

**NC DENR**    **Environmental Monitoring Reporting Form**  
 Division of Waste Management - Solid Waste

**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, PG    Phone: 919-828-0577 x 222  
 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 Coal Ash Landfill	921 Liles Rd, Aurellan Springs, NC	42-04	.0500	August 24, 2015

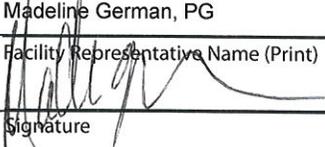
**Environmental Status: (Check all that apply)**  
 Initial/Background Monitoring     Detection Monitoring     Assessment Monitoring     Corrective Action

**Type of data submitted: (Check all that apply)**  
 Groundwater monitoring data from monitoring wells     Methane gas monitoring data  
 Groundwater monitoring data from private water supply wells     Corrective action data (specify) \_\_\_\_\_  
 Leachate monitoring data  
 Surface water monitoring data     Other(specify) \_\_\_\_\_

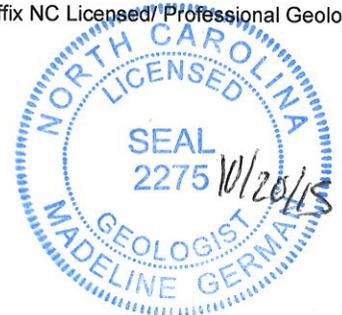
**Notification attached?**  
 No. No groundwater or surface water standards were exceeded.  
 Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater 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  
    10/20/15    Affix NC Licensed/Professional Geologist Seal  
 Signature    Date

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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# August 2015 Semi-Annual Groundwater Monitoring Report

## Halifax County Coal Ash Landfill NC Solid Waste Permit #42-04

Prepared for:

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



October 2015

Prepared by:

# SMITH+GARDNER

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577



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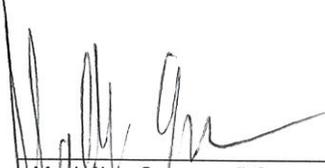
# August 2015 Groundwater Monitoring Report

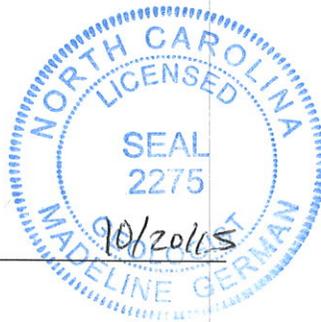
**Halifax County Coal Ash Landfill  
NC Solid Waste Permit #42-04**

Prepared For:

**Halifax County  
Halifax, North Carolina**

**S+G Project No. Halifax-8**

  
\_\_\_\_\_  
Madeline German, P.G.  
Project Geologist



  
\_\_\_\_\_  
Joan Smyth, P.G.  
Senior Hydrogeologist

**October 2015**

**SMITH+GARDNER**

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

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# Halifax County Coal Ash Landfill NC Solid Waste Permit #42-04

## February 2015 Semi-Annual Groundwater Monitoring Report

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## 1.0 INTRODUCTION

Smith Gardner, Inc. (S+G) is pleased to submit this semi-annual sampling report on behalf of the Halifax County Lined Coal Ash Landfill, operating under Solid Waste Permit #42-04, in accordance with Solid Waste Section Rule 15A NCAC 13B. This report presents semi-annual monitoring results for the event performed August 24, 2015.

The Halifax County Lined Coal Ash Landfill is a monofill landfill that only accepts coal ash from power generation. This report includes a field procedure summary, laboratory analyses, summary tables and groundwater characterization.

## 2.0 SITE HYDROGEOLOGY

The *1985 North Carolina Geological Map and Groundwater in the Halifax Area, North Carolina* (Dept. of Conservation and Development Bulletin #51, 1946) indicates the Halifax County Lined Coal Ash Landfill is situated on the eastern edge of the Eastern Piedmont Physiographic Province, just west of the Coastal Plain overlap. Western Halifax County is underlain by an assemblage of felsic to intermediate crystalline igneous and metamorphic rocks of early to late Paleozoic age. Eastern piedmont rocks exhibit a northeast strike and locally dip gently eastward as a result of regional metamorphism and folding that produced a broad plunging anticline. The area was simultaneously intruded by a number of felsic (granite) plutons. The rock formation underlying the subject site is a granitic pluton identified as the Butterwood Creek intrusive.

Depths to groundwater generally range from near surface in lowland areas along Brewer's Creek and its tributary to around 45 ft. below grade in the MW-12 area. Groundwater generally flows to the south.

## 3.0 SAMPLING LOCATIONS AND PROCEDURES

The sampling event, performed by Environment 1, Inc., on August 24, 2015 was conducted in accordance with the approved site Water Quality Monitoring Plan<sup>1</sup>. Sampling methods followed the protocol outlined in the Solid Waste Section Guidelines for Groundwater, Soil and Surface Water Sampling<sup>2</sup>. The depth to water in each well was gauged prior to purging and sampling.

The monitoring network at the Halifax Coal Ash Landfill currently includes six groundwater wells (MW-8, MW-9, MW-10, MW-11, MW-12 and MW-17), a surface water location (SW-3<sup>3</sup>) one sample collected from Sediment Basin 1 (Basin 1) and two sediment samples collected upstream and downstream of the sedimentation basin discharge point (Sediment 1 and Sediment 2). Basin 1 was dry; therefore unable to be sampled this event. Sampling location details are presented in **Table 1**.

---

1 Halifax County Landfill, Water Quality Monitoring Plan, November 2012 by Smith Gardner, Inc.

2 Solid Waste Section Guidelines for Groundwater, Soil and surface Water Sampling, NCDENR, DWM, April 2008.

3 The SW-3 location has been erroneously referred to as SW-1 in past semi-annual groundwater reports.

Samples were collected by Environment 1, Inc. 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.

Sampling locations are shown on **Figure 1**.

## **4.0 FIELD AND LABORATORY RESULTS**

### **4.1 Field Results**

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

### **4.2 Laboratory Analysis**

The samples were transported under proper chain of custody, in a cooler with ice to Environment 1, Inc., a North Carolina certified laboratory (NC Wastewater ID #10) located in Greenville, NC. Ground and surface water samples were analyzed for Appendix I metals plus mercury, total organic carbon (TOC), chloride and sulfate via the test methods specified in the laboratory report. Sediment samples were analyzed by Summit Environmental Technologies, Inc (NC Certification ID #39705 and #631) located in Cuyahoga Falls, OH. Samples were analyzed for specific metals detailed in the laboratory report using approved TCLP methods. Parameters were reported at NC Solid Waste Section Practical Quantitation Limits (SWSLs).

The laboratory analytical report is included as **Appendix A**.

### **4.3 Laboratory Results**

Analytical results were compared to the NC DWM Solid Waste Section Quantitation Limits (SWSLs), 15A NCAC 2L.0200 (2LStandard) and the EPA Federal Maximum Contaminant Limit. Surface water and basin results were compared with the NCAC 2B Standard for Class C waters (2B Standards).

No inorganic constituents were detected at concentrations above their 2L Standards this event, which is consistent with historically reported results. Most inorganic concentrations were reported as “J-qualified” indicating they are a non-quantifiable value that falls between the method limit and the SWSL.

Detectable concentrations of the indicator parameter total organic carbon were reported in the sample from MW-8; however, no SWSL, MCL or 2L Standard is established for this parameter.

No constituents were detected in the sample from SW-3 above the 2B Standard.

There were no constituents detected in the sediment samples (upstream and downstream).

Detected inorganic constituents from ground or surface water samples are presented in **Table 3**. Sediment sample results are shown in **Table 4**.

## **5.0 GROUNDWATER CHARACTERIZATION**

The depth to water data indicates that groundwater is flowing generally south towards the unnamed tributary to Brewer's Creek; which is consistent with historic groundwater flow patterns. Average groundwater velocity for the site is 0.0073 ft/day. Calculated groundwater velocities are presented in **Table 5**. The groundwater flow map is included as **Figure 1**.

## **6.0 CONCLUSIONS**

Current and historic analytical data indicate no groundwater impact at this site. The next semi-annual event is scheduled for February 2016. An event report will be submitted to NCDEQ following receipt and review of sampling results.

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## **FIGURES**

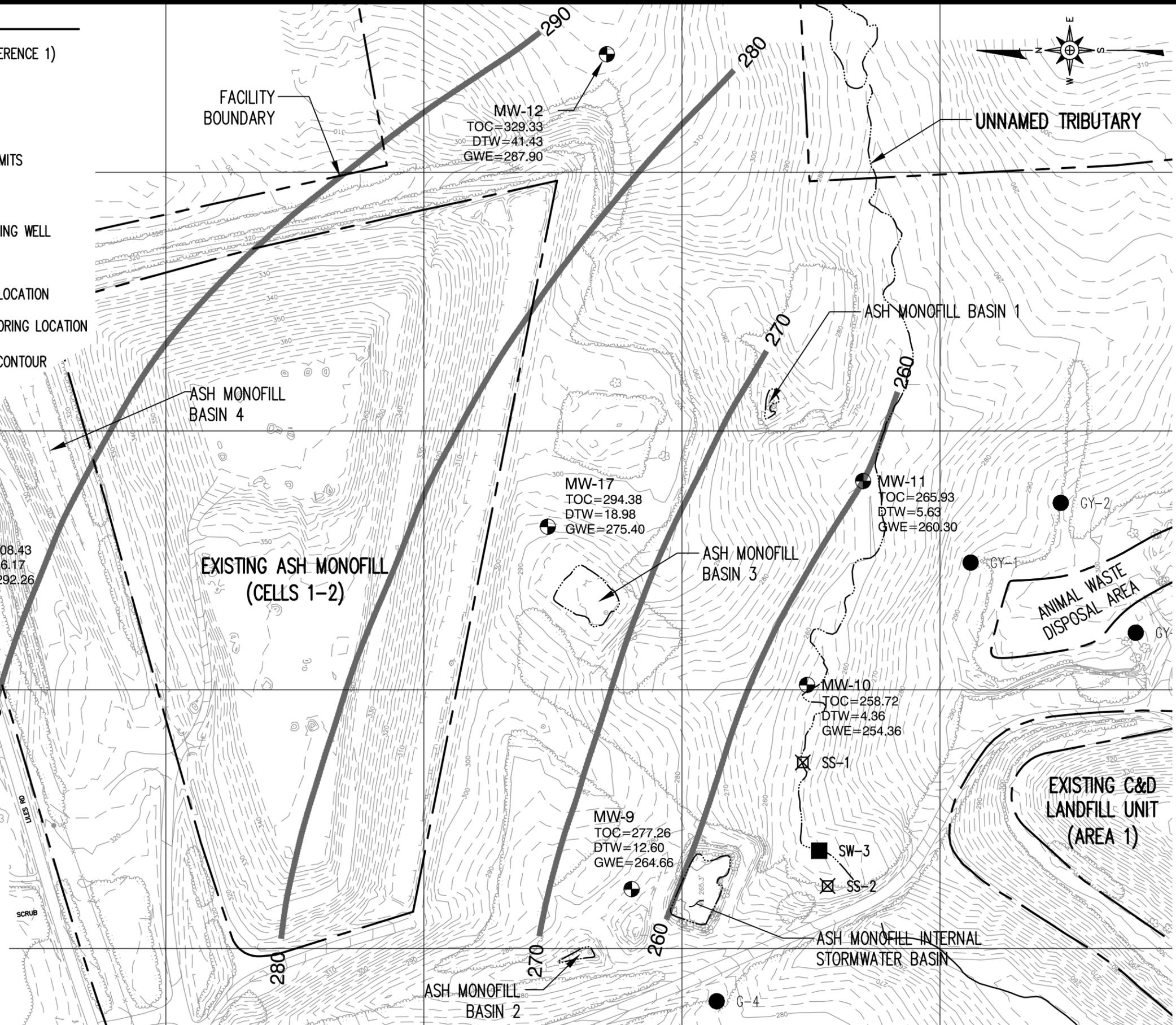
**August 2015 - Groundwater Monitoring Report  
Halifax County Coal Ash Landfill  
NC Solid Waste Permit #42-04**

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**LEGEND**

-  200 EXISTING 10' CONTOUR (SEE REFERENCE 1)
-  EXISTING 2' CONTOUR
-  STREAM/WATER BODY
-  APPROXIMATE EXISTING WASTE LIMITS
-  FACILITY BOUNDARY
-  MW-10 EXISTING GROUNDWATER MONITORING WELL
-  GY-2 EXISTING PIEZOMETER
-  SS-1 EXISTING SEDIMENT MONITORING LOCATION
-  SW-3 EXISTING SURFACE WATER MONITORING LOCATION
-  GROUNDWATER POTENTIOMETRIC CONTOUR
-  GROUNDWATER FLOW DIRECTION
- TOC TOP OF CASING
- DTW DEPTH TO WATER
- GWE GROUNDWATER ELEVATION

- REFERENCE:**
1. OVERALL SITE TOPOGRAPHY PROVIDED BY GEODATA CORPORATION, ZEBULON, NC, BASED ON JUNE 23, 2015 AERIAL PHOTOGRAPHY. AND NCDOT GIS DEPARTMENT DATA RELEASE MARCH 2005.
  2. GROUNDWATER ELEVATIONS ARE BASED ON WATER LEVEL MEASUREMENTS RECORDED BY ENVIRONMENT 1 PERSONNEL ON 8/25/2015.



G:\CAD\Halifax\Halifax-8\Sheets\HALI-B0290.dwg - 10/5/2015 2:57 PM

<p>PREPARED BY: <b>SMITH+GARDNER</b>  <small>NC LIC. NO. C-0828 (ENGINEERING)</small>  <small>14 N. Boylan Avenue, Raleigh NC 27603   919.828.0577</small></p>			
DRAWN: T.R.S.	APPROVED: M.M.G.	SCALE: AS SHOWN	FIGURE NO: 1
DATE: Oct 2015	PROJECT NO: HALIFAX-8	FILENAME: HALI-B0290	
<p><b>GROUNDWATER POTENTIOMETRIC MAP</b>  <b>HALIFAX COAL ASH LANDFILL</b>  <b>AUGUST 2015</b></p>			

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## **TABLES**

**August 2015 - Groundwater Monitoring Report  
Halifax County Coal Ash Landfill  
NC Solid Waste Permit #42-04**

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**Table 1**  
 Groundwater Elevation  
 Halifax County Coal Ash Landfill  
 August 25, 2015

Well	Well Installation Date	Latitude	Longitude	Well Diameter (inches)	Total Well Depth (ft. bgs)	Ground Surface Elevation (ft. amsl)	TOC Elevation (ft)	Measured Well Depth (ft)	Depth to Water (ft)	Water Table Elevation (ft)	Screen Interval (ft. bgs)	Screen Geology
MW-8	3/5/1992	36.38141717	77.80995961	2	20	311.12	308.43	23.38	16.17	292.26	5 - 20	NA
MW-9	1/5/1994	36.37798483	77.81249147	2	25	275.51	277.26	21.92	12.60	264.66	10 - 25	PWR
MW-10	1/10/1994	36.37703808	77.81116511	2	16.5	255.87	258.72	16.14	4.36	254.36	5 - 15	PWR
MW-11	1/7/1994	36.37672683	77.80983186	2	20	262.04	265.93	21.72	5.63	260.30	4 - 19	clayey silt/sand
MW-12	1/7/1994	36.37806319	77.80701042	2	50	325.67	329.33	51.34	41.43	287.90	34.5 - 49.5	sand
MW-17	1/7/1999	36.37840783	77.81010639	2	25	291.14	294.38	26.88	18.98	275.40	15 - 25	saprolite

**Table 2**  
 Field Parameters  
 Halifax County Coal Ash Landfill  
 August 25, 2015

Monitoring Location	pH (std units)	Specific Conductivity (uMhos/cm)	Temperature (degrees C)	Turbidity (NTU)
MW-8	4.8	429	17	3.1
MW-9	5.2	33	21	19
MW-10	5.4	47	21	14
MW-11	6.3	194	21	18
MW-12	4.6	127	17	82
MW-17	5.2	43	19	130
SW-3	6.6	770	21	4.5

Note:

Basin 1 unable to be sampled this event

Data from 09/17/15 Environment 1, Incorporated Laboratory Report Client ID#6042.

**Table 3**  
 Inorganic Constituents - Groundwater Samples  
 Halifax County Coal Ash Landfill  
 August 25, 2015

Parameter	MDL	SWSL	2L Standard	MCL	2B Standard	MW-8	MW-9	MW-10	MW-11	MW-12	MW-17	SW-3
Total Organic Carbon (mg/L)	0.085	NE	NE	NE	NE	1.47	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085
Chloride (mg/L)	5.0	NE	250	250	230	<5.0	<5.0	<5.0	<5.0	7.0	<5.0	154
Sulfate (mg/L)	5.0	250	250	250	NE	6.4 J	5.7 J	7.1 J	6.0 J	7.0 J	5.0 J	73.2 J
Arsenic (ug/L)	0.14	10	10	10	10	0.14 J	<0.14	<0.14	<0.14	<0.14	<0.14	1.4 J
Barium (ug/L)	0.01	100	700	2000	2000000	63.8 J	39.6 J	29.2 J	11.9 J	71.7 J	42.6 J	25.3 J
Cadmium (ug/L)	0.01	1	2	5	2	0.16 J	0.15 J	0.07 J	0.06 J	0.16 J	0.12 J	0.34 J
Chromium, total (ug/L)	0.12	10	10	100	50	0.47 J	0.13 J	<0.12	<0.12	1.1 J	1.4 J	<0.12
Copper (ug/L)	0.02	10	1000	1300	7	0.86 J	0.97 J	0.51 J	1.1 J	2.8 J	5.3 J	0.50 J
Lead (ug/L)	0.03	10	15	15	25	1.9 J	0.69 J	0.48 J	0.23 J	1.9 J	0.70 J	<0.03
Selenium (ug/L)	0.22	10	20	10	5	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	7.1 J
Silver (ug/L)	0.01	10	20	10	0.06	<0.01	<0.01	<0.01	<0.01	0.01 J	0.02 J	<0.01
Zinc (ug/L)	0.20	10	1000	5000*	50	2.8 J	8.1 J	2.0 J	1.9 J	19	6.7 J	11

Note:

- MDL - Method Detection Limit
- SWSL - Solid Waste Section Quantitation Limit
- 2L - Groundwater Standard (15A NCAC 2L 0200)
- MCL - Maximum Contaminant Limit
- 2B - NCAC 2B Standard for Class C waters
- < MDL - Not detected at or above the MDL
- Bold Letters - Concentration above 2L or 2B Standard
- J - "J-qualified" reported from laboratory data between the MDL and the SWSL
- NE - Standard Not Established
- \* - National Secondary Drinking Water Standard

Data from 9/17/2015 Environment 1, Incorporated Laboratory Report Client ID#6042.  
 Basin 1 unable to be sampled this event

**Table 4**  
 Inorganic Constituents - Sediment Samples  
 Halifax County Coal Ash Landfill  
 August 25, 2015

	LOQ/CL	SWSL	Sediment #1 Upstream	Sediment #2 Downstream
Arsenic	0.500	10	<0.500	<0.500
Barium	5.00	100	<5.00	<5.00
Cadmium	0.100	1	<0.100	<0.100
Chromium, total	0.200	10	<0.200	<0.200
Lead	0.500	10	<0.500	<0.500
Mercury	0.002	0.2	<0.002	<0.002
Selenium	0.500	10	<0.500	<0.500
Silver	0.500	10	<0.500	<0.500

**NOTE:**

- LOQ/CL - Reporting Limit/Control Limit for the parameter recovery result
- SWSL - Solid Waste Section Quantitation Limit
- < LOQ/CL - Not detected at or above the LOQ/CL
- Bold Letters - Constituent detected above SWSL

Results are from TCLP analysis presented in ug/l unless otherwise noted.

Results from Summit Environmental Technologies, Inc. on 9/1/2015 - WO#15082669.

Units are presented in mg/L

**Table 5**  
 Calculated Groundwater Velocities  
 Halifax County Coal Ash Landfill  
 August 25, 2015

Well	Hydraulic Conductivity (ft/day)	Porosity	Hydraulic Gradient (ft/ft)	Ground Water Velocity (ft/day)
MW-8	0.047	0.2	0.0156	0.0037
MW-9	0.047	0.2	0.0583	0.0137
MW-10	0.047	0.2	0.0135	0.0032
MW-11	0.047	0.2	0.0340	0.0080
MW-12	0.047	0.2	0.0405	0.0095
MW-17	0.047	0.2	0.0245	0.0058

**NOTE:**

Hydraulic Conductivity averaged from Closed MSW well data

Porosity values assumed from Groundwater & Wells (Driscoll)

Hydraulic Gradient based on August 2015 groundwater elevations

Velocity Calculated from  $V=K*i/n$

V = velocity

K = Hydraulic Conductivity

i = Gradient

n = Porosity

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## **Appendix A**

### **Laboratory Analytical Report**

**August 2015 - Groundwater Monitoring Report  
Halifax County Coal Ash Landfill  
NC Solid Waste Permit #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#: 6042

HALIFAX CO. (COAL ASH LANDFILL)  
MR. GREG GRIFFIN  
P.O. BOX 70  
HALIFAX, NC 27839

DATE COLLECTED: 08/25/15  
DATE REPORTED : 09/17/15

REVIEWED BY: 

PARAMETERS	MDL	SWSL	Well	Well	Well	Well	Well	Analysis		Method
			#8	#9	#10	#11	#12	Date	Analyst	Code
PH (field measurement), Units			4.8	5.2	5.4	6.3	4.6	08/25/15	BF	4500HB-00
Total Organic Carbon, mg/l	0.085	1.0	1.47	--- U	--- U	--- U	--- U	08/26/15	SEJ	5310C-00
Chloride, mg/l	5.0	5.0	--- U	--- U	--- U	--- U	7	08/31/15	SDB	4500CLB-97
Sulfate, mg/l	5.0	250.0	6.4 J	5.7 J	7.1 J	6.0 J	7.0 J	08/31/15	SEJ	4500SO42E9
Arsenic, ug/l	0.14	10.0	0.14 J	--- U	--- U	--- U	--- U	09/11/15	LFJ	EPA200.8
Barium, ug/l	0.01	100.0	63.8 J	39.6 J	29.2 J	11.9 J	71.7 J	09/11/15	LFJ	EPA200.8
Cadmium, ug/l	0.01	1.0	0.16 J	0.15 J	0.07 J	0.06 J	0.16 J	09/11/15	LFJ	EPA200.8
Total Chromium, ug/l	0.12	10.0	0.47 J	0.13 J	--- U	--- U	1.1 J	09/11/15	LFJ	EPA200.8
Copper, ug/l	0.02	10.0	0.86 J	0.97 J	0.51 J	1.1 J	2.8 J	09/11/15	LFJ	EPA200.8
Lead, ug/l	0.03	10.0	1.9 J	0.69 J	0.48 J	0.23 J	1.9 J	09/11/15	LFJ	EPA200.8
Mercury, ug/l	0.05	0.20	--- U	08/28/15	MTM	245.1 R3-9				
Selenium, ug/l	0.22	10.0	--- U	09/11/15	LFJ	EPA200.8				
Silver, ug/l	0.01	10.0	--- U	--- U	--- U	--- U	0.01 J	09/11/15	LFJ	EPA200.8
Zinc, ug/l	0.20	10.0	2.8 J	8.1 J	2.0 J	1.9 J	19	09/11/15	LFJ	EPA200.8
Turbidity, NTU	1.0	1.0	3.1	19.0	14.0	18.0	82.0	08/25/15	KKF	2130B-01
Conductivity (at 25c), uMhos/cm	1.0	1.0	429	33	47	194	127	08/25/15	BF	2510B-97
Temperature, °C			17	21	21	21	17	08/25/15	BF	2550B-00
Static Water Level, feet			16.17	12.60	4.36	5.63	41.43	08/25/15	BF	
Well Depth, feet			23.38	21.92	16.14	21.72	51.34	08/25/15	BF	

# 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#: 6042

HALIFAX CO. (COAL ASH LANDFILL)  
MR. GREG GRIFFIN  
P.O. BOX 70  
HALIFAX ,NC 27839

DATE COLLECTED: 08/25/15  
DATE REPORTED : 09/17/15

REVIEWED BY: 

PARAMETERS	MDL	SWSL	Well	Analysis		Method
			#17	Date	Analyst	Code
PH (field measurement), Units			5.2	08/25/15	BF	4500HB-00
Total Organic Carbon, mg/l	0.085	1.0	---	08/26/15	SEJ	5310C-00
Chloride, mg/l	5.0	5.0	---	08/31/15	SDB	4500CLB-97
Sulfate, mg/l	5.0	250.0	5.0	08/31/15	SEJ	4500SO42E97
Arsenic, ug/l	0.14	10.0	---	09/11/15	LFJ	EPA200.8
Barium, ug/l	0.01	100.0	42.6	09/11/15	LFJ	EPA200.8
Cadmium, ug/l	0.01	1.0	0.12	09/11/15	LFJ	EPA200.8
Total Chromium, ug/l	0.12	10.0	1.4	09/11/15	LFJ	EPA200.8
Copper, ug/l	0.02	10.0	5.3	09/11/15	LFJ	EPA200.8
Lead, ug/l	0.03	10.0	0.70	09/11/15	LFJ	EPA200.8
Mercury, ug/l	0.05	0.20	---	08/28/15	MTM	245.1 R3-94
Selenium, ug/l	0.22	10.0	---	09/11/15	LFJ	EPA200.8
Silver, ug/l	0.01	10.0	0.02	09/11/15	LFJ	EPA200.8
Zinc, ug/l	0.20	10.0	6.7	09/11/15	LFJ	EPA200.8
Turbidity, NTU	1.0	1.0	130	08/25/15	KKF	2130B-01
Conductivity (at 25c), uMhos/cm	1.0	1.0	43	08/25/15	BF	2510B-97
Temperature, °C			19	08/25/15	BF	2550B-00
Static Water Level, feet			18.98	08/25/15	BF	
Well Depth, feet			26.88	08/25/15	BF	

# 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#: 6042 A

HALIFAX CO. (COAL ASH LANDFILL)  
MR. GREG GRIFFIN  
P.O. BOX 70  
HALIFAX ,NC 27839

DATE COLLECTED: 08/24/15  
DATE REPORTED : 09/17/15

REVIEWED BY: 

PARAMETERS	MDL	SW-3 SWSL	Basin #1	Analysis		Method
				Date	Analyst	Code
PR (field measurement), Units			6.6	Missing	08/24/15	BF 4500HB-00
Total Organic Carbon, mg/l	0.085	1.0	--- U	Missing	08/26/15	SEJ 5310C-00
Chloride, mg/l	5.0	5.0	154	Missing	08/31/15	SDB 4500CLB-97
Sulfate, mg/l	5.0	250.0	73.2 J	Missing	08/31/15	SEJ 4500SO42E97
Arsenic, ug/l	0.14	10.0	1.4 J	Missing	09/11/15	LFJ EPA200.8
Barium, ug/l	0.01	100.0	25.3 J	Missing	09/11/15	LFJ EPA200.8
Cadmium, ug/l	0.01	1.0	0.34 J	Missing	09/11/15	LFJ EPA200.8
Total Chromium, ug/l	0.12	10.0	--- U	Missing	09/11/15	LFJ EPA200.8
Copper, ug/l	0.02	10.0	0.50 J	Missing	09/11/15	LFJ EPA200.8
Lead, ug/l	0.03	10.0	--- U	Missing	09/11/15	LFJ EPA200.8
Mercury, ug/l	0.05	0.20	--- U	Missing	08/28/15	MTM 245.1 R3-94
Selenium, ug/l	0.22	10.0	7.1 J	Missing	09/11/15	LFJ EPA200.8
Silver, ug/l	0.01	10.0	--- U	Missing	09/11/15	LFJ EPA200.8
Zinc, ug/l	0.20	10.0	11	Missing	09/11/15	LFJ EPA200.8
Turbidity, NTU	1.0	1.0	4.5	Missing	08/24/15	KDS 2130B-01
Conductivity (at 25c), uMhos/cm	1.0	1.0	770	Missing	08/24/15	BF 2510B-97
Temperature, °C			21	Missing	08/24/15	BF 2550B-00

Environment 1, Inc.  
 P.O. Box 7085, 114 Oakmont Dr.  
 Greenville, NC 27838

CHAIN OF CUSTODY RECORD

environment1inc.com  
 Phone (252) 756-6208 • Fax (252) 756-0633

CLIENT: 6042 A Week: 35

HALIFAX CO. (COAL ASH LANDFILL)  
 MR. GREG GRIFFIN  
 P.O. BOX 70  
 HALIFAX NC 27839

(252) 583-1807

SAMPLE LOCATION	COLLECTION		TOTAL CHLORINE, mg/l OR ug/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	DISINFECTION		Field pH	TOC	Chloride	Sulfate	Metals	Turbidity	Conductivity	Temperature	TCLP Metals	PARAMETERS/TESTS	CHLORINE NEUTRALIZED AT COLLECTION	PH CHECK (LAB)	CONTAINER TYPE, P/G	CHEMICAL PRESERVATION	
	DATE	TIME				CHLORINE	UV															
SW-3	8-24-15	1005		21	6	<input type="checkbox"/>	<input type="checkbox"/>															
Basin #1																						
Sediment Sample #1	8-24-15	0935			1																	
Sediment Sample #2	8-24-15	1012			1																	
RELINQUISHED BY (SIG.)	DATE/TIME	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME
<i>Robby Fox</i>	8-24-15	1410	<i>[Signature]</i>		<i>[Signature]</i>																	
RELINQUISHED BY (SIG.)	DATE/TIME	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME
<i>[Signature]</i>			<i>[Signature]</i>		<i>[Signature]</i>																	
RELINQUISHED BY (SIG.)	DATE/TIME	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME
<i>[Signature]</i>			<i>[Signature]</i>		<i>[Signature]</i>																	

FORM #5

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 297705

COMMENTS: Basin #1 Dry

SAMPLES COLLECTED BY: Robby Fox / Tom Beasley  
 (Please Print)  
 SAMPLES RECEIVED IN LAB AT 25 °C

CHAIN OF CUSTODY (SEAL) MAINTAINED DURING SHIPMENT/DELIVERY

- WASTEWATER (NPDES)
- DRINKING WATER
- DMO/GW
- SOLID WASTE SECTION

CLASSIFICATION:  
 A - NONE D - NaOH  
 B - HNO<sub>3</sub> E - HCL  
 C - H<sub>2</sub>SO<sub>4</sub> F - ZINC ACETATE/NaOH  
 G - Na THIOSULFATE

CHEMICAL PRESERVATION





Summit Environmental Technologies, Inc.  
3310 Win St.  
Cuyahoga Falls, Ohio 44223  
TEL: (330) 253-8211 FAX: (330) 253-4489  
Website: <http://www.settek.com>

September 01, 2015

Deedee Woolard  
Environment 1, Inc.  
114 Oakmont Dr  
P.O. Box 7085  
Greenville, NC 27858  
TEL: (252) 756-6208  
FAX: (252) 756-0633

RE: Sediment Sample

Dear Deedee Woolard:

Order No.: 15082669

Summit Environmental Technologies, Inc. received 2 sample(s) on 8/26/2015 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative.

Quality control data is within laboratory defined or method specified acceptance limits except where noted.

If you have any questions regarding these tests results, please feel free to call the laboratory.

Sincerely,

Dr. Mo Osman  
Project Manager  
3310 Win St.  
Cuyahoga Falls, Ohio 44223

A2LA 0724.01, Alabama 41600, Arizona AZ0788, Arkansas 88-0735, California 07256CA, Colorado, Connecticut PH-0105, Delaware, Florida NELAC E87688, Georgia E87688 and 943, Idaho OH00923, Illinois 200061 and Reg. 5, Indiana C-OH-13, Kansas E-10347, Kentucky (Underground Storage Tank) 3, Kentucky 90146, Louisiana 04061 and LA12004, Maine 2012015, Maryland 339, Massachusetts M-OPH923, Minnesota 409711, Montana CERT0099, New Hampshire 2996, New Jersey OH006, New York 11777, North Carolina 39705 and 631, Ohio Drinking Water 4170, Ohio VAP CL0052, Oklahoma 9940, Oregon OH200001, Rhode Island LA000317, South Carolina 92016001, Tennessee TN04018, Texas T104704466-11-5, Region 8 8TMS-L, USDA/APHIS P330-11-00244, Utah OH009232011-1, Vermont VT-87688, Virginia 00440 and 1581, Washington C891, West Virginia 248 and 9957C and E87688, Wisconsin 399013010



**SUMMIT**  
ENVIRONMENTAL TECHNOLOGIES, INC.  
Analytical Laboratories

Summit Environmental Technologies, Inc.  
3310 Win St.  
Cuyahoga Falls, Ohio 44223  
TEL: (330) 253-8211 FAX: (330) 253-4489  
Website: <http://www.settek.com>

## Case Narrative

WO#: 15082669  
Date: 9/1/2015

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**CLIENT:** Environment 1, Inc.  
**Project:** Sediment Sample

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This report in its entirety consists of the documents listed below. All documents contain the Summit Environmental Technologies, Inc., Work Order Number assigned to this report.

Paginated Report including Cover Letter, Case Narrative, Analytical Results, Applicable Quality Control Summary Reports, and copies of the Chain of Custody Documents are supplied with this sample set.

Concentrations reported with a J-Flag in the Qualifier Field are values below the Limit of Quantitation (LOQ) but greater than the established Method Detection Limit (MDL).

Method numbers, unless specified as SM (Standard Methods) or ASTM, are EPA methods.

Estimated uncertainty values are available upon request.

Analysis performed by DBM, VRM, or SFG were performed at Summit Labs 2704 Eatonton Highway Haddock, GA 31033

All results for Solid Samples are reported on an "as received" or "wet weight" basis unless indicated as "dry weight" using the "-dry" designation on the reporting units.

Summit Environmental Technologies, Inc., holds the accreditations/certifications listed at the bottom of the cover letter that may or may not pertain to this report.

The information contained in this analytical report is the sole property of Summit Environmental Technologies, Inc. and that of the customer. It cannot be reproduced in any form without the consent of Summit Environmental Technologies, Inc. or the customer for which this report was issued. The results contained in this report are only representative of the samples received. Conditions can vary at different times and at different sampling conditions. Summit Environmental Technologies, Inc. is not responsible for use or interpretation of the data included herein.

This report is believed to meet all of the requirements of NELAC or the accrediting / certifying agency. Any comments or problems with the analytical events associated with this report are noted below.



Summit Environmental Technologies, Inc.  
3310 Win S  
Cuyahoga Falls, Ohio 4422  
TEL: (330) 253-8211 FAX: (330) 253-448  
Website: <http://www.settek.co>

## Qualifiers and Acronyms

WO#: 15082669

Date: 9/1/2015

These commonly used Qualifiers and Acronyms may or may not be present in this report.

### Qualifiers

U	The compound was analyzed for but was not detected.
J	The reported value is greater than the Method Detection Limit but less than the Reporting Limit.
H	The hold time for sample preparation and/or analysis was exceeded.
D	The result is reported from a dilution.
E	The result exceeded the linear range of the calibration or is estimated due to interference.
MC	The result is below the Minimum Compound Limit.
*	The result exceeds the Regulatory Limit or Maximum Contamination Limit.
m	Manual integration was used to determine the area response.
N	The result is presumptive based on a Mass Spectral library search assuming a 1:1 response.
P	The second column confirmation exceeded 25% difference.
C	The result has been confirmed by GC/MS.
X	The result was not confirmed when GC/MS Analysis was performed.
B/MB+	The analyte was detected in the associated blank.
G	The ICB or CCB contained reportable amounts of analyte.
QC-/+	The CCV recovery failed low (-) or high (+).
R/QDR	The RPD was outside of accepted recovery limits.
QL-/+	The LCS or LCSD recovery failed low (-) or high (+).
QLR	The LCS/LCSD RPD was outside of accepted recovery limits.
QM-/+	The MS or MSD recovery failed low (-) or high (+).
QMR	The MS/MSD RPD was outside of accepted recovery limits.
QV-/+	The ICV recovery failed low (-) or high (+).
S	The spike result was outside of accepted recovery limits.

### Acronyms

ND	Not Detected	RL	Reporting Limit
QC	Quality Control	MDL	Method Detection Limit
MB	Method Blank	LOD	Level of Detection
LCS	Laboratory Control Sample	LOQ	Level of Quantitation
LCSD	Laboratory Control Sample Duplicate	PQL	Practical Quantitation Limit
QCS	Quality Control Sample	CRQL	Contract Required Quantitation Limit
DUP	Duplicate	PL	Permit Limit
MS	Matrix Spike	RegLvl	Regulatory Limit
MSD	Matrix Spike Duplicate	MCL	Maximum Contamination Limit
RPD	Relative Percent Different	MinCL	Minimum Compound Limit
ICV	Initial Calibration Verification	RA	Reanalysis
ICB	Initial Calibration Blank	RE	Reextraction
CCV	Continuing Calibration Verification	TIC	Tentatively Identified Compound
CCB	Continuing Calibration Blank	RT	Retention Time
RLC	Reporting Limit Check	CF	Calibration Factor
DF	Dilution Factor	RF	Response Factor

This list of Qualifiers and Acronyms reflects the most commonly utilized Qualifiers and Acronyms for reporting. Please refer to the Analytical Notes in the Case Narrative for any Qualifiers or Acronyms that do not appear in this list or for additional information regarding the use of these Qualifiers on reported data.



**SUMMIT**  
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*Analytical Laboratories*

*Summit Environmental Technologies, Inc.*  
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Website: <http://www.settek.com>

## Workorder Sample Summary

WO#: 15082669  
01-Sep-15

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**CLIENT:** Environment 1, Inc.  
**Project:** Sediment Sample

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Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
15082669-001	Sediment Sample #1		8/24/2015 9:35:00 AM	8/26/2015 10:40:00 AM	Solid
15082669-002	Sediment Sample #2		8/24/2015 10:10:00 AM	8/26/2015 10:40:00 AM	Solid



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3310 Wm St.  
Cuyahoga Falls, Ohio 44223  
TEL: (330) 253-8211 FAX: (330) 253-4489  
Website: <http://www.settek.com>

WO#: 15082669  
Date Reported: 9/1/2015  
Company: Environment 1, Inc.  
Address: 114 Oakmont Dr  
Greenville NC 27858  
Received: 8/26/2015  
Project#: Sediment Sample

**TCLP Metals Analysis (6010)**

Client ID#	Lab ID#	Collected Analyte	Rep Lmt	Result	Units	Matrix	Method	DF	RegLvl	Run	Analyst
Sediment Sample #1	001	8/24/2015 TCLP Arsenic(As)	0.500	ND	mg/L	Solid	EPA 6010 C	1	5.00	8/31/2015	VVK
Sediment Sample #1	001	8/24/2015 TCLP Barium(Ba)	5.00	ND	mg/L	Solid	EPA 6010 C	1	100	8/31/2015	VVK
Sediment Sample #1	001	8/24/2015 TCLP Cadmium(Cd)	0.100	ND	mg/L	Solid	EPA 6010 C	1	1.00	8/31/2015	VVK
Sediment Sample #1	001	8/24/2015 TCLP Chromium(Cr)	0.200	ND	mg/L	Solid	EPA 6010 C	1	5.00	8/31/2015	VVK
Sediment Sample #1	001	8/24/2015 TCLP Lead(Pb)	0.500	ND	mg/L	Solid	EPA 6010 C	1	5.00	8/31/2015	VVK
Sediment Sample #1	001	8/24/2015 TCLP Selenium(Se)	0.500	ND	mg/L	Solid	EPA 6010 C	1	1.00	8/31/2015	VVK
Sediment Sample #1	001	8/24/2015 TCLP Silver(Ag)	0.500	ND	mg/L	Solid	EPA 6010 C	1	5.00	8/31/2015	VVK

**TCLP Mercury Analysis (1311/7470)**

Client ID#	Lab ID#	Collected Analyte	Rep Lmt	Result	Units	Matrix	Method	DF	RegLvl	Run	Analyst
Sediment Sample #1	001	8/24/2015 TCLP Mercury	0.00200	ND	mg/L	Solid	EPA 7470 A	1	0.200	8/31/2015	ALJ

**TCLP Metals Analysis (6010)**

Client ID#	Lab ID#	Collected Analyte	Rep Lmt	Result	Units	Matrix	Method	DF	RegLvl	Run	Analyst
Sediment Sample #2	002	8/24/2015 TCLP Arsenic(As)	0.500	ND	mg/L	Solid	EPA 6010 C	1	5.00	8/31/2015	VVK
Sediment Sample #2	002	8/24/2015 TCLP Barium(Ba)	5.00	ND	mg/L	Solid	EPA 6010 C	1	100	8/31/2015	VVK
Sediment Sample #2	002	8/24/2015 TCLP Cadmium(Cd)	0.100	ND	mg/L	Solid	EPA 6010 C	1	1.00	8/31/2015	VVK
Sediment Sample #2	002	8/24/2015 TCLP Chromium(Cr)	0.200	ND	mg/L	Solid	EPA 6010 C	1	5.00	8/31/2015	VVK
Sediment Sample #2	002	8/24/2015 TCLP Lead(Pb)	0.500	ND	mg/L	Solid	EPA 6010 C	1	5.00	8/31/2015	VVK
Sediment Sample #2	002	8/24/2015 TCLP Selenium(Se)	0.500	ND	mg/L	Solid	EPA 6010 C	1	1.00	8/31/2015	VVK
Sediment Sample #2	002	8/24/2015 TCLP Silver(Ag)	0.500	ND	mg/L	Solid	EPA 6010 C	1	5.00	8/31/2015	VVK

**TCLP Mercury Analysis (1311/7470)**

Client ID#	Lab ID#	Collected Analyte	Rep Lmt	Result	Units	Matrix	Method	DF	RegLvl	Run	Analyst
Sediment Sample #2	002	8/24/2015 TCLP Mercury	0.00200	ND	mg/L	Solid	EPA 7470 A	1	0.200	8/31/2015	ALJ



### Summit Environmental Technologies, Inc. Cooler Receipt Form

Client: ENVIRONMENT 1 Initials of person inspecting cooler and samples: F.C.  
 Date Received: 8/26/15 Time Received: 10:40 AM Order Number: 15082609  
 Date cooler(s) opened and samples inspected: 8/26/15

Number of Coolers/Boxes: 1 N/A  
 Shipper: FED EX UPS DHL Airborne US Postal Walk-in Pickup Other: \_\_\_\_\_

Packaging: Peanuts Bubble Wrap Paper Foam None Other: \_\_\_\_\_  
 Tape on cooler/box: Y N N/A

Custody Seals Intact Y N N/A  
 C-O-C in plastic Y N N/A  
 Ice Blue Ice present / absent / melted N/A

Sample Temperature IR Gun #16020459 CF \_\_\_\_\_ °C 18.8 °C N/A  
 Radiological Testing Instrument serial #35127 Y N N/A  
 (see page 2 for scan results)

**\*\*Use 1 sheet per sample for Radiological Testing. If sample is HOT, the Radiological Safety Officer must be notified immediately.**

C-O-C filled out properly Y N N/A  
 Samples in separate bags Y N N/A  
 Sample containers intact\* Y N N/A  
 \*If no, list broken sample(s): \_\_\_\_\_

Sample label(s) complete (ID, date, etc.) Y N N/A  
 Label(s) agree with C-O-C Y N N/A  
 Correct containers used Y N N/A  
 Sufficient sample received Y N N/A  
 Samples received within holding time Y N N/A  
 Bubbles absent from 40 mL vials\*\* Y N N/A

\*\* Samples with bubbles <6mm are acceptable. Indicate bubble size if >6mm.  
 Was client contacted about samples Y N  
 Will client send new samples Y N

Client contact: \_\_\_\_\_  
 Date/Time: \_\_\_\_\_  
 Logged in by: \_\_\_\_\_  
 Comments: \_\_\_\_\_