Establishing Background Dataset

## 2.3.1 Summary Statistics and Distribution

Once the final background dataset has been collected, summary statistics should be computed, including mean and variance. An analysis of the data set be conducted to see if data is parametric (normally distributed). A Shapiro-Wilk analysis should be completed to make this determination. This should be completed for each parameter at each well installation. If the data is skewed and does not pass the normality test, the data may be able to be transformed to a normal distribution via lognormal plotting.

If a normal distribution cannot be achieved naturally or by transformation, non-paremetric statistics may be utilized.



## 2.3.2 Interwell and Intrawell Analysis

It is recommended that the primary method of determining if a SSI has occurred at the site utilize an interwell analysis. This analysis will look at the dataset of the upgradient well (background well) to determine the Upper Prediction Limit (UPL), for the downgradient well concentrations. However, if spatial variation is present in the monitoring system, it may be necessary to assess data from an intrawell analysis. This analysis looks at the background dataset for a specific parameter in the same well to determine if a SSI has occurred. Both methods are viable and can be used for specific parameters. It is not necessary to have a single analysis type for all wells for all parameters at the facility.

Care should be taken when conducting an interwell analysis when the background dataset for downgradient wells may be affected by pre-existing CCR impacts. Given the timeframe of placed CCR materials at the facility, the estimated groundwater velocity, and the monitoring well locations, none of the existing monitoring wells would be expected to exhibit any signs of CCR impact. However, analysis should be completed for any future wells installed.

## 2.3.3 Upper Prediction Limit

Per the recommendation from the USEPA "Statistical Analysis of Groundwater Monitoring Data At RCRA Facilities Unified Guidance (2009)" (Unified Guidance) document, Upper Prediction Limits (UPL) will be utilized to assess for a SSI in the downgradient wells the facility. The UPL is calculated as follows:

$$UPL = x + ks$$

Where:

x = mean parameter concentration of background dataset

s = standard deviation of background dataset

k = site specific multiplier provided by the Unified Guidance Tables 19, depends on number of wells, number of parameters to be analyzed, size of background dataset

The UPL statistical method allows for both interwell and intrawell comparison.

## 2.4 Analyzing for Trends

Trends in data may occur due to natural temporal factors, but are not expected to be seen in the initial background dataset. Trend analysis should be completed for the background datasets. If a trend does exist, this should trigger an analysis to assess the potential cause of the trend (especially upward trends of monitored concentrations) and determination of the method to correct for the trend in the statistical approach.

Trend analysis to determine if a statistically significant trend exists can be completed by utilizing the Theil-Sen slope analysis with Mann-Kendall trend test ( $\alpha = 0.05$ ) (non-parametric, more suitable for datasets with >20% non-detect results) or a Ordinary Least Squares (OLS) linear regression with Student's t-test ( $\alpha = 0.01$ ) (parametric dataset, <20% non-detect results).



## 2.5 Non-Detect Data

Datasets that have less than 20% non-detect data may substitute the reporting limit divided by 2 (RL/2 method) for non-detect results for statistical analysis.

Datasets that contain 20-50% non-detect data must utilize the Kaplan-Meier method to compute summary statistics for the dataset.

Datasets that contain more than 50% non-detect data will not be able to compute summary statistics data reliably. It is recommended that the UPL be set to the highest or second highest observed value.

If all background data are non-detect, than the UPL shall be set to the highest Reporting Limit (RL) (assuming a reasonable RL have been reported that are below MCL concentrations).

## 2.6 Outliers

The dataset should be analyzed for outlier datapoints. This can be done visually by examining a time series plot of the data or by a box-and-whisker plot. If a datapoint appears to be an outlier, field notes, lab reports, and analysis programs should be checked for indications of erroneous data or transcription erros.

Numerical methods of determining an outlier may include a 3-sigma analaysis for parametric data (data point outside of 3 standard deviations) or the following for non-parametric data if the data point x is:

Where:

$$x > x'_{.75} + 3 * IQR$$

X = individual data point x'.75 = Third Quartile IQR = x'.75 - x'.25 (InterQuartile Range)

Datapoints determined to be outliers due to erroneous data collection may be removed from the dataset. Datapoints that appear to be representative data but are extreme may be excluded from the statistical analysis, but should remain in the data for future evaluation if the data set significantly changes.

## 2.7 Duplicate Samples

Duplicate samples collected for quality control means should not be included in the statistically analyzed dataset as they are not physically independent and will inappropriately skew the data.

## **3.0 Detection Monitoring**

Following the completion of the background monitoring, detection monitoring will be initiated at the facility. Detection monitoring is to be conducted semiannually (preferably in the spring and



fall) and analyzed for Appendix III parameters only. Statisitcal analysis of the data must be completed within 90 days of receiving laboratory data.

## 3.1 Stastically Significant Increase

## 3.1.1 Two Sample Test

Two sample testing indicates that if a UPL (either interwell or intrawell) is exceeded for a parameter, then a second sample should be collected and analyzed. If analysis of the second sample indicates a concentration below the UPL, then a SSI has not occurred. If the second sample indicates a value above the UPL, then a SSI has occurred.

Three Sample Testing which would require 3 consecutive samples to indicate concentrations above the UPL for a SSI to be indicated may be appropriate for specific situations. One situation would be if False Positive readings (Type II error) appears to be exceeding 10% of the total dataset.

## **3.1.2** Pracitical monitoring Practice

Downgradient constituents should be compared to the established UPL determined from the upgradient well data (for interwell comparisons) or compared to the UPL determined from the segregated background dataset for the individual well (intrawell comparison). If a parameter exceeds a UPL, a second sample should be collected from the well and analyzed. If the second sample indicates a value above the UPL, then it can be determined that a SSI has occurred and Assessment monitoring should be initiated.

## 3.1.3 Responding to an SSI

If the statistical evaluation indicates a SSI has occurred, the data should be further evaluated to determine if the the SSI is likely caused by a CCR unit release and assessment monitoring should be initiated or if other factors of influence can be demonstrated to be taking effect. This demonstration must be certified by a qualified professional engineer within 90 days of completing the statistical evaluation (in addition to the 90 day requirement for conducting the statistical analysis).

## 4.0 Assessment Monitoring

Assessment monitoring occurs once evaluation of Detection Monitoring parameters (Appendix III) indicates a SSI and there is reason to believe that the SSI could indicate a release from a CCR unit. Assessment monitoring must begin within 90 days of determining that a SSI related to a potential release of the CCR unit has occurred.

## 4.1 Monitoring Parameters

The initial assessment monitoring event must include all parameters listed in Appendix III and Appendix IV of 40 CFR 257.93 at all monitoring well locations. Subsequent monitoring events may include Appendix III parameters and only the Appendix IV parameters that were detected in the initial monitoring event. Assessment monitoring will also be conducted on a semi-annual basis (e.g., spring and fall monitoring events).



## 4.2 Groundwater Protection Standard

A Groundwater Protection Standard (GWPS) must be established for each Appendix IV parameter. For parameters for which the USEPA has established a Maximum Contaminant Level (MCL), the MCL (shown on Tables 1 and 2) shall be used for the GWPS. For the parameters for which a MCL has not been established, then the Upper Tolerance Limit (UTL) ( $\alpha = 0.05$ , 95% coverage) of the parameter utilizing the upgradient (background) well(s) shall be utilized to establish a GWPS for the specific parameter. This determined UTL concentration shall be applied site-wide for all downgradient wells.

## 4.3 Move to Corrective Action

The UPL and UTL are useful to assess for a SSI or measurable increase above background. However, in order to assess if a dataset has stastically exceeded a set value (the GWPS), Confidence Limits would be the most appropriate. If the Lower Confidence Limit (LCL) of the Assessment Monitoring dataset exceeds the GWPS, then movement into Corrective Action is warranted.

This Statistical Analysis Plan does not address Corrective Action methods of monitoring. Corrective Action methods will be developed if required per the rule..

## 4.4 Return to Detection Monitoring

Assessment monitoring may cease and detection monitoring be re-initiated when all Appendix III and monitored Appendix IV parameters are below background (upgradient well) concentrations.

## 5.0 Updating Background Data

Background datasets should be updated every 2 years assuming that a SSI has not occurred. A Student t-test ( $\alpha$ =0.01, parametric) or Mann-Whitney ( $\alpha$  = 0.05, non-parametric) should be utilized to assess if the existing background dataset and the dataset to be added to the background dataset are statiscically different. If the data is shown not to be significantly different, the dataset should be pooled and the background dataset updated. If analysis of the data using the t-test or Mann-Whitney test indicates a statistical difference, the data should be analyzed to determine a potential cause for the stastistically significant difference.

TABLE 1 Appendix III Parameters			
Parameter	MCL		
Boron	NA		
Calcium	NA		
Chloride	NA		
Fluoride	4.0 mg/L		
pH	NA		
Sulfate	NA		
Total Dissolved Solids (TDS)	NA		

TABLE 2 Appendix IV Parameters				
Parameter	MCL			
Antimony	0.006 mg/L			
Arsenic	0.01 mg/L			
Barium	2.0 mg/L			
Beryllium	0.004 mg/L			
Cadmium	0.10 mg/L			
Chromium	0.10 mg/L			
Cobalt	NA			
Fluoride	4.0 mg/L			
Lead	0.015 mg/L			
Lithium	NA			
Mercury	0.002 mg/L			
Molybdenum	NA			
Selenium	0.05 mg/L			
Thallium	0.002 mg/L			
Radium 226 and 228 combined	5 pCi/L			

## **APPENDIX C**

# 2020 UPDATE OF BACKGROUND DATASET RATIONALE/WORKFLOW

A two year period of detection monitoring was completed at General Waste CCR Facility. The Statistical Analysis Plan (SAP) indicates the background dataset should be assessed following a two year period and detection monitoring added to the background dataset if not statistically different and if no Statistically Significant Increase (SSI) has occurred. The following outlines the process followed to assess the detection/background monitoring results for the Appendix III parameters (Boron, Calcium, Chloride, Fluoride, Sulfate, TDS, pH).

- 1.) Complete time series Plots for all 4 CCR wells at the facility to allow for visual assessment of Detection monitoring as it relates to background monitoring data.
  - a. MW-7 indicates large trends in Chloride, TDS, and Sulfate, with Chloride decreasing, and TDS & Sulfate increasing
  - b. MW-3R indicates decreasing trends in Calcium, Boron, Sulfate, and TDS
  - c. MW-8 and MW-9 Detection datasets appear generally consistent with background datasets
- 2.) A Students T-Test (STT) was conducted ( $\alpha$ =.01)(no Non-detects) or Tarone-Ware (TW) ( $\alpha$ =.01)(with Non-detects) to assess if the background dataset and detection monitoring dataset were statistically different or not. If the p-value is not less than 0.01, the background and detection monitoring datasets are not statistically different.
  - a. MW-7
    - i. Boron (TW): p=.02>.01, not statistically different, but close due to large non-detects in background dataset
    - ii. Calcium (STT): p=.58
    - iii. Chloride (STT): p=.81
    - iv. Fluoride (n/a): Nearly all non-detect, cannot conduct statistics, but no change
    - v. Sulfate (STT): p=.38
    - vi. TDS (STT): p=.45
    - vii. pH (STT): p=.93

## b. **MW-3R**

- i. Boron (TW): p=.07
- ii. Calcium (STT): p=.001, IS STATISTICALLY DIFFERENT. The Calcium results at MW-3R have been continually decreasing from the initial background monitoring. The cause for this is unknown. MW-3R was abandoned in 2019 and will no longer be monitored, therefore there is limited value for further assessment.
- iii. Chloride (STT): p=.02, not statistically different, but close, Chloride concentrations are elevated in the detection monitoring as compared to the background monitoring
- iv. Fluoride (n/a): Nearly all non-detect, cannot conduct statistics, but no change
- v. Sulfate (STT): p=0, IS STATISTIALLY DIFFERENT. All three Detection monitoring events indicated Sulfate concentrations below those observed in the initial background monitoring. The cause for this is unknown. MW-3R was abandoned in 2019 and will no longer be monitored, therefore there is limited value in further assessment.
- vi. TDS (STT): p=.001, IS STATISTICALLY DIFFERENT, very similar to Sulfate
- vii. pH (STT): p=.85

### c. MW-8

- i. Boron (TW): p=.51
- ii. Calcium (STT): p=.001, IS STATISTICALLY DIFFERENT. 3 of the 4 Detection monitoring results were considerably below the background detection monitoring results (~12% below). However, the concentration appears to be increasing to be consistent with the background dataset. Will add Detection monitoring values to background data even though they are shown to be less than the background dataset, statistically.
- iii. Chloride (STT): p=.009, IS STATISTICALLY DIFFERENT. 3 of the 4 Detection monitoring results were considerably HIGHER than the background dataset with a mean of 1.3 mg/L as compared to the background dataset mean of 1.1. (~20% higher). However, the very low concentrations make meaningful assessment difficult. Additionally, the upgradient well MW-7 has much higher Chloride concentrations (mean of 75 mg/L). Therefore, it would be very difficult to discern impact from upgradient watershed vs. the CCR unit. Chloride monitoring has limited value for our particular site.
- iv. Fluoride (n/a): Nearly all non-detect, cannot conduct statistics, but no change
- v. Sulfate (STT): p=0, IS STATISTICALLY DIFFERENT. All 4 Detection monitoring results were considerably below the background detection monitoring results with a mean of 600 mg/L as compared to 740 mg/L (~23% below). The Detection monitoring concentrations appear very stable with no trend and low deviation. Will add Detection monitoring values to background data even though they are shown to be less than the background dataset, statistically.
- vi. TDS (STT): p=.001. IS STATISTICALLY DIFFERENT. Very similar to Sulfate results, only 17% difference between background and detection mean.
- vii. pH (STT): p=.78, not statistically different.
- d. MW-9
  - i. Boron (n/a): Nearly all non-detect, cannot conduct statistics, but no obvious change
  - ii. Calcium (STT): p=.26
  - iii. Chloride (STT): p=.08
  - iv. Fluoride (n/a): Nearly all non-detect, cannot conduct statistics, but no obvious change
  - v. Sulfate (STT): p=.414
  - vi. TDS (STT): p=.77
  - vii. pH (STT): p=.85
- 3.) Added Detection Monitoring results to 'background' dataset, despite statistical difference. Reasons discussed at each bullet point above.
- 4.) Due to the stark difference in behavior of MW-7 (upgradient) well with all downgradient wells (MW-3R, MW-8, MW-9), interwell analysis will no longer be performed between the upgradient and downgradient wells. Intrawell analyses will be conducted for MW-8 and MW-9. MW-3R will no longer be updated since it is abandoned. Additionally, intrawell analysis will be completed for MW-7 to assess for changes in the upgradient watershed, even though the upgradient well is not assessed for Statistically Significant Increases (SSIs).
- 5.) Check all updated 'background' datasets for normality utilizing Robust Regression on order Statistics (ROS) to analyze datasets
  - a. Removed high non-detects from MW-7 Boron results, then dataset is normal.

- b. Removed high non-detects from MW-8 Boron results, then dataset is normal.
- c. Remove pH reading from 7/11/17 for all datasets, suspect pH, faulty equipment, bad reading. Without outlier, all pH datasets are normal.
- 6.) Determine Upper Prediction Limits (UPLs) for each parameter at each well using 2-sample, UPL at p=95 with ProUCL. See Table 2

a.	Utilize ROS Normal distribution for data with non-detects	
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Table 1: Previous UPLs					
Parameter	MW-7	MW-3R	MW-8	MW-9	
Boron (ug/L)	87.8	130.1	87.8	87.8	
Calcium (mg/L)	506.7	667.5	506.7	506.7	
Chloride (mg/L)	81.94	81.94	81.94	81.94	
Fluoride (mg/L)	0.11	0.11	0.11	0.11	
pH (SU)	6.286 - 6.814	6.286 - 6.814	6.286 - 6.814	6.286 - 7.318	
Sulfate (mg/L)	811.1	1937	811.1	811.1	
Total Dissolved Solids (mg/L)	1742	3571	1742	1742	

Table 2: Updated UPLs Based on ProUCL only					
Parameter	MW-7	MW-3R	MW-8	MW-9	
Boron (ug/L)	113.5	n/a	100.8	50	
Calcium (mg/L)	590.7	n/a	442.4	235.3	
Chloride (mg/L)	136.9	n/a	1.50	23.59	
Fluoride (mg/L)	0.11	n/a	0.11	0.11	
pH (SU)	5.97 – 6.67	n/a	6.03 - 6.74	6.286 - 7.318	
Sulfate (mg/L)	1231	n/a	877.2	534.3	
Total Dissolved Solids (mg/L)	2441	n/a	1884	1256	

7.) Determine UPL for each parameter at each well using Table 19 of the unified guidance with 1 of 2 sample, 3 wells, 12 background samples, 7 COCs, semi-annual assessment. See Table 3 Below.

Table 3: Updated UPLs Based on Unified Guidance Table 19					
Parameter	MW-7	MW-3R	MW-8	MW-9	
Boron (ug/L)	110.01	n/a	119.29	50.00	
Calcium (mg/L)	579.98	n/a	438.40	233.23	
Chloride (mg/L)	132.82	n/a	1.52	22.65	
Fluoride (mg/L)	0.11	n/a	0.10	0.10	
pH (SU)	6.12 - 6.79	n/a	6.23-7.13	6.23-7.13	
Sulfate (mg/L)	1197.73	n/a	865.08	527.68	
Total Dissolved		nla			
Solids (mg/L)	2391.34	n/a	1863.13	1243.10	

8.) The 2 methodologies utilized to calculate UPLs exhibit similar results. The UPLs determined by the Unified Guidance will be utilized as the monitoring limits for the next 2 years. This methodology is specifically laid out in the Unified Guidance Rule and is therefore more defensible.