DENR USE ONLY: ☐ Paper Report ☐ Electronic Data - Email CD (data loaded: Yes / No) Doc/Event #:

NC DENR
Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- **Prepare one form for each individually monitored unit.**
- **Please type or print legibly.**
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

Smith Gardner, Inc.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: Madeline German Phone: 919-828-0577 x222

E-mail: madeline@smithgardnerinc.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Halifax County Closed MSW Landfill	921 Liles Rd, Aurelian Springs, NC	42-04	.0500	February 9-11, 2015

Environmental Status: (Check all that apply)

☐ Initial/Background Monitoring ☐ Detection Monitoring ☒ Assessment Monitoring ☒ Corrective Action

Type of data submitted: (Check all that apply)

☒ Groundwater monitoring data from monitoring wells
☐ Groundwater monitoring data from private water supply wells
☐ Leachate monitoring data
☒ Surface water monitoring data
☐ Methane gas monitoring data
☒ Corrective action data (specify) MNA Parameters
☐ Other(specify)

Notification attached?

☐ No. No groundwater or surface water standards were exceeded.
☒ Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
☐ Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

Madeline German, PG — Geologist — 919-828-0577 x 222

Facility Representative Name (Print) — Title — (Area Code) Telephone Number

Signature — Date: 5/29/15

Affix NC Licensed/Professional Geologist Seal

NORTH CAROLINA LICENSED SEAL 2275 GEOLOGIST MADELINE GERMAN

14 N. Boylan Avenue, Raleigh, NC 27603

Facility Representative Address

C0828

NC PE Firm License Number (if applicable effective May 1, 2009)

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February 2015 Groundwater Monitoring Report

Halifax County Closed MSW Landfill
NC Solid Waste Permit No. 42-04

Prepared for:

Halifax County Solid Waste Department
P.O. Box 70
Halifax, North Carolina 27839

May 2015

Prepared by:

NC LIC. NO. C-0828 (ENGINEERING)

SMITH+GARDNER

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

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February 2015 Groundwater Monitoring Report

Halifax County Closed MSW Landfill
NC Solid Waste Permit 42-04

Prepared For:

Halifax County Solid Waste Department
Halifax, North Carolina

S+G Project No. Halifax-8

Madeline German, P.G.
Project Geologist

NORTH CAROLINA LICENSED SEAL 5/22/15 GEOLOGIST MADELINE GERMAN

Joan A, Smyth, P.G.
Senior Hydrogeologist

May 2015

NC LIC. NO. C-0828 (ENGINEERING)

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Halifax County Closed MSW Landfill
NC Solid Waste Permit No. 42-04

February 2015 Groundwater Monitoring Report

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1.0 INTRODUCTION

The Halifax County Landfill, operating under Solid Waste Permit #42-04, is required to submit semi-annual groundwater monitoring reports (15A NCAC 13B .0544) for assessment monitoring. This report presents the results from the semi-annual monitoring event conducted February 9-11, 2015.

The Halifax County Landfill is currently accepting C&D waste over the closed, unlined municipal solid waste (MSW) landfill. In December 1997 the landfill stopped accepting MSW; and the County is currently transferring MSW waste off-site to a lined landfill facility. The old landfill was closed per Solid Waste Regulations and a certification report was submitted to the Solid Waste Section (SWS) in September 1998. In 2007 an Assessment of Corrective Measures[1] was prepared to evaluate previously detected groundwater quality issues as well as remedial options for the site. A Corrective Action Plan (CAP)[2] for the site was approved June 8, 2009. **Section 7.0** of this report provides an update regarding the current corrective action situation for this facility.

This report presents a field procedure summary, laboratory analyses, groundwater characterization and summary tables and graphs.

2.0 SITE HYDROGEOLOGY

According to the *1985 North Carolina Geological Map* and *Groundwater in the Halifax Area, North Carolina* (Dept. of Conservation and Development Bulletin #51, 1946) the landfill is situated on the eastern edge of the Eastern Piedmont Physiographic Province; slightly west of the Coastal Plain overlap. Generally, Western Halifax County is underlain by felsic to intermediate, crystalline igneous and metamorphic rocks of early to late Paleozoic age. Eastern Piedmont rocks generally exhibit a northeastern strike and locally dip gently eastward due to regional metamorphism and folding that produced a broad plunging anticline. The area was simultaneously intruded by a number of felsic (granite) plutons. The granitic pluton underlying the landfill is the Butterwood Creek intrusion.

Groundwater depths generally range from near surface level in the lowland areas along Brewer's Creek and its tributary up to 45 ft. below grade along the ridge east of the landfill. Groundwater at the site flows generally west towards Brewer's Creek and its tributary. There are minor seasonal variations in the flow pattern, but overall flow direction is consistent.

[1] Richardson Smith Gardner and Associates, Inc., Assessment of Corrective Measures Halifax County Landfill 12/07.

[2] Richardson Smith Gardner and Associates, Inc., Corrective Action Plan Halifax County Landfill 5/09.

3.0 SAMPLING LOCATIONS

The sampling event performed by Environment 1, Inc. utilized the groundwater monitoring network that includes thirteen monitoring wells (MW-1, MW-2A, MW-2AD, MW-3AS, MW-3D, MW-6D, MW-7D, MW-15R, MW-16A, MW-17, MW-18D, MW-18S, and G-13) located around the landfill perimeter, and three surface water sampling points (SW-1, SW-2 and SW-3) up and downstream of the landfill. Water level was measured at one additional piezometer location (BP-3) upgradient of the landfill to assist in potentiometric surface evaluation.

Figure 1 illustrates sampling locations. Boring logs for the groundwater monitoring wells are included in **Appendix A**.

4.0 SAMPLING PROCEDURES

Sampling methods followed the protocol outlined in the North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities (DENR, DWM) and the approved site Water Quality Monitoring Plan[3]. Each well was gauged to determine groundwater depth and then purged three to five well volumes or until dry. Depth to groundwater is presented in **Table 1**.

Samples were collected by Environment 1 personnel in laboratory prepared containers for the specified analytical procedures. Groundwater samples were properly preserved, placed on ice and transported to the laboratory facility within the specified hold times for each analysis. Trip and equipment blanks were also analyzed for quality control.

5.0 FIELD & LABORATORY RESULTS

5.1 Field Results

Temperature, pH, and specific conductance were measured at each well in the field at the time of sampling via direct read instruments. The field parameter results are summarized in **Table 2** and have remained consistent with previously reported sampling events.

5.2 Laboratory Analysis

Samples were transported to Environment 1, Inc., in Greenville, NC, a North Carolina certified laboratory (NC Wastewater ID #10). Laboratory analysis included Appendix II metals and Volatile Organic Compounds (VOCs), pesticides, PCBs and semi-volatile organics analyzed via the EPA Test Method presented in the laboratory report.

Designated wells (MW-2A, MW-2AD, MW-3AS, MW-3D, MW-6D, MW-7D, MW15R, MW-16A, MW-17, MW-18S, MW-18D and G-13 were also analyzed for MNA and indicator

[3] Water Quality Monitoring Plan, Halifax County Landfill, Richardson Smith Gardner & Associates, May 2009.

parameters by Solid Waste Section approved methods as reported on the laboratory report included in **Appendix B**.

5.3 Laboratory Results

Analytical results were compared to the NCDWM Solid Waste Section Quantitation Limits (SWSLs) and 15A NCAC 2L.0200 (2LStandard). Constituent concentrations reported by the laboratory between the method detection limit (MDL) and SWSL are considered estimated values and are denoted with a "J" qualifier. Most constituents were either below the MDL or were non-quantifiable "J-values".

Time versus concentration graphs for the constituents detected above their respective 2L Standards are included in **Appendix C**.

5.3.1 Inorganic Constituents

Iron (MW-2A, MW-3AS, MW-6D, MW-7D and 18-S) was the only inorganic constituents were detected above its 2L Standard for this event. Inorganic detections are summarized in **Table 3**.

5.3.2 Organic Constituents

Six constituents were found in samples at concentrations above their respective 2L Standards for this event:

- Benzene (MW-3AS and MW-16A);
- 1,1-Dichloroethane (MW-2A, MW-2AD, MW-3D, and MW-16A);
- 1,2-Dichloropropane (MW-2AD)
- Tetrachloroethene (MW-3D, MW-16A, and MW-17);
- Trichloroethene (MW-16A) and
- Vinyl chloride (MW-2A).

An organic detection summary is provided on **Table 4**. Several constituents, including tetrachloroethene and trichloroethene, are demonstrating and increasing trend in samples collected from MW-16A. Landfill gas is thought to be responsible due to the cross-gradient well location.

5.3.3 Surface Water Results

Results from surface water sample analysis indicated no inorganic or organic constituents were detected above 2B Standards for Class C waters this event.

5.3.4 MNA Constituents

The following parameters were measured for designated wells (listed in **Section 5.2**) for this event:

BOD	carbon dioxide
COD	ORP
nitrate nitrogen	dissolved oxygen
TOC	methane
chloride	ethane/ethane
sulfide	volatile fatty acids

Groundwater chemistry indicates anaerobic conditions in wells MW-3AS, MW-3D, MW-17 and MW-18S with aerobic conditions exhibited in the remaining MNA wells. Natural attenuation processes are occurring for chlorinated compounds. MNA indicator results from this event are summarized in **Table 5**, and will be utilized for future site geochemistry and remedial strategy evaluation. Results of Biochlor analysis are included as **Appendix D**.

6.0 GROUNDWATER CHARACTERIZATION

A potentiometric surface map was prepared using groundwater data from this sampling event. The data indicates that groundwater is flowing generally to the west towards Brewer's Creek. This is consistent with groundwater flow patterns previously reported for the site. The potentiometric surface map is attached as **Figure 1**.

Groundwater flow velocities during the sampling event were calculated for two monitoring wells using the equation:

$$V = Ki/n$$

where: K = hydraulic conductivity
i = groundwater gradient
n = porosity

Groundwater flow velocities ranged from 0.006 ft/day (MW-16A) to 0.037 ft/day (MW-2A). These calculated flow velocities are included in **Table 6**.

7.0 CONCLUSIONS

In general, the detected constituents are consistent with historical analytical data. Tetrachloroethene and trichloroethene concentrations in MW-16A continue to demonstrate an increasing trend. Due to this well's location up/cross-gradient, the source of this increase may be landfill gas. A landfill gas flare has been installed on a nearby landfill gas vent within the waste in an effort to reduce landfill gas pressure in this area. We will continue to watch the trends in this well.

The next groundwater monitoring event is scheduled for February 2015. A groundwater monitoring report will be submitted to NCDENR after receipt and analysis of laboratory data.

FIGURE

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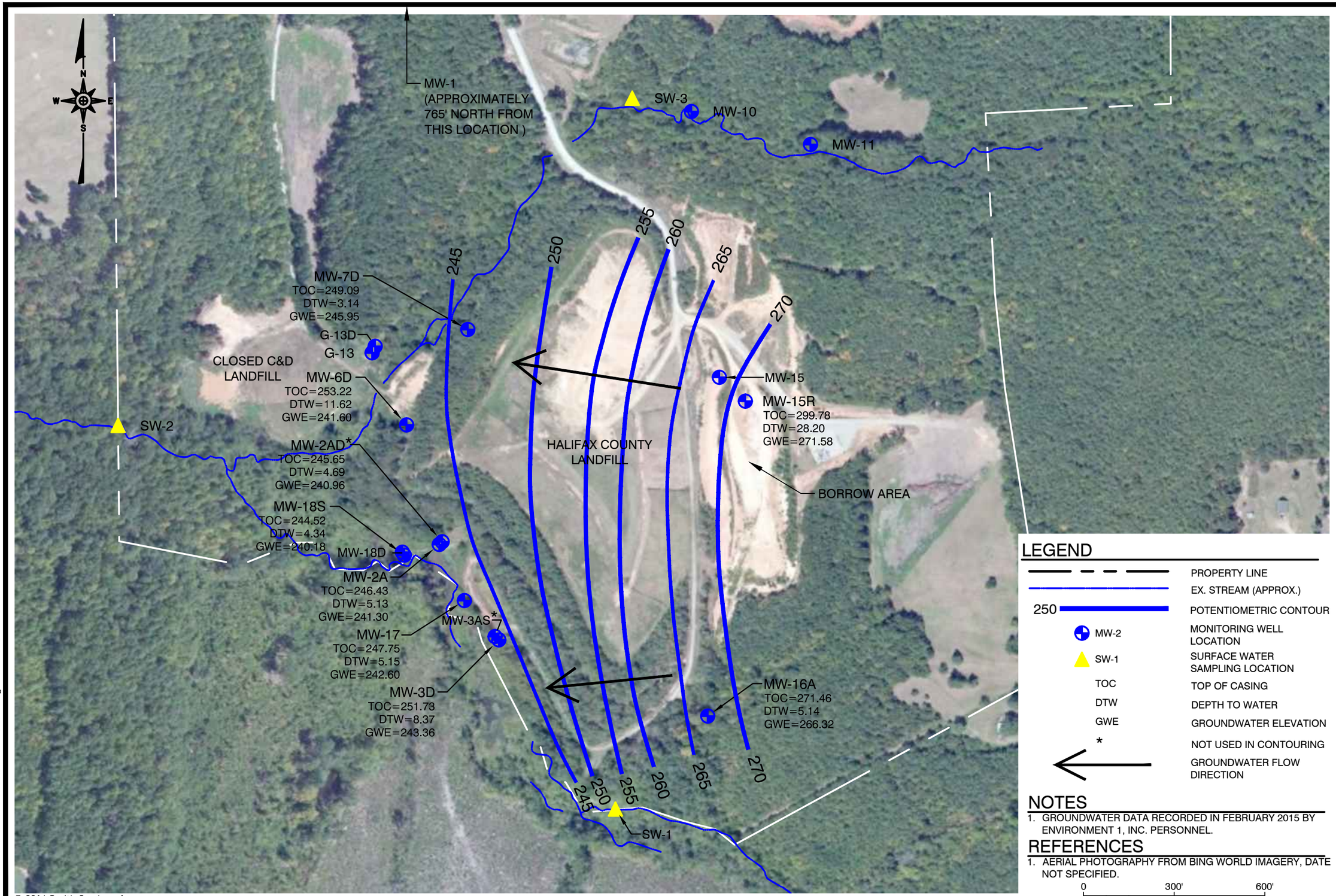

LEGEND

	PROPERTY LINE
	EX. STREAM (APPROX.)
250	POTENTIOMETRIC CONTOUR
MW-2	MONITORING WELL LOCATION
SW-1	SURFACE WATER SAMPLING LOCATION
TOC	TOP OF CASING
DTW	DEPTH TO WATER
GWE	GROUNDWATER ELEVATION
*	NOT USED IN CONTOURING
	GROUNDWATER FLOW DIRECTION

NOTES

1. GROUNDWATER DATA RECORDED IN FEBRUARY 2015 BY ENVIRONMENT 1, INC. PERSONNEL.

REFERENCES

1. AERIAL PHOTOGRAPHY FROM BING WORLD IMAGERY, DATE NOT SPECIFIED.

0 300' 600'

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PREPARED BY:

NC LIC. NO. C-0828 (ENGINEERING)

SMITH+GARDNER

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

FIGURE NO.	1
FILENAME:	HALI-B0287
SCALE:	AS SHOWN
PROJECT NO:	HALIFAX-8
APPROVED:	M.M.G.
DATE:	May 2015
DRAWN:	T.R.S.

PREPARED FOR:

HALIFAX COUNTY
CLOSED MSW LANDFILL
POTENTIOMETRIC SURFACE MAP
FEBRUARY 2015

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TABLES

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Table 1
Groundwater Elevations
Halifax County Closed Landfill
February 9-11, 2015

By: LMH
Date: 4/07/2015

Monitoring Location	Well Installation Date	Latitude	Longitude	Well Diameter (inches)	Total Well Depth (ft. bgs)	Ground Surface Elevation (ft. amsl)	TOC Elevation (ft)	Depth to Water (ft)	Water Table Elevation (ft)	Screen Interval (ft. bgs)	Screen Geology
MW-1*	NA	36.3804	77.8143	2	42.61**	321.18	323.18 ⁂	28.14	295.04	NA	NA
MW-2A	07/26/1995	36.3731	77.8141	2	14	246.43	246.43	5.13	241.30	4-14	Silt & Sand
MW-2AD	09/01/1999	36.3732	77.8140	2	40	245.65	245.65	4.69	240.96	30 - 40	Coarse Sandy PWR
MW-3AS	07/25/1995	36.3723	77.8134	2	19	248.57	251.57 ⁂	8.90	242.67	9-19	Clayey Silty Sand
MW-3D	NA	36.3723	77.8134	2	52.20**	251.73	251.73	8.37	243.36	NA	NA
MW-6D	10/30/1991	36.3742	77.8144	2	40	253.22	253.22	11.62	241.60	25 - 40	Sandy Silt
MW-7D	10/31/1991	36.3751	77.8137	2	40	249.09	249.09	3.14	245.95	25 - 40	Sandy Silt
MW-15R	08/31/1999	36.3744	77.8106	2	43	299.78	299.78	28.20	271.58	33 - 43	Sandy Clayey Silt
MW-16A	07/26/1995	36.3715	77.8111	2	15	271.46	271.46	5.14	266.32	5 - 15	Clayey Sand
MW-17	10/03/2007	36.3726	77.8138	2	25	247.75	247.75	5.15	242.60	15 - 25	Saprolite
MW-18S	10/16/2007	36.3730	77.8144	2	18	244.52	244.52	4.34	240.18	8-18	Clayey Sand/Saprolite
MW-18D	10/17/2007	36.3731	77.8145	2	52	244.04	244.04	4.11	239.93	47 - 52	Granite
BP-3	NA	36.3732	77.8102	2	NA	NA	300.50	27.74	272.76	NA	NA
BP-9	NA	36.3750	77.8094	2	NA	NA	303.48	23.36	280.12	NA	NA

NOTE:

1.) MW-1 is not used in the ground water characterization calculations due to its remote location from the landfill
2.) ** Well depth from Environment 1 3/26/2015 Report client ID#6015
3.) ⁂3' stickup estimated, therefore groundwater elevation is also estimated
4.) NS = Not Sampled
5.) NA = Not Available

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Table 2
Field Parameters
Halifax County Closed Landfill
February 9-11, 2015

By: LMH
Date: 4/07/2015

Monitoring Location	pH (std units)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Dissolved Oxygen (DO) (mg/l)	Oxygen Reduction Potential (ORP) (mv)
MW-1	5.2	33	13	80	8.01	136
MW-2A	6.1	287	10	21	1.43	70
MW-2AD	6.7	485	10	4.2	2.07	190
MW-3AS	6.1	906	14	450	0.65	-12
MW-3D	6.1	192	14	1.5	0.80	55
MW-6D	6.5	454	14	4.9	2.05	72
MW-7D	5.8	59	11	11	7.32	111
MW-15R	4.9	52	14	4.8	7.35	118
MW-16A	5.6	197	13	22	1.46	139
MW-17	6	146	10	4.1	0.83	84
MW-18S	6.4	278	9	85	0.90	62
MW-18D	6.4	151	8	**	5.47	72
SW-1	6.7	125	12	NA	NA	NA
SW-2	7.1	225	11	NA	NA	NA
SW-3	7.2	99	11	NA	NA	NA

NOTE:
1. Field data collected by Environment 1 personnel.
2. NA = Not Analyzed
3. ** Turbitidy below instrument calibration

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Table 3
Detected Inorganic Constituents
Halifax County Closed Landfill
February 9-11, 2015

By: LMH
Date: 4/7/2015

Monitoring Location	MDL	SWSL	2L or GWP* Standard	MCL	2B Standard	MW-1	MW-2A	MW-2AD	MW-3AS	MW-3D	MW-6D	MW-7D	MW-15R	MW-16A	MW-17	MW-18S	MW-18D	SW-1	SW-2	SW-3
Antimony	0.12	6	1 *	6	NE	1.3 J	<0.12	0.12 J	<0.12	<0.12	<0.12	1.6 J	1.1 J	0.15 J	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Arsenic	0.10	10	10	10	10	0.72 J	1.9 J	0.52 J	2.8 J	0.30 J	0.47 J	0.27 J	0.28 J	0.44 J	0.43 J	2.3 J	0.18 J	0.12 J	0.42 J	<0.10
Barium	0.12	100	700	2000	1,000	48.9 J	130	127	96.3 J	74.6 J	684	34.4 J	42.6 J	118	35.6 J	104	57.7 J	16.2 J	29.2 J	23.0 J
Beryllium	0.04	1	4 *	4	6.5	0.31 J	0.30 J	<0.04	0.04 J	0.12 J	0.12 J	0.07 J	0.09 J	0.75 J	0.10 J	0.08 J	<0.04	<0.04	0.07 J	<0.04
Cadmium	0.04	1	2	5	2	0.24 J	<0.04	0.09 J	<0.04	0.11 J	2	0.18 J	0.10 J	0.28 J	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Cobalt	0.12	10	1 *	NE	NE	0.99 J	7.6 J	7.2 J	1.3 J	0.12 J	4.9 J	0.13 J	0.29 J	0.93 J	<0.12	4.6 J	<0.12	<0.12	0.39 J	0.19 J
Copper	0.10	10	1000	1300	7	2.1 J	0.22 J	0.54 J	<0.10	0.22 J	0.31 J	0.37 J	0.47 J	0.43 J	0.91 J	0.10 J	<0.10	<0.10	0.21 J	<0.10
Chromium, total	0.14	10	10	1000	50	1.4 J	<0.14	<0.14	<0.14	<0.14	<0.14	0.14 J	0.14 J	<0.14	<0.14	0.20 J	<0.14	<0.14	<0.14	0.15 J
Iron	16	300	300	300**	1000	NA	**32700**	287 J	**155625**	78 J	**377**	**489**	NA	<16	66 J	**31500**	19 J	NA	NA	NA
Lead	0.13	10	15	15	25	2.5 J	<0.13	<0.13	<0.13	<0.13	<0.13	0.23 J	0.21 J	0.90 J	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
Mercury	0.06	0.2	1	2	0.012	NA	<0.06	<0.06	0.07 J	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	NA	NA	NA	NA
Nickel	0.12	50	100	NE	25	1.1 J	0.75 J	1.6 J	0.61 J	0.52 J	1.8 J	0.27 J	0.43 J	0.60 J	0.48 J	0.86 J	0.53 J	0.40 J	0.73 J	0.34 J
Selenium	0.16	10	20	50	5	0.93 J	0.52 J	0.47 J	0.81 J	0.29 J	0.70 J	0.40 J	0.46 J	0.18 J	0.21 J	0.32 J	<0.16	<0.16	1.4 J	<0.16
Tin	0.05	100	2000 *	NE	NE	NA	0.16 J	0.15 J	0.06 J	0.15 J	<0.05	0.18 J	0.18 J	0.08 J	<0.05	<0.05	NA	NA	NA	NA
Vanadium	0.06	25	0.3 *	NE	NE	2.6 J	0.86 J	0.21 J	1.6 J	0.62 J	0.70 J	0.44 J	<0.06	1.1 J	1.1 J	1.4 J	1.2 J	2.8 J	0.84 J	0.52 J
Zinc	0.53	10	1000	5000**	50	15	4.6 J	5.3 J	2.6 J	4.9 J	13	7.3 J	7.3 J	12	2.0 J	0.99 J	5.0 J	2.8 J	4.1 J	3.4 J

NOTES:

MDL	-	Method Detection Limit
SWSL	-	Solid Waste Section Quantitation Limits
2L	-	Groundwater Standards (15A NCAC 2L 0200)
GWP	-	Groundwater Protection Standards (noted by *)
MCL	-	Federal Maximum Contaminant Limit
2B	-	NCAC 2B Standard for Class C waters
Bold	-	Detection above 2L Standard
J	-	Laboratory defined detection between MDL and SWSL limit
<MDL value	-	Not detected at or above MDL (non-detect)
NA	-	Not analyzed
**	-	National Secondary Drinking Water Standards
NE	-	Standard Not Established

Table units are presented in ug/l.
Lab data analysis by Environment 1, Inc. Report dated 03/16 & 26/2015, Client ID#6015

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Table 6
Gradient and Velocity Calculations
Halifax County Closed Landfill
February 9-11, 2015

By: LMH
Date: 4/24/2015

Monitoring Location	Water Table Elevation (ft)	Hydraulic Conductivity (ft/day)	Assumed Porosity	Hydraulic Gradient (ft/ft)	Groundwater Velocity (ft/day)
MW-2A	241.30	1.835	0.2	0.037	0.339
MW-16A	266.32	0.057	0.2	0.022	0.006

NOTE:

Hydraulic Conductivity data from slug tests performed by G.N. Richardson and Associates in 1997.
Porosity values assumed from Groundwater & Wells (Driscoll)
Velocity Calculated from V=K*i/n

V = velocity
K = Hydraulic Conductivity
i = Gradient
n = Porosity

Deep wells not used in velocity calculations

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Table 5
Indicator Parameter Summary
Halifax County Closed Landfill
February 9-11, 2015

By: LMH
Date: 4/24/2015

	MDL	SWSL	MW-1	MW-2A	MW-2AD	MW-3AS	MW-3D	MW-6D	MW-7D	MW-15R	MW-16A	MW-17	MW-18S	MW-18D	G-13
BOD	2000	NE	NA	<2000	<2000	15000	<2000	<2000	NA	NA	NA	<2000	2200	<2000	NA
COD	20000	NE	NA	<20000	<20000	41000	<20000	<20000	<20000	NA	NA	<20000	<20000	<20000	NA
Nitrate Nitrogen as N	40	10000	NA	<40	<40	70 J	<40	190 J	130 J	NA	NA	210 J	60 J	<40	NA
Total Organic Carbon	46	NE	NA	2300	<46	7140	<46	1560	<46	NA	NA	<46	4960	<46	NA
Chloride	5000	NE	NA	5000	8000	10000	8000	20000	<500	NA	NA	<500	5000	5000	NA
Dissolved Oxygen	100	NE	8010	1430	2070	650	800	2050	7320	7350	1460	830	900	5470	NA
Carbon Dioxide	1000	NE	NA	75000	32000	535	61000	52000	NA	NA	NA	38000	115000	32000	47000
ORP, mv	NE	NE	136	70	190	-12	55	72	111	118	139	84	62	72	NA
Methane, ug/l	0.006	NE	NA	2600	0.47	11000	1600	66	<0.006	<0.006	<0.006	1100	9200	6.6	3.9
Ethane, ug/l	0.001	NE	NA	0.14	0.0047 J	0.25	<0.001	0.098	<0.001	<0.001	<0.001	<0.001	0.22	0.0032 J	0.0018 J
Ethene, ug/l	0.008	NE	NA	0.19	0.013	<0.008	0.017 J	0.010	<0.008	<0.008	<0.008	<0.008	<0.008	0.038	<0.008
Hydrogen, nM	0.13	NE	NA	0.81	1.6	1.2	1.2	1.6	<0.13	<0.13	<0.13	0.66	1.1	1.2	1.2
Lactic Acid, mg/l	0.012	NE	NA	0.20	0.21	0.3	0.23	0.11	<0.012	<0.012	<0.012	0.26	0.23	0.31	0.11
Acetic Acid mg/l	0.008	NE	NA	0.062 J	0.056 J	0.099	0.069 J	0.058 J	<0.008	<0.008	<0.008	0.063 J	0.071	0.068 J	0.056 J

NOTES:

MDL	-	Method Detection Limit
SWSL	-	Solid Waste Section Quantitation Limits
J	-	Laboratory defined detection between the MDL and SWSL
<MDL value	-	Not detected at or above MDL
NE	-	Not established
NA	-	Not Analyzed

Table presented in units of ug/l unless otherwise noted
Lab data analysis by Environment 1, Inc. Report dated 03/26/2015, Client ID#6015 A

SMITH+GARDNER

By:LMH
Date: 4/07/2015

Table 4
Detected Organic Constituents
Halifax County Closed Landfill
February 9-11, 2015

Constituent	MDL	SWSL	2L Standard	MCL	MW-2A	MW-2AD	MW-3AS	MW-3D	MW-6D	MW-15R	MW-16A	MW-17	MW-18S
Benzene	0.24	1	1	5	0.70 J	0.40 J	**2.40**	0.60 J	0.50 J	<0.24	**3.90**	<0.24	<0.24
1,1-Dichloroethane	0.20	5	6	NE	**9.60**	**6.40**	1.40 J	**7.70**	<0.20	1.3 J	**15.80**	4.20 J	2.20 J
1,1-Dichloroethene	0.17	5	7	7	0.60 J	<0.17	<0.17	<0.17	<0.17	<0.17	0.60 J	0.20 J	<0.17
1,2-Dichlorobenzene	0.32	5	20	6000	<0.32	<0.32	<0.32	<0.32	<0.32	<0.32	1.30 J	<0.32	<0.32
1,2-Dichloroethane	0.21	1	0.4	5	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	0.40 J	<0.21	<0.21
1,2- Dichloropropane	0.21	1	0.6	5	0.30 J	**1.30**	0.40 J	0.40 J	<0.21	<0.21	0.60 J	<0.21	<0.21
1,4-Dichlorobenzene	0.39	1	6	75	1.90	1.30	1.80	0.50 J	1.60	<0.39	2.10	<0.39	<0.39
Dichlorodifluoromethane	0.51	5	1000	NE	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	6.40	0.80 J	<0.51
Cis-1,2-Dichloroethene	0.25	5	70	70	9.70	7.90	0.60 J	8.60	<0.25	<0.25	51.50	2.80 J	0.40 J
Chlorobenzene	0.30	3	50	100	3.30	2.50 J	4.50	0.50 J	2.90 J	<0.30	1.5 J	<0.30	0.50 J
Chloroethane	0.48	10	3000	NE	<0.48	<0.48	0.70 J	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48
Methylene Chloride	0.64	1	5	5	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	4.20	<0.64	<0.64
Tetrachloroethene	0.17	1	0.7	5	<0.17	<0.17	<0.17	**1.10**	<0.17	0.90 J	**59.20**	**1.10**	<0.17
Trans-1,2 Dichloroethene	0.23	5	100	100	0.30 J	<0.23	<0.23	<0.23	<0.23	<0.23	0.60 J	<0.23	<0.23
Trichloroethene	0.23	1	3	5	2.40	<0.23	<0.23	1.70	<0.23	<0.23	**28.90**	1.10	<0.23
Trichlorofluoromethane	0.24	1	2000	NE	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	0.40 J	<0.24	<0.24
Vinyl Chloride	0.63	1	0.03	2	**9.30**	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63

NOTE:

MDL	-	Method Detection Limit
SWSL	-	Solid Waste Section Quantitation Limits .
2L	-	Groundwater Standards (15A NCAC 2L 0200)
GWP	-	Groundwater Protection Standards (noted by *)
MCL	-	Federal Maximum Contaminant Limit
Bold	-	Detection above 2L standard or GWP standard
J	-	Laboratory defined detection between the MDL and SWSL
<MDL	-	Not detected at or above MDL
NE	-	Not Established

Table units are presented in ug/l.
Lab data analysis by Environment 1, Inc. Report dated 3/26/2015, Client ID#6015 A

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Appendix A

Boring Logs

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FIELD BOREHOLE LOG

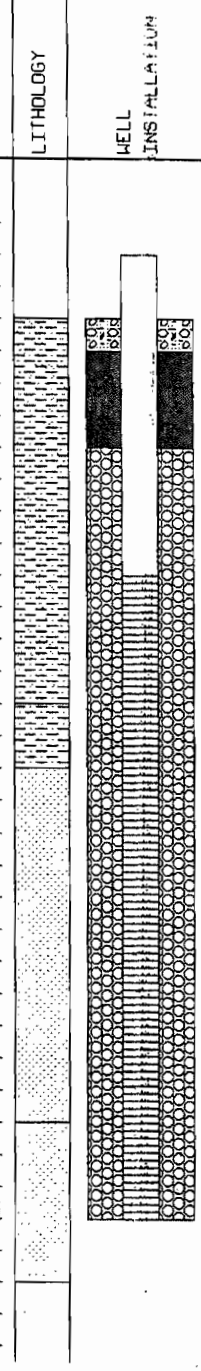
BOREHOLE NUMBER: MW-2A

PROJECT NUMBER HALIFAX-2
PROJECT NAME: HALIFAX COUNTY LANDFILL
LOCATION HALIFAX, NC
DRILLING COMPANY BORE & CORE
RIG TYPE & NUMBER MOBILE B-57 ATV
DRILLING METHOD HOLLOW STEM AUGER
WEATHER: HOT, HUMID
FIELD PARTY: BILL BROW
GEOLOGIST DAVID GARRETT
DATE BEGUN: 7/25/95 DATE COMPLETED: 7/26/95

TOP OF CASING ELEVATION -
TOTAL DEPTH: 16.0
GROUND SURFACE ELEVATION -
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(ft)	7.3 FT	
Time	2:00 PM	
Date	7/25/95	

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
0.0–3.0				D				SILTY SAND: Loose red-brown very silty clayey coarse-fine SAND; SM-ML; fill pad.
3.0–6.0	2, 3, 3	Ss	S1					SILT: M. stiff black-gray fine sandy clayey SILT; wet; alluvium; ML.
6.0–9.0	8, 10, 11	Ss	S2					SAND: Loose light-gray and red-gray slightly silty-clayey fine-coarse SAND; alluvium; very clayey from 9.5' to 10.5'; fine rounded gravel from 10.5' to 12.5'; Water level at 7.3 ft; SW-SM; SC, CL, SW.
9.0–12.0	10, 7, 7	Ss	S3	W				
12.0–15.0	26, 50/0	Ss	4'					SAND: V. dense brown clayey fine SAND w/ scattered coarse sand; SM-ML; residual soil; well developed upon completion by surging and overpumping.



FIELD BOREHOLE LOG

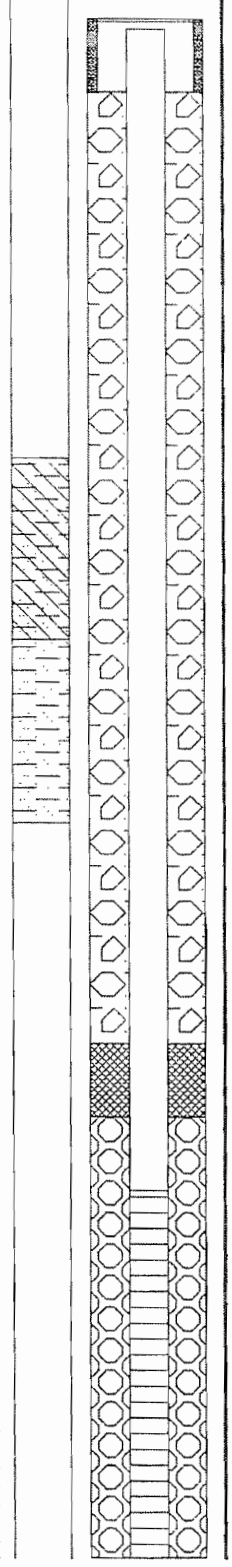
BOREHOLE NUMBER: MW-2aa

PROJECT NUMBER: HALIFAX-14
PROJECT NAME: Halifax County LandFill
LOCATION: Aurelian Springs, North Carolina
DRILLING COMPANY: Engineering Tectonics, P.A.
RIG TYPE & NUMBER: MOBILE B-60
DRILLING METHOD: Hollow Stem Auger
WEATHER: Cloudy, 70 degrees
FIELD PARTY: David Barron
GEOLOGIST: Philip May
DATE BEGUN: 9/1/99 DATE COMPLETED: 9/1/99

TOP OF CASING ELEVATION: TBD
TOTAL DEPTH: 40.0 FT
GROUND SURFACE ELEVATION: TBD
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WD-While Drilling AB-After Boring		
Depth(ft)	6.0'	5.25'
Time	12:00	9:00
Date:	9/1/99	9/2/99

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
10.0	5 5 6	Ss	61	W		10"		CLAYEY SILTY SAND: Grey clayey silty sand, wet, Fe staining and quartz gravel.
15.0	15 29 34	Ss	62	W		12"		SILTY SAND: Mottled white, tan-pink, grey & rust M-C slightly silty sand, moist, relict rock, quartz, some mica.
20.0	50/4	Ss	63	W		2"		PWR: Wet C sand, partially weathered rock, tan-pink gravel w/ white, brown, & grey mottling, micaceous;
25.0	50/3	Ss	64	W		1"		25.0' same as above;
30.0	50/4	Ss	65	W		2"		30.0' same as above;
35.0	50/2	Ss	66	W		0"		35.0' same as above;
40.0								40.0' Boring terminated at 40'.



North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
P.O. Box 29578 - Raleigh, N.C. 27626-0578-Phone (919) 733-3221

'VELL CONSTRUCTION RECORD

Well ID: MW-2ad

DRILLING CONTRACTOR: Engineering Tectonics, P.A.
DRILLER REGISTRATION #: 835
STATE WELL CONSTRUCTION PERMIT#:

1. WELL USE (Check Applicable Box): Residential ☐ Municipal ☐ Industrial ☐ Agricultural ☐ Monitoring ☒
Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use:

2. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Aurelian Springs County: Halifax
Liles Road
(Road, Community, or Subdivision and Lot No.)

3. OWNER Halifax County
ADDRESS
(Street or Route No.)
Halifax NC
City or Town State Zip Code

4. DATE DRILLED 9/1/99
5. TOTAL DEPTH 40.0
6. CUTTINGS COLLECTED YES ☐ NO ☒
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
8. STATIC WATER LEVEL Below Top of Casing: 5.26 FT.
(Use '+' if Above Top of Casing)
9. TOP OF CASING IS 2.5 FT. Above Land Surface *
* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .01 18
10. YIELD(gpm): METHOD OF TEST
11. WATER ZONES (depth):

12. CHLORINATION: Type Amount

DEPTH From	To	DRILLING LOG Formation Description
See attached boring log		

If additional space is needed use back of form

13. CASING:

	Depth From	TO	Ft.	Diameter	Wall Thickness or Weight/Ft	Material
	2.0	30.0		2"		PVC

14. GROUT:

	Depth From	TO	Ft.	Material	Method
	0	26.0		Portland cement	Tremie
	26.0	28.0		Bentonite	

15. SCREEN:

	Depth From	TO	Ft	Diameter	Slot Size	Material
	30.0	40.0		2 in.	10 in.	PVC
				in.	in.	
				in.	in.	

16. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	28.0	40.0		No. 2 Filter Sand	

17. REMARKS:

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

FOR OFFICE USE ONLY
Quad No:

SIGNATURE OF CONTRACTOR OR AGENT DATE
Submit original to Division of Water Quality and copy to well owner.

FIELD BOREHOLE LOG

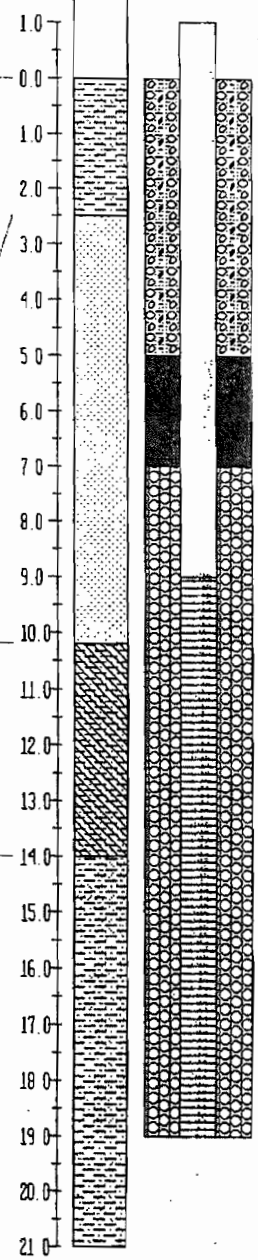
BOREHOLE NUMBER: MW-3A-S

PROJECT NUMBER HALIFAX-2
PROJECT NAME HALIFAX COUNTY LANDFILL
LOCATION HALIFAX, NC
DRILLING COMPANY BORE & CORE
RIG TYPE & NUMBER MOBILE B-57 ATV
DRILLING METHOD HOLLOW STEM AUGER
WEATHER HOT, HUMID
FIELD PARTY BILL BROW
GEOLOGIST DAVID GARRETT
DATE BEGUN 7/25/95 DATE COMPLETED 7/25/95

TOP OF CASING ELEVATION -
TOTAL DEPTH 21
GROUND SURFACE ELEVATION -
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(ft)	6.0 FT	
Time	3:45PM	
Date	7/25/95	

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
1.0								
0.0								SILTY SAND: Loose brwon-gray dry silty fine SAND w/ scattered roots, sticks, and inert debris on surface; SM.
1.0								
2.0				D				
3.0	2	Ss	S1					
4.0	1							SAND: Soft, dark brown wet clayey silty fine SAND w/ small sticks, rounded pebbles; alluvium; CL/ML.
	1							
5.0								
6.0								
7.0								
8.0								
9.0	4	Ss	S2					
10.0	4			W				
	6							
11.0								CLAYEY SILT: Stiff orange-yellow clayey SILT w/ coarse sand, scattered mica; relict rock texture; residual soil; ML; saturated below 11'.
12.0								
13.0								
14.0	6	Ss	S3					SILTY SAND: Orange-white mottled silty fine-coarse SAND, trace clay, mica; residual soil, weathered granite; SM.
15.0	6							
	7							
16.0								
17.0								
18.0								
19.0	8	Ss	S4					
20.0	9							
	13							
21.0								



WELL COMPLETION RECORD

MW-6A MW-6d

'I ETE ALL INFORMATION REQUESTED BELOW FOR EACH WELL INSTALLED, AND RETURN FORM TO THE N.C. ' MENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH, 91, RALEIGH, N.C. 27602

OF SITE: Halifax County Sanitary Landfill	PERMIT NO.: 41-0176-WM-0033
ES: R. 1417 Aurelian Springs, N.C.	OWNER (print): Halifax County
G CONTRACTOR: ore & Core, Inc.	REGISTRATION NO.: 763

Type:	PVC dia. 2 in.	Grout Depth:	from 0' to -21' ft. - dia. 4 in.
Depth:	from 2' to -25 ft. - dia. 2 in.	Bentonite Seal:	from -21' to -23 ft. - dia. 4 in.
Type:	slotted .010 dia. 2 in.	Sand/Gravel PK:	from -23 to -40 ft. - dia. 4 in.
Depth:	from -25 to -40 ft. - dia. 2 in.	Total Well Depth:	from 2' to -41 ft. - dia. 4 in.

Water Level: 11' 7" Below ground surface ~~feet from top of casing~~ Date Measured 11 / 26 / 91

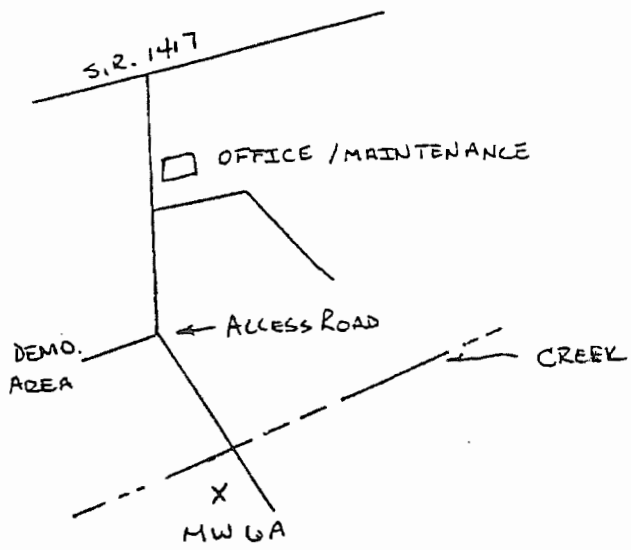
(m): _____ Method of Testing: _____ Casing is _____ feet above land surface

DRILLING LOG

DEPTH FROM	TO	FORMATION DESCRIPTION
	2.8	Brown fine sandy silt
	10.6	Brown medium to fine silt
C 6	22.4	Damp DrkBr.Med. sandy silt
2.4	40.0	Wet Br. fine sandy silt

LOCATION SKETCH

(show distance to numbered roads, or other map reference points)



RKS: Well screened too deep.
Static water level is above the screen.

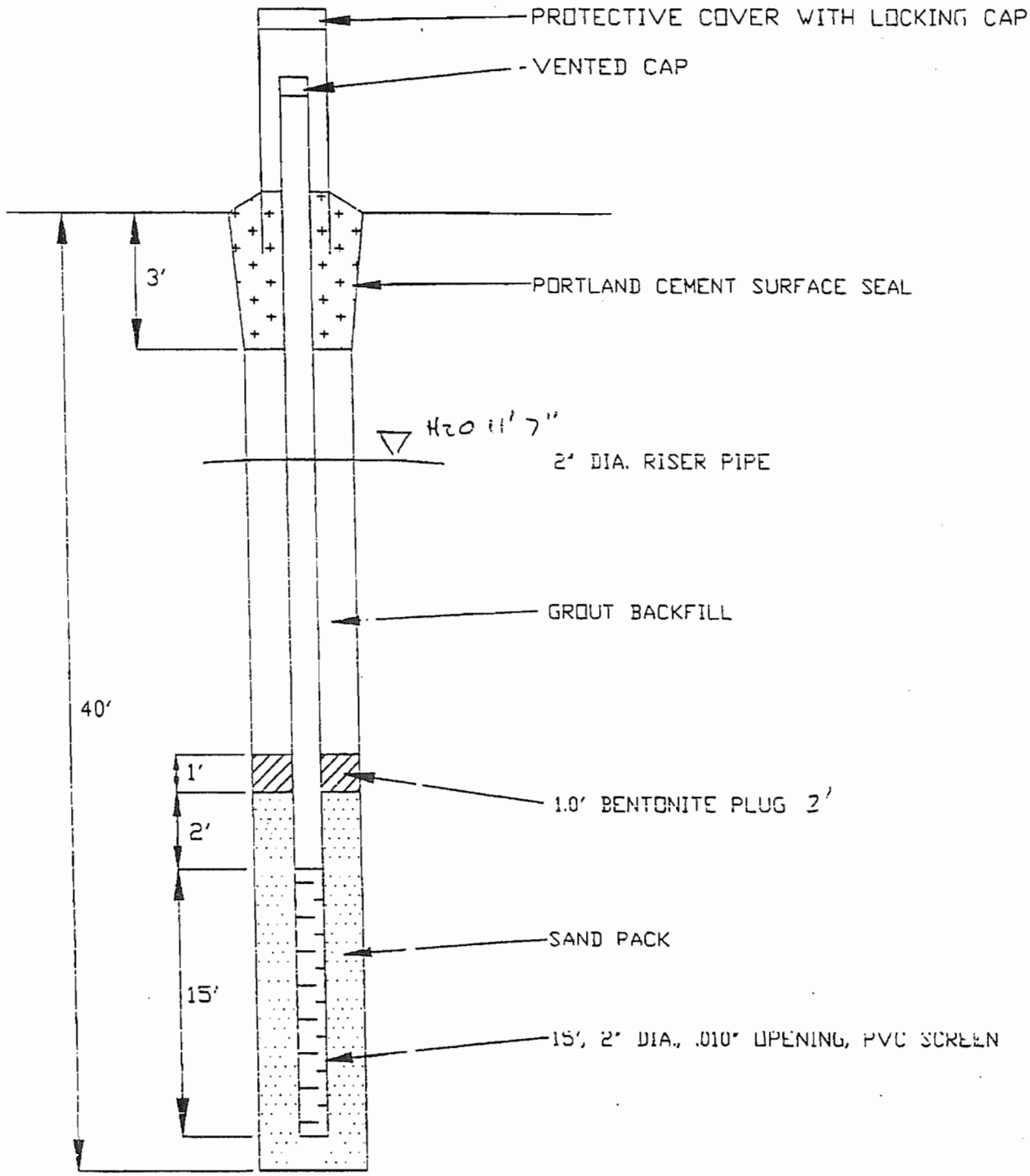
_____ SIGNATURE: _____

3342 (6/85)
& Hazardous Waste Management Branch

TYPICAL MONITORING WELL SCHEMATIC

PROJECT HALIFAX COUNTY LANDFILL VERTICAL EXPANSION
WELL NUMBER MW-6A

6d



TEST BORING FIELD REPORT

MW6d

Name Halifax County Landfill Vertical Expansion Job No. _____

Supervisor Tony Crew Ben Hrs. Drilling ____ Hrs. Moving ____ Boring # MW6

a e 10/30/91 Weather _____ Ground Surface Elevation _____

Soil Strata			Sampling/Blows per Ft.				
o	To	Soil Description and Remarks	No.	Depth	1st6"	2nd6"	3rd6"
.0	2.8	Brown fine sandy silt w/rocks					
.8	10.6	Brown medium to fine sandy silt					
.6	22.4	Damp dark brown medium sandy silt					
.4	40.0	Wet brown fine sandy silt					
		B.T. 40.0					
		Set 2"x15' PVC screen at 40.0 with 30' PVC riser 4 bags					
		sand, ½ bucket bentonite 1 2" locking cap, 1 4"x5'					
		protective casing					

ter Level _____ at TOB

er Level _____ at _____

er Level _____ at 24 Hours

Losses _____

sing, Size _____ Length _____

Note: (Record Methods of Drilling & Depths)

CME 450 ATV
4¼" ID hollow stem auger
0.0 - 40.0

WELL COMPLETION RECORD

MW-7 MW-7d

'I ETE ALL INFORMATION REQUESTED BELOW FOR EACH WELL INSTALLED, AND RETURN FORM TO THE N.C. ' MENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH, 091, RALEIGH, N.C. 27602

.C.F SITE: ifax County Sanitary Landfill	PERMIT NO.: 41-0176-WM-0033
.E S: .. 1417 Aurelian Springs, N.C.	OWNER (print): Halifax County
.I G CONTRACTOR: 'e & Core, Inc.	REGISTRATION NO.: 763

'pe:	PVC	dia.	2 in.	Grout Depth:	from	0	to	-21'	ft. - dia. 4" in.
epth:	from 2	to -25	ft. - dia. 2 in.	Bentonite Seal:	from	-21'	to	-23'	ft. - dia. 4" in.
Type:	slotted PVC .010	dia.	2 in.	Sand/Gravel PK:	from	-23'	to	40'	ft. - dia. 4" in.
Depth:	from -25	to -40	ft. - dia. 2 in.	Total Well Depth:	from	2'	to	-40'	ft. - dia. 4" in.

W. ater Level: 3' 11" Below ground surface feet from top of casing Date Measured 11 / 26 / 91

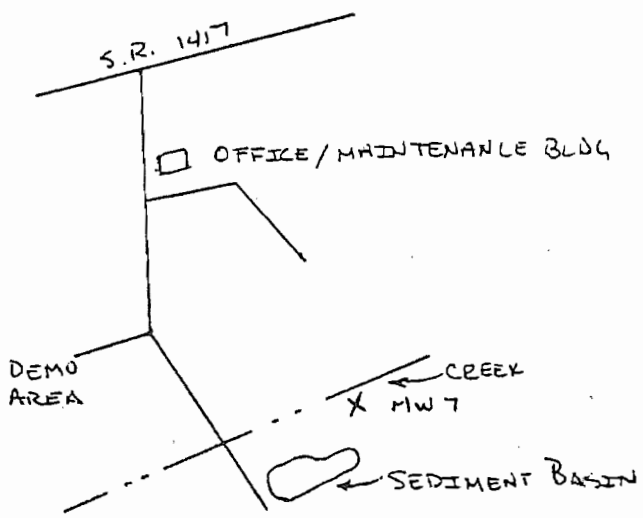
(g m): _____ Method of Testing: _____ Casing is _____ feet above land surface

DRILLING LOG

DEPTH FROM	TO	FORMATION DESCRIPTION
	1.4	Brown fine sandy silt
4	6.7	Brown fine sandy silt
.7	14.3	Damp DrkBr. fine very sandy silt.
4 ?	40.0	Wet Brown medium sandy silt/gravel

LOCATION SKETCH

(show distance to numbered roads, or other map reference points)



1 RKS: Well screened too deep.
Static water table is above the screen.

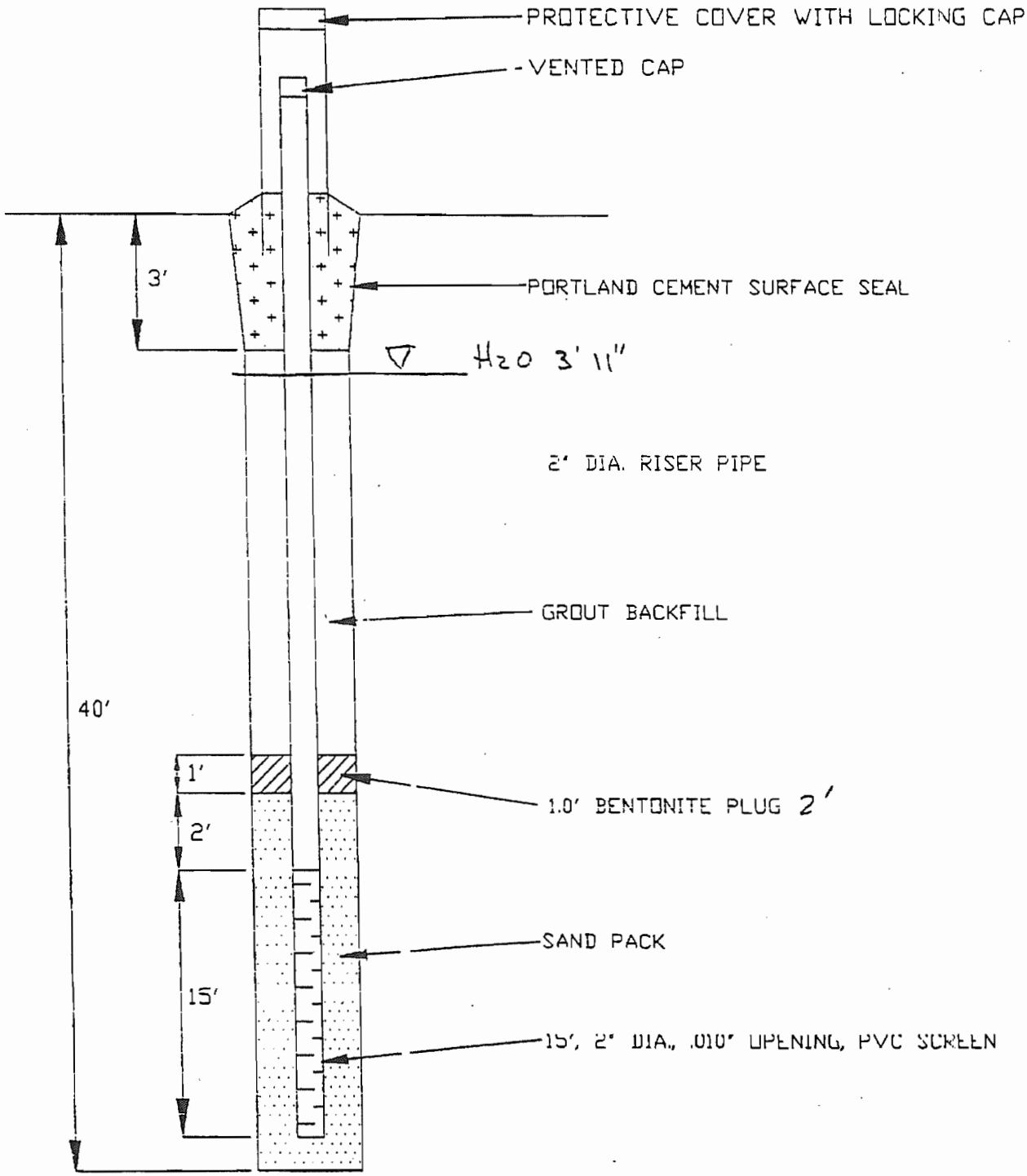
SIGNATURE: _____

3342 (6/85)
& Hazardous Waste Management Branch

TYPICAL MONITORING WELL SCHEMATIC

PROJECT HALIFAX COUNTY LANDFILL VERTICAL EXPANSION
WELL NUMBER MW-7

7d



TEST BORING FIELD REPORT

MW7d

Name Halifax County Landfill Vertical Expansion Job No. _____

Supervisor Tony Crew Ben Hrs. Drilling ____ Hrs. Moving ____ Boring # MW7

Date 10/31/91 Weather _____ Ground Surface Elevation _____

Soil Strata			Sampling/Blows per Ft				
From	To	Soil Description and Remarks	No.	Depth	1st6"	2nd6"	3rd6"
.0	1.4	Brown fine sandy silt with roots					
.4	6.7	Brown fine sandy silt					
.	14.3	Damp dark brown fine very sandy silt					
.3	40.0	Wet brown medium sandy silt with gravel B.T. 40.0					
		Set 2" PVC screen (15') at 40.0 with 30' PVC riser 4 bags					
		sand, ½ bucket Bentonite 1 2" locking cap, 1 4"x5'					
		protective casing					

ater Level _____ at TOB

er Level _____ at _____

Level _____ at 24 Hours

Losses _____

asing, Size _____ Length _____

Note: (Record Methods of Drilling & Depths)

CME 450 ATV
4¼" ID hollow stem auger
0.0 - 40.0

FIELD BOREHOLE LOG

BOREHOLE NUMBER: MW-15R

PROJECT NUMBER: HALIFAX-14
PROJECT NAME: Halifax County Landfill
LOCATION: Aurelian Springs, North Carolina
DRILLING COMPANY: Engineering Tectonics, P.A.
RIG TYPE & NUMBER: MOBILE B-60
DRILLING METHOD: Hollow Stem Auger
WEATHER: Cloudy, 70 degrees
FIELD PARTY: David Barron
GEOLOGIST: Philip May
DATE BEGUN: 8/31/99 DATE COMPLETED: 8/31/99

TOP OF CASING ELEVATION TBD
TOTAL DEPTH 43.0 FT
GROUND SURFACE ELEVATION: TBD
SHEET: 1 OF: 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(Ft)	31.5'	31.55'
Time	2:00	12:00
Date	8/31/99	9/1/99

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
5.0	5 6 8	Ss	81	SM		8"		SANDY CLAYEY SILT: Slightly moist rust-brown F sandy clayey silt, mottled (20%) w/ grey clay & some gravel, lower 1" moist white F sandy silt w/ rust mottling, some Mn & quartz throughout.
10.0	6 10 15	Ss	82	SM		12"		CLAYEY SILTY SAND: Slightly moist tan-pink clayey silty F sand w/ grey, white, yellow, & rust mottles (50%);
15.0	9 12 15	Ss	83	SM		12"		15.0' same as above, grading into rust orange matrix w/ other mottles, some mica & quartz.
20.0	10 14 17	Ss	84	M		12"		SANDY CLAYEY SILT: Moist M-C sandy clayey silt, mottled tan-pink, grey-black, white, & rust, quartz gravel;
25.0	8 11 15	Ss	85	M		6"		25.0' Moist M-C sandy clayey silt, grey-tan-pink, brown-black, grey-tan, & white mottles, quartz, Feldspar, Mn, Mica;
30.0	9 17 25	Ss	86	M		8"		30.0' same as above;
35.0	20 29 11	Ss	87	W		12"		35.0' same as above, very moist;
43.0	11 20 33	Ss	88	W		14"		43.0' same as above, wet, boring terminated at 43.0'.

LITHOLOGY

WELL INSTALLATION

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
P.O. Box 29578 - Raleigh, N.C. 27626-0578-Phone (919) 733-3221

WELL CONSTRUCTION RECORD

Well ID: MW-15r

DRILLING CONTRACTOR: Engineering Tectonics, P.A.
DRILLER REGISTRATION #: 835
STATE WELL CONSTRUCTION PERMIT#:

1. WELL USE (Check Applicable Box): Residential ☐ Municipal ☐ Industrial ☐ Agricultural ☐ Monitoring ☒
Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use:

2. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Aurelian Springs County: Halifax
Liles Road
(Road, Community, or Subdivision and Lot No.)

3. OWNER Halifax County
ADDRESS
(Street or Route No.)
Halifax NC
City or Town State Zip Code

4. DATE DRILLED 8/31/99
5. TOTAL DEPTH 43.0
6. CUTTINGS COLLECTED YES ☐ NO ☒
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
8. STATIC WATER LEVEL Below Top of Casing: 31.55 FT
(Use + if Above Top of Casing)
9. TOP OF CASING IS 2.5 FT. Above Land Surface *
* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .01 18
10. YIELD(gpm): METHOD OF TEST
11. WATER ZONES (depth):

DEPTH From	DEPTH To	DRILLING LOG Formation Description
See attached boring log		

If additional space is needed use back of form

12. CHLORINATION: Type Amount

13. CASING:

	Depth From	Depth TO	Ft.	Diameter	Wall Thickness or Weight/Ft	Material
	2.0	33.0		2"		PVC

14. GROUT:

	Depth From	Depth TO	Ft.	Material	Method
	0	29.0		Portland cement	Tremie
	29.0	31.0		Bentonite	

15. SCREEN:

	Depth From	Depth TO	Ft	Diameter	in.	Slot Size	in.	Material
	33.0	43.0		2		10		PVC

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Ft.	Size	Material
	31.0	43.0		No. 2 Filter Sand	

17. REMARKS:

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

FOR OFFICE USE ONLY
Quad No:

SIGNATURE OF CONTRACTOR OR AGENT DATE
Submit original to Division of Water Quality and copy to well owner.

FIELD BOREHOLE LOG

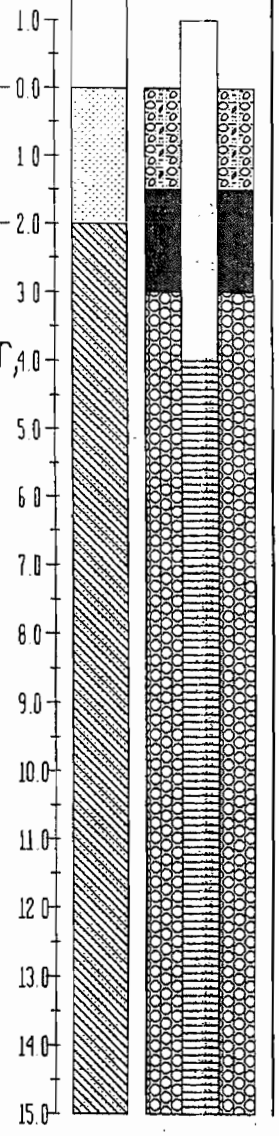
BOREHOLE NUMBER: MW-16A

PROJECT NUMBER HALIFAX-2
PROJECT NAME HALIFAX COUNTY LANDFILL
LOCATION HALIFAX, NC
DRILLING COMPANY: BORE & CORE
RIG TYPE & NUMBER: MOBILE B-57 ATV
DRILLING METHOD: HOLLOW STEM AUGER
WEATHER HOT, HUMID
FIELD PARTY: BILL BROW
GEOLOGIST: GREG MILLS
DATE BEGUN: 7/26/95 DATE COMPLETED: 7/26/95

TOP OF CASING ELEVATION -
TOTAL DEPTH 16.0
GROUND SURFACE ELEVATION -
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WO=While Drilling AB=After Boring		
Depth(Ft)	7.2 FT	
Time	3:00 PM	
Date	7/26/95	

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
1.0								
0.0								SAND: Tan coarse grained SAND w/ some organics.
1.0								
2.0				D				CLAYEY SAND: White, pink and orange coarse grained clayey SAND with mica, feldspar, K-feldspar, and some quartz; weathered granite; residual soil; SC.
3.0								
4.0	6	Ss	S1					
5.0	7 9							
6.0								
7.0								
8.0								
9.0	5	Ss	S2					
10.0	8 8			W				
11.0								
12.0								
13.0								
14.0	86	Ss	S3					
15.0	50/0	4'						



Richardson Smith Gardner and Assoc
14 North Boylan Avenue, Raleigh NC 27603
(919) 828-0577

FIELD BOREHOLE LOG

BOREHOLE NUMBER **MW-17**

PROJECT NAME: **Halifax Landfill**
OCATION: **Halifax Co.**
DRILLING CO: **McCall Bros.**
DRILLING METHOD: **HSA**
FIELD PARTY: **Ken McDonald**
GEOLOGIST: **J. Smyth**
DATE BEGUN: **10/03/07** DATE COMPLETED: **10/03/07**

TOTAL DEPTH: **25**
GROUND SURFACE ELEVATION:
TOP OF CASING ELEVATION:

STATIC WATER LEVEL (TOC)		
Depth (ft)		
Time		
Date		

DEPTH	BLOW COUNT	SAMPLING METHOD	RECOVERY	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH	WELL INSTALLATION
0.0				HSA	SILTY CLAY: Wet, dark brown silty clay with organic matter.		0.0	
1.0							1.0	
2.0							2.0	
3.0							3.0	
4.0							4.0	
5.0	2,2,4,6	SS	16"				5.0	
6.0							6.0	
7.0							7.0	
8.0							8.0	
9.0							9.0	
10.0	4,6,10,12	SS	14"		SAPROLITE: Wet, very weathered to weathered K-spar granitic saprolite. Boring terminated at 25' below grade.		10.0	
11.0							11.0	
12.0							12.0	
13.0							13.0	
14.0							14.0	
15.0	11,16,22,27	SS	8"				15.0	
16.0							16.0	
17.0							17.0	
18.0							18.0	
19.0							19.0	
20.0	7,22,29,33	SS	6"				20.0	
21.0							21.0	
22.0							22.0	
23.0							23.0	
24.0							24.0	
25.0							25.0	

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FIELD BOREHOLE LOG

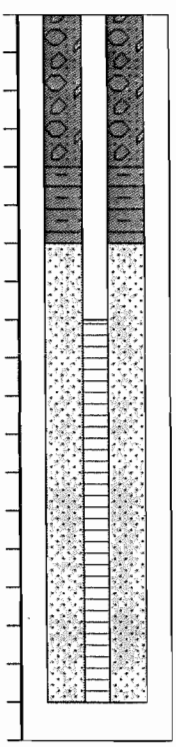
BOREHOLE NUMBER **MW-18s**

PROJECT NAME: **Halifax Landfill**
LOCATION: **Halifax Co.**
DRILLING CO: **McCall Bros.**
DRILLING METHOD: **HSA**
FIELD PARTY: **Ken McDonald**
GEOLOGIST: **J. Smyth**
DATE BEGUN: **10/16/07** DATE COMPLETED: **10/16/07**

TOTAL DEPTH: **19**
GROUND SURFACE ELEVATION:
TOP OF CASING ELEVATION:

STATIC WATER LEVEL (TOC)		
Depth (ft)		
Time		
Date		

DEPTH	BLOW COUNT	SAMPLING METHOD	RECOVERY	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH	WELL INSTALLATION
0.0				HSA	SILTY CLAY: Moist to Wet gray green silty clay		0.0	
1.0							1.0	
2.0							2.0	
3.0							3.0	
4.0							4.0	
5.0	2,2,1,2	SS	6"				5.0	
6.0							6.0	
7.0							7.0	
8.0							8.0	
							9.0	
10.0	3,2,3,11	SS	8"		CLAYEY SILTY SAND: Wet, dark gray, clayey silty sand with some partially weathered rock.		10.0	
11.0							11.0	
12.0							12.0	
13.0							13.0	
14.0							14.0	
15.0	18,26,27,26	SS	12"		SAPROLITE: Wet weathered potassium feldspar granite saprolite. Auger Refusal at 19 feet. Running sands backfilled hole to 18' where well was then set.		15.0	
16.0							16.0	
17.0							17.0	
18.0							18.0	
19.0							19.0	



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FIELD BOREHOLE LOG

BOREHOLE NUMBER **MW-18d**

PROJECT NAME: **Halifax Landfill**
LOCATION: **Halifax Co.**
DRILLING CO: **McCall Bros.**
DRILLING METHOD: **HSA**
FIELD PARTY: **Ken McDonald**
GEOLOGIST: **J. Smyth**
DATE BEGUN: **10/16/07** DATE COMPLETED: **10/17/07**

TOTAL DEPTH: **52**
GROUND SURFACE ELEVATION:
TOP OF CASING ELEVATION:

STATIC WATER LEVEL (TOC)		
Depth (ft)		
Time		
Date		

DEPTH	BLOW COUNT	SAMPLING METHOD	RECOVERY	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH	WELL INSTALLATION
0.0				HSA	SILTY CLAY: Moist to Wet gray green silty clay		0.0	
1.0							1.0	
2.0							2.0	
3.0							3.0	
4.0							4.0	
5.0	2,2,1,2	SS	6"				5.0	
6.0							6.0	
7.0							7.0	
8.0							8.0	
							9.0	
10.0	3,2,3,11	SS	8"		CLAYEY SILTY SAND: Wet, dark gray, clayey silty sand with some partially weathered rock.		10.0	
11.0							11.0	
12.0							12.0	
13.0							13.0	
14.0							14.0	
15.0	18,26,27,26	SS	12"		SAPROLITE: Wet weathered potassium feldspar granite saprolite. Auger Refusal at 32 feet.		15.0	
16.0							16.0	
17.0							17.0	
18.0							18.0	
19.0							19.0	
20.0		Grab					20.0	
21.0							21.0	
22.0							22.0	
23.0							23.0	
24.0							24.0	
25.0		Grab					25.0	
26.0							26.0	
27.0							27.0	
28.0							28.0	
29.0							29.0	
		Grab					30.0	

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(919) 828-0577

FIELD BOREHOLE LOG

BOREHOLE NUMBER **MW-18d**

PROJECT NAME: **Halifax Landfill**
LOCATION: **Halifax Co.**
DRILLING CO: **McCall Bros.**
DRILLING METHOD: **HSA**
FIELD PARTY: **Ken McDonald**
GEOLOGIST: **J. Smyth**
DATE BEGUN: **10/16/07** DATE COMPLETED: **10/17/07**

TOTAL DEPTH: **52**
GROUND SURFACE ELEVATION:
TOP OF CASING ELEVATION:

STATIC WATER LEVEL (TOC)		
Depth (ft)		
Time		
Date		

DEPTH	BLOW COUNT	SAMPLING METHOD	RECOVERY	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH	WELL INSTALLATION
31.0							31.0	
32.0				AH	GRANITE: Wet Potassium Feldspar Granite (observed by cuttings). Boring terminated at 52'.		32.0	
33.0							33.0	
34.0							34.0	
35.0		Grab					35.0	
36.0							36.0	
37.0							37.0	
38.0							38.0	
39.0							39.0	
40.0		Grab					40.0	
41.0							41.0	
42.0							42.0	
43.0							43.0	
44.0							44.0	
45.0		Grab					45.0	
46.0							46.0	
47.0							47.0	
48.0							48.0	
49.0							49.0	
50.0		Grab					50.0	
51.0							51.0	
52.0							52.0	

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Appendix B

Laboratory Analytical Report

February 2015 – Groundwater Monitoring Report
Halifax County Closed MSW Landfill
NC Solid Waste Permit No. 42-04

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Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

ID#: 6015

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX ,NC 27839

DATE COLLECTED: 02/10/15
DATE REPORTED : 03/26/15

REVIEWED BY:

PARAMETERS	MDL	SWSL	MW-1	MW-7D	MW-15R	Equipment Blank	Trip Blank	Analysis Date	Analyst	Method Code
PH (field measurement), Units			5.2	5.8	4.9			02/10/15	BF	4500HB-00
COD, mg/l	20.0	20.0		--- U				02/16/15	TRB	H8000-79
Nitrate Nitrogen as N, mg/l	0.04	10.0		0.13 J				02/11/15	AKS	353.2 R2-9
Total Organic Carbon, mg/l	0.046	1.0		--- U				02/12/15	SEJ	5310C-00
Chloride, mg/l	5.0	5.0		--- U				02/16/15	LW	4500CLB-97
Cyanide, ug/l	5.0	10.0		--- U	--- U			02/18/15	SEJ	4500CNE-99
Antimony, ug/l	0.12	6.0	1.3 J	1.6 J	1.1 J			02/17/15	LFJ	EPA200.8
Arsenic, ug/l	0.10	10.0	0.72 J	0.27 J	0.28 J			02/17/15	LFJ	EPA200.8
Barium, ug/l	0.12	100.0	48.9 J	34.4 J	42.6 J			02/17/15	LFJ	EPA200.8
Beryllium, ug/l	0.04	1.0	0.31 J	0.07 J	0.09 J			02/17/15	LFJ	EPA200.8
Cadmium, ug/l	0.04	1.0	0.24 J	0.18 J	0.10 J			02/17/15	LFJ	EPA200.8
Cobalt, ug/l	0.12	10.0	0.99 J	0.13 J	0.29 J			02/17/15	LFJ	EPA200.8
Copper, ug/l	0.10	10.0	2.1 J	0.37 J	0.47 J			02/17/15	LFJ	EPA200.8
Total Chromium, ug/l	0.14	10.0	1.4 J	0.14 J	0.14 J			02/17/15	LFJ	EPA200.8
Iron, ug/l	16.0	300.0		489				03/12/15	JMN	3111B-99
Lead, ug/l	0.13	10.0	2.5 J	0.23 J	0.21 J			02/17/15	LFJ	EPA200.8
Mercury, ug/l	0.06	0.20		--- U	--- U			02/16/15	MTM	245.1 R3-9
Nickel, ug/l	0.12	50.0	1.1 J	0.27 J	0.43 J			02/17/15	LFJ	EPA200.8
Selenium, ug/l	0.16	10.0	0.93 J	0.40 J	0.46 J			02/17/15	LFJ	EPA200.8
Silver, ug/l	0.04	10.0	--- U	--- U	--- U			02/17/15	LFJ	EPA200.8
Thallium, ug/l	0.13	5.5	--- U	--- U	--- U			02/17/15	LFJ	EPA200.8
Tin, ug/l	0.05	100.0		0.18 J	0.18 J			02/17/15	LFJ	EPA200.8
Vanadium, ug/l	0.06	25.0	2.6 J	0.44 J	--- U			02/17/15	LFJ	EPA200.8
Zinc, ug/l	0.53	10.0	15	7.3 J	7.3 J			02/17/15	LFJ	EPA200.8
Turbidity, NTU	1.0	1.0	80.0	11.0	4.8			02/10/15	SDB	2130B-01
Sulfide, ug/l	100	1000		--- U	--- U			02/16/15	LFJ	4500S2D-00
Conductivity (at 25c), uMhos/cm	1.0	1.0	33	59	52			02/10/15	BF	2510B-97
Dissolved Oxygen, mg/l	0.1	0.1	8.01	7.32	7.35			02/10/15	BF	4500OG-01
Temperature, °C			13	11	14			02/10/15	BF	2550B-00
Static Water Level, feet			28.14	3.14	28.20			02/10/15	BF	
Well Depth, feet			42.61	39.45	46.51			02/10/15	BF	
ORP, mv			+136	+111	+118			02/10/15	BF	2580B

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: CHS
DATE COLLECTED: 02/10/15
DATE EXTRACTED: 02/11/15
DATE ANALYZED: 02/23/15
DATE REPORTED: 03/26/15

REVIEWED BY: _____

PESTICIDES AND PCB'S
EPA METHOD 8081B R2(07)

PARAMETERS, ug/l	MDL	SWSL	MW-7D	MW-15R
1. Aldrin	0.029	0.05	--- U	--- U
2. Alpha-BHC	0.032	0.05	--- U	--- U
3. Beta-BHC	0.031	0.05	--- U	--- U
4. Delta-BHC	0.030	0.05	--- U	--- U
5. Gamma-BHC (Lindane)	0.032	0.05	--- U	--- U
6. Chlordane	0.320	0.50	--- U	--- U
7. 4,4-DDD	0.051	0.10	--- U	--- U
8. 4,4-DDE	0.049	0.10	--- U	--- U
9. 4,4-DDT	0.052	0.10	--- U	--- U
10. Dieldrin	0.042	0.075	--- U	--- U
11. Endosulfan I	0.056	0.10	--- U	--- U
12. Endosulfan II	0.046	0.10	--- U	--- U
13. Endosulfan Sulfate	0.072	0.10	--- U	--- U
14. Endrin	0.053	0.10	--- U	--- U
15. Endrin Aldehyde	0.068	0.10	--- U	--- U
16. Heptachlor	0.039	0.05	--- U	--- U
17. Heptachlor Epoxide	0.042	0.075	--- U	--- U
18. Methoxychlor	0.530	1.00	--- U	--- U
19. Pcb's (Aroclors)	0.500	2.00	--- U	--- U
20. Toxaphene	0.690	1.50	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

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CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: CHS
DATE COLLECTED: 02/10/15
DATE EXTRACTED: 02/12/15
DATE ANALYZED: 03/19/15
DATE REPORTED: 03/26/15

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8151A R1(96)

PARAMETERS, ug/l	MDL	SWSL	MW-7D	MW-15R
1. 2,4-D	0.36	2.0	--- U	--- U
2. Dinoseb	0.54	1.0	--- U	--- U
3. 2,4,5-TP	0.42	2.0	--- U	--- U
4. 2,4,5-T	0.47	2.0	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

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GREENVILLE, N.C. 27835-7085

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FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: MAO
DATE COLLECTED: 02/10/15
DATE ANALYZED: 02/24/15
DATE REPORTED: 03/26/15

REVIEWED BY:

VOLATILE ORGANICS
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	MW-1
1. Chloromethane	0.77	1.0	--- U
2. Vinyl Chloride	0.63	1.0	--- U
3. Bromomethane	0.67	10.0	--- U
4. Chloroethane	0.48	10.0	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U
6. 1,1-Dichloroethene	0.17	5.0	--- U
7. Acetone	9.06	100.0	--- U
8. Iodomethane	0.26	10.0	--- U
9. Carbon Disulfide	0.23	100.0	--- U
10. Methylene Chloride	0.64	1.0	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U
12. 1,1-Dichloroethane	0.20	5.0	--- U
13. Vinyl Acetate	0.20	50.0	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	--- U
15. 2-Butanone	2.21	100.0	--- U
16. Bromochloromethane	0.27	3.0	--- U
17. Chloroform	0.25	5.0	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U
20. Benzene	0.24	1.0	--- U
21. 1,2-Dichloroethane	0.27	1.0	--- U
22. Trichloroethene	0.23	1.0	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U
24. Bromodichloromethane	0.21	1.0	--- U
25. Cis-1,3-Dichloropropene	0.24	1.0	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U
27. Toluene	0.23	1.0	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U
30. Tetrachloroethene	0.17	1.0	--- U
31. 2-Hexanone	1.57	50.0	--- U
32. Dibromochloromethane	0.24	3.0	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U
34. Chlorobenzene	0.30	3.0	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U
36. Ethylbenzene	0.21	1.0	--- U
37. Xylenes	0.68	5.0	--- U
38. Dibromomethane	0.28	10.0	--- U
39. Styrene	0.19	1.0	--- U
40. Bromoform	0.20	3.0	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U
46. Acrylonitrile	2.72	200.0	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

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PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: CHS
DATE COLLECTED: 02/10/15
DATE EXTRACTED: 02/11/15
DATE ANALYZED: 03/07/15
DATE REPORTED: 03/26/15

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270D R4(07)

PARAMETERS, ug/l	MDL	SWSL	MW-7D	MW-15R
1. Acenaphthene	2.66	10.0	--- U	--- U
2. Acenaphthylene	2.60	10.0	--- U	--- U
3. Anthracene	2.97	10.0	--- U	--- U
4. Benzo[a]antrhacene	4.16	10.0	--- U	--- U
5. Benzo[b]fluoranthene	3.32	10.0	--- U	--- U
6. Benzo[k]fluoranthene	4.23	10.0	--- U	--- U
7. Benzo[g,h,i]perylene	2.61	10.0	--- U	--- U
8. Benzo[a]pyrene	3.27	10.0	--- U	--- U
9. 4-Bromophenyl Phenyl Ether	2.63	10.0	--- U	--- U
10. Butyl Benzyl Phthalate	5.78	10.0	--- U	--- U
11. Bis-(2-Chloroethoxy) Methane	3.14	10.0	--- U	--- U
12. Bis-(2-Chloroethyl) Ether	2.58	10.0	--- U	--- U
13. Bis-(2-Chloroisopropyl) Ether	2.58	10.0	--- U	--- U
14. 2-Chloronaphthalene	2.17	10.0	--- U	--- U
15. 4-Chlorophenyl Phenyl Ether	2.42	10.0	--- U	--- U
16. Chrysene	4.04	10.0	--- U	--- U
17. Dibenzo[a,h]anthracene	2.78	10.0	--- U	--- U
18. Di-N-Butyl Phthalate	3.09	10.0	--- U	--- U
19. Dimethyl Phthalate	3.78	10.0	--- U	--- U
20. Diethyl Phthalate	3.92	10.0	--- U	--- U
21. 2,4-Dinitrotoluene	3.95	10.0	--- U	--- U
22. 2,6-Dinitrotoluene	3.88	10.0	--- U	--- U
23. Di-N-Octyl Phthalate	2.81	10.0	--- U	--- U
24. Bis-(2-Ethylhexyl) Phthalate	9.97	15.0	--- U	--- U
25. Fluoranthene	3.92	10.0	--- U	--- U
26. Fluorene	2.95	10.0	--- U	--- U
27. Hexachlorobenzene	2.61	10.0	--- U	--- U
28. Hexachlorocyclopentadiene	4.16	10.0	--- U	--- U
29. Indeno[1,2,3-Cd]pyrene	2.91	10.0	--- U	--- U
30. Isophorone	3.74	10.0	--- U	--- U
31. Nitrobenzene	2.85	10.0	--- U	--- U
32. N-Nitrosodimethylamine	4.25	10.0	--- U	--- U
33. N-Nitrosodiphenylamine	3.95	10.0	--- U	--- U
34. N-Nitrosodi-N-Propylamine	4.06	10.0	--- U	--- U
35. Phenanthrene	3.24	10.0	--- U	--- U
36. Pyrene	3.63	10.0	--- U	--- U
37. 4-Chloro-3-Methylphenol	3.79	20.0	--- U	--- U
38. 2-Chlorophenol	2.75	10.0	--- U	--- U
39. O-Cresol	3.68	10.0	--- U	--- U
40. P-Cresol	4.12	10.0	--- U	--- U
41. 2,4-Dichlorophenol	5.19	10.0	--- U	--- U
42. 2,6-Dichlorophenol	4.89	10.0	--- U	--- U
43. 2,4-Dimethylphenol	3.21	10.0	--- U	--- U
44. 4,6-Dinitro-2-Methylphenol	4.77	50.0	--- U	--- U
45. 2,4-Dinitrophenol	4.37	50.0	--- U	--- U
46. Ethyl Methanesulfonate	5.26	20.0	--- U	--- U
47. Methyl Methanesulfonate	4.92	10.0	--- U	--- U
48. 2-Nitrophenol	3.64	10.0	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: CHS
DATE COLLECTED: 02/10/15
DATE EXTRACTED: 02/11/15
DATE ANALYZED: 03/07/15
DATE REPORTED: 03/26/15

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270D R4(07)

PARAMETERS, ug/l	MDL	SWSL	MW-7D	MW-15R
49. 4-Nitrophenol	3.17	50.0	--- U	--- U
50. Pentachlorophenol	5.33	25.0	--- U	--- U
51. Phenol	1.86	10.0	--- U	--- U
52. 2,3,4,6-Tetrachlorophenol	3.12	10.0	--- U	--- U
53. 2,4,5-Trichlorophenol	4.17	10.0	--- U	--- U
54. 2,4,6-Trichlorophenol	3.84	10.0	--- U	--- U
55. Acetophenone	2.89	10.0	--- U	--- U
56. 2-Acetylaminofluorene	3.98	20.0	--- U	--- U
57. 4-Aminobiphenyl	4.12	20.0	--- U	--- U
58. Benzyl Alcohol	4.47	20.0	--- U	--- U
59. 4-Chloroaniline	3.36	20.0	--- U	--- U
60. Chlorobenzilate	5.12	10.0	--- U	--- U
61. Diallate	2.98	10.0	--- U	--- U
62. Dibenzofuran	4.28	10.0	--- U	--- U
63. 3,3-Dichlorobenzidine	4.22	20.0	--- U	--- U
64. Dimethoate	3.98	20.0	--- U	--- U
65. P-Dimethylaminoazobenzene	2.89	10.0	--- U	--- U
66. 7,12-Dimethylbenz[a]anthracene	5.26	10.0	--- U	--- U
67. 3,3-Dimethylbenzadine	3.21	10.0	--- U	--- U
68. 1,3-Dinitrobenzene	2.89	20.0	--- U	--- U
69. Diphenylamine	5.10	10.0	--- U	--- U
70. Disulfoton	4.28	10.0	--- U	--- U
71. Famphur	3.98	20.0	--- U	--- U
72. Hexachloropropene	4.31	10.0	--- U	--- U
73. Isosafrole	2.88	10.0	--- U	--- U
74. Kepone	2.78	20.0	--- U	--- U
75. Methapyrilene	3.54	100.0	--- U	--- U
76. 3-Methylchloroanthrene	4.21	10.0	--- U	--- U
77. 2-Methylnaphthalene	3.79	10.0	--- U	--- U
78. Methyl Parathion	4.32	10.0	--- U	--- U
79. m-Cresol	3.81	10.0	--- U	--- U
80. 1,4-Naphthoquinone	4.00	10.0	--- U	--- U
81. 1-Naphthylamine	5.61	10.0	--- U	--- U
82. 2-Naphthylamine	4.62	10.0	--- U	--- U
83. 2-Nitroaniline	3.61	50.0	--- U	--- U
84. 3-Nitroaniline	4.81	50.0	--- U	--- U
85. 4-Nitroaniline	4.22	20.0	--- U	--- U
86. 5-Nitro-O-Toluidine	4.01	10.0	--- U	--- U
87. N-Nitrosodi-n-butylamine	3.63	10.0	--- U	--- U
88. N-Nitrosodiethylamine	3.83	20.0	--- U	--- U
89. N-Nitrosomethylethylamine	3.83	10.0	--- U	--- U
90. N-Nitrosopiperidine	5.19	20.0	--- U	--- U
91. N-Nitrosopyrrolidine	2.89	10.0	--- U	--- U
92. Parathion	3.12	10.0	--- U	--- U
93. Pentachlorobenzene	3.92	10.0	--- U	--- U
94. Pentachloronitrobenzene	3.71	20.0	--- U	--- U
95. Phenacetin	4.41	20.0	--- U	--- U
96. 1,4 Benzenediamine	2.99	10.0	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: CHS
DATE COLLECTED: 02/10/15
DATE EXTRACTED: 02/11/15
DATE ANALYZED: 03/07/15
DATE REPORTED: 03/26/15

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270D R4(07)

PARAMETERS, ug/l	MDL	SWSL	MW-7D	MW-15R
97. Phorate	3.86	10.0	--- U	--- U
98. Pronamide	3.69	10.0	--- U	--- U
99. Safrole	4.12	10.0	--- U	--- U
100. 1,2,4,5-Tetrachlorobenzene	5.01	10.0	--- U	--- U
101. Thionazin	4.62	20.0	--- U	--- U
102. O-Toluidine	4.11	10.0	--- U	--- U
103. 1,3,5-Trinitrobenzene	3.98	10.0	--- U	--- U
104. 0,0,0-Triethyl Phosphorothioate	3.61	10.0	--- U	--- U
105. Hexachloroethane	1.49	10.0	--- U	--- U
106. Isodrin	3.11	20.0	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: MAO
DATE COLLECTED: 02/10/15
DATE ANALYZED: 02/24/15
DATE REPORTED: 03/26/15

REVIEWED BY: _____

LANDFILL APPENDIX II
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	MW-7D	MW-15R	Equipment Blank	Trip Blank
1. Chloromethane	0.77	1.0	--- U	--- U	--- U	--- U
2. Vinyl Chloride	0.63	1.0	--- U	--- U	--- U	--- U
3. Bromomethane	0.67	10.0	--- U	--- U	--- U	--- U
4. Chloroethane	0.48	10.0	--- U	--- U	--- U	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U	--- U	--- U	--- U
6. 1,1-Dichloroethene	0.17	5.0	--- U	--- U	--- U	--- U
7. Acetone	9.06	100.0	--- U	--- U	--- U	--- U
8. Iodomethane	0.26	10.0	--- U	--- U	--- U	--- U
9. Carbon Disulfide	0.23	100.0	--- U	--- U	--- U	--- U
10. Methylene Chloride	0.64	1.0	--- U	--- U	--- U	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U	--- U	--- U	--- U
12. 1,1-Dichloroethane	0.20	5.0	--- U	1.30 J	--- U	--- U
13. Vinyl Acetate	0.20	50.0	--- U	--- U	--- U	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	--- U	--- U	--- U	--- U
15. 2-Butanone	2.21	100.0	--- U	--- U	--- U	--- U
16. Bromochloromethane	0.27	3.0	--- U	--- U	--- U	--- U
17. Chloroform	0.25	5.0	--- U	--- U	--- U	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U	--- U	--- U	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U	--- U	--- U	--- U
20. Benzene	0.24	1.0	--- U	--- U	--- U	--- U
21. 1,2-Dichloroethane	0.21	1.0	--- U	--- U	--- U	--- U
22. Trichloroethene	0.23	1.0	--- U	--- U	--- U	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U	--- U	--- U	--- U
24. Bromodichloromethane	0.21	1.0	--- U	--- U	--- U	--- U
25. Cis-1,3-Dichloropropene	0.24	1.0	--- U	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U	--- U	--- U	--- U
27. Toluene	0.23	1.0	--- U	--- U	--- U	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U	--- U	--- U	--- U
30. Tetrachloroethene	0.17	1.0	--- U	0.90 J	--- U	--- U
31. 2-Hexanone	1.57	50.0	--- U	--- U	--- U	--- U
32. Dibromochloromethane	0.24	3.0	--- U	--- U	--- U	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U	--- U	--- U	--- U
34. Chlorobenzene	0.30	3.0	--- U	--- U	--- U	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U	--- U	--- U	--- U
36. Ethylbenzene	0.21	1.0	--- U	--- U	--- U	--- U
37. Xylenes	0.68	5.0	--- U	--- U	--- U	--- U
38. Dibromomethane	0.28	10.0	--- U	--- U	--- U	--- U
39. Styrene	0.19	1.0	--- U	--- U	--- U	--- U
40. Bromoform	0.20	3.0	--- U	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U	--- U	--- U	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U	--- U	--- U	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U	--- U	--- U	--- U
46. Acrylonitrile	2.72	200.0	--- U	--- U	--- U	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U	--- U	--- U	--- U
48. Acrolein	40.57	53.0	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: MAO
DATE COLLECTED: 02/10/15
DATE ANALYZED: 02/24/15
DATE REPORTED: 03/26/15

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	MW-7D	MW-15R	Equipment Blank	Trip Blank
49. Allyl Chloride	0.20	10.0	--- U	--- U	--- U	--- U
50. Chloroprene	0.21	20.0	--- U	--- U	--- U	--- U
51. 1,3-Dichlorobenzene	0.41	5.0	--- U	--- U	--- U	--- U
52. Dichlorodifluoromethane	0.51	5.0	--- U	--- U	--- U	--- U
53. 1,3-Dichloropropane	0.28	1.0	--- U	--- U	--- U	--- U
54. 2,2-Dichloropropane	0.17	15.0	--- U	--- U	--- U	--- U
55. 1,1-Dichloropropene	0.22	5.0	--- U	--- U	--- U	--- U
56. Ethyl Methacrylate	0.16	10.0	--- U	--- U	--- U	--- U
57. Hexachlorobutadiene	0.57	10.0	--- U	--- U	--- U	--- U
58. Isobutyl Alcohol	12.80	100.0	--- U	--- U	--- U	--- U
59. Methacrylonitrile	1.93	100.0	--- U	--- U	--- U	--- U
60. Methyl Methacrylate	0.25	30.0	--- U	--- U	--- U	--- U
61. Naphthalene	0.47	10.0	--- U	--- U	--- U	--- U
62. Propionitrile	3.26	150.0	--- U	--- U	--- U	--- U
63. 1,2,4-Trichlorobenzene	0.50	10.0	--- U	--- U	--- U	--- U
64. Acetonitrile	36.29	55.0	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Inc.
P.O. Box 7085, 114 Oakmont Dr.
Greenville, NC 27858
environment1inc.com
Phone (252) 756-6208 • Fax (252) 756-0633

CHAIN OF CUSTODY RECORD

CLIENT: 6015 **Week:** 10

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX NC 27839

(252) 583-1807

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l OR ug/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	EPA 8270D	8270D Dup. 1	EPA 8081B	8151A Duplicate	8260B App. II	8260 App. II 1	8260 App. II 2	8151A Landfill	CO2	ORP
CHLORINE NEUTRALIZED AT COLLECTION															
pH CHECK (LAB)										12/12					
CONTAINER TYPE, P/G						G	G	G	G	G	G	G	G	P	P
CHEMICAL PRESERVATION						A	A	A	A	E	E	E	A	A	A
MW-1	2-10-15	0855		13	5										G
[redacted]															
MW-7D	2-10-15	1030		11	16	G	G	G	G	G	G		G		G
MW-15R	2-10-15	1010		14	13	G	G	G	G	G	G		G		G
Equipment Blank	2-10-15	0835			2					G	G				
Trip Blank	2-10-15				2					G	G				

PARAMETERS/TESTS — A - NONE, B - HNO_3, C - H_2SO_4, D - NAOH, E - HCL, F - ZINC ACETATE/NAOH, G - NA THIOSULFATE

CLASSIFICATION:
- ☐ WASTEWATER (NPDES)
- ☐ DRINKING WATER
- ☐ DWQ/GW
- ☒ SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY: (Y) N

SAMPLES COLLECTED BY: (Please Print) Bobby Fox / Tom Beasley

SAMPLES RECEIVED IN LAB AT 0.2 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Tom Beasley	2-10-15 1335	[signature]	2/10/15 1336
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

PLEASE READ Instructions for completing this form on the reverse side.

Sampler must place a "C" for composite sample or a "G" for Grab sample in the blocks above for each parameter requested.

№ 287309

FORM #5

Environment 1, Inc.
P.O. Box 7085, 114 Oakmont Dr.
Greenville, NC 27858
environment1inc.com
Phone (252) 756-6208 • Fax (252) 756-0633

CHAIN OF CUSTODY RECORD

CLIENT: 6015 **Week:** 10

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX NC 27839

(252) 583-1807

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l OR ug/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	Field pH	BOD	COD	Nitrate	TOC	Chloride	Cyanide	Metals	Turbidity	Sulfide	Conductivity	DO	Temperature	Field Parameter	EPA 8260B	8260 Dup. 1	PARAMETERS/TESTS
												✓ ea										CHLORINE NEUTRALIZED AT COLLECTION
								<2		<2		>12	<2		>9					<2	<2	pH CHECK (LAB)
						P	P	P	P	P	P	P	P	P	P	P	P	P		G	G	CONTAINER TYPE, P/G
						A	A	C	A	C	A	D	A	A	F	A	A	A		E	E	CHEMICAL PRESERVATION
MW-1	2-10-15	0855		13	5	G							G	G		G	G	G	G	G	G	
[redacted]																						
MW-7D	2-10-15	1030		11	16	G		G	G	G	G	G	G	G	G	G	G	G	G			
MW-15R	2-10-15	1010		14	13	G						G	G	G	G	G	G	G	G			
Equipment Blank	2-10-15	0835			2																	
Trip Blank	2-10-15				2																	

A - NONE D - NAOH
B - HNO_3 E - HCL
C - H_2SO_4 F - ZINC ACETATE/NAOH
G - NA THIOSULFATE

CLASSIFICATION:
☐ WASTEWATER (NPDES)
☐ DRINKING WATER
☐ DWQ/GW
☒ SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY: Y N

SAMPLES COLLECTED BY: (Please Print) Bobby Fox / Tom Beasley

SAMPLES RECEIVED IN LAB AT 0.2 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Tom Beasley	2-10-15 1335	[signature]	2/10/15 1 36
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

PLEASE READ Instructions for completing this form on the reverse side.

Sampler must place a "C" for composite sample or a "G" for Grab sample in the blocks above for each parameter requested.

Nº 287310

FORM #5

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

ID#: 6015

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX ,NC 27839

DATE COLLECTED: 02/11/15
DATE REPORTED : 03/26/15

REVIEWED BY:

PARAMETERS	MDL	SWSL	MW-2A	MW-2AD	MW-3D	MW-3AS	MW-8D	Analysis Date	Analyst	Method Code
PH (field measurement), Units			6.1	6.7	6.1	6.1	6.5	02/11/15	BF	4500HB-00
BOD, mg/l	2.0	2.0	--- U	--- U	--- U	15	--- U	02/12/15	TRB	5210B-01
COD, mg/l	20.0	20.0	--- U	--- U	--- U	41	--- U	02/16/15	TRB	H8000-79
Nitrate Nitrogen as N, mg/l	0.04	10.0	--- U	--- U	--- U	0.07 J	0.19 J	02/13/15	KDB	353.2 R2-9
Total Organic Carbon, mg/l	0.046	1.0	2.30	--- U	--- U	7.14	1.56	02/12/15	SEJ	5310C-00
Chloride, mg/l	5.0	5.0	5	8	8	10	20	02/16/15	LW	4500CLB-97
Cyanide, ug/l	5.0	10.0	--- U	--- U	--- U	--- U	--- U	02/18/15	SEJ	4500CNE-99
Antimony, ug/l	0.12	6.0	--- U	0.12 J	--- U	--- U	--- U	02/17/15	LFJ	EPA200.8
Arsenic, ug/l	0.10	10.0	1.9 J	0.52 J	0.30 J	2.8 J	0.47 J	02/17/15	LFJ	EPA200.8
Barium, ug/l	0.12	100.0	130	127	74.6 J	96.3 J	684	02/17/15	LFJ	EPA200.8
Beryllium, ug/l	0.04	1.0	0.30 J	--- U	0.12 J	0.04 J	0.12 J	02/17/15	LFJ	EPA200.8
Cadmium, ug/l	0.04	1.0	--- U	0.09 J	0.11 J	--- U	2	02/17/15	LFJ	EPA200.8
Cobalt, ug/l	0.12	10.0	7.6 J	7.2 J	0.12 J	1.3 J	4.9 J	02/17/15	LFJ	EPA200.8
Copper, ug/l	0.10	10.0	0.22 J	0.54 J	0.22 J	--- U	0.31 J	02/17/15	LFJ	EPA200.8
Total Chromium, ug/l	0.14	10.0	--- U	--- U	--- U	--- U	--- U	02/17/15	LFJ	EPA200.8
Iron, ug/l	16.0	300.0	32700	287 J	78 J	155625	377	03/12/15	JMN	3111B-99
Lead, ug/l	0.13	10.0	--- U	--- U	--- U	--- U	--- U	02/17/15	LFJ	EPA200.8
Mercury, ug/l	0.06	0.20	--- U	--- U	--- U	0.07 J	--- U	02/16/15	MTM	245.1 R3-9
Nickel, ug/l	0.12	50.0	0.75 J	1.6 J	0.52 J	0.61 J	1.8 J	02/17/15	LFJ	EPA200.8
Selenium, ug/l	0.16	10.0	0.52 J	0.47 J	0.29 J	0.81 J	0.70 J	02/17/15	LFJ	EPA200.8
Silver, ug/l	0.04	10.0	--- U	--- U	--- U	--- U	--- U	02/17/15	LFJ	EPA200.8
Thallium, ug/l	0.13	5.5	--- U	--- U	--- U	--- U	--- U	02/17/15	LFJ	EPA200.8
Tin, ug/l	0.05	100.0	0.16 J	0.15 J	0.15 J	0.06 J	--- U	02/17/15	LFJ	EPA200.8
Vanadium, ug/l	0.06	25.0	0.86 J	0.21 J	0.62 J	1.6 J	0.70 J	02/17/15	LFJ	EPA200.8
Zinc, ug/l	0.53	10.0	4.6 J	5.3 J	4.9 J	2.6 J	13	02/17/15	LFJ	EPA200.8
Turbidity, NTU	1.0	1.0	21.0	4.2	1.5	450	4.9	02/11/15	SDB	2130B-01
Sulfide, ug/l	100	1000	--- U	--- U	--- U	--- U	--- U	02/16/15	LFJ	4500S2D-00
Conductivity (at 25c), uMhos/cm	1.0	1.0	287	485	192	906	454	02/11/15	BF	2510B-97
Dissolved Oxygen, mg/l	0.1	0.1	1.43	2.07	0.80	0.65	2.05	02/11/15	BF	4500OG-01
Temperature, °C			10	10	14	14	14	02/11/15	BF	2550B-00
Static Water Level, feet			5.13	4.69	8.37	8.90	11.62	02/11/15	BF	
Well Depth, feet			16.91	41.20	52.20	22.29	42.00	02/11/15	BF	
Carbon Dioxide, mg/l	1.0	1.0	75	32	61	535	52	02/11/15	TRB	4500CO2C
ORP, mv			+70	+190	+55	-12	+72	02/11/15	BF	2580B

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: CHS
DATE COLLECTED: 02/11/15
DATE EXTRACTED: 02/16/15
DATE ANALYZED: 02/24/15
DATE REPORTED: 03/26/15

REVIEWED BY:

PESTICIDES AND PCB'S
EPA METHOD 8081B R2(07)

PARAMETERS, ug/l	MDL	SWSL	MW-2A	MW-2AD	MW-3D	MW-3AS	MW-6D
1. Aldrin	0.029	0.05	--- U	--- U	--- U	--- U	--- U
2. Alpha-BHC	0.032	0.05	--- U	--- U	--- U	--- U	--- U
3. Beta-BHC	0.031	0.05	--- U	--- U	--- U	--- U	--- U
4. Delta-BHC	0.030	0.05	--- U	--- U	--- U	--- U	--- U
5. Gamma-BHC (Lindane)	0.032	0.05	--- U	--- U	--- U	--- U	--- U
6. Chlordane	0.320	0.50	--- U	--- U	--- U	--- U	--- U
7. 4,4-DDD	0.051	0.10	--- U	--- U	--- U	--- U	--- U
8. 4,4-DDE	0.049	0.10	--- U	--- U	--- U	--- U	--- U
9. 4,4-DDT	0.052	0.10	--- U	--- U	--- U	--- U	--- U
10. Dieldrin	0.042	0.075	--- U	--- U	--- U	--- U	--- U
11. Endosulfan I	0.056	0.10	--- U	--- U	--- U	--- U	--- U
12. Endosulfan II	0.046	0.10	--- U	--- U	--- U	--- U	--- U
13. Endosulfan Sulfate	0.072	0.10	--- U	--- U	--- U	--- U	--- U
14. Endrin	0.053	0.10	--- U	--- U	--- U	--- U	--- U
15. Endrin Aldehyde	0.068	0.10	--- U	--- U	--- U	--- U	--- U
16. Heptachlor	0.039	0.05	--- U	--- U	--- U	--- U	--- U
17. Heptachlor Epoxide	0.042	0.075	--- U	--- U	--- U	--- U	--- U
18. Methoxychlor	0.530	1.00	--- U	--- U	--- U	--- U	--- U
19. Pcb's (Aroclors)	0.500	2.00	--- U	--- U	--- U	--- U	--- U
20. Toxaphene	0.690	1.50	--- U	--- U	--- U	--- U	--- U

NOTE: EPA METHOD 8081B R2 (07): Surrogate recoveries for MW-2A and MW-3AS exceeded control limits due to matrix effects.

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
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CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: CHS
DATE COLLECTED: 02/11/15
DATE EXTRACTED: 02/12/15
DATE ANALYZED: 03/19/15
DATE REPORTED: 03/26/15

REVIEWED BY: _____

LANDFILL APPENDIX II
EPA METHOD 8151A R1(96)

PARAMETERS, ug/l	MDL	SWSL	MW-2A	MW-2AD	MW-3D	MW-3AS	MW-6D
1. 2,4-D	0.36	2.0	--- U	--- U	--- U	--- U	--- U
2. Dinoseb	0.54	1.0	--- U	--- U	--- U	--- U	--- U
3. 2,4,5-TP	0.42	2.0	--- U	--- U	--- U	--- U	--- U
4. 2,4,5-T	0.47	2.0	--- U	--- U	--- U	--- U	--- U

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Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
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CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: CHS
DATE COLLECTED: 02/11/15
DATE EXTRACTED: 02/17/15
DATE ANALYZED: 03/07/15
DATE REPORTED: 03/26/15

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270D R4(07)

PARAMETERS, ug/l	MDL	SWSL	MW-2A	MW-2AD	MW-3D	MW-3AS	MW-6D
1. Acenaphthene	2.66	10.0	--- U	--- U	--- U	--- U	--- U
2. Acenaphthylene	2.60	10.0	--- U	--- U	--- U	--- U	--- U
3. Anthracene	2.97	10.0	--- U	--- U	--- U	--- U	--- U
4. Benzo[a]antrhacene	4.16	10.0	--- U	--- U	--- U	--- U	--- U
5. Benzo[b]fluoranthene	3.32	10.0	--- U	--- U	--- U	--- U	--- U
6. Benzo[k]fluoranthene	4.23	10.0	--- U	--- U	--- U	--- U	--- U
7. Benzo[g,h,i]perylene	2.61	10.0	--- U	--- U	--- U	--- U	--- U
8. Benzo[a]pyrene	3.27	10.0	--- U	--- U	--- U	--- U	--- U
9. 4-Bromophenyl Phenyl Ether	2.63	10.0	--- U	--- U	--- U	--- U	--- U
10. Butyl Benzyl Phthalate	5.78	10.0	--- U	--- U	--- U	--- U	--- U
11. Bis-(2-Chloroethoxy) Methane	3.14	10.0	--- U	--- U	--- U	--- U	--- U
12. Bis-(2-Chloroethyl) Ether	2.58	10.0	--- U	--- U	--- U	--- U	--- U
13. Bis-(2-Chloroisopropyl) Ether	2.58	10.0	--- U	--- U	--- U	--- U	--- U
14. 2-Chloronaphthalene	2.17	10.0	--- U	--- U	--- U	--- U	--- U
15. 4-Chlorophenyl Phenyl Ether	2.42	10.0	--- U	--- U	--- U	--- U	--- U
16. Chrysene	4.04	10.0	--- U	--- U	--- U	--- U	--- U
17. Dibenzo[a,h]anthracene	2.78	10.0	--- U	--- U	--- U	--- U	--- U
18. Di-N-Butyl Phthalate	3.09	10.0	--- U	--- U	--- U	--- U	--- U
19. Dimethyl Phthalate	3.78	10.0	--- U	--- U	--- U	--- U	--- U
20. Diethyl Phthalate	3.92	10.0	--- U	--- U	--- U	--- U	--- U
21. 2,4-Dinitrotoluene	3.95	10.0	--- U	--- U	--- U	--- U	--- U
22. 2,6-Dinitrotoluene	3.88	10.0	--- U	--- U	--- U	--- U	--- U
23. Di-N-Octyl Phthalate	2.81	10.0	--- U	--- U	--- U	--- U	--- U
24. Bis-(2-Ethylhexyl) Phthalate	9.97	15.0	--- U	--- U	--- U	--- U	--- U
25. Fluoranthene	3.92	10.0	--- U	--- U	--- U	--- U	--- U
26. Fluorene	2.95	10.0	--- U	--- U	--- U	--- U	--- U
27. Hexachlorobenzene	2.61	10.0	--- U	--- U	--- U	--- U	--- U
28. Hexachlorocyclopentadiene	4.16	10.0	--- U	--- U	--- U	--- U	--- U
29. Indeno[1,2,3-Cd]pyrene	2.91	10.0	--- U	--- U	--- U	--- U	--- U
30. Isophorone	3.74	10.0	--- U	--- U	--- U	--- U	--- U
31. Nitrobenzene	2.85	10.0	--- U	--- U	--- U	--- U	--- U
32. N-Nitrosodimethylamine	4.25	10.0	--- U	--- U	--- U	--- U	--- U
33. N-Nitrosodiphenylamine	3.95	10.0	--- U	--- U	--- U	--- U	--- U
34. N-Nitrosodi-N-Propylamine	4.06	10.0	--- U	--- U	--- U	--- U	--- U
35. Phenanthrene	3.24	10.0	--- U	--- U	--- U	--- U	--- U
36. Pyrene	3.63	10.0	--- U	--- U	--- U	--- U	--- U
37. 4-Chloro-3-Methylphenol	3.79	20.0	--- U	--- U	--- U	--- U	--- U
38. 2-Chlorophenol	2.75	10.0	--- U	--- U	--- U	--- U	--- U
39. O-Cresol	3.68	10.0	--- U	--- U	--- U	--- U	--- U
40. P-Cresol	4.12	10.0	--- U	--- U	--- U	--- U	--- U
41. 2,4-Dichlorophenol	5.19	10.0	--- U	--- U	--- U	--- U	--- U
42. 2,6-Dichlorophenol	4.89	10.0	--- U	--- U	--- U	--- U	--- U
43. 2,4-Dimethylphenol	3.21	10.0	--- U	--- U	--- U	--- U	--- U
44. 4,6-Dinitro-2-Methylphenol	4.77	50.0	--- U	--- U	--- U	--- U	--- U
45. 2,4-Dinitrophenol	4.37	50.0	--- U	--- U	--- U	--- U	--- U
46. Ethyl Methanesulfonate	5.26	20.0	--- U	--- U	--- U	--- U	--- U
47. Methyl Methanesulfonate	4.92	10.0	--- U	--- U	--- U	--- U	--- U
48. 2-Nitrophenol	3.64	10.0	--- U	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: CHS
DATE COLLECTED: 02/11/15
DATE EXTRACTED: 02/17/15
DATE ANALYZED: 03/07/15
DATE REPORTED: 03/26/15

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270D R4(07)

PARAMETERS, ug/l	MDL	SWSL	MW-2A	MW-2AD	MW-3D	MW-3AS	MW-6D
49. 4-Nitrophenol	3.17	50.0	--- U	--- U	--- U	--- U	--- U
50. Pentachlorophenol	5.33	25.0	--- U	--- U	--- U	--- U	--- U
51. Phenol	1.86	10.0	--- U	--- U	--- U	--- U	--- U
52. 2,3,4,6-Tetrachlorophenol	3.12	10.0	--- U	--- U	--- U	--- U	--- U
53. 2,4,5-Trichlorophenol	4.17	10.0	--- U	--- U	--- U	--- U	--- U
54. 2,4,6-Trichlorophenol	3.84	10.0	--- U	--- U	--- U	--- U	--- U
55. Acetophenone	2.89	10.0	--- U	--- U	--- U	--- U	--- U
56. 2-Acetylaminofluorene	3.98	20.0	--- U	--- U	--- U	--- U	--- U
57. 4-Aminobiphenyl	4.12	20.0	--- U	--- U	--- U	--- U	--- U
58. Benzyl Alcohol	4.47	20.0	--- U	--- U	--- U	--- U	--- U
59. 4-Chloroaniline	3.36	20.0	--- U	--- U	--- U	--- U	--- U
60. Chlorobenzilate	5.12	10.0	--- U	--- U	--- U	--- U	--- U
61. Diallate	2.98	10.0	--- U	--- U	--- U	--- U	--- U
62. Dibenzofuran	4.28	10.0	--- U	--- U	--- U	--- U	--- U
63. 3,3-Dichlorobenzidine	4.22	20.0	--- U	--- U	--- U	--- U	--- U
64. Dimethoate	3.98	20.0	--- U	--- U	--- U	--- U	--- U
65. P-Dimethylaminoazobenzene	2.89	10.0	--- U	--- U	--- U	--- U	--- U
66. 7,12-Dimethylbenz[a]anthracene	5.26	10.0	--- U	--- U	--- U	--- U	--- U
67. 3,3-Dimethylbenzadine	3.21	10.0	--- U	--- U	--- U	--- U	--- U
68. 1,3-Dinitrobenzene	2.89	20.0	--- U	--- U	--- U	--- U	--- U
69. Diphenylamine	5.10	10.0	--- U	--- U	--- U	--- U	--- U
70. Disulfoton	4.28	10.0	--- U	--- U	--- U	--- U	--- U
71. Famphur	3.98	20.0	--- U	--- U	--- U	--- U	--- U
72. Hexachloropropene	4.31	10.0	--- U	--- U	--- U	--- U	--- U
73. Isosafrole	2.88	10.0	--- U	--- U	--- U	--- U	--- U
74. Kepone	2.78	20.0	--- U	--- U	--- U	--- U	--- U
75. Methapyrilene	3.54	100.0	--- U	--- U	--- U	--- U	--- U
76. 3-Methylchloroanthrene	4.21	10.0	--- U	--- U	--- U	--- U	--- U
77. 2-Methylnaphthalene	3.79	10.0	--- U	--- U	--- U	--- U	--- U
78. Methyl Parathion	4.32	10.0	--- U	--- U	--- U	--- U	--- U
79. m-Cresol	3.81	10.0	--- U	--- U	--- U	--- U	--- U
80. 1,4-Naphthoquinone	4.00	10.0	--- U	--- U	--- U	--- U	--- U
81. 1-Naphthylamine	5.61	10.0	--- U	--- U	--- U	--- U	--- U
82. 2-Naphthylamine	4.62	10.0	--- U	--- U	--- U	--- U	--- U
83. 2-Nitroaniline	3.61	50.0	--- U	--- U	--- U	--- U	--- U
84. 3-Nitroaniline	4.81	50.0	--- U	--- U	--- U	--- U	--- U
85. 4-Nitroaniline	4.22	20.0	--- U	--- U	--- U	--- U	--- U
86. 5-Nitro-O-Toluidine	4.01	10.0	--- U	--- U	--- U	--- U	--- U
87. N-Nitrosodi-n-butylamine	3.63	10.0	--- U	--- U	--- U	--- U	--- U
88. N-Nitrosodiethylamine	3.83	20.0	--- U	--- U	--- U	--- U	--- U
89. N-Nitrosomethylethylamine	3.83	10.0	--- U	--- U	--- U	--- U	--- U
90. N-Nitrosopiperidine	5.19	20.0	--- U	--- U	--- U	--- U	--- U
91. N-Nitrosopyrrolidine	2.89	10.0	--- U	--- U	--- U	--- U	--- U
92. Parathion	3.12	10.0	--- U	--- U	--- U	--- U	--- U
93. Pentachlorobenzene	3.92	10.0	--- U	--- U	--- U	--- U	--- U
94. Pentachloronitrobenzene	3.71	20.0	--- U	--- U	--- U	--- U	--- U
95. Phenacetin	4.41	20.0	--- U	--- U	--- U	--- U	--- U
96. 1,4 Benzenediamine	2.99	10.0	--- U	--- U	--- U	--- U	--- U

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Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
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CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: CHS
DATE COLLECTED: 02/11/15
DATE EXTRACTED: 02/17/15
DATE ANALYZED: 03/07/15
DATE REPORTED: 03/26/15

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270D R4(07)

PARAMETERS, ug/l	MDL	SWSL	MW-2A	MW-2AD	MW-3D	MW-3AS	MW-6D
97. Phorate	3.86	10.0	--- U	--- U	--- U	--- U	--- U
98. Pronamide	3.69	10.0	--- U	--- U	--- U	--- U	--- U
99. Safrole	4.12	10.0	--- U	--- U	--- U	--- U	--- U
100. 1,2,4,5-Tetrachlorobenzene	5.01	10.0	--- U	--- U	--- U	--- U	--- U
101. Thionazin	4.62	20.0	--- U	--- U	--- U	--- U	--- U
102. O-Toluidine	4.11	10.0	--- U	--- U	--- U	--- U	--- U
103. 1,3,5-Trinitrobenzene	3.98	10.0	--- U	--- U	--- U	--- U	--- U
104. 0,0,0-Triethyl Phosphorothioate	3.61	10.0	--- U	--- U	--- U	--- U	--- U
105. Hexachloroethane	1.49	10.0	--- U	--- U	--- U	--- U	--- U
106. Isodrin	3.11	20.0	--- U	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

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Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
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CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: MAO
DATE COLLECTED: 02/11/15
DATE ANALYZED: 02/24/15
DATE REPORTED: 03/26/15

REVIEWED BY: _____

LANDFILL APPENDIX II
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	MW-2A	MW-2AD	MW-3D	MW-3AS	MW-6D
1. Chloromethane	0.77	1.0	--- U	--- U	--- U	--- U	--- U
2. Vinyl Chloride	0.63	1.0	9.30	--- U	--- U	--- U	--- U
3. Bromomethane	0.67	10.0	--- U	--- U	--- U	--- U	--- U
4. Chloroethane	0.48	10.0	--- U	--- U	--- U	0.70 J	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U	--- U	--- U	--- U	--- U
6. 1,1-Dichloroethene	0.17	5.0	0.60 J	--- U	--- U	--- U	--- U
7. Acetone	9.06	100.0	--- U	--- U	--- U	--- U	--- U
8. Iodomethane	0.26	10.0	--- U	--- U	--- U	--- U	--- U
9. Carbon Disulfide	0.23	100.0	--- U	--- U	--- U	--- U	--- U
10. Methylene Chloride	0.64	1.0	--- U	--- U	--- U	--- U	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	0.30 J	--- U	--- U	--- U	--- U
12. 1,1-Dichloroethane	0.20	5.0	9.60	6.40	7.70	1.40 J	--- U
13. Vinyl Acetate	0.20	50.0	--- U	--- U	--- U	--- U	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	9.70	7.90	8.60	0.60 J	--- U
15. 2-Butanone	2.21	100.0	--- U	--- U	--- U	--- U	--- U
16. Bromochloromethane	0.27	3.0	--- U	--- U	--- U	--- U	--- U
17. Chloroform	0.25	5.0	--- U	--- U	--- U	--- U	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U	--- U	--- U	--- U	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U	--- U	--- U	--- U	--- U
20. Benzene	0.24	1.0	0.70 J	0.40 J	0.60 J	2.40	0.50 J
21. 1,2-Dichloroethane	0.21	1.0	--- U	--- U	--- U	--- U	--- U
22. Trichloroethene	0.23	1.0	2.40	--- U	1.70	--- U	--- U
23. 1,2-Dichloropropane	0.21	1.0	0.30 J	1.30	0.40 J	0.40 J	--- U
24. Bromodichloromethane	0.21	1.0	--- U	--- U	--- U	--- U	--- U
25. Cis-1,3-Dichloropropene	0.24	1.0	--- U	--- U	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U	--- U	--- U	--- U	--- U
27. Toluene	0.23	1.0	--- U	--- U	--- U	--- U	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U	--- U	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U	--- U	--- U	--- U	--- U
30. Tetrachloroethene	0.17	1.0	--- U	--- U	1.10	--- U	--- U
31. 2-Hexanone	1.57	50.0	--- U	--- U	--- U	--- U	--- U
32. Dibromochloromethane	0.24	3.0	--- U	--- U	--- U	--- U	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U	--- U	--- U	--- U	--- U
34. Chlorobenzene	0.30	3.0	3.30	2.50 J	0.50 J	4.50	2.90 J
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U	--- U	--- U	--- U	--- U
36. Ethylbenzene	0.21	1.0	--- U	--- U	--- U	--- U	--- U
37. Xylenes	0.68	5.0	--- U	--- U	--- U	--- U	--- U
38. Dibromomethane	0.28	10.0	--- U	--- U	--- U	--- U	--- U
39. Styrene	0.19	1.0	--- U	--- U	--- U	--- U	--- U
40. Bromoform	0.20	3.0	--- U	--- U	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U	--- U	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U	--- U	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	1.90	1.30	0.50 J	1.80	1.60
44. 1,2-Dichlorobenzene	0.32	5.0	--- U	--- U	--- U	--- U	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U	--- U	--- U	--- U	--- U
46. Acrylonitrile	2.72	200.0	--- U	--- U	--- U	--- U	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U	--- U	--- U	--- U	--- U
48. Acrolein	40.57	53.0	--- U	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015

ANALYST: MAO
DATE COLLECTED: 02/11/15
DATE ANALYZED: 02/24/15
DATE REPORTED: 03/26/15

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	MW-2A	MW-2AD	MW-3D	MW-3AS	MW-6D
49. Allyl Chloride	0.20	10.0	--- U	--- U	--- U	--- U	--- U
50. Chloroprene	0.21	20.0	--- U	--- U	--- U	--- U	--- U
51. 1,3-Dichlorobenzene	0.41	5.0	--- U	--- U	--- U	--- U	--- U
52. Dichlorodifluoromethane	0.51	5.0	--- U	--- U	--- U	--- U	--- U
53. 1,3-Dichloropropane	0.28	1.0	--- U	--- U	--- U	--- U	--- U
54. 2,2-Dichloropropane	0.17	15.0	--- U	--- U	--- U	--- U	--- U
55. 1,1-Dichloropropene	0.22	5.0	--- U	--- U	--- U	--- U	--- U
56. Ethyl Methacrylate	0.16	10.0	--- U	--- U	--- U	--- U	--- U
57. Hexachlorobutadiene	0.57	10.0	--- U	--- U	--- U	--- U	--- U
58. Isobutyl Alcohol	12.80	100.0	--- U	--- U	--- U	--- U	--- U
59. Methacrylonitrile	1.93	100.0	--- U	--- U	--- U	--- U	--- U
60. Methyl Methacrylate	0.25	30.0	--- U	--- U	--- U	--- U	--- U
61. Naphthalene	0.47	10.0	--- U	--- U	--- U	--- U	--- U
62. Propionitrile	3.26	150.0	--- U	--- U	--- U	--- U	--- U
63. 1,2,4-Trichlorobenzene	0.50	10.0	--- U	--- U	--- U	--- U	--- U
64. Acetonitrile	36.29	55.0	--- U	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Inc.
P.O. Box 7085, 114 Oakmont Dr.
Greenville, NC 27858
environment1inc.com
Phone (252) 756-6208 • Fax (252) 756-0633

CHAIN OF CUSTODY RECORD

CLIENT: 6015 **Week:** 10

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX NC 27839

(252) 583-1807

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

	Field pH	BOD	COD	Nitrate	TOC	Chloride	Cyanide	Metals	Turbidity	Sulfide	Conductivity	DO	Temperature	Field Parameter	EPA 8260B	8260 Dup. 1
CHLORINE NEUTRALIZED AT COLLECTION							6a									
pH CHECK (LAB)			12		12		12	12		12						
CONTAINER TYPE, P/G	P	P	P	P	P	P	P	P	P	P	P	P	P		G	G
CHEMICAL PRESERVATION	A	A	C	A	C	A	D	A	A	F	A	A	A		E	E

A - NONE, B - HNO_3, C - H_2SO_4, D - NAOH, E - HCL, F - ZINC ACETATE/NAOH, G - NA THIOSULFATE

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l OR ug/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	Field pH	BOD	COD	Nitrate	TOC	Chloride	Cyanide	Metals	Turbidity	Sulfide	Conductivity	DO	Temperature	Field Parameter	EPA 8260B	8260 Dup. 1
[redacted]																					
MW-2A	2-11-15	0910		10	18	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
MW-2AD	2-11-15	0840		10	18	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
MW-3D	2-11-15	1230		14	18	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
MW-3AS	2-11-15	1300		14	18	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
MW-6D	2-11-15	1400		14	17	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
[redacted]																					
[redacted]																					
[redacted]																					
[redacted]																					

PARAMETERS/TESTS

CLASSIFICATION:
- ☐ WASTEWATER (NPDES)
- ☐ DRINKING WATER
- ☐ DWQ/GW
- ☒ SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY: (Y) N

SAMPLES COLLECTED BY: (Please Print) Bobby Fox / Tom Beasley

SAMPLES RECEIVED IN LAB AT 0.2 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Bobby Fox	2-11-15 4:29	[signature]	2/11/15 433
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

PLEASE READ Instructions for completing this form on the reverse side.

Sampler must place a "C" for composite sample or a "G" for Grab sample in the blocks above for each parameter requested.

FORM #5

№ 287310

Environment 1, Inc.
P.O. Box 7085, 114 Oakmont Dr.
Greenville, NC 27858
environment1inc.com
Phone (252) 756-6208 • Fax (252) 756-0633

CHAIN OF CUSTODY RECORD

CLIENT: 6015 **Week:** 10

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX NC 27839

(252) 583-1807

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l OR ug/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	EPA 8270D	8270D Dup. 1	EPA 8081B	8151A Duplicate	8260B App. II	8260 App. II 1	8260 App. II 2	8151A Landfill	CO2	ORP
CHLORINE NEUTRALIZED AT COLLECTION															
pH CHECK (LAB)															
CONTAINER TYPE, P/G						G	G	G	G	G	G	G	G	P	P
CHEMICAL PRESERVATION						A	A	A	A	E	E	E	A	A	A
[redacted]															
MW-2A	2-11-15	0910		10	18	G	G	G	G	G	G		G	G	G
MW-2AD	2-11-15	0840		10	18	G	G	G	G	G	G		G	G	G
MW-3D	2-11-15	1230		14	18	G	G	G	G	G	G	G	G	G	G
MW-3AS	2-11-15	1300		14	18	G	G	G	G	G	G	G	G	G	G
MW-6D	2-11-15	1400		14	17	G	G	G	G	G	G		G	G	G
[redacted]															
[redacted]															
[redacted]															
[redacted]															

PARAMETERS/TESTS

A - NONE D - NAOH
B - HNO_3 E - HCL
C - H_2SO_4 F - ZINC ACETATE/NAOH
G - NA THIOSULFATE

CLASSIFICATION:
☐ WASTEWATER (NPDES)
☐ DRINKING WATER
☐ DWQ/GW
☒ SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY
(Y) N

SAMPLES COLLECTED BY: (Please Print)
Bobby Fox / Tom Beasley

SAMPLES RECEIVED IN LAB AT 6.2 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Bobby Fox	2-11-15 4:29	[signature]	2/11/15 4:33
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

PLEASE READ Instructions for completing this form on the reverse side.

Sampler must place a "C" for composite sample or a "G" for Grab sample in the blocks above for each parameter requested.

FORM #5

№ 287309

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

ID#: 6015 B

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX ,NC 27839

DATE COLLECTED: 02/11/15
DATE REPORTED : 03/26/15

REVIEWED BY:

PARAMETERS	MDL	SWSL	MW-17	MW-16A	MW-18S	MW-18D	BP-3	Analysis Date	Analyst	Method Code
PH (field measurement), Units			6.0	5.6	6.4	6.4		02/11/15	BF	4500HB-00
BOD, mg/l	2.0	2.0	--- U		2.2	--- U		02/12/15	TRB	5210B-01
COD, mg/l	20.0	20.0	--- U		--- U	--- U		02/16/15	TRB	H8000-79
Nitrate Nitrogen as N, mg/l	0.04	10.0	0.21 J		0.06 J	--- U		02/13/15	KDB	353.2 R2-9
Total Organic Carbon, mg/l	0.046	1.0	--- U		4.96	--- U		02/12/15	SEJ	5310C-00
Chloride, mg/l	5.0	5.0	--- U		5	5		02/16/15	LW	4500CLB-97
Cyanide, ug/l	5.0	10.0	--- U	--- U	--- U			02/18/15	SEJ	4500CNE-99
Antimony, ug/l	0.12	6.0	--- U	0.15 J	--- U	--- U		02/17/15	LFJ	EPA200.8
Arsenic, ug/l	0.10	10.0	0.43 J	0.44 J	2.3 J	0.18 J		02/17/15	LFJ	EPA200.8
Barium, ug/l	0.12	100.0	35.6 J	118	104	57.7 J		02/17/15	LFJ	EPA200.8
Beryllium, ug/l	0.04	1.0	0.10 J	0.75 J	0.08 J	--- U		02/17/15	LFJ	EPA200.8
Cadmium, ug/l	0.04	1.0	--- U	0.28 J	--- U	--- U		02/17/15	LFJ	EPA200.8
Cobalt, ug/l	0.12	10.0	--- U	0.93 J	4.6 J	--- U		02/17/15	LFJ	EPA200.8
Copper, ug/l	0.10	10.0	0.91 J	0.43 J	0.10 J	--- U		02/17/15	LFJ	EPA200.8
Total Chromium, ug/l	0.14	10.0	--- U	--- U	0.20 J	--- U		02/17/15	LFJ	EPA200.8
Iron, ug/l	16.0	300.0	66 J		31500	19 J		03/12/15	JMN	3111B-99
Lead, ug/l	0.13	10.0	--- U	0.90 J	--- U	--- U		02/17/15	LFJ	EPA200.8
Mercury, ug/l	0.06	0.20	--- U	--- U	--- U			03/06/15	MTM	245.1 R3-9
Nickel, ug/l	0.12	50.0	0.48 J	0.60 J	0.86 J	0.53 J		02/17/15	LFJ	EPA200.8
Selenium, ug/l	0.16	10.0	0.21 J	0.18 J	0.32 J	--- U		02/17/15	LFJ	EPA200.8
Silver, ug/l	0.04	10.0	--- U	--- U	--- U	--- U		02/17/15	LFJ	EPA200.8
Thallium, ug/l	0.13	5.5	--- U	--- U	--- U	--- U		02/17/15	LFJ	EPA200.8
Tin, ug/l	0.05	100.0	--- U	0.08 J	--- U			02/17/15	LFJ	EPA200.8
Vanadium, ug/l	0.06	25.0	1.1 J	1.1 J	1.4 J	1.2 J		02/17/15	LFJ	EPA200.8
Zinc, ug/l	0.53	10.0	2.0 J	12	0.99 J	5.0 J		02/17/15	LFJ	EPA200.8
Turbidity, NTU	1.0	1.0	4.1	22.0	85.0	--- U		02/11/15	SDB	2130B-01
Sulfide, ug/l	100	1000	--- U	--- U	--- U	--- U		02/16/15	LFJ	4500S2D-00
Conductivity (at 25c), uMhos/cm	1.0	1.0	146	197	278	151		02/11/15	BF	2510B-97
Dissolved Oxygen, mg/l	0.1	0.1	0.83	1.46	0.90	5.47		02/11/15	BF	4500OG-01
Temperature, °C			10	13	9	8		02/11/15	BF	2550B-00
Static Water Level, feet			5.15	5.14	4.34	4.11	27.74	02/11/15	BF	
Well Depth, feet			26.98	22.13	20.00	52.24		02/11/15	BF	
Carbon Dioxide, mg/l	1.0	1.0	38		115	32		02/11/15	TRB	4500CO2C
ORP, mv			+84	+139	+62	+72		02/11/15	BF	2580B

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

ID#: 6015 B

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX ,NC 27839

DATE COLLECTED: 02/11/15
DATE REPORTED : 03/26/15

REVIEWED BY:

PARAMETERS	MDL	SWSL	BP-9	G-13	Trip Blank	Analysis Date	Analyst	Method Code
BOD, mg/l	2.0	2.0		--- U		02/12/15	TRB	5210B-01
Static Water Level, feet			23.36			02/11/15	BF	
Carbon Dioxide, mg/l	1.0	1.0		47		02/11/15	TRB	4500CO2C

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015 B

ANALYST: CHS
DATE COLLECTED: 02/11/15
DATE EXTRACTED: 02/16/15
DATE ANALYZED: 02/24/15
DATE REPORTED: 03/26/15

REVIEWED BY:

PESTICIDES AND PCB'S
EPA METHOD 8081B R2(07)

PARAMETERS, ug/l	MDL	SWSL	MW-17	MW-16A	MW-18S
1. Aldrin	0.029	0.05	--- U	--- U	--- U
2. Alpha-BHC	0.032	0.05	--- U	--- U	--- U
3. Beta-BHC	0.031	0.05	--- U	--- U	--- U
4. Delta-BHC	0.030	0.05	--- U	--- U	--- U
5. Gamma-BHC (Lindane)	0.032	0.05	--- U	--- U	--- U
6. Chlordane	0.320	0.50	--- U	--- U	--- U
7. 4,4-DDD	0.051	0.10	--- U	--- U	--- U
8. 4,4-DDE	0.049	0.10	--- U	--- U	--- U
9. 4,4-DDT	0.052	0.10	--- U	--- U	--- U
10. Dieldrin	0.042	0.075	--- U	--- U	--- U
11. Endosulfan I	0.056	0.10	--- U	--- U	--- U
12. Endosulfan II	0.046	0.10	--- U	--- U	--- U
13. Endosulfan Sulfate	0.072	0.10	--- U	--- U	--- U
14. Endrin	0.053	0.10	--- U	--- U	--- U
15. Endrin Aldehyde	0.068	0.10	--- U	--- U	--- U
16. Heptachlor	0.039	0.05	--- U	--- U	--- U
17. Heptachlor Epoxide	0.042	0.075	--- U	--- U	--- U
18. Methoxychlor	0.530	1.00	--- U	--- U	--- U
19. Pcb's (Aroclors)	0.500	2.00	--- U	--- U	--- U
20. Toxaphene	0.690	1.50	--- U	--- U	--- U

NOTE: EPA METHOD 8081B R2 (07): Surrogate recoveries for MW-16A exceeded control limits due to matrix effects.

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015 B

ANALYST: CHS
DATE COLLECTED: 02/11/15
DATE EXTRACTED: 02/12/15
DATE ANALYZED: 03/19/15
DATE REPORTED: 03/26/15

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8151A R1(96)

PARAMETERS, ug/l	MDL	SWSL	MW-17	MW-16A	MW-18S
1. 2,4-D	0.36	2.0	--- U	--- U	--- U
2. Dinoseb	0.54	1.0	--- U	--- U	--- U
3. 2,4,5-TP	0.42	2.0	--- U	--- U	--- U
4. 2,4,5-T	0.47	2.0	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015 B

ANALYST: CHS
DATE COLLECTED: 02/11/15
DATE EXTRACTED: 02/17/15
DATE ANALYZED: 03/07/15
DATE REPORTED: 03/26/15

REVIEWED BY: _____

SEMI-VOLATILE ORGANICS
EPA METHOD 8270D R4(07)

PARAMETERS, ug/l	MDL	SWSL	MW-17	MW-16A	MW-18S
1. Acenaphthene	2.66	10.0	--- U	--- U	--- U
2. Acenaphthylene	2.60	10.0	--- U	--- U	--- U
3. Anthracene	2.97	10.0	--- U	--- U	--- U
4. Benzo[a]antrhacene	4.16	10.0	--- U	--- U	--- U
5. Benzo[b]fluoranthene	3.32	10.0	--- U	--- U	--- U
6. Benzo[k]fluoranthene	4.23	10.0	--- U	--- U	--- U
7. Benzo[g,h,i]perylene	2.61	10.0	--- U	--- U	--- U
8. Benzo[a]pyrene	3.27	10.0	--- U	--- U	--- U
9. 4-Bromophenyl Phenyl Ether	2.63	10.0	--- U	--- U	--- U
10. Butyl Benzyl Phthalate	5.78	10.0	--- U	--- U	--- U
11. Bis-(2-Chloroethoxy) Methane	3.14	10.0	--- U	--- U	--- U
12. Bis-(2-Chloroethyl) Ether	2.58	10.0	--- U	--- U	--- U
13. Bis-(2-Chloroisopropyl) Ether	2.58	10.0	--- U	--- U	--- U
14. 2-Chloronaphthalene	2.17	10.0	--- U	--- U	--- U
15. 4-Chlorophenyl Phenyl Ether	2.42	10.0	--- U	--- U	--- U
16. Chrysene	4.04	10.0	--- U	--- U	--- U
17. Dibenzo[a,h]anthracene	2.78	10.0	--- U	--- U	--- U
18. Di-N-Butyl Phthalate	3.09	10.0	--- U	--- U	--- U
19. Dimethyl Phthalate	3.78	10.0	--- U	--- U	--- U
20. Diethyl Phthalate	3.92	10.0	--- U	--- U	--- U
21. 2,4-Dinitrotoluene	3.95	10.0	--- U	--- U	--- U
22. 2,6-Dinitrotoluene	3.88	10.0	--- U	--- U	--- U
23. Di-N-Octyl Phthalate	2.81	10.0	--- U	--- U	--- U
24. Bis-(2-Ethylhexyl) Phthalate	9.97	15.0	--- U	--- U	--- U
25. Fluoranthene	3.92	10.0	--- U	--- U	--- U
26. Fluorene	2.95	10.0	--- U	--- U	--- U
27. Hexachlorobenzene	2.61	10.0	--- U	--- U	--- U
28. Hexachlorocyclopentadiene	4.16	10.0	--- U	--- U	--- U
29. Indeno[1,2,3-Cd]pyrene	2.91	10.0	--- U	--- U	--- U
30. Isophorone	3.74	10.0	--- U	--- U	--- U
31. Nitrobenzene	2.85	10.0	--- U	--- U	--- U
32. N-Nitrosodimethylamine	4.25	10.0	--- U	--- U	--- U
33. N-Nitrosodiphenylamine	3.95	10.0	--- U	--- U	--- U
34. N-Nitrosodi-N-Propylamine	4.06	10.0	--- U	--- U	--- U
35. Phenanthrene	3.24	10.0	--- U	--- U	--- U
36. Pyrene	3.63	10.0	--- U	--- U	--- U
37. 4-Chloro-3-Methylphenol	3.79	20.0	--- U	--- U	--- U
38. 2-Chlorophenol	2.75	10.0	--- U	--- U	--- U
39. O-Cresol	3.68	10.0	--- U	--- U	--- U
40. P-Cresol	4.12	10.0	--- U	--- U	--- U
41. 2,4-Dichlorophenol	5.19	10.0	--- U	--- U	--- U
42. 2,6-Dichlorophenol	4.89	10.0	--- U	--- U	--- U
43. 2,4-Dimethylphenol	3.21	10.0	--- U	--- U	--- U
44. 4,6-Dinitro-2-Methylphenol	4.77	50.0	--- U	--- U	--- U
45. 2,4-Dinitrophenol	4.37	50.0	--- U	--- U	--- U
46. Ethyl Methanesulfonate	5.26	20.0	--- U	--- U	--- U
47. Methyl Methanesulfonate	4.92	10.0	--- U	--- U	--- U
48. 2-Nitrophenol	3.64	10.0	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015 B

ANALYST: CHS
DATE COLLECTED: 02/11/15
DATE EXTRACTED: 02/17/15
DATE ANALYZED: 03/07/15
DATE REPORTED: 03/26/15

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270D R4(07)

PARAMETERS, ug/l	MDL	SWSL	MW-17	MW-16A	MW-18S
49. 4-Nitrophenol	3.17	50.0	--- U	--- U	--- U
50. Pentachlorophenol	5.33	25.0	--- U	--- U	--- U
51. Phenol	1.86	10.0	--- U	--- U	--- U
52. 2,3,4,6-Tetrachlorophenol	3.12	10.0	--- U	--- U	--- U
53. 2,4,5-Trichlorophenol	4.17	10.0	--- U	--- U	--- U
54. 2,4,6-Trichlorophenol	3.84	10.0	--- U	--- U	--- U
55. Acetophenone	2.89	10.0	--- U	--- U	--- U
56. 2-Acetylaminofluorene	3.98	20.0	--- U	--- U	--- U
57. 4-Aminobiphenyl	4.12	20.0	--- U	--- U	--- U
58. Benzyl Alcohol	4.47	20.0	--- U	--- U	--- U
59. 4-Chloroaniline	3.36	20.0	--- U	--- U	--- U
60. Chlorobenzilate	5.12	10.0	--- U	--- U	--- U
61. Diallate	2.98	10.0	--- U	--- U	--- U
62. Dibenzofuran	4.28	10.0	--- U	--- U	--- U
63. 3,3-Dichlorobenzidine	4.22	20.0	--- U	--- U	--- U
64. Dimethoate	3.98	20.0	--- U	--- U	--- U
65. P-Dimethylaminoazobenzene	2.89	10.0	--- U	--- U	--- U
66. 7,12-Dimethylbenz[a]anthracene	5.26	10.0	--- U	--- U	--- U
67. 3,3-Dimethylbenzadine	3.21	10.0	--- U	--- U	--- U
68. 1,3-Dinitrobenzene	2.89	20.0	--- U	--- U	--- U
69. Diphenylamine	5.10	10.0	--- U	--- U	--- U
70. Disulfoton	4.28	10.0	--- U	--- U	--- U
71. Famphur	3.98	20.0	--- U	--- U	--- U
72. Hexachloropropene	4.31	10.0	--- U	--- U	--- U
73. Isosafrole	2.88	10.0	--- U	--- U	--- U
74. Kepone	2.78	20.0	--- U	--- U	--- U
75. Methapyrilene	3.54	100.0	--- U	--- U	--- U
76. 3-Methylchloroanthrene	4.21	10.0	--- U	--- U	--- U
77. 2-Methylnaphthalene	3.79	10.0	--- U	--- U	--- U
78. Methyl Parathion	4.32	10.0	--- U	--- U	--- U
79. m-Cresol	3.81	10.0	--- U	--- U	--- U
80. 1,4-Naphthoquinone	4.00	10.0	--- U	--- U	--- U
81. 1-Naphthylamine	5.61	10.0	--- U	--- U	--- U
82. 2-Naphthylamine	4.62	10.0	--- U	--- U	--- U
83. 2-Nitroaniline	3.61	50.0	--- U	--- U	--- U
84. 3-Nitroaniline	4.81	50.0	--- U	--- U	--- U
85. 4-Nitroaniline	4.22	20.0	--- U	--- U	--- U
86. 5-Nitro-O-Toluidine	4.01	10.0	--- U	--- U	--- U
87. N-Nitrosodi-n-butylamine	3.63	10.0	--- U	--- U	--- U
88. N-Nitrosodiethylamine	3.83	20.0	--- U	--- U	--- U
89. N-Nitrosomethylethylamine	3.83	10.0	--- U	--- U	--- U
90. N-Nitrosopiperidine	5.19	20.0	--- U	--- U	--- U
91. N-Nitrosopyrrolidine	2.89	10.0	--- U	--- U	--- U
92. Parathion	3.12	10.0	--- U	--- U	--- U
93. Pentachlorobenzene	3.92	10.0	--- U	--- U	--- U
94. Pentachloronitrobenzene	3.71	20.0	--- U	--- U	--- U
95. Phenacetin	4.41	20.0	--- U	--- U	--- U
96. 1,4 Benzenediamine	2.99	10.0	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015 B

ANALYST: CHS
DATE COLLECTED: 02/11/15
DATE EXTRACTED: 02/17/15
DATE ANALYZED: 03/07/15
DATE REPORTED: 03/26/15

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270D R4(07)

PARAMETERS, ug/l	MDL	SWSL	MW-17	MW-16A	MW-18S
97. Phorate	3.86	10.0	--- U	--- U	--- U
98. Pronamide	3.69	10.0	--- U	--- U	--- U
99. Safrole	4.12	10.0	--- U	--- U	--- U
100. 1,2,4,5-Tetrachlorobenzene	5.01	10.0	--- U	--- U	--- U
101. Thionazin	4.62	20.0	--- U	--- U	--- U
102. O-Toluidine	4.11	10.0	--- U	--- U	--- U
103. 1,3,5-Trinitrobenzene	3.98	10.0	--- U	--- U	--- U
104. 0,0,0-Triethyl Phosphorothioate	3.61	10.0	--- U	--- U	--- U
105. Hexachloroethane	1.49	10.0	--- U	--- U	--- U
106. Isodrin	3.11	20.0	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015 B

ANALYST: MAO
DATE COLLECTED: 02/11/15
DATE ANALYZED: 02/24/15
DATE REPORTED: 03/26/15

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	MW-17	MW-16A	MW-18S	Trip Blank
1. Chloromethane	0.77	1.0	--- U	--- U	--- U	--- U
2. Vinyl Chloride	0.63	1.0	--- U	--- U	--- U	--- U
3. Bromomethane	0.67	10.0	--- U	--- U	--- U	--- U
4. Chloroethane	0.48	10.0	--- U	--- U	--- U	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U	0.40 J	--- U	--- U
6. 1,1-Dichloroethene	0.17	5.0	0.20 J	0.60 J	--- U	--- U
7. Acetone	9.06	100.0	--- U	--- U	--- U	--- U
8. Iodomethane	0.26	10.0	--- U	--- U	--- U	--- U
9. Carbon Disulfide	0.23	100.0	--- U	--- U	--- U	--- U
10. Methylene Chloride	0.64	1.0	--- U	4.20	--- U	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U	0.60 J	--- U	--- U
12. 1,1-Dichloroethane	0.20	5.0	4.20 J	15.80	2.20 J	--- U
13. Vinyl Acetate	0.20	50.0	--- U	--- U	--- U	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	2.80 J	51.50	0.40 J	--- U
15. 2-Butanone	2.21	100.0	--- U	--- U	--- U	--- U
16. Bromochloromethane	0.27	3.0	--- U	--- U	--- U	--- U
17. Chloroform	0.25	5.0	--- U	--- U	--- U	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U	--- U	--- U	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U	--- U	--- U	--- U
20. Benzene	0.24	1.0	--- U	3.90	--- U	--- U
21. 1,2-Dichloroethane	0.21	1.0	--- U	0.40 J	--- U	--- U
22. Trichloroethene	0.23	1.0	1.10	28.90	--- U	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U	0.60 J	--- U	--- U
24. Bromodichloromethane	0.21	1.0	--- U	--- U	--- U	--- U
25. Cis-1,3-Dichloropropene	0.24	1.0	--- U	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U	--- U	--- U	--- U
27. Toluene	0.23	1.0	--- U	--- U	--- U	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U	--- U	--- U	--- U
30. Tetrachloroethene	0.17	1.0	1.10	59.20	--- U	--- U
31. 2-Hexanone	1.57	50.0	--- U	--- U	--- U	--- U
32. Dibromochloromethane	0.24	3.0	--- U	--- U	--- U	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U	--- U	--- U	--- U
34. Chlorobenzene	0.30	3.0	--- U	1.50 J	0.50 J	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U	--- U	--- U	--- U
36. Ethylbenzene	0.21	1.0	--- U	--- U	--- U	--- U
37. Xylenes	0.68	5.0	--- U	--- U	--- U	--- U
38. Dibromomethane	0.28	10.0	--- U	--- U	--- U	--- U
39. Styrene	0.19	1.0	--- U	--- U	--- U	--- U
40. Bromoform	0.20	3.0	--- U	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U	2.10	--- U	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U	1.30 J	--- U	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U	--- U	--- U	--- U
46. Acrylonitrile	2.72	200.0	--- U	--- U	--- U	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U	--- U	--- U	--- U
48. Acrolein	40.57	53.0	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015 B

ANALYST: MAO
DATE COLLECTED: 02/11/15
DATE ANALYZED: 02/24/15
DATE REPORTED: 03/26/15

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	MW-17	MW-16A	MW-18S	Trip Blank
49. Allyl Chloride	0.20	10.0	--- U	--- U	--- U	--- U
50. Chloroprene	0.21	20.0	--- U	--- U	--- U	--- U
51. 1,3-Dichlorobenzene	0.41	5.0	--- U	--- U	--- U	--- U
52. Dichlorodifluoromethane	0.51	5.0	0.80 J	6.40	--- U	--- U
53. 1,3-Dichloropropane	0.28	1.0	--- U	--- U	--- U	--- U
54. 2,2-Dichloropropane	0.17	15.0	--- U	--- U	--- U	--- U
55. 1,1-Dichloropropene	0.22	5.0	--- U	--- U	--- U	--- U
56. Ethyl Methacrylate	0.16	10.0	--- U	--- U	--- U	--- U
57. Hexachlorobutadiene	0.57	10.0	--- U	--- U	--- U	--- U
58. Isobutyl Alcohol	12.80	100.0	--- U	--- U	--- U	--- U
59. Methacrylonitrile	1.93	100.0	--- U	--- U	--- U	--- U
60. Methyl Methacrylate	0.25	30.0	--- U	--- U	--- U	--- U
61. Naphthalene	0.47	10.0	--- U	--- U	--- U	--- U
62. Propionitrile	3.26	150.0	--- U	--- U	--- U	--- U
63. 1,2,4-Trichlorobenzene	0.50	10.0	--- U	--- U	--- U	--- U
64. Acetonitrile	36.29	55.0	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

NOTE: EPA METHOD 8260B R1 (96): MW-16A cis-1,2-Dichloroethene and Tetrachloroethene concentrations exceeded calibration range.

Environment 1, Inc.
P.O. Box 7085, 114 Oakmont Dr.
Greenville, NC 27858
environment1inc.com
Phone (252) 756-6208 • Fax (252) 756-0633

CHAIN OF CUSTODY RECORD

CLIENT: 6015 B **Week: 10**

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX NC 27839

(252) 583-1807

DISINFECTION
- [ ] CHLORINE
- [ ] UV
- [ ] NONE
- [ ] _____

	TOTAL CHLORINE, mg/l OR ug/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	Field pH	BOD	COD	Nitrate	TOC	Chloride	Cyanide	Metals	Turbidity	Sulfide	Conductivity	DO	Temperature	Field Parameter	8260 Dup. 1	EPA 8270D
CHLORINE NEUTRALIZED AT COLLECTION										Y									
pH CHECK (LAB)					<2		<2		>12	02			9						
CONTAINER TYPE, P/G				P	P	P	P	P	P	P	P	P	P	P	P	P		G	G
CHEMICAL PRESERVATION				A	A	C	A	C	A	D	A	A	F	A	A	A		E	A
SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME																	
MW-17	2-11-15	1145	10	18	G	G	G	G	G	G	G	G	G	G	G	G	G		G
MW-16A	2-11-15	0735	13	13	G						G	G	G	G	G	G	G		G
MW-18S	2-11-15	1030	9	18	G	G	G	G	G	G	G	G	G	G	G	G	G		G
MW-18D	2-11-15	1000	8	9	G	G	G	G	G	G		G	G	G	G	G	G		
BP-3	2-11-15	1115		1													G		
BP-9	2-11-15	1110		1													G		
G-13	2-11-15	1110	14	2		G													
Trip Blank				2														G	

PARAMETERS/TESTS

A - NONE D - NAOH
B - HNO_3 E - HCL
C - H_2SO_4 F - ZINC ACETATE/NAOH
G - NA THIOSULFATE

CLASSIFICATION:
- [ ] WASTEWATER (NPDES)
- [ ] DRINKING WATER
- [ ] DWQ/GW
- [X] SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY
Y N

SAMPLES COLLECTED BY: (Please Print)
Bobby Fox / Tom Beasley

SAMPLES RECEIVED IN LAB AT 0-2 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Bobby Fox	2-11-15 4:29	[illegible]	2/11/15 4:33
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

PLEASE READ Instructions for completing this form on the reverse side.

Sampler must place a "C" for composite sample or a "G" for grab sample in the blocks above for each parameter requested.

№ 287307

Environment 1, Inc.
P.O. Box 7085, 114 Oakmont Dr.
Greenville, NC 27858
environment1inc.com
Phone (252) 756-6208 • Fax (252) 756-0633

CHAIN OF CUSTODY RECORD

CLIENT: 6015 B **Week: 10**

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX NC 27839

(252) 583-1807

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l OR ug/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	8270D Dup. 1	EPA 8081B	8151A Duplicate	8260B App. II	8260 App. II 1	8260 App. II 2	8151A Landfill	8151A Duplicate	CO2	ORP
CHLORINE NEUTRALIZED AT COLLECTION															
pH CHECK (LAB)															
CONTAINER TYPE, P/G						G	G	G	G	G	G	G	G	P	P
CHEMICAL PRESERVATION						A	A	A	E	E	E	A	A	A	A
MW-17	2-11-15	1145		10	18	G	G		G	G	G	G	G	G	G
MW-16A	2-11-15	0735		13	13	G	G	G	G	G		G			G
MW-18S	2-11-15	1030		9	18	G	G		G	G	G	G	G	G	G
MW-18D	2-11-15	1000		8	9									G	G
BP-3	2-11-15	1115			1										
BP-9	2-11-15	1110			1										
G-13	2-11-15	1430		14	2									G	
Trip Blank	2-11-15				2				G						

PARAMETERS/TESTS

A - NONE D - NAOH
B - HNO_3 E - HCL
C - H_2SO_4 F - ZINC ACETATE/NAOH
G - NA THIOSULFATE

CLASSIFICATION:
☐ WASTEWATER (NPDES)
☐ DRINKING WATER
☐ DWQ/GW
☒ SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY: (Y) N

SAMPLES COLLECTED BY: (Please Print) Bobby Fox / Tom Beasley

SAMPLES RECEIVED IN LAB AT 02 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Bobby Fox	2-11-15 4:29	[signature]	2/11/15 1433
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

PLEASE READ Instructions for completing this form on the reverse side

Sampler must place a "C" for composite sample or a "G" for Grab sample in the blocks above for each parameter requested

№ 287306

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

ID#: 6015 A

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX ,NC 27839

DATE COLLECTED: 02/09/15
DATE REPORTED : 03/16/15

REVIEWED BY:

PARAMETERS	MDL	SWSL	SW-1	SW-2	SW-3	Analysis Date	Analyst	Method Code
PH (field measurement), Units			6.7	7.1	7.2	02/09/15	BF	4500HB-00
Antimony, ug/l	0.12	6.0	--- U	--- U	--- U	02/11/15	LFJ	EPA200.8
Arsenic, ug/l	0.10	10.0	0.12 J	0.42 J	--- U	02/11/15	LFJ	EPA200.8
Barium, ug/l	0.12	100.0	16.2 J	29.2 J	23.0 J	02/11/15	LFJ	EPA200.8
Beryllium, ug/l	0.04	1.0	--- U	0.07 J	--- U	02/11/15	LFJ	EPA200.8
Cadmium, ug/l	0.04	1.0	--- U	--- U	--- U	02/20/15	LFJ	EPA200.8
Cobalt, ug/l	0.12	10.0	--- U	0.39 J	0.19 J	02/11/15	LFJ	EPA200.8
Copper, ug/l	0.10	10.0	--- U	0.21 J	--- U	02/11/15	LFJ	EPA200.8
Total Chromium, ug/l	0.14	10.0	--- U	--- U	0.15 J	02/11/15	LFJ	EPA200.8
Lead, ug/l	0.13	10.0	--- U	--- U	--- U	02/11/15	LFJ	EPA200.8
Nickel, ug/l	0.12	50.0	0.40 J	0.73 J	0.34 J	02/11/15	LFJ	EPA200.8
Selenium, ug/l	0.16	10.0	--- U	1.4 J	--- U	02/11/15	LFJ	EPA200.8
Silver, ug/l	0.04	10.0	--- U	--- U	--- U	02/12/15	LFJ	EPA200.8
Thallium, ug/l	0.13	5.5	--- U	--- U	--- U	02/11/15	LFJ	EPA200.8
Vanadium, ug/l	0.06	25.0	2.8 J	0.84 J	0.52 J	02/11/15	LFJ	EPA200.8
Zinc, ug/l	0.53	10.0	2.8 J	4.1 J	3.4 J	02/11/15	LFJ	EPA200.8
Conductivity (at 25c), uMhos/cm	1.0	1.0	125	225	99	02/09/15	BF	2510B-97
Temperature, °C			12	11	11	02/09/15	BF	2550B-00

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX, NC 27839

CLIENT ID: 6015 A

ANALYST: MAO
DATE COLLECTED: 02/09/15
DATE ANALYZED: 02/18/15
DATE REPORTED: 03/16/15

REVIEWED BY:

VOLATILE ORGANICS
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	SW-1	SW-2	SW-3
1. Chloromethane	0.77	1.0	--- U	--- U	--- U
2. Vinyl Chloride	0.63	1.0	--- U	--- U	--- U
3. Bromomethane	0.67	10.0	--- U	--- U	--- U
4. Chloroethane	0.48	10.0	--- U	--- U	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U	--- U	--- U
6. 1,1-Dichloroethene	0.17	5.0	--- U	--- U	--- U
7. Acetone	9.06	100.0	--- U	--- U	--- U
8. Iodomethane	0.26	10.0	--- U	--- U	--- U
9. Carbon Disulfide	0.23	100.0	--- U	--- U	--- U
10. Methylene Chloride	0.64	1.0	--- U	--- U	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U	--- U	--- U
12. 1,1-Dichloroethane	0.20	5.0	--- U	--- U	--- U
13. Vinyl Acetate	0.20	50.0	--- U	--- U	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	--- U	--- U	--- U
15. 2-Butanone	2.21	100.0	--- U	--- U	--- U
16. Bromochloromethane	0.27	3.0	--- U	--- U	--- U
17. Chloroform	0.25	5.0	--- U	--- U	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U	--- U	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U	--- U	--- U
20. Benzene	0.24	1.0	--- U	--- U	--- U
21. 1,2-Dichloroethane	0.27	1.0	--- U	--- U	--- U
22. Trichloroethene	0.23	1.0	--- U	--- U	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U	--- U	--- U
24. Bromodichloromethane	0.21	1.0	--- U	--- U	--- U
25. Cis-1,3-Dichloropropene	0.24	1.0	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U	--- U	--- U
27. Toluene	0.23	1.0	--- U	--- U	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U	--- U	--- U
30. Tetrachloroethene	0.17	1.0	--- U	--- U	--- U
31. 2-Hexanone	1.57	50.0	--- U	--- U	--- U
32. Dibromochloromethane	0.24	3.0	--- U	--- U	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U	--- U	--- U
34. Chlorobenzene	0.30	3.0	--- U	--- U	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U	--- U	--- U
36. Ethylbenzene	0.21	1.0	--- U	--- U	--- U
37. Xylenes	0.68	5.0	--- U	--- U	--- U
38. Dibromomethane	0.28	10.0	--- U	--- U	--- U
39. Styrene	0.19	1.0	--- U	--- U	--- U
40. Bromoform	0.20	3.0	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U	--- U	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U	--- U	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U	--- U	--- U
46. Acrylonitrile	2.72	200.0	--- U	--- U	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Inc.
P.O. Box 7085, 114 Oakmont Dr.
Greenville, NC 27858
environment1inc.com
Phone (252) 756-6208 • Fax (252) 756-0633

CHAIN OF CUSTODY RECORD

CLIENT: 6015 A **Week:** 10

HALIFAX CO. LANDFILL (CLOSED MSW)
GREG GRIFFIN
P.O. BOX 70
HALIFAX NC 27839

(252) 583-1807

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l OR ug/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	Field pH	Metals	Conductivity	Temperature	EPA 8260B	8260 Dup. 1
CHLORINE NEUTRALIZED AT COLLECTION											
pH CHECK (LAB)							12			12	12
CONTAINER TYPE, P/G						P	P	P	P	G	G
CHEMICAL PRESERVATION						A	A	A	A	E	E
SW-1	2-9-15	0857		12	4	G	G	G	G	G	G
SW-2	2-9-15	1230		11	4	G	G	G	G	G	G
SW-3	2-9-15	1040 ~~1115~~		12	4	G	G	G	G	G	G

PARAMETERS/TESTS

A - NONE D - NAOH
B - HNO_3 E - HCL
C - H_2SO_4 F - ZINC ACETATE/NAOH
G - NA THIOSULFATE

CLASSIFICATION:
☐ WASTEWATER (NPDES)
☐ DRINKING WATER
☐ DWQ/GW
☒ SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY: (Y) N

SAMPLES COLLECTED BY: (Please Print) Bobby Fox / Tom Beasley

SAMPLES RECEIVED IN LAB AT 1.6 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Bobby Fox	2-9-15 2:04	[signature]	2/9/15 2:10
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

PLEASE READ Instructions for completing this form on the reverse side.

Sampler must place a "C" for composite sample or a "G" for Grab sample in the blocks above for each parameter requested.

FORM #5

№ 287308

Microseeps/Pace Analytical Energy Services, LLC
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

February 23, 2015

Steve Jones
Environment 1, Inc.
PO Box 7085
114 Oakmont Drive
Greenville, NC 27835

RE: **HALIFAX CO / 6015**
Microseeps Workorder: 14728

Dear Steve Jones:

Enclosed are the analytical results for sample(s) received by the laboratory on Friday, February 13, 2015. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

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

Sincerely,

Robbin Robl 02/23/2015
rrobl@microseeps.com

Customer Service Representative

Enclosures

As a valued client we would appreciate your comments on our service.
Please email info@microseeps.com.

Total Number of Pages 31

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Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

LABORATORY ACCREDITATIONS & CERTIFICATIONS

Accreditor:	Pennsylvania Department of Environmental Protection, Bureau of Laboratories
Accreditation ID:	02-00538
Scope:	NELAP Non-Potable Water and Solid & Hazardous Waste
Accreditor:	South Carolina Department of Health and Environmental Control, Office of Environmental Laboratory Certification
Accreditation ID:	89009003
Scope:	Clean Water Act (CWA); Resource Conservation and Recovery Act (RCRA)
Accreditor:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
Accreditor:	State of Connecticut, Department of Public Health, Division of Environmental Health
Accreditation ID:	PH-0263
Scope:	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
Accreditor:	NELAP: Texas, Commission on Environmental Quality
Accreditation ID:	T104704453-09-TX
Scope:	Non-Potable Water
Accreditor:	State of New Hampshire
Accreditation ID:	299409
Scope:	Non-potable water
Accreditor:	State of Georgia
Accreditation ID:	Chapter 391-3-26
Scope:	As per the Georgia EPD Rules and Regulations for Commercial Laboratories, PAES is accredited by the Pennsylvania Department of Environmental Protection Bureau of Laboratories under the National Environmental Laboratory Approval Program (NELAC).

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SAMPLE SUMMARY

Workorder: 14728 HALIFAX CO / 6015

Lab ID	Sample ID	Matrix	Date Collected	Date Received
147280001	MW2A	Water	2/11/2015 09:10	2/13/2015 11:30
147280002	MW2A	Bubble Strip	2/11/2015 09:10	2/13/2015 11:30
147280003	MW2AD	Water	2/11/2015 08:40	2/13/2015 11:30
147280004	MW2AD	Bubble Strip	2/11/2015 08:40	2/13/2015 11:30
147280005	MW3AS	Water	2/11/2015 13:00	2/13/2015 11:30
147280006	MW3AS	Bubble Strip	2/11/2015 13:00	2/13/2015 11:30
147280007	MW3D	Water	2/11/2015 12:30	2/13/2015 11:30
147280008	MW6D	Water	2/11/2015 14:00	2/13/2015 11:30
147280009	MW6D	Bubble Strip	2/11/2015 14:00	2/13/2015 11:30
147280010	MW17	Water	2/11/2015 11:45	2/13/2015 11:30
147280011	MW17	Bubble Strip	2/11/2015 11:45	2/13/2015 11:30
147280012	MW18S	Water	2/11/2015 10:30	2/13/2015 11:30
147280013	MW18S	Bubble Strip	2/11/2015 10:30	2/13/2015 11:30
147280014	MW18D	Water	2/11/2015 10:00	2/13/2015 11:30
147280015	MW18D	Bubble Strip	2/11/2015 10:00	2/13/2015 11:30
147280016	G13	Water	2/11/2015 14:30	2/13/2015 11:30
147280017	G13	Bubble Strip	2/11/2015 14:30	2/13/2015 11:30

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PROJECT SUMMARY

Workorder: 14728 HALIFAX CO / 6015

Batch Comments

Batch: DISG/4387 - AM20GAX Water QC

The percent recovery for the opening calibration verification analysis was above laboratory control limits. Analytes n-Butane. Results associated to the analytes in samples may be bias high.

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280001 Date Received: 2/13/2015 11:30 Matrix: Water
Sample ID: MW2A Date Collected: 2/11/2015 09:10

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
EDonors - MICR										
Analysis Desc: AM23G			Analytical Method: AM23G							
Lactic Acid	0.20	mg/l	0.10	0.012	1			2/17/2015 06:24	KB	
Acetic Acid	0.062J	mg/l	0.070	0.0080	1			2/17/2015 06:24	KB	
Propionic Acid	0.011U	mg/l	0.050	0.011	1			2/17/2015 06:24	KB	
Butyric Acid	0.0070U	mg/l	0.050	0.0070	1			2/17/2015 06:24	KB	
Pyruvic Acid	0.0090U	mg/l	0.15	0.0090	1			2/17/2015 06:24	KB	
I-Pentanoic Acid	0.0080U	mg/l	0.15	0.0080	1			2/17/2015 06:24	KB	
Pentanoic Acid	0.014U	mg/l	0.070	0.014	1			2/17/2015 06:24	KB	
I-Hexanoic Acid	0.10U	mg/l	0.20	0.10	1			2/17/2015 06:24	KB	
Hexanoic Acid	0.12U	mg/l	0.50	0.12	1			2/17/2015 06:24	KB	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280002 Date Received: 2/13/2015 11:30 Matrix: Bubble Strip
Sample ID: MW2A Date Collected: 2/11/2015 09:10

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	2600	ug/l	0.015	0.0060	1			2/14/2015 13:47	TD	
Ethane	0.14	ug/l	0.010	0.0010	1			2/14/2015 13:47	TD	
Ethene	0.19	ug/l	0.010	0.0080	1			2/14/2015 13:47	TD	
Hydrogen	0.81	nM	0.60	0.13	1			2/14/2015 13:47	TD	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280003 Date Received: 2/13/2015 11:30 Matrix: Water
Sample ID: MW2AD Date Collected: 2/11/2015 08:40

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
EDonors - MICR										
Analysis Desc: AM23G			Analytical Method: AM23G							
Lactic Acid	0.21	mg/l	0.10	0.012	1			2/17/2015 07:13	KB	
Acetic Acid	0.056J	mg/l	0.070	0.0080	1			2/17/2015 07:13	KB	
Propionic Acid	0.011U	mg/l	0.050	0.011	1			2/17/2015 07:13	KB	
Butyric Acid	0.0070U	mg/l	0.050	0.0070	1			2/17/2015 07:13	KB	
Pyruvic Acid	0.0090U	mg/l	0.15	0.0090	1			2/17/2015 07:13	KB	
i-Pentanoic Acid	0.0080U	mg/l	0.15	0.0080	1			2/17/2015 07:13	KB	
Pentanoic Acid	0.014U	mg/l	0.070	0.014	1			2/17/2015 07:13	KB	
i-Hexanoic Acid	0.10U	mg/l	0.20	0.10	1			2/17/2015 07:13	KB	
Hexanoic Acid	0.12U	mg/l	0.50	0.12	1			2/17/2015 07:13	KB	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: **147280004** Date Received: 2/13/2015 11:30 Matrix: Bubble Strip
Sample ID: **MW2AD** Date Collected: 2/11/2015 08:40

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**0.47**	ug/l	0.015	0.0060	1			2/14/2015 13:59	TD	
Ethane	**0.0047J**	ug/l	0.010	0.0010	1			2/14/2015 13:59	TD	
Ethene	**0.013**	ug/l	0.010	0.0080	1			2/14/2015 13:59	TD	
Hydrogen	**1.6**	nM	0.60	0.13	1			2/14/2015 13:59	TD	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280005 Date Received: 2/13/2015 11:30 Matrix: Water
Sample ID: MW3AS Date Collected: 2/11/2015 13:00

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
EDonors - MICR										
Analysis Desc: AM23G			Analytical Method: AM23G							
Lactic Acid	0.30	mg/l	0.10	0.012	1			2/17/2015 08:01	KB	
Acetic Acid	0.099	mg/l	0.070	0.0080	1			2/17/2015 08:01	KB	
Propionic Acid	0.011U	mg/l	0.050	0.011	1			2/17/2015 08:01	KB	
Butyric Acid	0.0070U	mg/l	0.050	0.0070	1			2/17/2015 08:01	KB	
Pyruvic Acid	0.0090U	mg/l	0.15	0.0090	1			2/17/2015 08:01	KB	
I-Pentanoic Acid	0.0080U	mg/l	0.15	0.0080	1			2/17/2015 08:01	KB	
Pentanoic Acid	0.014U	mg/l	0.070	0.014	1			2/17/2015 08:01	KB	
I-Hexanoic Acid	0.10U	mg/l	0.20	0.10	1			2/17/2015 08:01	KB	
Hexanoic Acid	0.12U	mg/l	0.50	0.12	1			2/17/2015 08:01	KB	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280006 Date Received: 2/13/2015 11:30 Matrix: Bubble Strip
Sample ID: MW3AS Date Collected: 2/11/2015 13:00

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**11000**	ug/l	0.015	0.0060	1			2/14/2015 14:12	TD	
Ethane	**0.25**	ug/l	0.010	0.0010	1			2/14/2015 14:12	TD	
Ethene	**0.0080U**	ug/l	0.010	0.0080	1			2/14/2015 14:12	TD	
Hydrogen	**1.2**	nM	0.60	0.13	1			2/14/2015 14:12	TD	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280007 Date Received: 2/13/2015 11:30 Matrix: Water
Sample ID: MW3D Date Collected: 2/11/2015 12:30

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
EDonors - MICR										
Analysis Desc: AM23G			Analytical Method: AM23G							
Lactic Acid	0.23	mg/l	0.10	0.012	1			2/17/2015 08:50	KB	
Acetic Acid	0.069J	mg/l	0.070	0.0080	1			2/17/2015 08:50	KB	
Propionic Acid	0.011U	mg/l	0.050	0.011	1			2/17/2015 08:50	KB	
Butyric Acid	0.0070U	mg/l	0.050	0.0070	1			2/17/2015 08:50	KB	
Pyruvic Acid	0.0090U	mg/l	0.15	0.0090	1			2/17/2015 08:50	KB	
i-Pentanoic Acid	0.0080U	mg/l	0.15	0.0080	1			2/17/2015 08:50	KB	
Pentanoic Acid	0.014U	mg/l	0.070	0.014	1			2/17/2015 08:50	KB	
i-Hexanoic Acid	0.10U	mg/l	0.20	0.10	1			2/17/2015 08:50	KB	
Hexanoic Acid	0.12U	mg/l	0.50	0.12	1			2/17/2015 08:50	KB	
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	1600	ug/l	0.10	0.042	1			2/22/2015 15:47	GT	
Ethane	0.0020U	ug/l	0.025	0.0020	1			2/22/2015 15:47	GT	
Ethene	0.017J	ug/l	0.025	0.0030	1			2/22/2015 15:47	GT	

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Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280008 Date Received: 2/13/2015 11:30 Matrix: Water
Sample ID: MW6D Date Collected: 2/11/2015 14:00

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
EDonors - MICR										
Analysis Desc: AM23G			Analytical Method: AM23G							
Lactic Acid	**0.11**	mg/l	0.10	0.012	1			2/17/2015 09:39	KB	
Acetic Acid	**0.058J**	mg/l	0.070	0.0080	1			2/17/2015 09:39	KB	
Propionic Acid	**0.011U**	mg/l	0.050	0.011	1			2/17/2015 09:39	KB	
Butyric Acid	**0.0070U**	mg/l	0.050	0.0070	1			2/17/2015 09:39	KB	
Pyruvic Acid	**0.0090U**	mg/l	0.15	0.0090	1			2/17/2015 09:39	KB	
i-Pentanoic Acid	**0.0080U**	mg/l	0.15	0.0080	1			2/17/2015 09:39	KB	
Pentanoic Acid	**0.014U**	mg/l	0.070	0.014	1			2/17/2015 09:39	KB	
i-Hexanoic Acid	**0.10U**	mg/l	0.20	0.10	1			2/17/2015 09:39	KB	
Hexanoic Acid	**0.12U**	mg/l	0.50	0.12	1			2/17/2015 09:39	KB	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280009 Date Received: 2/13/2015 11:30 Matrix: Bubble Strip
Sample ID: MW6D Date Collected: 2/11/2015 14:00

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	66	ug/l	0.015	0.0060	1			2/14/2015 14:24	TD	
Ethane	0.098	ug/l	0.010	0.0010	1			2/14/2015 14:24	TD	
Ethene	0.010	ug/l	0.010	0.0080	1			2/14/2015 14:24	TD	
Hydrogen	1.6	nM	0.60	0.13	1			2/14/2015 14:24	TD	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280010 Date Received: 2/13/2015 11:30 Matrix: Water
Sample ID: MW17 Date Collected: 2/11/2015 11:45

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
EDonors - MICR										
Analysis Desc: AM23G			Analytical Method: AM23G							
Lactic Acid	0.26	mg/l	0.10	0.012	1			2/17/2015 10:27	KB	
Acetic Acid	0.083J	mg/l	0.070	0.0080	1			2/17/2015 10:27	KB	
Propionic Acid	0.011U	mg/l	0.050	0.011	1			2/17/2015 10:27	KB	
Butyric Acid	0.0070U	mg/l	0.050	0.0070	1			2/17/2015 10:27	KB	
Pyruvic Acid	0.0090U	mg/l	0.15	0.0090	1			2/17/2015 10:27	KB	
I-Pentanoic Acid	0.0080U	mg/l	0.15	0.0080	1			2/17/2015 10:27	KB	
Pentanoic Acid	0.014U	mg/l	0.070	0.014	1			2/17/2015 10:27	KB	
I-Hexanoic Acid	0.10U	mg/l	0.20	0.10	1			2/17/2015 10:27	KB	
Hexanoic Acid	0.12U	mg/l	0.50	0.12	1			2/17/2015 10:27	KB	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280011 Date Received: 2/13/2015 11:30 Matrix: Bubble Strip
Sample ID: MW17 Date Collected: 2/11/2015 11:45

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	1100	ug/l	0.015	0.0060	1			2/14/2015 14:36	TD	
Ethane	0.0010U	ug/l	0.010	0.0010	1			2/14/2015 14:36	TD	
Ethene	0.0080U	ug/l	0.010	0.0080	1			2/14/2015 14:36	TD	
Hydrogen	0.66	nM	0.60	0.13	1			2/14/2015 14:36	TD	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280012 Date Received: 2/13/2015 11:30 Matrix: Water
Sample ID: MW18S Date Collected: 2/11/2015 10:30

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
EDonors - MICR										
Analysis Desc: AM23G			Analytical Method: AM23G							
Lactic Acid	0.23	mg/l	0.10	0.012	1			2/17/2015 11:16	KB	
Acetic Acid	0.071	mg/l	0.070	0.0080	1			2/17/2015 11:16	KB	
Propionic Acid	0.011U	mg/l	0.050	0.011	1			2/17/2015 11:16	KB	
Butyric Acid	0.0070U	mg/l	0.050	0.0070	1			2/17/2015 11:16	KB	
Pyruvic Acid	0.0090U	mg/l	0.15	0.0090	1			2/17/2015 11:16	KB	
i-Pentanoic Acid	0.0080U	mg/l	0.15	0.0080	1			2/17/2015 11:16	KB	
Pentanoic Acid	0.014U	mg/l	0.070	0.014	1			2/17/2015 11:16	KB	
i-Hexanoic Acid	0.10U	mg/l	0.20	0.10	1			2/17/2015 11:16	KB	
Hexanoic Acid	0.12U	mg/l	0.50	0.12	1			2/17/2015 11:16	KB	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280013 Date Received: 2/13/2015 11:30 Matrix: Bubble Strip
Sample ID: MW18S Date Collected: 2/11/2015 10:30

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	9200	ug/l	0.015	0.0060	1			2/14/2015 14:49	TD	
Ethane	0.22	ug/l	0.010	0.0010	1			2/14/2015 14:49	TD	
Ethene	0.0080U	ug/l	0.010	0.0080	1			2/14/2015 14:49	TD	
Hydrogen	1.1	nM	0.60	0.13	1			2/14/2015 14:49	TD	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280014 Date Received: 2/13/2015 11:30 Matrix: Water
Sample ID: MW18D Date Collected: 2/11/2015 10:00

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
EDonors - MICR										
Analysis Desc: AM23G			Analytical Method: AM23G							
Lactic Acid	0.31	mg/l	0.10	0.012	1			2/17/2015 12:05	KB	
Acetic Acid	0.068J	mg/l	0.070	0.0080	1			2/17/2015 12:05	KB	
Propionic Acid	0.011U	mg/l	0.050	0.011	1			2/17/2015 12:05	KB	
Butyric Acid	0.0070U	mg/l	0.050	0.0070	1			2/17/2015 12:05	KB	
Pyruvic Acid	0.0090U	mg/l	0.15	0.0090	1			2/17/2015 12:05	KB	
i-Pentanoic Acid	0.0080U	mg/l	0.15	0.0080	1			2/17/2015 12:05	KB	
Pentanoic Acid	0.014U	mg/l	0.070	0.014	1			2/17/2015 12:05	KB	
i-Hexanoic Acid	0.10U	mg/l	0.20	0.10	1			2/17/2015 12:05	KB	
Hexanoic Acid	0.12U	mg/l	0.50	0.12	1			2/17/2015 12:05	KB	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280015 Date Received: 2/13/2015 11:30 Matrix: Bubble Strip
Sample ID: MW18D Date Collected: 2/11/2015 10:00

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	6.6	ug/l	0.015	0.0060	1			2/14/2015 15:01	TD	
Ethane	0.0032J	ug/l	0.010	0.0010	1			2/14/2015 15:01	TD	
Ethene	0.038	ug/l	0.010	0.0080	1			2/14/2015 15:01	TD	
Hydrogen	1.2	nM	0.60	0.13	1			2/14/2015 15:01	TD	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: **147280016** Date Received: 2/13/2015 11:30 Matrix: Water

Sample ID: **G13** Date Collected: 2/11/2015 14:30

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
EDonors - MICR										
Analysis Desc: AM23G			Analytical Method: AM23G							
Lactic Acid	**0.11**	mg/l	0.10	0.012	1			2/17/2015 12:53	KB	
Acetic Acid	**0.056J**	mg/l	0.070	0.0080	1			2/17/2015 12:53	KB	
Propionic Acid	**0.011U**	mg/l	0.050	0.011	1			2/17/2015 12:53	KB	
Butyric Acid	**0.0070U**	mg/l	0.050	0.0070	1			2/17/2015 12:53	KB	
Pyruvic Acid	**0.0090U**	mg/l	0.15	0.0090	1			2/17/2015 12:53	KB	
i-Pentanoic Acid	**0.0080U**	mg/l	0.15	0.0080	1			2/17/2015 12:53	KB	
Pentanoic Acid	**0.014U**	mg/l	0.070	0.014	1			2/17/2015 12:53	KB	
i-Hexanoic Acid	**0.10U**	mg/l	0.20	0.10	1			2/17/2015 12:53	KB	
Hexanoic Acid	**0.12U**	mg/l	0.50	0.12	1			2/17/2015 12:53	KB	

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ANALYTICAL RESULTS

Workorder: 14728 HALIFAX CO / 6015

Lab ID: 147280017 Date Received: 2/13/2015 11:30 Matrix: Bubble Strip
Sample ID: G13 Date Collected: 2/11/2015 14:30

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	3.9	ug/l	0.015	0.0060	1			2/14/2015 15:13	TD	
Ethane	0.0018J	ug/l	0.010	0.0010	1			2/14/2015 15:13	TD	
Ethene	0.0080U	ug/l	0.010	0.0080	1			2/14/2015 15:13	TD	
Hydrogen	1.2	nM	0.60	0.13	1			2/14/2015 15:13	TD	

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ANALYTICAL RESULTS QUALIFIERS

Workorder: 14728 HALIFAX CO / 6015

DEFINITIONS/QUALIFIERS

Disclaimer : The Pennsylvania Department of Environmental Protection (PADEP) has decided to no longer recognize analyses that do not produce data for primary compliance, for NELAP accreditation. The methods affected by this decision are AM20GAx, AM21G, SW846 7199 and AM4.02. The laboratory shall continue to administer the NELAP/TNI standard requirements in the performance of these methods.

MDL	Method Detection Limit. Can be used synonymously with LOD; Limit Of Detection.
PQL	Practical Quanitation Limit. Can be used synonymously with LOQ; Limit Of Quantitation.
ND	Not detected at or above reporting limit.
DF	Dilution Factor.
S	Surrogate.
RPD	Relative Percent Difference.
% Rec	Percent Recovery.
U	Indicates the compound was analyzed for, but not detected at or above the noted concentration.
J	Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (PQL).

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QUALITY CONTROL DATA

Workorder: 14728 HALIFAX CO / 6015

QC Batch: DISG/4377 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 147280002, 147280004, 147280008, 147280009, 147280011, 147280013, 147280015, 147280017

METHOD BLANK: 33308

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Methane	ug/l	0.0060U	0.0060	
Ethane	ug/l	0.0010U	0.0010	
Ethene	ug/l	0.0080U	0.0080	

METHOD BLANK: 33310

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Hydrogen	nM	0.13U	0.13	

LABORATORY CONTROL SAMPLE & LCSD: 33311 33314

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Methane	ug/l	8.3	8.7	8.7	106	106	80-120	0	20	
Ethane	ug/l	6.5	6.7	6.7	104	104	80-120	0	20	
Ethene	ug/l	16	17	17	102	102	80-120	0	20	

LABORATORY CONTROL SAMPLE & LCSD: 33313 33316

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Hydrogen	nM	24	23	23	96	96	80-120	0	20	

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QUALITY CONTROL DATA

Workorder: 14728 HALIFAX CO / 6015

QC Batch: EDON/2422 Analysis Method: AM23G

QC Batch Method: AM23G

Associated Lab Samples: 147280001, 147280003, 147280005, 147280007, 147280008, 147280010, 147280012, 147280014, 147280016

METHOD BLANK: 33335

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
EDonors				
Lactic Acid	mg/l	0.012U	0.012	
Acetic Acid	mg/l	0.044J	0.0080	
Propionic Acid	mg/l	0.011U	0.011	
Butyric Acid	mg/l	0.0070U	0.0070	
Pyruvic Acid	mg/l	0.0090U	0.0090	
i-Pentanoic Acid	mg/l	0.0080U	0.0080	
Pentanoic Acid	mg/l	0.014U	0.014	
i-Hexanoic Acid	mg/l	0.10U	0.10	
Hexanoic Acid	mg/l	0.12U	0.12	

LABORATORY CONTROL SAMPLE: 33336

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
EDonors						
Lactic Acid	mg/l	2	1.7	86	70-130	
Acetic Acid	mg/l	2	2.1	105	70-130	
Propionic Acid	mg/l	2	2.1	103	70-130	
Butyric Acid	mg/l	2	2.1	105	70-130	
Pyruvic Acid	mg/l	2	2.0	100	70-130	
i-Pentanoic Acid	mg/l	2	2.1	105	70-130	
Pentanoic Acid	mg/l	2	1.9	96	70-130	
i-Hexanoic Acid	mg/l	2	1.8	88	70-130	
Hexanoic Acid	mg/l	2	1.9	94	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 33337 33338 Original: 147230001

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
EDonors											
Lactic Acid	mg/l	0.95	2	3.0	2.9	101	98	70-130	3	30	
Acetic Acid	mg/l	0.26	2	2.4	2.3	105	104	70-130	0.96	30	
Propionic Acid	mg/l	0	2	2.1	2.1	104	107	70-130	2.8	30	

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QUALITY CONTROL DATA

Workorder: 14728 HALIFAX CO / 6015

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 33337 33338 Original: 147230001

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Butyric Acid	mg/l	0	2	2.0	2.1	102	107	70-130	4.8	30	
Pyruvic Acid	mg/l	0	2	2.0	2.0	101	99	70-130	2	30	
I-Pentanoic Acid	mg/l	0	2	1.9	2.1	97	104	70-130	7	30	
Pentanoic Acid	mg/l	0	2	1.8	1.8	90	91	70-130	1.1	30	
I-Hexanoic Acid	mg/l	0	2	1.7	2.0	86	99	70-130	14	30	
Hexanoic Acid	mg/l	0	2	1.9	2.1	96	104	70-130	8	30	

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QUALITY CONTROL DATA

Workorder: 14728 HALIFAX CO / 6015

QC Batch: DISG/4387 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 147280007

METHOD BLANK: 33409

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Methane	ug/l	0.042U	0.042	
Ethane	ug/l	0.0020U	0.0020	
Ethene	ug/l	0.0030U	0.0030	

LABORATORY CONTROL SAMPLE & LCSD: 33411 33413

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Methane	ug/l	750	750	760	100	102	80-120	2	20	
Ethane	ug/l	38	41	45	107	118	80-120	9.8	20	
Ethene	ug/l	35	38	41	106	116	80-120	9	20	

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 14728 HALIFAX CO / 6015

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
147280002	MW2A			AM20GAX	DISG/4377
147280004	MW2AD			AM20GAX	DISG/4377
147280006	MW3AS			AM20GAX	DISG/4377
147280009	MW6D			AM20GAX	DISG/4377
147280011	MW17			AM20GAX	DISG/4377
147280013	MW18S			AM20GAX	DISG/4377
147280015	MW18D			AM20GAX	DISG/4377
147280017	G13			AM20GAX	DISG/4377
147280001	MW2A			AM23G	EDON/2422
147280003	MW2AD			AM23G	EDON/2422
147280005	MW3AS			AM23G	EDON/2422
147280007	MW3D			AM23G	EDON/2422
147280008	MW6D			AM23G	EDON/2422
147280010	MW17			AM23G	EDON/2422
147280012	MW18S			AM23G	EDON/2422
147280014	MW18D			AM23G	EDON/2422
147280016	G13			AM23G	EDON/2422
147280007	MW3D			AM20GAX	DISG/4387

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

14728

Page: 1 of 1

002644

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: ENVIRONMENT 1	Report To: STEVE JONES	Attention:
Address: 114 OAKMONT DR	Copy To:	Company Name: SAME
GREENVILLE, NC 27858		Address:
Email To: SJONESE1@AOL.COM	Purchase Order No.:	Pace Quote Reference:
Phone: 252-756-6208 Fax: 252-756-0633	Project Name: HALIFAX CO.	Pace Project Manager:
Requested Due Date/TAT:	Project Number: 6015	Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: NC

Section D Required Client Information

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

SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

	ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	TSP	BAK	Zink Acetate & NaOH	Other	Analysis Test (Y/N)	HYDROGEN	METHANE/ETHANE/ETHENE	LLUFA	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
12	1	MW2A	AR	GT			2/11/15	0910												X	X	X		
34	2	MW2AD						0840												X	X	X		
56	3	MW3AS						1300												X	X	X		
7	4	MW3D						1230												X	X	X		
8 9	5	MW6						1400												X	X	X		
10 11	6	MW17						1145												X	X	X		
12 13	7	MW18S						1530												X	X	X		
14 15	8	MW18D						1000												X	X	X		
16 17	9	G13						1430												X	X	X		
	10																							
	11																							
	12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Bobby Fap / E-1	2/11/15	4:32P	[signature] / E-1	2/11/15	4:32P				
FACILITY ID # 4204	[signature] / E-1	2/12/15 ~~10:15AM~~ 2/12/15	10:15A	[signature] / PACS	2-13-15	1130	1.2	Y	N	

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Bobby Fap

SIGNATURE of SAMPLER: Bobby Fap

DATE Signed (MM/DD/YY): 2/11/15

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

NON-CONFORMANCE FORM

PAES Work Order #: 14728

Date: 2.13.15 Time of Receipt: 1130 Receiver: LY

Client: Environment 1.

REASON FOR NON-CONFORMANCE:

1. MW3D: Hydrogen vial broke (the bottom broke off).
2. MW6: Vials ID was MW6D.

ACTION TAKEN:

Client name: Steve Jones Date: 2/13/15 Time: email

Per attached email - sample ID should be MW6D.

Customer Service Initials: RR Date: 2/19/15

F-PAE-Q-014-rev.00, 20 Nov2014

Microseeps/Pace Analytical Energy Services, LLC
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

SAMPLE SUMMARY

Workorder: 14789 HALIFAX CO. / 6015

Lab ID	Sample ID	Matrix	Date Collected	Date Received
147890001	MW3D	Bubble Strip	2/23/2015 11:20	2/24/2015 12:30

CERTIFICATE OF ANALYSIS
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Microseeps/Pace Analytical Energy Services, LLC
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

ANALYTICAL RESULTS

Workorder: 14789 HALIFAX CO. / 6015

Lab ID: 147890001 Date Received: 2/24/2015 12:30 Matrix: Bubble Strip
Sample ID: MW3D Date Collected: 2/23/2015 11:20

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Hydrogen	1.2	nM	0.60	0.13	1			3/4/2015 09:40	GT	

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220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

ANALYTICAL RESULTS QUALIFIERS

Workorder: 14789 HALIFAX CO. / 6015

DEFINITIONS/QUALIFIERS

Disclaimer : The Pennsylvania Department of Environmental Protection (PADEP) has decided to no longer recognize analyses that do not produce data for primary compliance, for NELAP accreditation. The methods affected by this decision are AM20GAx, AM21G, SW846 7199 and AM4.02. The laboratory shall continue to administer the NELAP/TNI standard requirements in the performance of these methods.

MDL	Method Detection Limit. Can be used synonymously with LOD; Limit Of Detection.
PQL	Practical Quanitation Limit. Can be used synonymously with LOQ; Limit Of Quantitation.
ND	Not detected at or above reporting limit.
DF	Dilution Factor.
S	Surrogate.
RPD	Relative Percent Difference.
% Rec	Percent Recovery.
U	Indicates the compound was analyzed for, but not detected at or above the noted concentration.
J	Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (PQL).

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Microseeps/Pace Analytical Energy Services, LLC
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

QUALITY CONTROL DATA

Workorder: 14789 HALIFAX CO. / 6015

QC Batch: DISG/4411 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 147890001

METHOD BLANK: 33579

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Hydrogen	nM	0.13U	0.13	

LABORATORY CONTROL SAMPLE & LCSD: 33580 33581

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Hydrogen	nM	24	25	25	104	103	80-120	0.97	20	

CERTIFICATE OF ANALYSIS
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220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 14789 HALIFAX CO. / 6015

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
147890001	MW3D			AM20GAX	DISG/4411

CERTIFICATE OF ANALYSIS
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Pace Analytical®
www.pacelabs.com

14789

Microseeps

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

002765

Section A Required Client Information:

Company: ENVIRONMENT 1, INC
Address: 114 OAKMONT DR
GREENVILLE, NC 27858
Email To: STONEJEX@ABL.COM
Phone: 252-756-6069 Fax: 252-756-0683
Requested Due Date/TAT:

Section B Required Project Information:

Report To: STONE JONES
Copy To:
Purchase Order No.:
Project Name: HALIFAX CO.
Project Number: 6015

Section C Invoice Information:

Attention:
Company Name:
Address: SAME
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: NC

Section D Required Client Information

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

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB G=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	TSP	BAK	Zink Acetate & NaOH	Other	Analysis Test ↓ Y/N	HYDROGEN	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW3D	AR	G			2/23/15	1120		1										X		
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
FACILITY ID# 4204	Tom Beasley / E1	02/23/15	1340	[illegible] / E1	2/23/15	1340				
	[illegible] / E1	2/24/15	1440	[illegible] PACE	2/24/15	1230	n/a	n/a	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: TOM BEASLEY
SIGNATURE of SAMPLER: Tom Beasley
DATE Signed (MM/DD/YY): 02/23/15

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Appendix C

Time vs. Concentration Graphs

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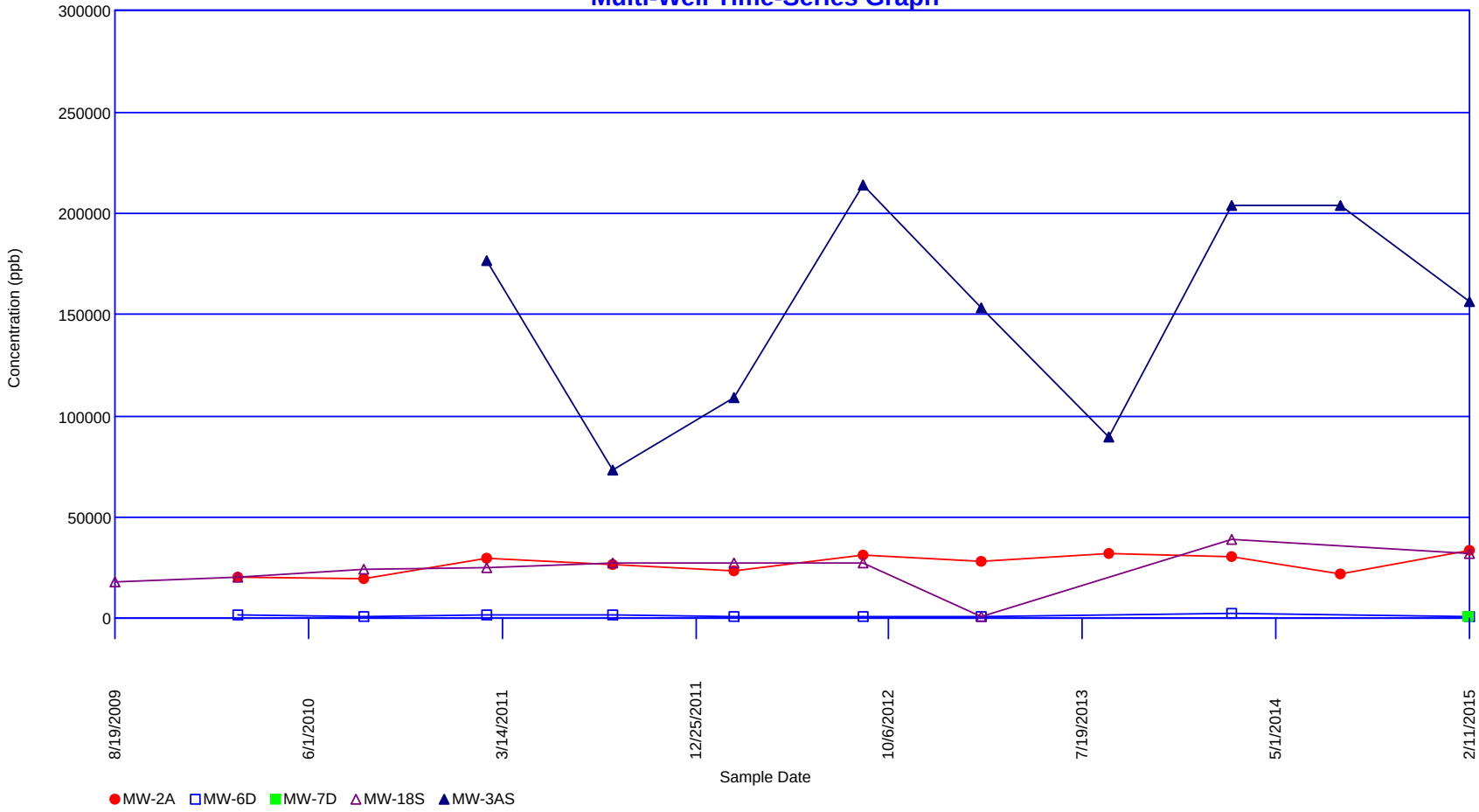
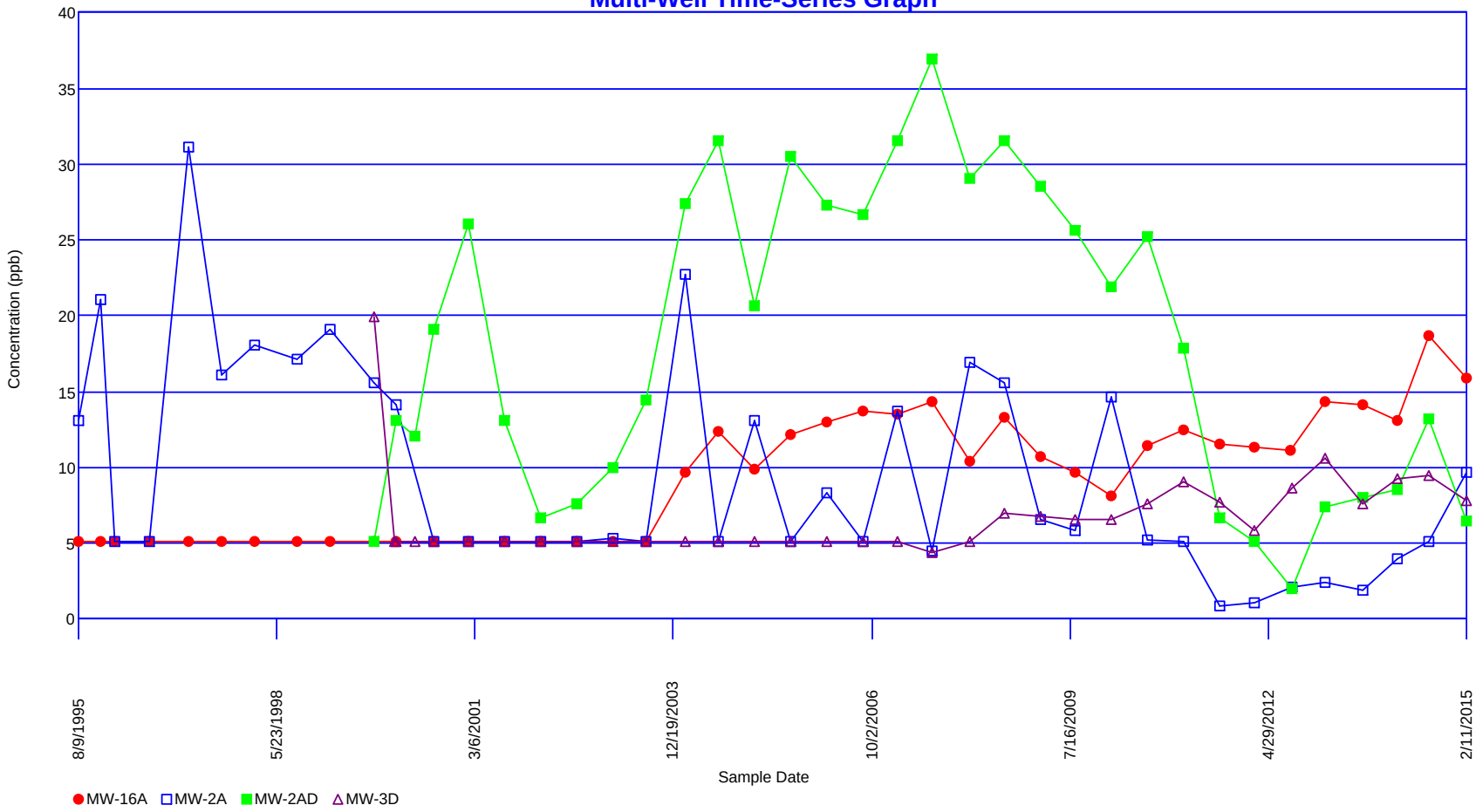
Iron, total

Multi-Well Time-Series Graph



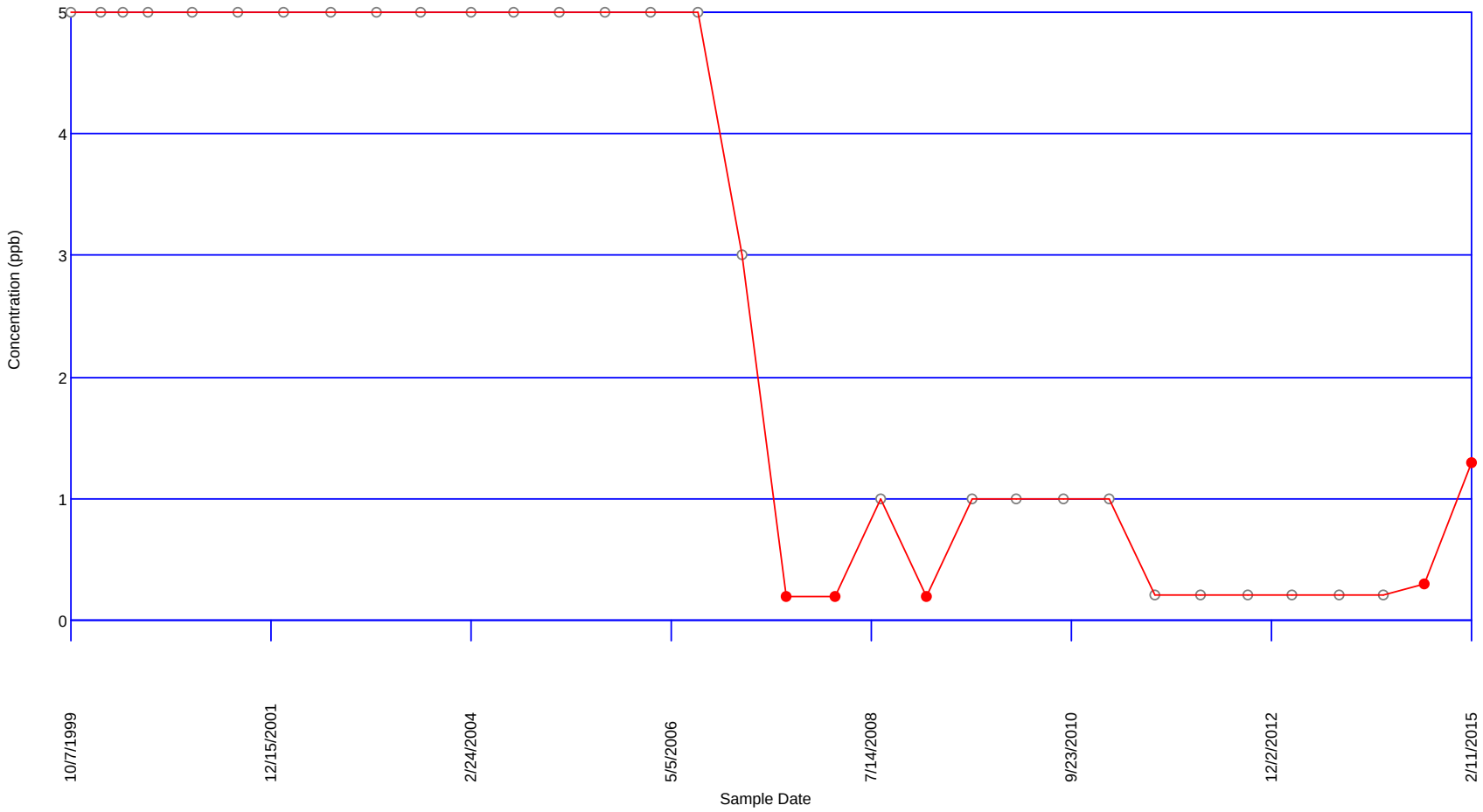
1,1-Dichloroethane

Multi-Well Time-Series Graph



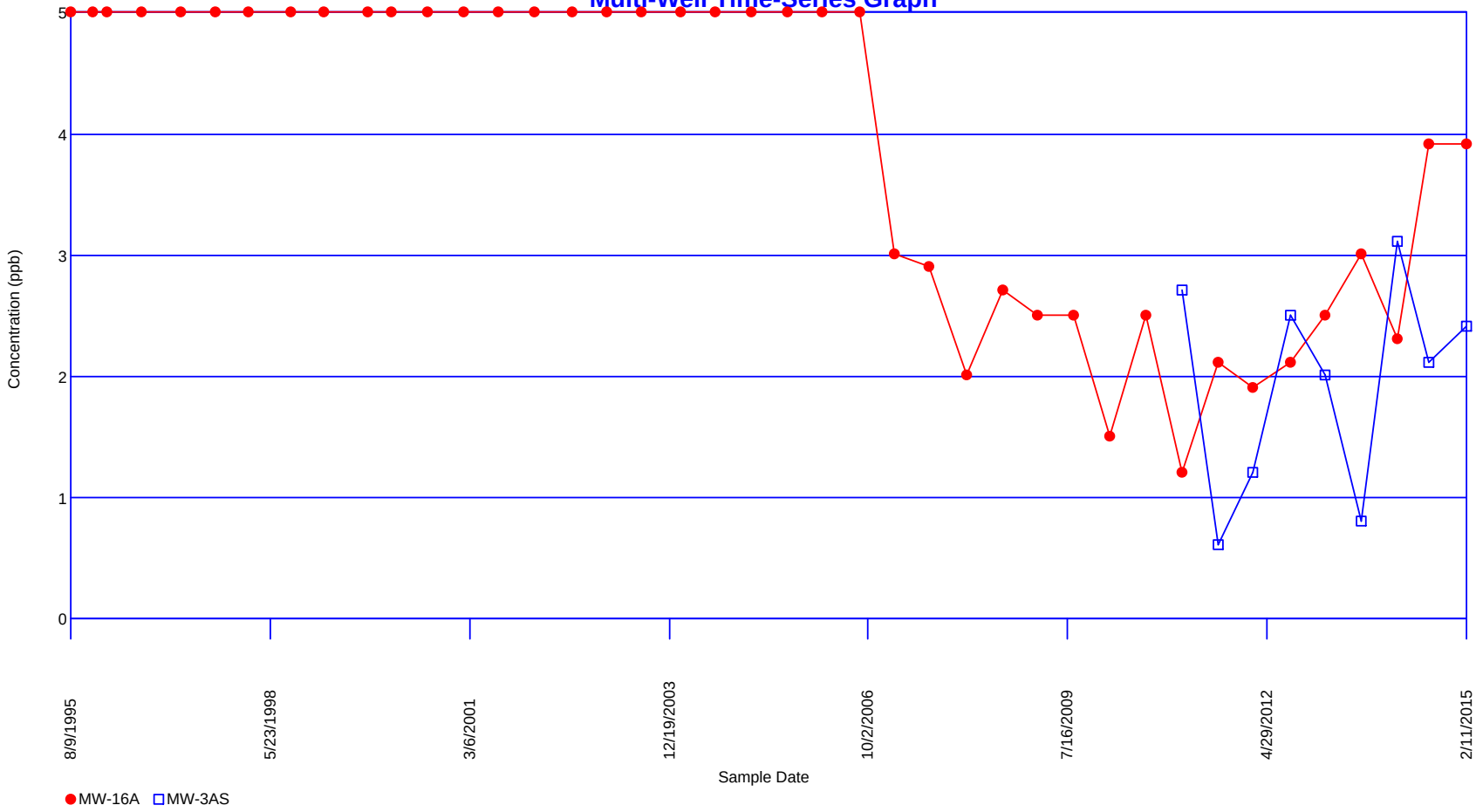
1,2-Dichloropropane

Time-Series Graph of MW-2AD



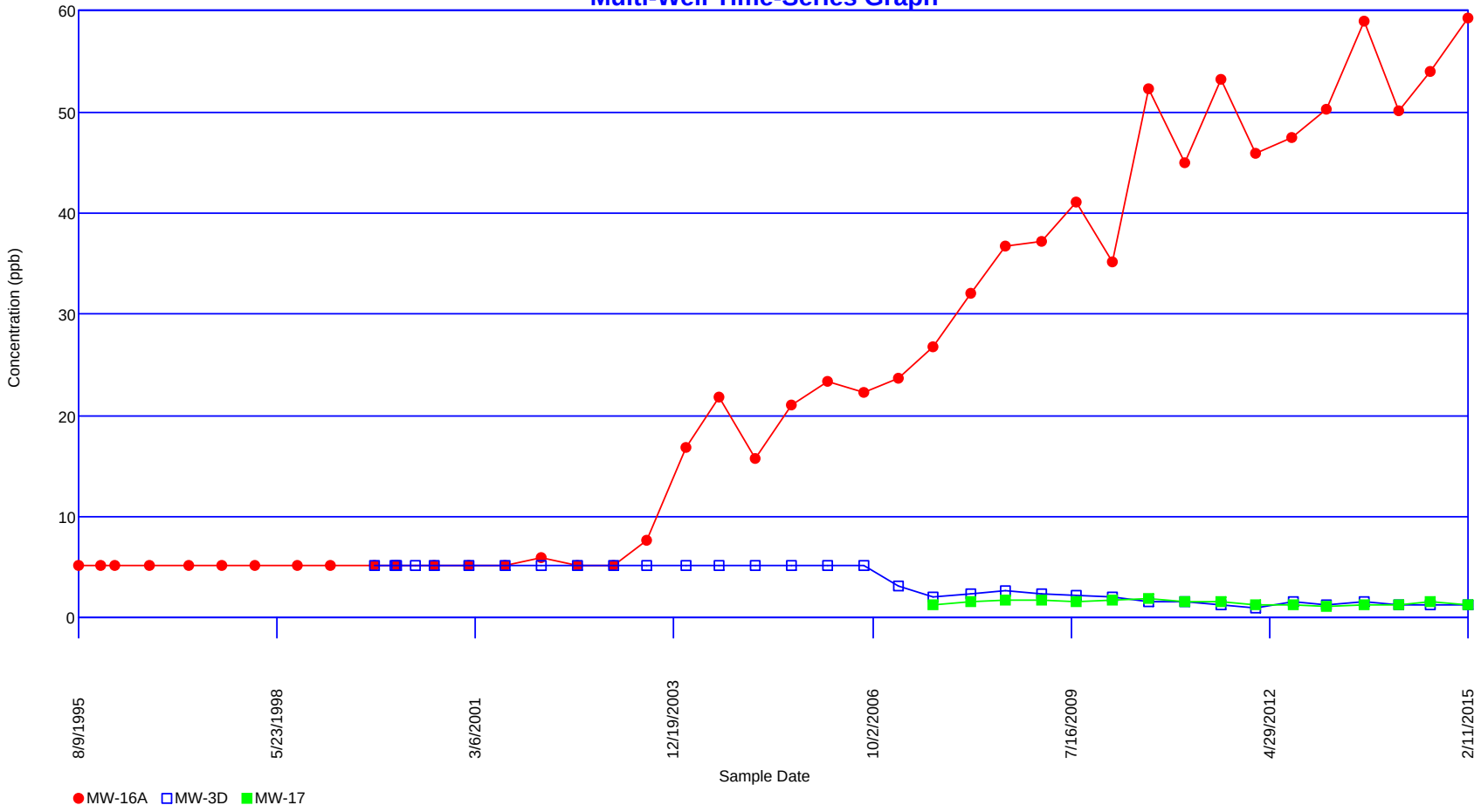
Benzene

Multi-Well Time-Series Graph



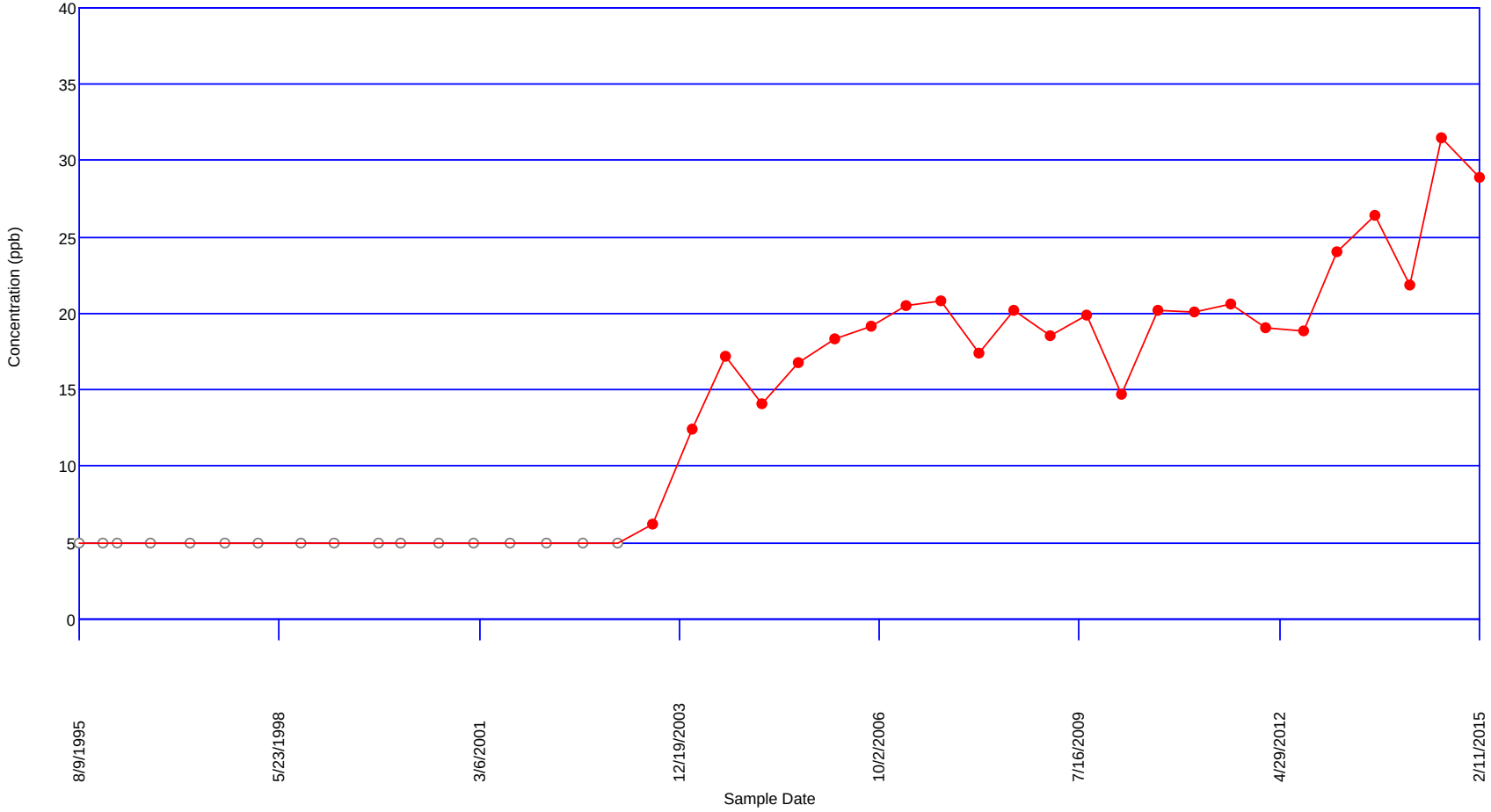
Tetrachloroethene (-ethylene)

Multi-Well Time-Series Graph



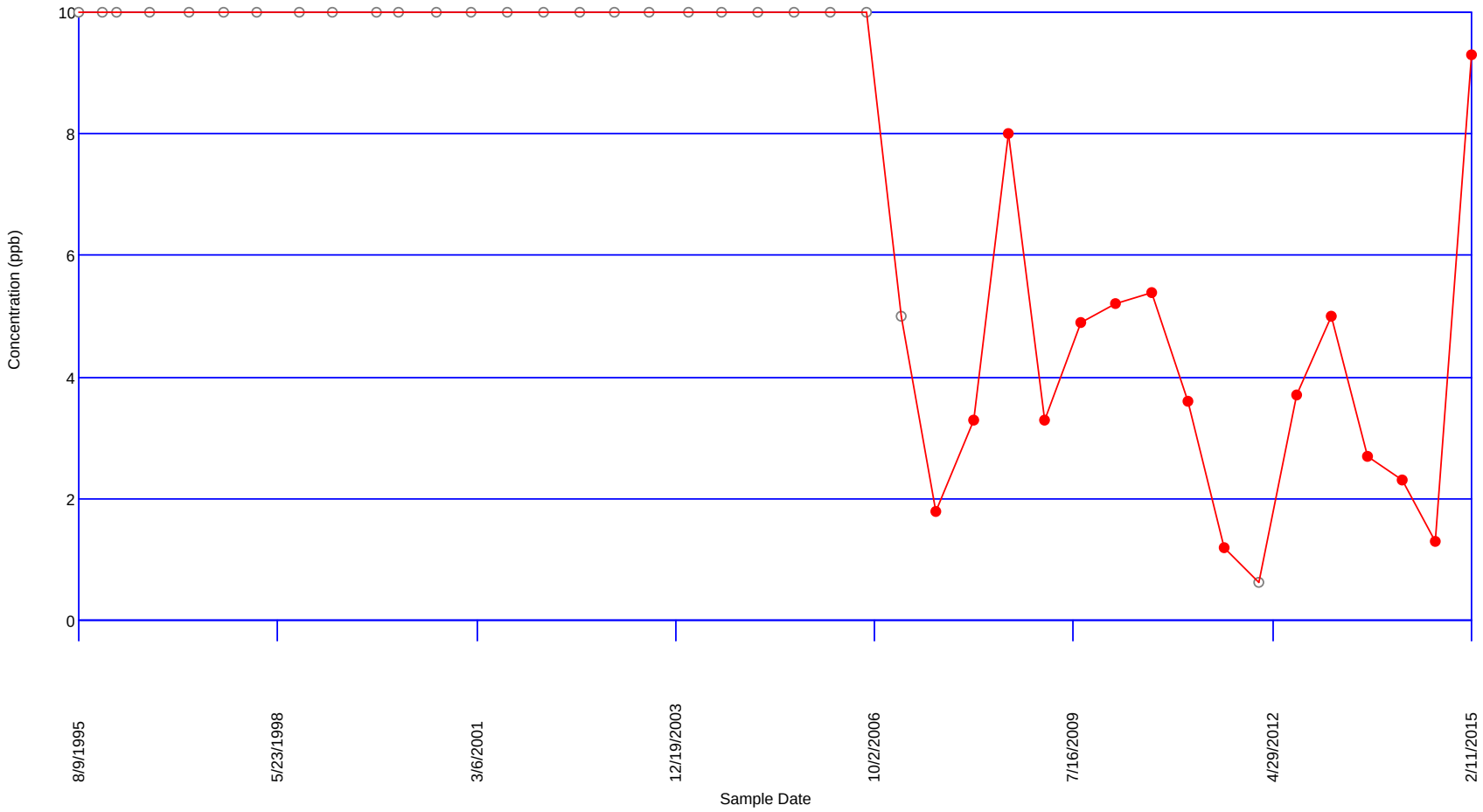
Trichloroethene (-ethylene)

Time-Series Graph of MW-16A



Vinyl chloride

Time-Series Graph of MW-2A



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Appendix D

Biochlor Evaluation

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BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Halifax County
Downgradient Plume
Run Name

Data Input Instructions:

115 → 1. Enter value directly....or
↑ *or* 2. Calculate by filling in gray
0.02 cells. Press Enter, then C
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation

TYPE OF CHLORINATED SOLVENT: Ethenes ◉ Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	66.6	(ft/yr)
or			
Hydraulic Conductivity	K	3.785E-04	(cm/sec)
Hydraulic Gradient	i	0.034	(ft/ft)
Effective Porosity	n	0.2	(-)

2. DISPERSION

Alpha x*	15	(ft)
(Alpha y) / (Alpha x)*	0.1	(-)
(Alpha z) / (Alpha x)*	1.E-99	(-)

Calc.

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient	Koc			
PCE	426	(L/kg)	4.62	(-)
TCE	130	(L/kg)	2.11	(-)
DCE	125	(L/kg)	2.06	(-)
VC	30	(L/kg)	1.25	(-)
ETH	302	(L/kg)	3.57	(-)
Common R (used in model)* =			**2.11**	

4. BIOTRANSFORMATION

-1st Order Decay Coefficient*

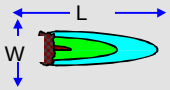
Zone 1	λ (1/yr)	half-life (yrs)	Yield
PCE → TCE	9.900	0.07	0.79
TCE → DCE	13.860	0.05	0.74
DCE → VC	3.850	0.18	0.64
VC → ETH	5.775	0.12	0.45

Zone 2	λ (1/yr)	half-life (yrs)
PCE → TCE	0.000	
TCE → DCE	0.000	
DCE → VC	0.000	
VC → ETH	0.000	

λ HELP

5. GENERAL

Simulation Time*	10	(yr)
Modeled Area Width*	1350	(ft)
Modeled Area Length*	150	(ft)
Zone 1 Length*	150	(ft)
Zone 2 Length*	0	(ft)



Zone 2=

6. SOURCE DATA

TYPE: Decaying
Single Planar

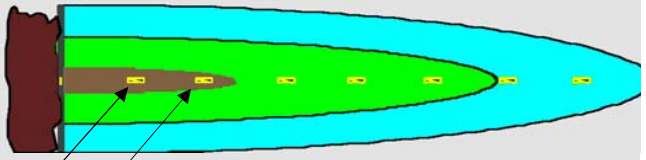
Source Options

Source Thickness in Sat. Zone* 25 (ft)

Width* (ft) Y1 1350

Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	.04	0.2
TCE	5.5	0.2
DCE	3.25	0.2
VC	1.6	0.2
ETH	0.03	0.2

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	0.0	0.0	0.0011								
TCE Conc. (mg/L)	0.0	0.0024	0.0011								
DCE Conc. (mg/L)	0.0	0.0097	0.0028								
VC Conc. (mg/L)	0.0	0.0093	0.0								
ETH Conc. (mg/L)	0.0	0.0	0.0								
Distance from Source (ft)	190	270	310								
Date Data Collected	2015										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore | RESET | SEE | Paste

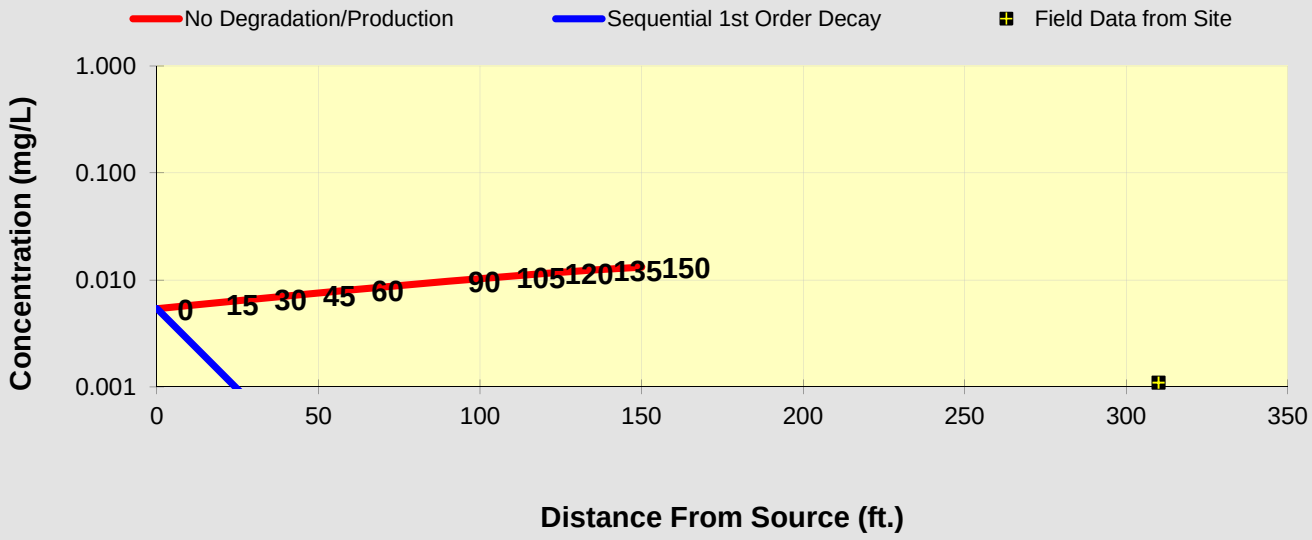
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

PCE	0	15	30	45	60	75	90	105	120	135	150
No Degradation	0.005	0.006	0.007	0.007	0.008	0.009	0.010	0.011	0.011	0.012	0.013
Biotransformation	0.0054	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	190	270	310								
Field Data from Site	0.000	0.000	0.001								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

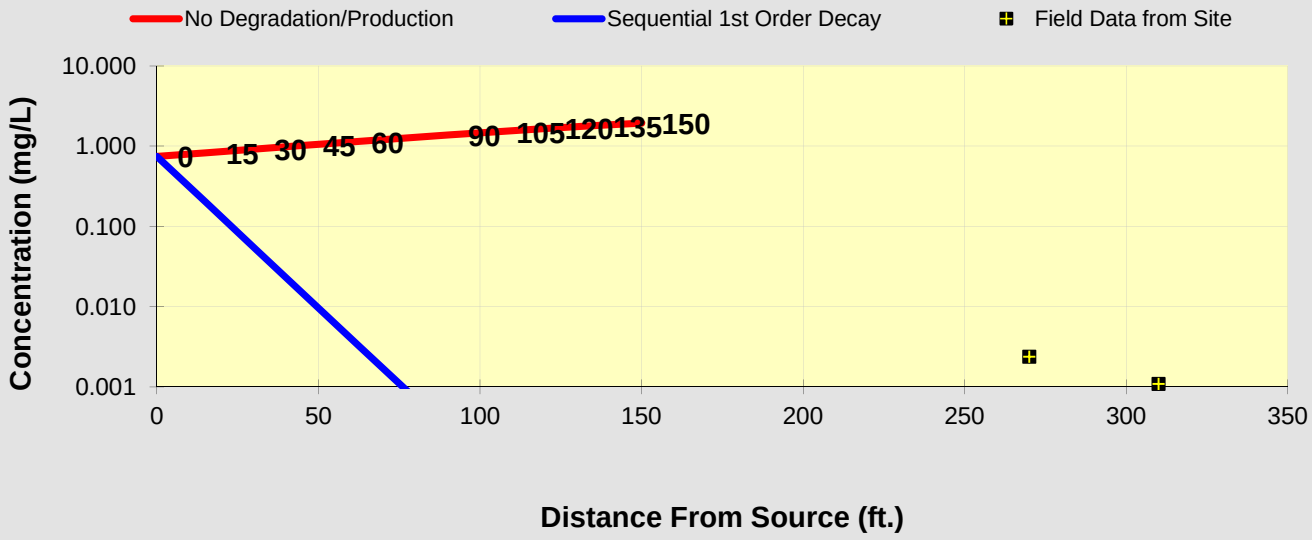
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCE	0	15	30	45	60	75	90	105	120	135	150
No Degradation	0.744	0.827	0.918	1.019	1.128	1.247	1.375	1.510	1.650	1.794	1.937
Biotransformation	0.7443	0.202	0.055	0.015	0.004	0.001	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	190	270	310								
Field Data from Site	0.000	0.002	0.001								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

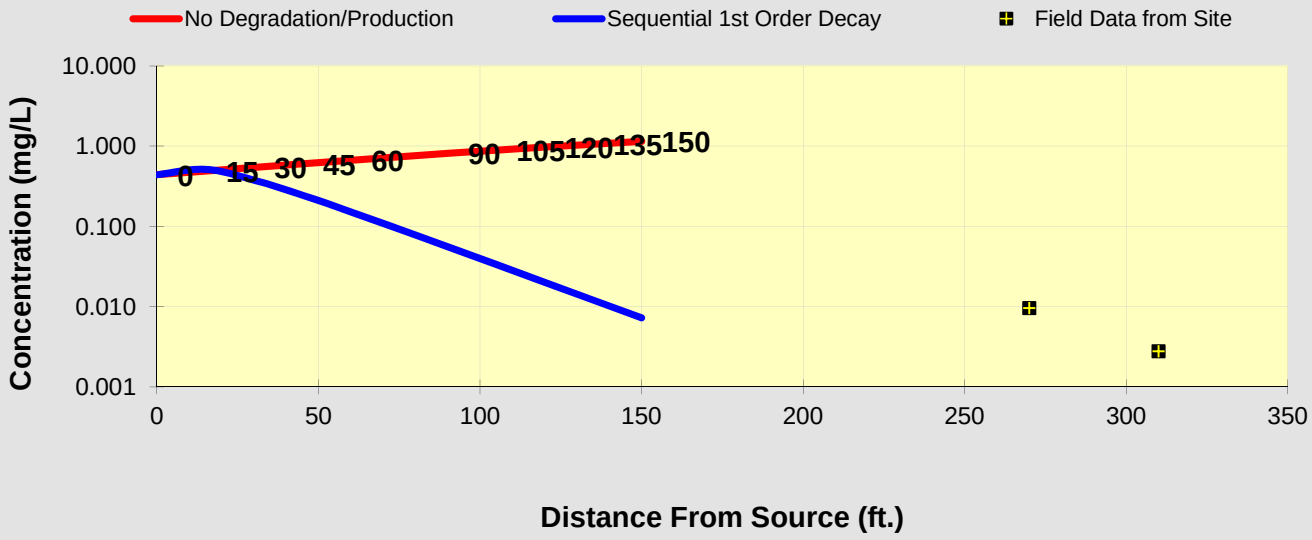
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

DCE	0	15	30	45	60	75	90	105	120	135	150
No Degradation	0.440	0.489	0.543	0.602	0.667	0.737	0.812	0.892	0.975	1.060	1.145
Biotransformation	0.4398	0.516	0.377	0.245	0.152	0.093	0.056	0.034	0.020	0.012	0.007

Monitoring Well Locations (ft)

	190	270	310								
Field Data from Site	0.000	0.010	0.003								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

10.0 Years

Log ⟺ Linear

Return to Input

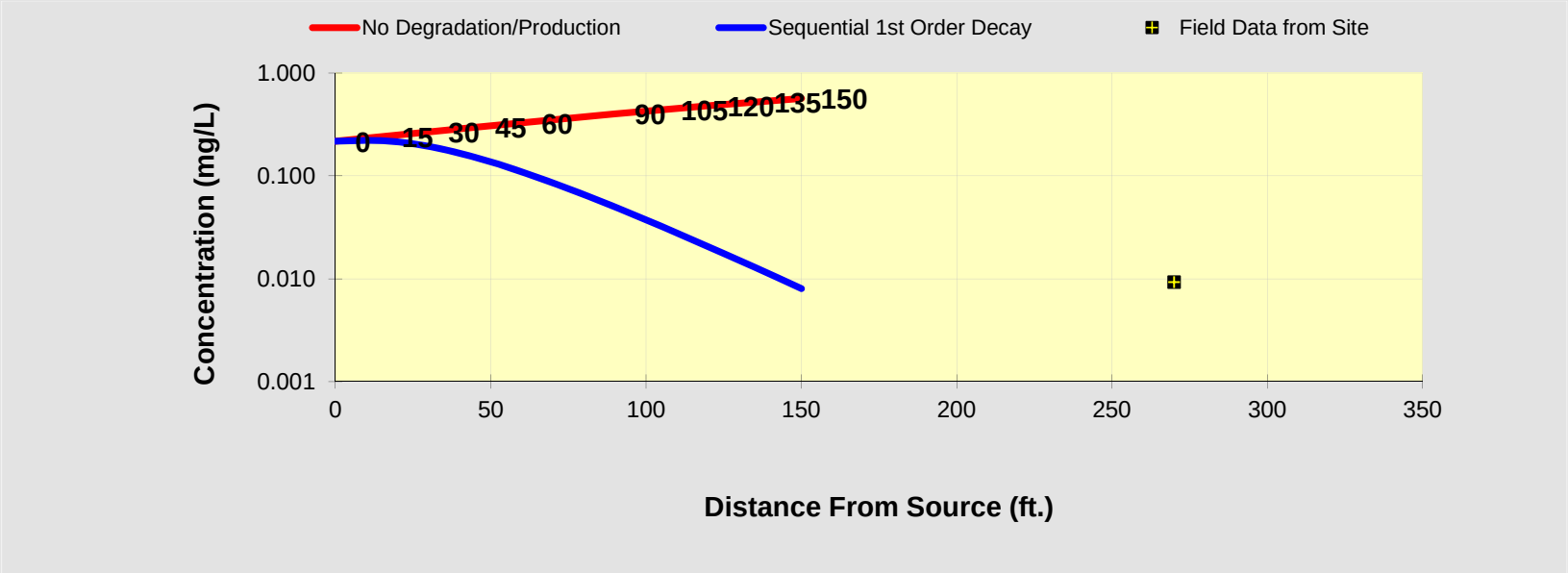
To All

To Array

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

VC	Distance from Source (ft)										
	0	15	30	45	60	75	90	105	120	135	150
No Degradation	0.217	0.241	0.267	0.296	0.328	0.363	0.400	0.439	0.480	0.522	0.564
Biotransformation	0.2165	0.220	0.193	0.151	0.109	0.075	0.050	0.032	0.021	0.013	0.008

	Monitoring Well Locations (ft)										
	190	270	310								
Field Data from Site	0.000	0.009	0.000								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

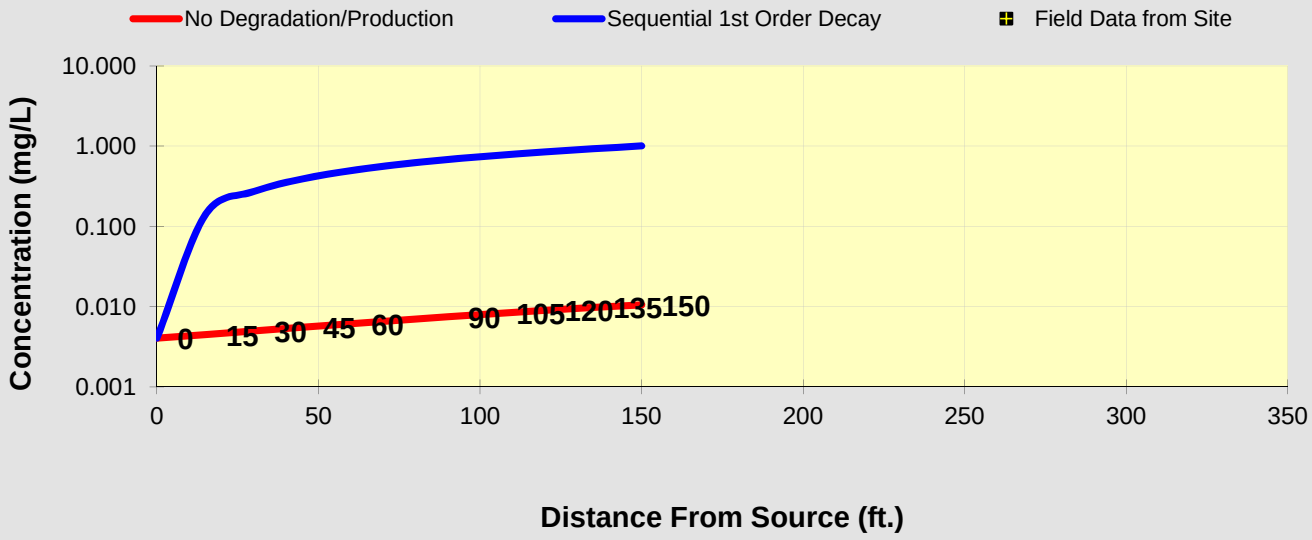
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

ETH	0	15	30	45	60	75	90	105	120	135	150
No Degradation	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
Biotransformation	0.0041	0.141	0.272	0.390	0.496	0.591	0.680	0.765	0.848	0.928	1.007

Monitoring Well Locations (ft)

	190	270	310								
Field Data from Site	0.000	0.000	0.000								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Halifax County
Downgradient Plume
Run Name

Data Input Instructions:

115 → 1. Enter value directly....or
↑ *or* 2. Calculate by filling in gray
0.02 cells. Press Enter, then C
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation

TYPE OF CHLORINATED SOLVENT: Ethenes ◉ Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	66.6	(ft/yr)
or			
Hydraulic Conductivity	K	3.785E-04	(cm/sec)
Hydraulic Gradient	i	0.034	(ft/ft)
Effective Porosity	n	0.2	(-)

2. DISPERSION

Alpha x*	15	(ft)
(Alpha y) / (Alpha x)*	0.1	(-)
(Alpha z) / (Alpha x)*	1.E-99	(-)

Calc.

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient	Koc			
PCE	426	(L/kg)	4.62	(-)
TCE	130	(L/kg)	2.11	(-)
DCE	125	(L/kg)	2.06	(-)
VC	30	(L/kg)	1.25	(-)
ETH	302	(L/kg)	3.57	(-)
Common R (used in model)* =			**2.11**	

4. BIOTRANSFORMATION

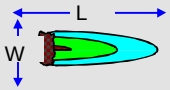
-1st Order Decay Coefficient*

	λ (1/yr)	half-life (yrs)	Yield
Zone 1			
PCE → TCE	0.578	1.20	0.79
TCE → DCE	0.770	0.90	0.74
DCE → VC	0.210	3.30	0.64
VC → ETH	0.267	2.60	0.45
Zone 2	λ (1/yr)	half-life (yrs)	
PCE → TCE	0.000		
TCE → DCE	0.000		
DCE → VC	0.000		
VC → ETH	0.000		

λ HELP

5. GENERAL

Simulation Time*	10	(yr)
Modeled Area Width*	1350	(ft)
Modeled Area Length*	150	(ft)
Zone 1 Length*	150	(ft)
Zone 2 Length*	0	(ft)



Zone 2=

6. SOURCE DATA

TYPE: Decaying
Single Planar

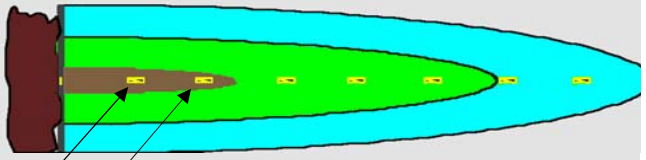
Source Options

Source Thickness in Sat. Zone* 25 (ft)

Width* (ft) Y1 1350

Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	0.4	0.2
TCE	5.5	0.2
DCE	3.25	0.2
VC	1.6	0.2
ETH	0.03	0.2

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	0.0	0.0000	0.0011								
TCE Conc. (mg/L)	0.0	0.0024	0.0011								
DCE Conc. (mg/L)	0.0	0.0097	0.0028								
VC Conc. (mg/L)	0.0	0.0093	0.0								
ETH Conc. (mg/L)	0.0	0.0	0.0								
Distance from Source (ft)	190	270	310								
Date Data Collected	2015										

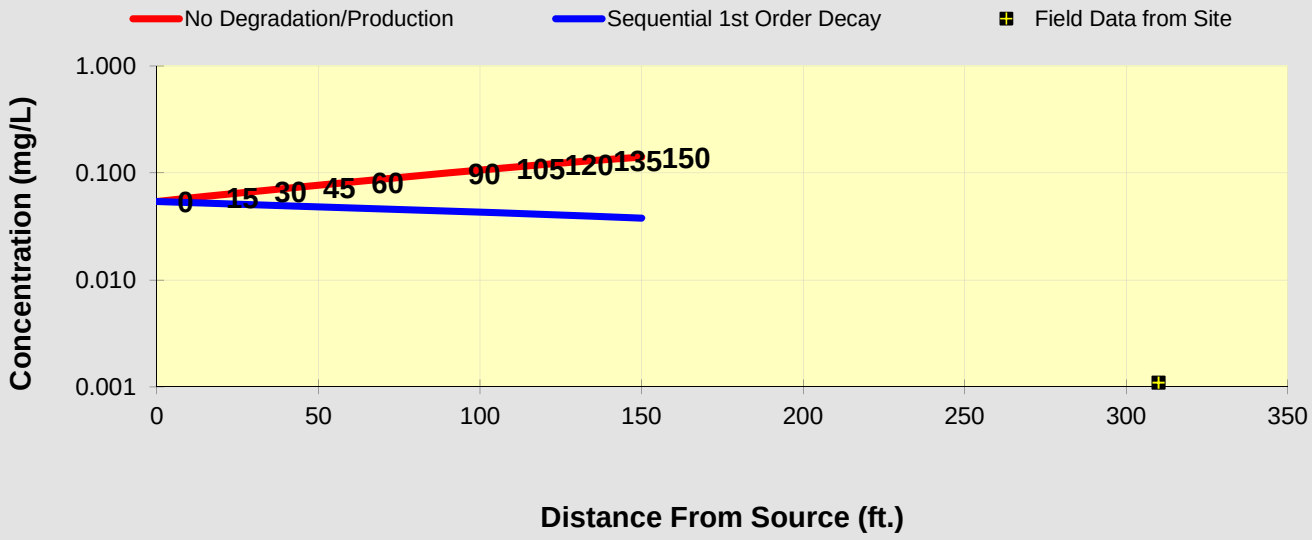
8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | *Help* | Restore | RESET | *SEE* | Paste

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

PCE	Distance from Source (ft)										
	0	15	30	45	60	75	90	105	120	135	150
No Degradation	0.054	0.060	0.067	0.074	0.082	0.091	0.100	0.110	0.120	0.130	0.141
Biotransformation	0.0541	0.052	0.051	0.049	0.047	0.046	0.044	0.042	0.041	0.039	0.038

	Monitoring Well Locations (ft)										
	190	270	310								
Field Data from Site	0.000	0.000	0.001								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

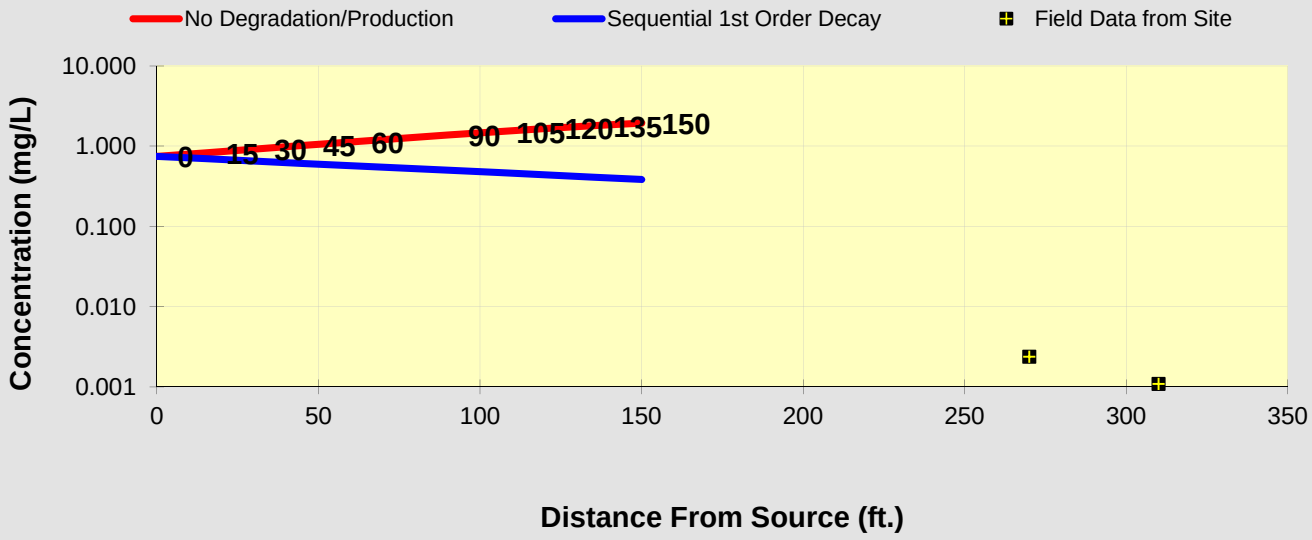
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCE	0	15	30	45	60	75	90	105	120	135	150
No Degradation	0.744	0.827	0.918	1.019	1.128	1.247	1.375	1.510	1.650	1.794	1.937
Biotransformation	0.7443	0.697	0.652	0.610	0.571	0.535	0.501	0.469	0.439	0.411	0.384

Monitoring Well Locations (ft)

	190	270	310								
Field Data from Site	0.000	0.002	0.001								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

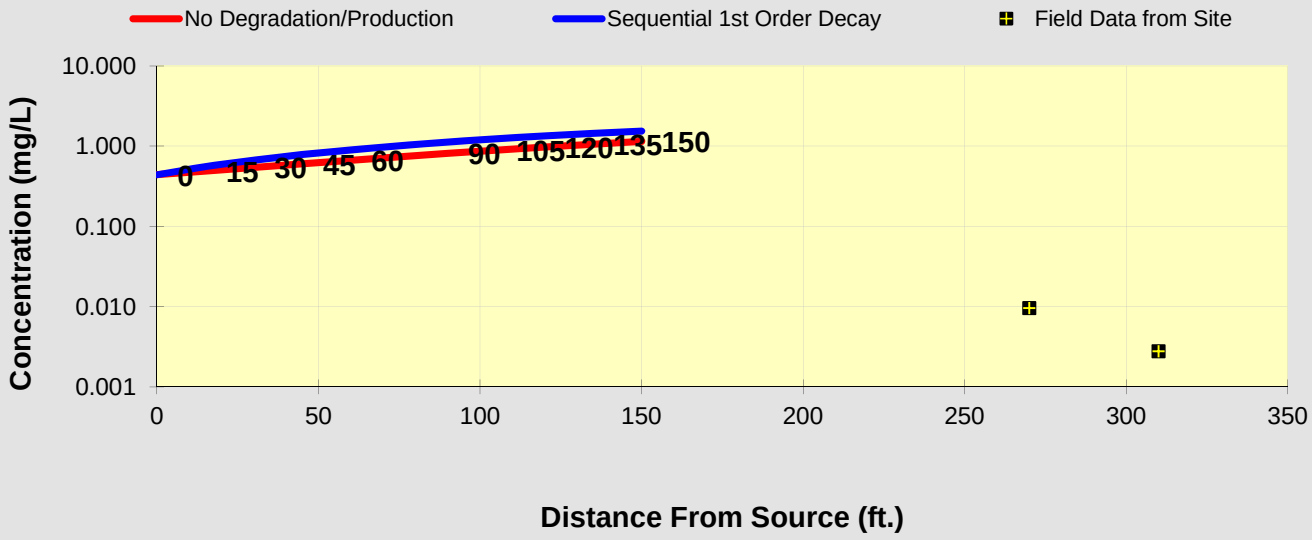
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

DCE	0	15	30	45	60	75	90	105	120	135	150
No Degradation	0.440	0.489	0.543	0.602	0.667	0.737	0.812	0.892	0.975	1.060	1.145
Biotransformation	0.4398	0.555	0.670	0.785	0.899	1.013	1.125	1.236	1.343	1.446	1.541

Monitoring Well Locations (ft)

	190	270	310								
Field Data from Site	0.000	0.010	0.003								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

10.0 Years

Log ⟺ Linear

Return to Input

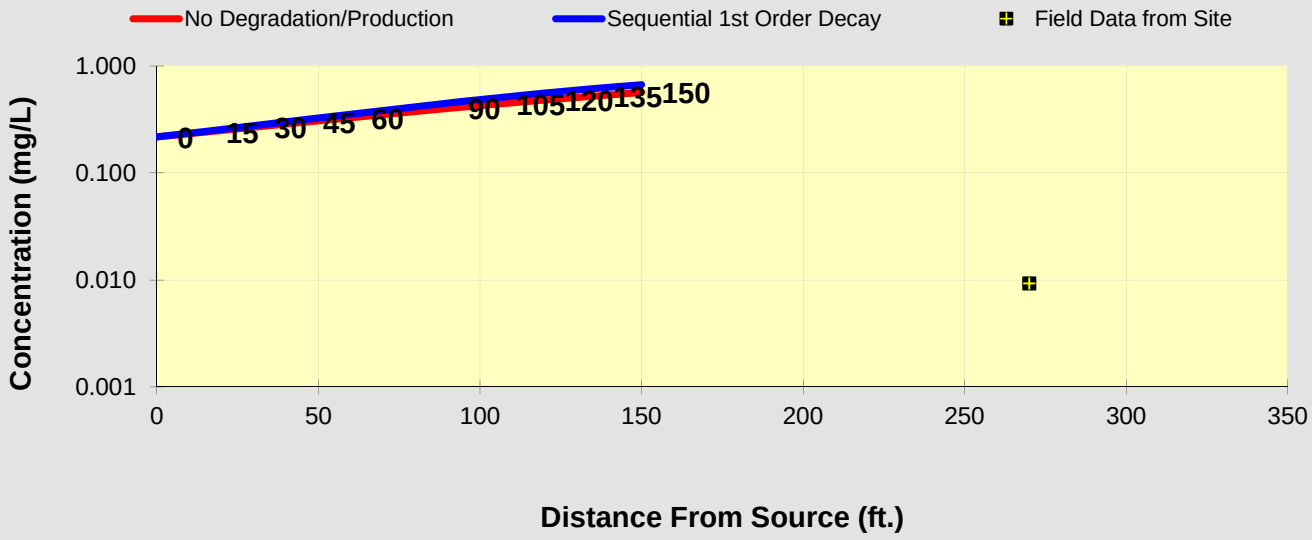
To All

To Array

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

VC	Distance from Source (ft)										
	0	15	30	45	60	75	90	105	120	135	150
No Degradation	0.217	0.241	0.267	0.296	0.328	0.363	0.400	0.439	0.480	0.522	0.564
Biotransformation	0.2165	0.244	0.276	0.313	0.354	0.400	0.449	0.501	0.556	0.612	0.668

	Monitoring Well Locations (ft)										
	190	270	310								
Field Data from Site	0.000	0.009	0.000								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

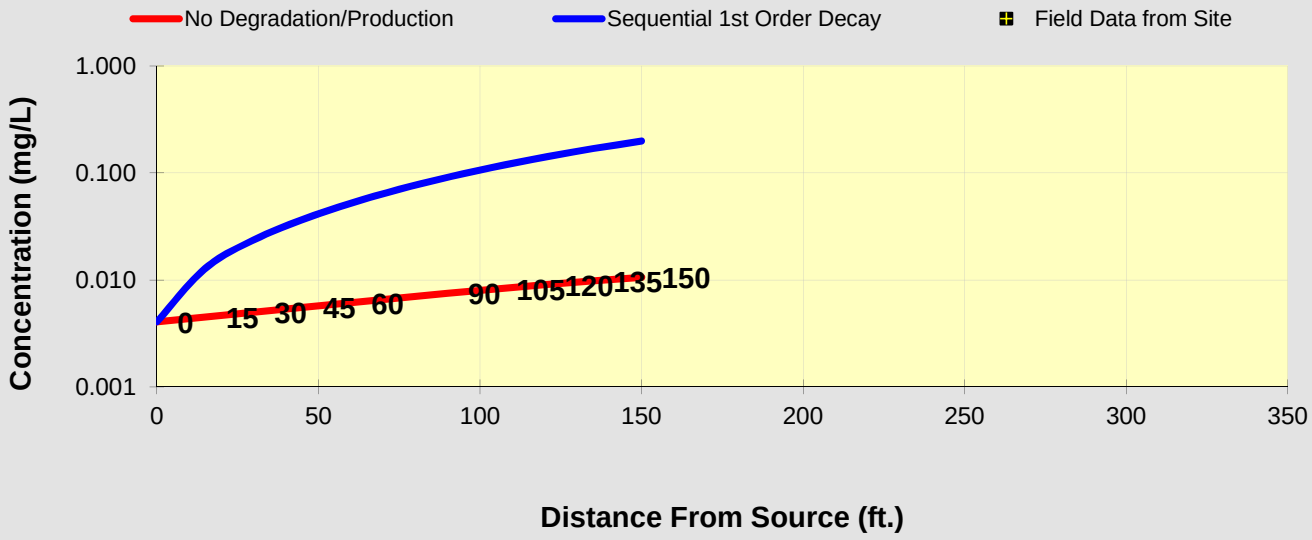
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

ETH	0	15	30	45	60	75	90	105	120	135	150
No Degradation	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
Biotransformation	0.0041	0.013	0.024	0.037	0.052	0.070	0.091	0.115	0.141	0.169	0.198

Monitoring Well Locations (ft)

	190	270	310								
Field Data from Site	0.000	0.000	0.000								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

10.0 Years

Log ⟺ Linear

Return to Input

To All

To Array