

SOIL AND SURFACE WATER ASSESSMENT
for
LEACHATE OUTBREAKS
EDGECOMBE COUNTY C&D LANDFILL
TARBORO, NORTH CAROLINA
NCDENR PERMIT #33-01
S&ME PROJECT NO. 1054-13-280A

Prepared for
Edgecombe County
P.O. Box 10
Tarboro, North Carolina 27886

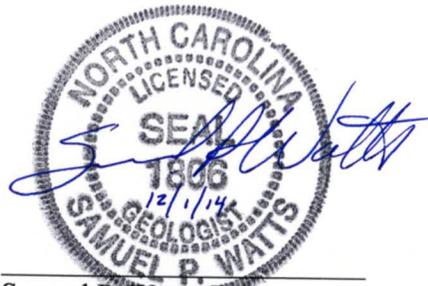
Prepared by
 **S&ME**
3201 Spring Forest Road
Raleigh, North Carolina 27616
(919) 872-2660

December 1, 2014



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I hereby certify this 1st day of December, 2014, that this report was prepared by me and under my direct supervision.



Samuel P. Watts, P.G.
Senior Geologist
NC Licensed Geologist No. 1806

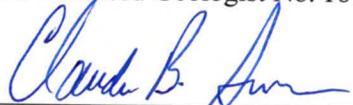

Claudia B. Irvin, E.I.T.
Project Professional

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Appendix II: Photo Log of Soil Sample Locations

Appendix III: Analytical Laboratory Report for Soil Sampling

Appendix IV: Alternative Source Demonstration Report dated June 10, 2008 prepared by S&ME, Inc.

1. INTRODUCTION

1.1 Inspection and Notice of Violation

On October 6, 2014 a *Soil and Surface Water Sampling Plan for Leachate Outbreaks* (Plan) for the Edgecombe County Construction and Demolition Landfill was submitted to the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Waste Management (DWQM), Solid Waste Section in response to NCDENR's inspection of the Landfill on June 10, 2014 and the subsequent Notice of Violations (NOV) issued to Edgecombe County on June 20, 2014. This Plan included copies of the June 20, 2014 NOV and the June 10, 2014 Inspection Report (**Appendix I**). NCDENR issued an approval letter dated October 8, 2014 for the *Soil and Surface Water Sampling Plan for Leachate Outbreaks*.

This report details the sampling activities and results conducted in accordance with the sampling plan.

2. SITE ACTIVITIES

2.1 Soil Sampling

2.1.1 Soil Sampling Locations

Soil samples were collected at two areas located beyond the Municipal Solid Waste (MSW) Edge-of-Waste boundary, located down slope from the leachate outbreaks. The two soil sampling locations (SS-1 and SS-2) are shown in **Figure 1**, and were selected to assess impact to soil that may have come in contact with leachate. A background soil sample (SS-3) was collected from beyond the MSW Edge-of-Waste boundary on the south side of the landfill as shown in **Figure 1**. The locations of the samples are documented in the photo log contained in **Appendix II**.

2.1.2 Soil Sampling Methodology

Discrete soil samples were collected between one and two feet below ground surface (ft-bgs) at the sampling locations shown in **Figure 1**. The soil samples were collected using the methodology set out in the approved Plan (**Appendix I**).

2.1.3 Soil Analysis

The Plan proposed to analyze the soil samples for Appendix I volatile organic compounds (VOCs) and metals. In the October 8, 2014 NCDENR approval letter, it was requested that the soil samples also be analyzed for chemical oxygen demand (COD), phosphorus, sulfate, and pH. The three soil samples (SS-1, SS-2 and SS-3) were submitted to Environmental Conservation Laboratories, Inc. (ENCO), a North Carolina certified laboratory, under appropriate chain-of-custody procedure for analysis.

2.1.4 Soil Results Comparison

The results of soil sampling are summarized in **Table 1**. The analytical results were compared to the Inactive Hazardous Sites Branch (IHSB) Preliminary Soil Remediation

Goals (PSRG) Table dated September 2014. Specifically, the results were compared to the Industrial Health-Based Soil Remediation Goals, the Residential Health-Based Soil Remediation Goals, and the Protection of Groundwater Soil Remediation Goals.

No VOCs were detected in the soil samples collected from SS-1 and background sample SS-3. In the soil sample collected from SS-2, only 2-butanone (methyl ethyl ketone (MEK)) was detected at a level below the PSRGs.

Low levels of metals, including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, vanadium and zinc, were detected in the three soil samples, including the background soil sample, SS-3. The only exception is nickel, which was not detected in SS-2. Antimony, Arsenic, Cobalt, and Vanadium were reported above one or both of the PSRG's in all three samples.

Phosphorus and sulfate were detected in the three soil samples.

A copy of the analytical laboratory report for the soil samples is located in **Appendix III**.

2.2 Surface Water Sampling and Analysis

In the June 20, 2014 NOV it was stated that surface water sampling should be conducted to evaluate the extent of the potential environmental impacts from the release(s) at the facility. It was also noted that a background surface water sample should be collected.

The north side of the landfill, in the area of the two leachate outbreaks, is sloped such that any surface water and sediment runoff is directed into a sediment control basin located to the north of the outbreaks. The water discharge from the sediment control basin is directed into Jerry's Creek located to the north of the basin. On July 30, 2014 (20 days after Mr. Barnes' inspection), as a part of routine compliance monitoring at the landfill, an Upstream (SW-1) and a Downstream (SW-2) surface water sample were collected from Jerry's Creek (**Figure 1**). These samples were analyzed for Appendix I VOCs and Metals. The field parameters of pH, specific conductance (SC), oxygen reduction potential (ORP), dissolved oxygen (DO) and turbidity were also collected for these two surface water samples.

The results of the Upstream and the Downstream surface water samples collected on July 30, 2014 during routine landfill monitoring activities are presented in **Table 2** and are compared the North Carolina 15A North Carolina Administrative Code (NCAC) 2B Surface Water Standards. There were no exceedances of the Surface Water Standards for either the Upstream or Downstream samples. A copy of the analytical laboratory report is located in Appendix III of the *Soil and Surface Water Sampling Plan for Leachate Outbreaks* located in **Appendix I**.

3. CONCLUSIONS AND RECOMMENDATIONS

A limited surface water and soil assessment was conducted at the Edgecombe County Construction and Demolition Landfill in Tarboro, North Carolina. The results of the site activities are summarized below.

The results do not indicate impacts by VOCs to soil. Four metals, antimony, arsenic, cobalt and vanadium, were detected at one or more of the sample locations above the PSRG's. Two of these metals, arsenic and vanadium, were detected in the background soil sample above the PSRGs, as well. The only metal detected above the Industrial Health-Base PSRG was arsenic.

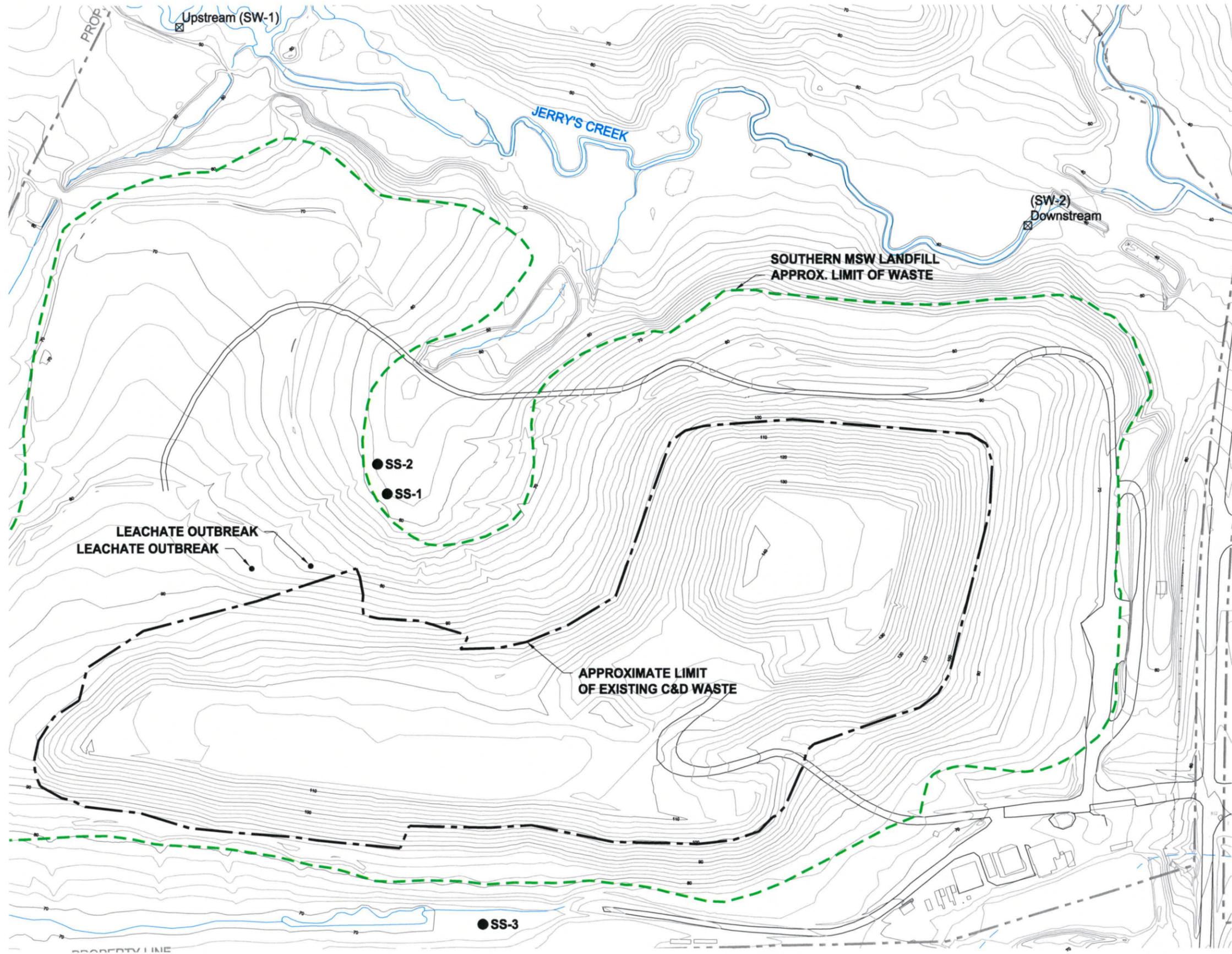
Based on a review of data presented in the *Alternate Source Demonstration Report* for the Edgecombe County Landfill dated June 10, 2008 (**Appendix IV**), it appears that these four detected metals detected at levels exceeding the PSRG's occur naturally at the site. It was also determined that the detections of metals in the Alternate Source Demonstration varied greatly in the seven background samples collected throughout the site, including two samples collected near each other in the soil borrow pit area. The values of metals detected in this soil leachate assessment, including Arsenic, are not unexpected.

The results do not indicate impact to surface water by VOCs or metals.

No additional assessment or remediation is recommended.

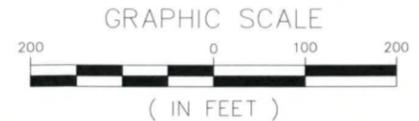
FIGURE

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- LEGEND**
- SOIL SAMPLE (10-10-2014)
 - LIMIT OF MSW WASTE
 - PROPERTY LINE
 - 10-FOOT CONTOUR
 - 2-FOOT CONTOUR

- NOTE:**
1. TOPOGRAPHIC MAP DEVELOPED BY GEODATA CORPORATION OF ZEBULON, NC USING PHOTOGRAMETRIC METHODS FROM AERIAL PHOTOGRAPHY FLOWN ON FEBRUARY 5, 2007.
 2. TOPOGRAPHIC MAP UPDATED WITH GROUND SURVEY BY BATEMAN CIVIL SURVEY COMPANY, PC OF HOLLY SPRINGS, NC ON JULY 2011, JUNE 2012, JUNE 2013 & AUGUST 2014.



SCALE: 1" = 200'	DATE: NOV 2014
PROJECT NUMBER: 1054-13-280A	DRAWN BY: BTR
DRAWING NUMBER: B-2420	CHECKED BY:
 WWW.SMEINC.COM <small>NC ENGINEER LICENSE #F-0176 3201 SPRING FOREST RD., RALEIGH, NC 27616</small>	
SOIL SAMPLE LOCATION MAP EDGECOMBE COUNTY LANDFILL TARBORO, NORTH CAROLINA	
FIGURE NO. 1	

TABLES

TABLE 1
Summary of Soil Analytical Results
Edgecombe County Landfill
Tarboro, North Carolina
S&ME Project No. 1054-13-280A

Analytical Method	Analyte ^{1,3}	Sample ID	SS-1	SS-2	SS-3	Industrial Health-Based PSRG ²	Residential Health-Based PSRG ²	Protection of Groundwater PSRG ²
		Date Collected	10/10/2014	10/10/2014	10/10/2014			
EPA 6010C	Antimony		0.248 ^J	1.83 ^{J,D}	0.392 ^J	94	6.2	0.9
	Arsenic		1.39 ^J	19.1 ^D	1.68 ^J	3	0.67	6
	Barium		20 ^J	11.4 ^{J,D}	13.8 ^J	44,000	3000	580
	Beryllium		0.191 ^J	0.346 ^{J,D}	0.0359 ^J	460	32	63
	Cadmium		0.0116 ^U	0.0223 ^U	0.0454	200	14	3
	Chromium		8.05 ^J	22.8 ^D	5.73 ^J	100,000	24,000	360,000
	Cobalt		1.02 ^J	0.89 ^{J,D}	0.528 ^J	70	4.6	0.9
	Copper		1.69 ^J	3.26 ^{J,D}	1.38 ^J	9,400	620	700
	Lead		5.55 ^J	4.95 ^{J,D}	6.10 ^J	160	400	270
	Nickel		1.91 ^J	<0.836	1.28 ^J	4,400	300	130
	Vanadium		14.7 ^J	45 ^D	10.1 ^J	1,200	78	6
Zinc		7.38 ^J	6.9 ^{J,D}	7.12 ^J	70,000	4,600	1,200	
VOCs by EPA 8260B	2-Butanone (MEK)		<0.0006	0.0007 ^J	<0.0007	38,000	5,400	16
SM 5220D-1997	Chemical Oxygen Demand		480	560	1,500	NS	NS	NS
EPA 365.4	Phosphorus		160	240	140	NS	NS	NS
EPA Method 9056A	Sulfate as SO ₄		67 ^J	140 ^J	40	NS	NS	NS
EPA Method 9045D	pH ⁶		5.3	7	5.3	NS	NS	NS

Notes:

Shaded values indicate exceedances of the Residential Health-Based PSRG or the Protection of Groundwater Remedial Goal.

1. All constituents reported in milligrams per kilogram (mg/kg)

2. PSRG: Preliminary Soil Remediation Goals obtained from the NCDENR Inactive Hazardous Sites Branch Table dated September 2014.

3. Constituents not shown were not detected for the method.

4. Chromium PSRG is presented as chromium III.

5. Nickel is presented as Nickel Soluble Salts.

6. SU = Standard Units

J: The reported value is between the laboratory method detection limit (MDL) and the laboratory method reporting limit (MRL), adjusted for actual sample preparation data and moisture content,

D: The sample was analyzed at dilution.

U: Analyte was analyzed for, but not detected to the level shown, adjusted for actual sample preparation data and moisture content, where applicable.

NS: No Standard

TABLE 2
Summary of Surface Water Results
Edgecombe County Landfill
Tarboro, North Carolina
July 30, 2014 Sampling Event¹
S&ME Project No. 1054-13-276A & 1054-13-280A

APPENDIX I VOCs ⁴ EPA METHOD 8260B	UNITS	2B STANDARD Freshwater Aquatic Life	2B STANDARD Water Supply	SURFACE WATER	
				UPSTREAM (SW-1)	DOWNSTREAM (SW-2)
Acetone	µg/l ³	2,000	NS	<1.2	4.6 J
Benzene	µg/l	NS	1.19	<0.15	<0.15
Chlorobenzene	µg/l	140	488	<0.17	<0.17
1,4-Dichlorobenzene	µg/l	100	488	<0.19	<0.19
1,1-Dichloroethane	µg/l	LD	6	<0.13	<0.13
cis-1,2-Dichloroethene	µg/l	NS	60	<0.15	<0.15
trans-1,2-Dichloroethene	µg/l	NS	140	<0.21	<0.21
1,2-Dichloropropane	µg/l	NS	0.5	<0.10	<0.10
Dibromochloromethane	µg/l	NL	NL	3.3²	<0.17
Methylene chloride	µg/l	NS	4.6	<0.23	<0.23
Trichloroethene	µg/l	NS	2.5	<0.15	<0.15
Vinyl chloride	µg/l	NS	0.025	<0.32 [*]	<0.32 [*]
APPENDIX I INORGANIC COMPOUNDS EPA METHOD 6010B					
Antimony (Total)	µg/l	NS	5.6	<0.22	<0.22
Arsenic (Total)	µg/l	50	10	<2.8	<2.8
Barium (Total)	µg/l	LD	1,000	60.7 J	60.4 J
Beryllium (Total)	µg/l	6.5	NS	<0.10	<0.10
Cadmium (Total)	µg/l	2 (N)	NS	<0.36	<0.36
Chromium (Total)	µg/l	50	NS	<1.4	<1.4
Cobalt (Total)	µg/l	NS	3	1.77 J	1.70 J
Copper (Total)	µg/l	7 (AL)	NS	<1.6	<1.6
Lead (Total)	µg/l	25 (N)	NS	<2.1	<2.1
Nickel (Total)	µg/l	88 (N)	25	<1.8	<1.8
Selenium (Total)	µg/l	5	NS	<0.91	<0.91
Silver (Total)	µg/l	0.06 (N)	NS	<1.9 [*]	<1.9 [*]
Thallium (Total)	µg/l	NS	0.24	<0.11	<0.11
Vanadium (Total)	µg/l	NL	NL	1.83 J	<1.4
Zinc (Total)	µg/l	50 (AL)	NS	7.82 J	5.60 J
FIELD PARAMETERS					
pH	standard	NE	NE	6.13	6.8
Specific Conductance	mS/cm	NE	NE	0.086	0.107
Oxygen Reduction Potential	mV	NE	NE	128.8	57.2
Dissolved Oxygen	mg/L	NE	NE	3.85	5.81
Turbidity	NTUs	NE	NE	575.6	17.1
Temperature	°C	NE	NE	25.54	23.05

NOTES:

1. Samples were collected by S&ME on July 30, 2014 and analyzed by Environmental Conservation Laboratories, Inc. (ENCO). This summary table only shows those constituents detected above method detection limits. Detection limits are shown on laboratory reports.

2. Values which are **BOLD** indicate levels above laboratory detection limits.

3. µg/L = Micrograms Per Liter

4. VOCs = Volatile Organic Compounds

NE = Standard not Established

NS = No Standard Value Listed

NL = Constituent not Listed

(AL) = Action Level Standard - See 2B.0211 for additional information

(N) = Narrative Standard - See 2B.0211

LD = Limited Data Available

* = Method Detection Limit is greater than the 2B Standard

J = Analyte detected, but below the laboratory reporting limit therefore the result is an estimated concentration.

DAF Computation = Dilution/Attenuation Factor Computation (ref. S&ME Alternate Source Demonstration, June 2008).

SWSL = Solid Waste Section Limit. (ref. NCDENR-DWM, Solid Waste Section February 23, 2007 memorandum)

Appendix I compounds not shown were not detected during this sampling event. See **Appendix I** of the report for laboratory reports.

APPENDIX I

Soil and Surface Water Sampling Plan for Leachate Outbreaks

NCDENR Soil and Surface Water Sampling Plan Approval Letter



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

October 8, 2014

Mr. Mike Cummings
Edgecombe County Solid Waste Manager
P.O. Box 10
Tarboro, NC 27886

Re: Soil and Surface Water Sampling Plan for Leachate Outbreaks
Edgecombe County Construction and Demolition Landfill, Permit #33-01

Dear Mr. Cummings:

The Solid Waste Section (Section) has reviewed the *Soil and Surface Water Sampling Plan for Leachate Outbreaks* submitted by S&ME, Inc. (S&ME) on behalf of Edgecombe County. The sampling plan was submitted in response to observed leachate outbreaks during inspections at the facility in June and August 2014 by Solid Waste Section (Section) personnel. The CDLF is located on top of the closed MSWLF and one of the outbreaks originating from the CDLF was being absorbed into the MSWLF cover and the other traveled beyond the MSWLF edge of waste.

S&ME proposes to collect discrete soil samples at two locations beyond the MSWLF edge of waste to assess the potential impact of the leachate outbreaks. A background soil sample will also be collected from the southern portion of the landfill beyond the edge of waste. The soil samples are proposed to be collected one to two feet below ground surface and analyzed for Appendix I volatile organic compounds, metals, and pH. S&ME has also proposed to use surface water analytical data collected during routine monitoring in lieu of additional surface water monitoring since leachate from the outbreaks would be directed into Jerry's Creek via the sediment control basin.

The Section approves the sampling plan as proposed under the condition that soil samples are also analyzed for BOD, COD, phosphorus, and sulfate. Please contact me at (919) 707-8288 or by e-mail at ervin.lane@ncdenr.gov if you have any questions or concerns regarding this letter. Thank you in advance for your cooperation in this manner.

Sincerely,

Ervin Lane
Compliance Hydrogeologist
Solid Waste Section

cc: Sam Watts, P.G., S&ME, Inc.
Jason Watkins, Field Operations Branch Head
Dennis Shackelford, Eastern District Supervisor
Ben Barnes, Environmental Senior Specialist

1646 Mail Service Center, Raleigh, North Carolina 27699-1646
Phone: 919-707-8200 \ Internet: <http://portal.ncdenr.org/web/wm>

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October 6, 2014

North Carolina Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section
217 West Jones Street
Raleigh, North Carolina 27603

Attention: Mr. Ben Barnes

via email: ben.barnes@ncdenr.gov

Reference: **Soil and Surface Water Sampling Plan for Leachate Outbreaks**
Edgecombe County C&D Landfill (Permit No. 33-01)
Tarboro, North Carolina
S&ME Project No. 1054-13-280A

Dear Mr. Barnes:

S&ME, Inc. (S&ME), on behalf of Edgecombe County, is submitting this *Soil and Surface Water Sampling Plan for Leachate Outbreaks* for the Edgecombe County Construction and Demolition Landfill located in Tarboro, North Carolina. This Plan was prepared in response to the Notice of Violations dated June 20, 2014 and August 11, 2014 issued by the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Solid Waste Section to Edgecombe County.

If you have any questions about this Sampling Plan, please do not hesitate to contact us at (919) 872-2660.

Sincerely,
S&ME, Inc.

Claudia B. Irvin, E.I.T.
Staff Professional

Samuel P. Watts, P.G.
Senior Consultant

Attachment: *Soil and Surface Water Sampling Plan for Leachate Outbreaks, dated October 6, 2014*

cc: Mike Cummings, Edgecombe County Solid Waste Director

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SOIL AND SURFACE WATER SAMPLING PLAN
for
LEACHATE OUTBREAKS
EDGECOMBE COUNTY C&D LANDFILL
TARBORO, NORTH CAROLINA
S&ME PROJECT NO 1054-13-280A

Prepared for
Edgecombe County
P.O. Box 10
Tarboro, North Carolina 27886

Prepared by

3201 Spring Forest Road
Raleigh, North Carolina 27616
(919) 872-2660

October 6, 2014

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FIGURE 1: Site Plan/Areas of Concern/Proposed Sample Locations

APPENDIX I: June 20, 2014 Notice of Violation
June 10, 2014 Inspection Report
August 11, 2014 Inspection Report

APPENDIX II: Solid Waste Section Guidelines for Groundwater, Soil and Surface
Water Sampling revised April 2008.

APPENDIX III: Results of July 30, 2014 Surface Water Sampling

1. BACKGROUND

1.1 Inspection and Notice of Violation

On June 10, 2014, Mr. Ben Barnes, representing the North Carolina Division of Waste Management (NCDWM), Solid Waste Section, inspected the Edgecombe County Construction and Demolition (C&D) Landfill for compliance with the North Carolina statutes and rules. During the inspection Mr. Barnes observed two leachate outbreaks on the north side of the C&D Landfill. Mr. Barnes noted that one of the outbreaks was being absorbed into the landfill cover and the other outbreak was flowing offsite. Mr. Barnes issued a Notice of Violation (NOV) letter, dated June 20, 2014, concerning the outbreaks. It was requested that Edgecombe County repair the leachate outbreak areas so that the leachate is controlled under the soil cover. It was also requested by NCDWM that the leachate contaminated soil be removed and placed on top of the landfill.

Mr. Barnes stated in the June 20, 2014 NOV that Edgecombe had placed a temporary berm below the leachate breakout on June 11, 2014 and that the berm should be able to control the leachate except in heavy rains. Copies of the June 20, 2014 NOV and June 10, 2014 Inspection Report are located in **Appendix I**.

1.2 Corrective Action

On June 11, 2014 Edgecombe County placed a temporary soil berm below the leachate breakout identified on June 10, 2014.

In July and August 2014, Edgecombe County graded the outbreak areas to remove the slight depression that has allowing rainwater to pond and infiltrate the cover.

Another inspection of the landfill was conducted by Mr. Barnes for the NDWM on August 11, 2014. In the Facility Compliance Inspection Report for this inspection, it was noted that the leachate outbreaks were in the process of being repaired and the work was progressing well. A copy of the August 11, 2014 Inspection Report is located in **Appendix I**. In the Inspection Report it was noted that Edgecombe County must submit a plan to address the leachate breakout and monitoring of any contaminated soil and surface water.

On August 11, 2014 the two leachate outbreaks were surveyed by Bateman Civil Survey Company (BCSC). The surveyed locations of the outbreaks are depicted on **Figure 1**.

1.3 Purpose of this Sampling Plan

In the June 20, 2014 NOV and the August 11, 2014 Inspection Report issued by the NCDWM, it was stated that the soil and leachate should be sampled according to the method listed below:

- Submit a sampling plan for the Solid Waste Section review and approval prior to conducting the sampling activities.

- The sampling plan should include sampling methodology and a figure depicting the sampling locations.
- A summary report (in electronic format) containing the results of the assessment should be submitted to the Solid Waste Section within 30 days of receiving the analytical results from a NC certified laboratory.

2. SAMPLING PLAN

2.1 Soil Sampling and Analysis

In an effort to evaluate the extent of the potential environmental impacts from the leachate outbreaks at the facility, it was required that Edgecombe County conduct soil sampling. The soil sampling plan is described in the sections below.

2.1.1 Soil Sampling Locations

The proposed soil sampling locations are located beyond the Municipal Solid Waste (MSW) Edge-of-Waste boundary in areas that are believed to have been in contact with leachate from the outbreaks Mr. Barnes observed. The two proposed soil sampling locations are shown in **Figure 1**. A background soil sample will also be collected from beyond the MSW Edge-of-Waste boundary on the south side of the landfill as shown in **Figure 1**.

2.1.2 Soil Sampling Methodology

Discrete soil samples will be collected between one and two feet below ground surface (ft-bgs) at the proposed sampling locations shown in **Figure 1**. The soil samples will be collected using the methodology set out in the *Solid Waste Section Guidelines for Groundwater, Soil and Surface Water Sampling* revised April 2008. A copy of the Guidelines is contained in **Appendix II**.

2.1.3 Soil Analysis

The collected soils will be analyzed for Appendix I volatile organic compounds (VOCs) and metals as well as pH. The samples will be submitted to a North Carolina certified laboratory, under appropriate chain-of-custody for analysis.

2.1.4 Comparison of Results

The analytical results for the soil samples will be compared to the values in the Inactive Hazardous Sites Branch (IHSB) Preliminary Soil Remediation Goals (PSRG) Table. Specifically, the results will be compared to the Residential Health-Based Soil Remediation Goals and the Protection of Groundwater Remediation Goals.

2.2 Surface Water Sampling and Analysis

In the June 20, 2014 NOV it was stated that surface water sampling should be conducted to evaluate the extent of the potential environmental impacts from the release(s) at the facility. It was also noted that a background surface water sample should be collected.

The north side of the landfill, in the area of the two leachate outbreaks, is sloped such that any surface water and sediment runoff is directed into a sediment control basin located to the north of the outbreaks. The water discharge from the sediment control basin is directed into Jerry's Creek located to the north of the basin. On July 30, 2014 (20 days after Mr. Barnes' inspection), as a part of routine compliance monitoring at the landfill, an Upstream (SW-1) and a Downstream (SW-2) surface water sample were collected from Jerry's Creek (**Figure 1**). These samples were analyzed for Appendix I VOCs and Metals. The field parameters of pH, specific conductance (SC), oxygen reduction potential (ORP), dissolved oxygen (DO) and turbidity were also collected for these two surface water samples.

Since these surface water samples were collected soon after the time the leachate outbreaks were observed, Edgecombe County plans on using this data in lieu of additional sampling of this surface water.

The results of the Upstream and the Downstream surface water samples collected on July 30, 2014 during routine landfill monitoring activities are included in **Appendix III**. **Table 1**, also in **Appendix III**, summarizes the results and compares them to the North Carolina 15A North Carolina Administrative Code (NCAC) 2B Surface Water Standards.

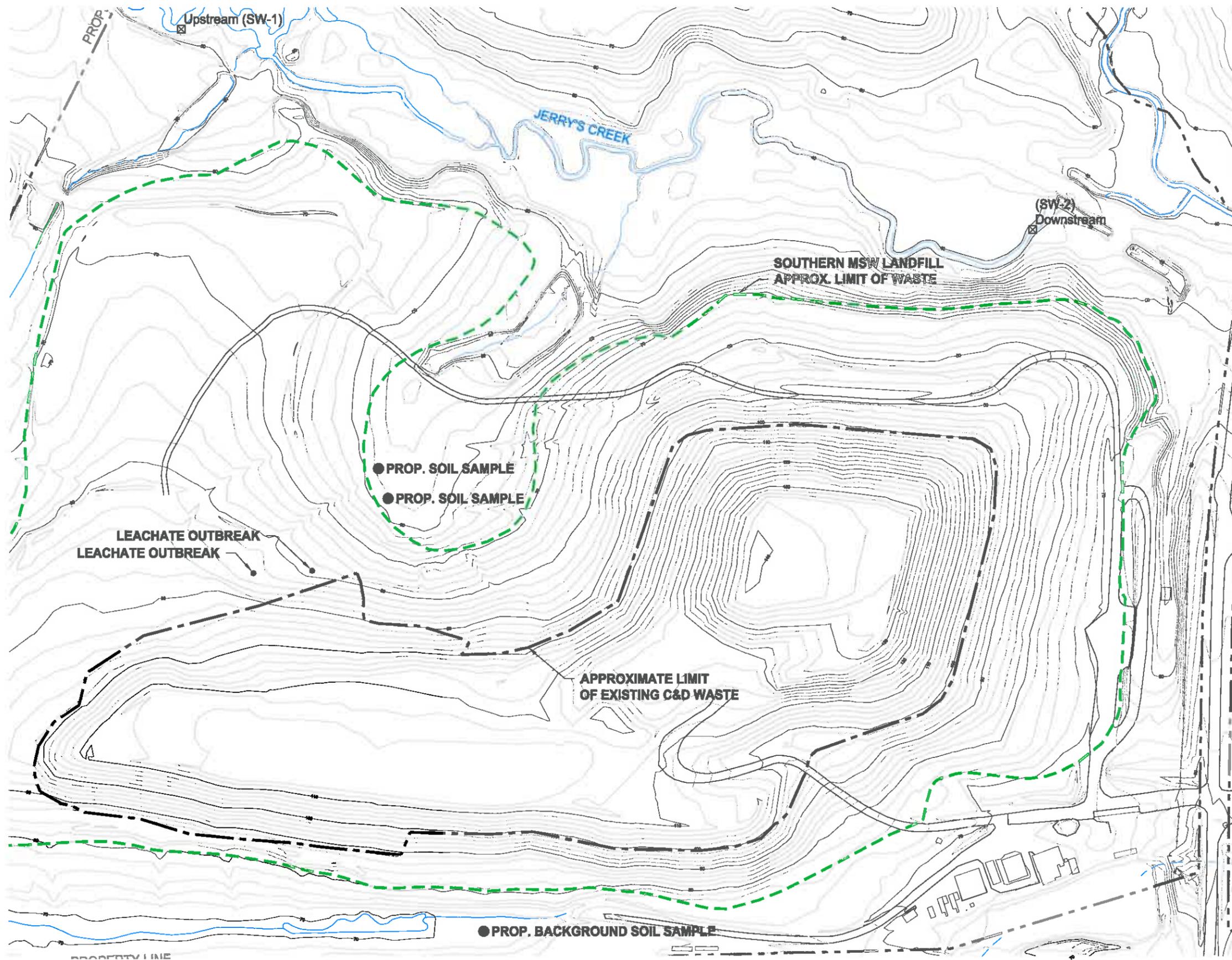
3. REPORTING

The results of the soil and surface water assessment will be provided in a letter report to the NCDWM within 30 days of receipt of the analytical report for the laboratory. Based on the results of the assessment, additional assessment activities and/or corrective action activities will be recommended in the report.

FIGURE 1

Site Plan/Areas of Concern/Proposed Sample Locations

T:\Projects\2013\ENV\13-280 Edgecombe FY 13-14 On-Call Consulting\CAD\B2400.dwg, FIG1, 10/6/2014 10:06:27 AM, 1:1

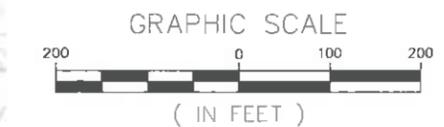


LEGEND

- LIMIT OF MSW WASTE
- PROPERTY LINE
- 10-FOOT CONTOUR
- 2-FOOT CONTOUR

NOTE:

1. TOPOGRAPHIC MAP DEVELOPED BY GEODATA CORPORATION OF ZEBULON, NC USING PHOTOGRAMETRIC METHODS FROM AERIAL PHOTOGRAPHY FLOWN ON FEBRUARY 5, 2007.
2. TOPOGRAPHIC MAP UPDATED WITH GROUND SURVEY BY BATEMAN CIVIL SURVEY COMPANY, PC OF HOLLY SPRINGS, NC ON JULY 2011, JUNE 2012, JUNE 2013 & AUGUST 2014.



SCALE: 1" = 200'	DATE: SEPT 2014	PROJECT NUMBER: 1054-13-280	DRAWN BY: BTR
DRAWING NUMBER: B-2400	CHECKED BY:		

S&ME
WWW.SMEINC.COM
NC ENGINEER LICENSE #F-0176
3201 SPRING FOREST RD, RALEIGH, NC 27616

LEACHATE OUTBREAK & PROPOSED SAMPLE LOCATION MAP	FIGURE NO. 1
EDGECOMBE COUNTY LANDFILL TARBORO, NORTH CAROLINA	

APPENDIX I

June 20, 2014 Notice of Violation

June 10, 2014 Inspection Report

August 11, 2014 Inspection Report



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

June 20, 2014

CERTIFIED MAIL

RETURN RECEIPT REQUESTED

CERTIFICATION NUMBER 7011 2000 0001 6591 2186

Mr. Mike Cummins

Edgecombe Co. C&D/closed MSWLF

P.O. Box 10

Tarboro, North Carolina 27886

SUBJECT: Notice of Violation
Compliance Inspection Report
Edgecombe Co. MSWLF Transfer
3302T
Edgecombe County

Dear Mr. Cummins:

On June 10, 2014, Ben Barnes, representing the State of North Carolina, Division of Waste Management Solid Waste Section, inspected the above referenced facility for compliance with North Carolina solid waste statutes and rules. Mike Cummins was present and represented the Edgecombe Co. C&D&MSWLF(closed) during this inspection. The following violations were noted:

A. 15A NCAC 13B. 0203(d) states: "By receiving solid waste at a permitted facility, the permit-tee(s) shall be considered to have accepted the conditions of the permit and shall comply with the conditions of the permit."

General Permit Condition Number 5 of the Permit to Operate states: "By beginning construction or receiving waste at this facility the permit-tee shall be considered to have accepted the terms and conditions of this permit."

General Permit Condition Number 6 states: "Construction and operation of this solid waste management facility must be in accordance with the Solid Waste Management Rules, 15A NCAC 13B, Article 9 of the Chapter 130A of the North Carolina General Statutes (NCGS 130A-290, et seq.), the conditions contained in this permit; and the approved plan. Should the approved plan and the rules conflict, the Solid Waste Management Rules shall take precedence unless specifically addressed by permit condition."

Conditions of Permit to Operate Number 6 states: The landfill is permitted to receive the following waste types in part: (a) C&D solid waste as defined in 15A NCAC 13B Rule .0532 (8) means solid waste generated solely from the construction, remodeling, repair, or demolition operations on pavement and buildings or structures.

Conditions of Permit to Operate Number 14 states in part: The permit-tee must actively employ a training and screening program at the facility prepared in accordance with the Section .0544(e) for detecting and preventing the disposal of excluded or unauthorized wastes.

B. 15A NCAC 13B .0542 OPERATIONAL REQUIREMENTS FOR C&DLF FACILITIES:

(a) The owner or operator of a C&DLF unit must maintain and operate the facility in accordance with the operation plan prepared in accordance with this Rule. The operation plan must be submitted in accordance with Rule .0535 of this Section. Each phase of operation must be defined by an area which contains five years of disposal capacity.

(c) Waste Acceptance and Disposal Requirements

(1) A C&DLF must accept on those wastes it is permitted to receive.

(e) Waste Exclusions. The following wastes must not be disposed of in a C&DLF unit:

(1) Containers such as tubes, drums, barrels, tanks, cans, and bottles unless they are empty and perforated

(7) Municipal solid waste as defined in GS. 130A-290(a)(18a).

(l) Drainage control and water protection requirements.

(4) Leachate must be contained on-site or treated prior to discharge. An NPDES permit may be required prior to the discharge of leachate to surface waters.

15A NCAC 13B .0544 MONITORING PLANS AND REQUIREMENTS FOR C&DLF FACILITIES

(e) A waste acceptability program. Owners and operators of all C&DLF units must implement a program at the facility for detecting and preventing the disposal of industrial, hazardous, liquid, municipal solid waste and excluded wastes in accordance with the Operating Plan or the effective permit. This program must include

(3) training of facility personnel to recognize industrial, hazardous, liquid, municipal and excluded waste.

During the inspection:

- *Two leachate breakouts were observed. One was being re-absorbed into the cover. The other was flowing off site.*
- *A load of waste containing a large percentage of MSW was dumped on the working face and not removed until instructed. Other MSW was observed in on the working face.*
- *A large number of flies were also observed on the working face indicating the presence of putrescible waste in the landfill.*

Based upon the foregoing, The Edgecombe Co. C&D and closed MSWLF shall come into compliance by **July 25, 2014** with all requirements of the regulations in **15A NCAC 13B .0203(d), .0542(a)(c)(e)(l)(4) & .0544(e)(3)** by completing the following:

- Institute an improved training and screening program for the recognition of non-C&D waste so that only waste defined as C&D is accepted.
- Perform necessary repairs so leachate is contained under the soil cover. A temporary berm was placed below the leachate breakout on June 11, 2014. This should contain the leachate unless a heavy rain occurs.
- Remove the leachate contaminated soil. This soil can be placed on the top of the landfill. Sample the soil and leachate according to the method listed below:
 - Submit a sampling plan for Solid Waste Section review and approval prior to conducting the sampling activities.
 - The sampling plan should include sampling methodology and a figure depicting the sampling locations.
 - A summary report (in electronic format) containing the results of the assessment should be submitted to the Solid Waste Section within 30 days of receiving the analytical results from the NC certified laboratory.

Soil Sampling

- Guidelines for soil sampling are located at http://portal.ncdenr.org/c/document_library/get_file?uuid=d28d4f91-4b6d-4c9d-afd9-47c9ee93615f&groupId=38361.
- Conduct subsurface soil sampling to evaluate the extent of the potential environmental impacts from the release(s) at the facility. Discrete soil samples should be collected between one to two feet below ground surface. Composite soil samples will not be accepted. A background subsurface soil sample should also be collected.
- Analyze subsurface soil samples for the Appendix I of 40 CFR Part 258 list of constituents consisting of both VOCs and metals. Please also analyze for pH.
- The results should be compared to the Preliminary Soil Remediation Goal Table. Both the health based and the protection of groundwater soil goals must be met. The table is located at http://portal.ncdenr.org/c/document_library/get_file?uuid=5539ecfb-739f-4345-9459-b514508135f1&groupId=38361.

Surface Water Sampling

- Guidelines for surface water sampling are located at http://portal.ncdenr.org/c/document_library/get_file?uuid=d28d4f91-4b6d-4c9d-afd9-47c9ee93615f&groupId=38361.
- Conduct surface water sampling to evaluate the extent of the potential environmental impacts from the release(s) at the facility. A background surface water sample should also be collected.
- Analyze surface water samples for the Appendix I of 40 CFR Part 258 list of constituents consisting of both VOCs and metals. Please also analyze for the field parameters pH, specific conductance, ORP, dissolved oxygen, and turbidity.
- The results should be compared to the 2B Surface Water Standards.

The Edgecombe Co. C&D/closed MSWLF shall provide a written certification with supporting documentation on company letterhead confirming that the noted compliance schedule has been completed. Include in this certification any actions taken to prevent these deficiencies from occurring in the future. Mail this certification to Ben Barnes, NCDENR, PO Box 1568, Elm City, North Carolina 27822 by the noted compliance date.

The item(s) listed above were observed by Section staff and require action on behalf of the facility in order to come into or maintain compliance with the Statutes, Rules, and/or other regulatory requirements applicable to this facility. Be advised that pursuant to N.C.G.S. 130A-22, an administrative penalty of up to \$15,000 per day may be assessed for each violation of the Solid Waste Laws, Regulations, Conditions of a Permit, or Order under Article 9 of Chapter 130A of the N.C. General Statutes. Further, the facility and/or all responsible parties may also be subject to enforcement actions including penalties, injunction from operation of a solid waste management facility or a solid waste collection service and any such further relief as may be necessary to achieve compliance with the North Carolina Solid Waste Management Act and Rules.

Please keep me informed of your progress in this matter. Solid Waste Section staff will conduct follow-up inspection(s) to verify that the facility has completed the requirements of this Notice of Violation.

If you have any questions please contact me at 252 236 4453 or e-mail ben.barnes@ncdenr.gov.

Sincerely,



Ben Barnes
Environmental Senior Specialist
Division of Waste Management - Solid Waste Section

copies: Michael Scott, Section Chief
Dennis Shackelford, Eastern District Supervisor
Jessica Montie, Compliance Officer
Ming-tai Chao, Permitting Engineer
Lorenzo Carmon, County Manager, Edgecombe Co. 7011 2000 0001 6591 2193



FACILITY COMPLIANCE INSPECTION REPORT
Division of Waste Management
Solid Waste Section

UNIT TYPE:

Lined MSWLF	LCID	YW	Transfer	Compost	SLAS	COUNTY: Edgecombe PERMIT NO.: 3301-CDLF-1997 FILE TYPE: COMPLIANCE
Closed MSWLF	HHW	White goods	Incin	T&P	FIRM	
CDLF	Tire T&P / Collection	Tire Monofill	Industrial Landfill	DEMO	SDTF	

Date of Site Inspection: June 10, 2014

Date of Last Inspection: July 22, 2013

FACILITY NAME AND ADDRESS:

Edgecombe Co C&LF/ Closed MSWLF
 2872 Colonial Road
 Tarboro, North Carolina 27886

GPS COORDINATES: N: 35.82293

W: 77.56511

FACILITY CONTACT NAME AND PHONE NUMBER:

Name: Mike Cummins
 Telephone: 252 827 4253 cell 252 813 3947
 Email address: mcummings@co.edgecombe.nc.us
 Fax: 252 827 6618

FACILITY CONTACT ADDRESS:

Edgecombe Co.
 P.O. Box 10
 Tarboro, North Carolina 27886

PARTICIPANTS:

Ben Barnes, NCDENR Solid Waste Section
 Mike Cummins, Director Edgecombe Co. Solid Waste
 Gloria Moseley, Admin Assistant Edgecombe Co. Solid Waste

STATUS OF PERMIT:

Active, PTO for Phase 2 and the continued operation of Phase 1 was issued March 31, 2010, due to expire on March 31, 2015. On or before September 30, 2014 documents must be submitted for the renewal of the permit to the Division.

PURPOSE OF SITE VISIT:

Comprehensive inspection

STATUS OF PAST NOTED VIOLATIONS:

NONE

OBSERVED VIOLATIONS

15A NCAC 13B .0203(d) states: "By receiving solid waste at a permitted facility, the permit-tee(s) shall be considered to have accepted the conditions of the permit and shall comply with the conditions of the permit."

General Permit Condition Number 5 of the Permit to Operate states: "By beginning construction or receiving waste at this facility the permit-tee shall be considered to have accepted the terms and conditions of this permit."

FACILITY COMPLIANCE INSPECTION REPORT

Division of Waste Management

Solid Waste Section

Page 2 of 4

General Permit Condition Number 6 states: "Construction and operation of this solid waste management facility must be in accordance with the Solid Waste Management Rules, 15A NCAC 13B, Article 9 of the Chapter 130A of the North Carolina General Statutes (NCGS 130A-290, et seq.), the conditions contained in this permit; and the approved plan. Should the approved plan and the rules conflict, the Solid Waste Management Rules shall take precedence unless specifically addressed by permit condition."

Conditions of Permit to Operate Number 6 states: The landfill is permitted to receive the following waste types in part: (a) C&D solid waste as defined in 15A NCAC 13B Rule .0532 (8) means solid waste generated solely from the construction, remodeling, repair, or demolition operations on pavement and buildings or structures.

Conditions of Permit to Operate Number 14 states in part: The permit-tee must actively employ a training and screening program at the facility prepared in accordance with the Section .0544(e) for detecting and preventing the disposal of excluded or unauthorized wastes.

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- (a) The owner or operator of a C&DLF unit must maintain and operate the facility in accordance with the operation plan prepared in accordance with this Rule. The operation plan must be submitted in accordance with Rule .0535 of this Section. Each phase of operation must be defined by an area which contains five years of disposal capacity.
- (c) Waste Acceptance and Disposal Requirements
 - (1) A C&DLF must accept on those wastes it is permitted to receive.
- (e) Waste Exclusions. The following wastes must not be disposed of in a C&DLF unit:
 - (1) Containers such as tubes, drums, barrels, tanks, cans, and bottles unless they are empty and perforated
 - (7) Municipal solid waste as defined in GS. 130A-290(a)(18a).
- (l) Drainage control and water protection requirements.
 - (4) Leachate must be contained on-site or treated prior to discharge. An NPDES permit may be required prior to the discharge of leachate to surface waters.

15A NCAC 13B .0544 MONITORING PLANS AND REQUIREMENTS FOR C&DLF FACILITIES

- (e) A waste acceptability program. Owners and operators of all C&DLF units must implement a program at the facility for detecting and preventing the disposal of industrial, hazardous, liquid, municipal solid waste and excluded wastes in accordance with the Operating Plan or the effective permit. This program must include
 - (3) training of facility personnel to recognize industrial, hazardous, liquid, municipal and excluded waste.

The item(s) listed above were observed by Section staff and require action on behalf of the facility in order to come into or maintain compliance with the Statutes, Rules, and/or other regulatory requirements applicable to this facility. Be advised that pursuant to N.C.G.S. 130A-22, an administrative penalty of up to \$15,000 per day may be assessed for each violation of the Solid Waste Laws, Regulations, Conditions of a Permit, or Order under Article 9 of Chapter 130A of the N.C. General Statutes. Further, the facility and/or all responsible parties may also be subject to enforcement actions including penalties, injunction from operation of a solid waste management facility or a solid waste collection service and any such further relief as may be necessary to achieve compliance with the North Carolina Solid Waste Management Act and Rules.

FACILITY COMPLIANCE INSPECTION REPORT

Division of Waste Management

Solid Waste Section

Page 3 of 4

ADDITIONAL COMMENTS:

1. The permit and operations plan and contingency plan were on the wall in the office and available for review, and were reviewed. The PTO includes a manufactured home deconstruction plan.
2. The normal hours of operation are M-F 8AM to 5PM, Saturday 7:30AM-11:30AM.
3. This facility is receiving around 50 TPD.
4. The certified operators are Mike Cummings CLOS expires, 10/3/14; Charles Cross CTSOS, expires 10/14; Travis Hudson CTSOS expires 12/8/15; Gloria Mosley CTSOS, expires 10/20/14, William Crocker CLOS 10/14.
5. The service are includes Edgecombe, Nash, Halifax, Wilson, Pitt and Martin Counties.
6. Methane monitoring is being conducted by S&ME Engineering as required, the last monitoring event in the facility records was on January 23, 2014. Wells numbered MW-1B, MW-3B, MW-4, MW-5, MW-6, MW-9A, MW-11 through MW-16 are being monitored at this time. No exceedences were noted.
7. GW monitoring is being handled by S&ME Engineering. The last GW monitoring event was on January 23, 2014. A Corrective Action Plan was approved by the Division on January 16, 2009 and is included in the permit. The Plan was amended on August 9, 2010 and called for permanently dewatering the existing drainage ditch and pond features and installing a groundwater barrier trench drain to form a hydraulic barrier. **Corrective Action Evaluation Report must be submitted to the Division by September 30, 2014 to demonstrate the effectiveness of the CAP. Conditions of the CAP must be met by the required deadlines.**
8. The latest Financial Assurance was dated February 24, 2011. The closure cost estimate \$905,587 post closure cost estimates was \$901,819.
9. Asbestos and scrap tire records were reviewed and in order.
10. Waste screening records are being maintained and are in order, Screenings are being conducted weekly, but waste other than C&D was observed in the working face. A load of MSW was dumped during the time of the inspection and not removed until instructed by me. Many flies were observed on the working face indicating the presence of putrescible waste. **The county must improve training for screening non-approved waste. Make sure the form included in the application is being used.**
11. Edge of waste markers are in place
12. Yard waste facilities shall follow the time and temperature requirements listed in 15A NCAC 13B .1406(10) for all yard trash feed stocks. The temperature requirements include the compost process being maintained at or above 55 degrees Celsius (131 degrees F) for 3 days and aerated to maintain elevated temperatures. Yard trash is defined within 130A-290(a)(45) as solid waste consisting solely of vegetative matter resulting from landscaping maintenance. Leaves from landscaping maintenance and grass clippings are considered yard trash.
13. CFC containing white goods are being separated from non-CFC containing white goods and stacked neatly. Omnisource is collecting white goods and removing Freon and providing records.
14. The signage is adequate.
15. Scrap tires are being stored in open top trailers. Central Carolina Tire is collecting the tires.
16. Fluorescent bulbs are being collected by Southeast recycling.
17. **According to data submitted in the Facility Annual Report the Landfill has overfilled and exceeded the approved capacity/air space for current Phases 1&2. In a Division letter dated October 21, 2013, the Edgecombe Co. C&DLF was directed by January 16, 2014 to conduct a survey to determine if the in place waste volume of 766,361 CY is correct and if so submit a Permit Application Amendment to construct and operate the C&DLF Phase 3. As of the date of this inspection report this has not been done.**
18. **There is some remaining ash and mulch from the storm debris that burned. The unburned mulch can to be utilized for erosion control on any area inside the permitted boundary where stabilization is need. The remaining wood ash must be handled in a manner consistent with Division guidelines.**

*Submitted
new permit
application*

FACILITY COMPLIANCE INSPECTION REPORT
Division of Waste Management
Solid Waste Section

Page 4 of 4

Load of MSW dumped during the inspection



MSW observed already on site



19. Two leachate outbreaks were observed on the landfill. Both show evidence of flowing off site, but one was being absorbed during the time of the inspection. These must be repaired by the actions listed in the NOV.



Please contact me if you have any questions or concerns regarding this inspection report.

Ben Barnes

Phone: 252 236 4453 Email ben.barnes@ncdenr.gov

Ben Barnes

Environmental Senior Specialist
 Division of Waste Management - Solid Waste Section

Sent on: June 20, 2014	Email	Hand delivery	US Mail	X	Certified No. 7011 2000 0001 6591 2186
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Copies:
 Michael Scott, Section Chief
 Dennis Shackelford, Eastern District Supervisor
 Jessica Montie, Compliance Officer
 Ming-tai Chao, Permitting Engineer
 Lorenzo Carmon, County Manager, Edgecombe Co. certification number 7011 2000 0001 6591 2193



FACILITY COMPLIANCE INSPECTION REPORT
Division of Waste Management
Solid Waste Section

UNIT TYPE:											
Lined MSWLF		LCID		YW		Transfer		Compost		SLAS	COUNTY: Edgecombe PERMIT NO.: 3301-CDLF-1997 FILE TYPE: COMPLIANCE
Closed MSWLF		HHW		White goods		Incin		T&P		FIRM	
CDLF	X	Tire T&P / Collection		Tire Monofill		Industrial Landfill		DEMO		SDTF	

Date of Site Inspection: August 11, 2014 **Date of Last Inspection:** August 6, 2014

FACILITY NAME AND ADDRESS:

Edgecombe Co C&LF/ Closed MSWLF
 2872 Colonial Road
 Tarboro, North Carolina 27886

GPS COORDINATES: N: 35.82293 W: 77.56511

FACILITY CONTACT NAME AND PHONE NUMBER:

Name: Mike Cummins
 Telephone: 252 827 4253 cell 252 813 3947
 Email address: mcummings@co.edgecombe.nc.us
 Fax: 252 827 6618

FACILITY CONTACT ADDRESS:

Edgecombe Co.
 P.O. Box 10
 Tarboro, North Carolina 27886

PARTICIPANTS:

Ben Barnes, NCDENR Solid Waste Section
 Mike Cummins, Director Edgecombe Co. Solid Waste
 Gloria Moseley, Admin Assistant Edgecombe Co. Solid Waste
 Jimmy Price Director of Edgecombe Co. Maintenance
 Sam Watts, P.G. S&ME
 Kenneth Obenauf, P.G. S&ME

STATUS OF PERMIT:

Active, PTO for Phase 2 and the continued operation of Phase 1 was issued March 31, 2010, due to expire on March 31, 2015. On or before September 30, 2014 documents must be submitted for the renewal of the permit to the Division.

PURPOSE OF SITE VISIT:

Partial inspection to resolve violations listed in an NOV dated June 10, 2014

STATUS OF PAST NOTED VIOLATIONS:

15A NCAC 13B .0203(d) Not resolved General Permit Condition Number 5 Not resolved, General Permit Condition Number 6 Not resolved, Conditions of Permit to Operate Number 6, Not resolved Conditions of Permit to Operate Number 14 Not resolved
15A NCAC 13B .0542 (a) Not resolved (c) Not resolved (e)(1)(7) Not resolved (l)(4) Resolved, The leachate outbreaks are in the process of being repaired
15A NCAC 13B .0544 MONITORING PLANS AND REQUIREMENTS FOR C&DLF

FACILITY COMPLIANCE INSPECTION REPORT
Division of Waste Management
Solid Waste Section

Page 2 of 4

FACILITIES (e)(3) Not resolved

OBSERVED VIOLATIONS

NONE

The item(s) listed above were observed by Section staff and require action on behalf of the facility in order to come into or maintain compliance with the Statutes, Rules, and/or other regulatory requirements applicable to this facility. Be advised that pursuant to N.C.G.S. 130A-22, an administrative penalty of up to \$15,000 per day may be assessed for each violation of the Solid Waste Laws, Regulations, Conditions of a Permit, or Order under Article 9 of Chapter 130A of the N.C. General Statutes. Further, the facility and/or all responsible parties may also be subject to enforcement actions including penalties, injunction from operation of a solid waste management facility or a solid waste collection service and any such further relief as may be necessary to achieve compliance with the North Carolina Solid Waste Management Act and Rules.

ADDITIONAL COMMENTS:

1. I met with Watts, Price, and Obenauf to discuss remediation of the site.



2. Work is progressing well on the leachate breakouts.
3. Part of the problem appears to be that waste had placed in shallow lifts in the past in the area of the breakouts so that any obstruction causes leachate to break through the cover. The area above the slope where the breakouts are occurring is a slight depression and allows rainwater to pond and infiltrate the cover. A remedy appears to be filling that area as soon as possible with waste to get more of a crown and improve drainage.
4. The county needs to inspect the area where the breakouts are occurring weekly to identify any problems.



5. Area where the infiltration appears to be occurring. A possible solution is to begin filling this area with waste so that a better slope can be constructed.

FACILITY COMPLIANCE INSPECTION REPORT
Division of Waste Management
Solid Waste Section

Page 3 of 4

6. **Edgecombe County must submit the Division by September 22nd a plan to address the leachate breakout and monitoring of any contaminated soil and surface water.**
7. **According to data submitted in the Facility Annual Report the Landfill has exceeded the approved capacity/air space for current Phases 1&2. In a Division letter dated October 21, 2013, the Edgecombe Co. C&DLF was directed by January 16, 2014 to conduct a survey to determine if the in place waste volume of 766,361 CY is correct and if so submit a Permit Application Amendment to construct and operate the C&DLF Phase 3. As of the date of this inspection report this has not been done.**
8. **There is some remaining ash and mulch from the storm debris that burned. The unburned mulch can to be utilized for erosion control on any area inside the permitted boundary where stabilization is need. The remaining wood ash must be handled in a manner consistent with Division guidelines.**
9. **The working face was mostly covered during this inspection so it was difficult to determine if non-conforming waste is still being dumped in the landfill. A follow-up inspection will be conducted to check for non-conforming waste and further leachate breakouts.**
10. **The county must continue to take steps to keep nonconforming waste from being accepted at the landfill.**

Please contact me if you have any questions or concerns regarding this inspection report.



Phone: 252 236 4453 Email ben.barnes@ncdenr.gov

Ben Barnes
Ben Barnes
Environmental Senior Specialist
Division of Waste Management - Solid Waste Section

Sent on: September 3, 2014	X	Email		Hand delivery		US Mail	X	Certified No.
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- Copies:**
- Jason Watkins, Field Operations Branch Head
 - Dennis Shackelford, Eastern District Supervisor
 - Jessica Montie, Compliance Officer
 - Ming-tai Chao, Permitting Engineer
 - Lorenzo Carmon, County Manager, Edgecombe Co.
 - Gloria Moseley, Office Manager
 - Sam Watts, S&ME Engineering

APPENDIX II

Solid Waste Section Guidelines for Groundwater, Soil and Surface Water Sampling revised April 2008

Solid Waste Section

Guidelines for Groundwater, Soil, and Surface Water Sampling

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION

General Sampling Procedures

The following guidance is provided to insure a consistent sampling approach so that sample collection activities at solid waste management facilities provide reliable data. Sampling must begin with an evaluation of facility information, historical environmental data and site geologic and hydrogeologic conditions. General sampling procedures are described in this document.

Planning

Begin sampling activities with planning and coordination. The party contracting with the laboratory is responsible for effectively communicating reporting requirements and evaluating data reliability as it relates to specific monitoring activities.

Sample Collection

Contamination Prevention

- a.) Take special effort to prevent cross contamination or environmental contamination when collecting samples.
 1. If possible, collect samples from the least contaminated sampling location (or background sampling location, if applicable) to the most contaminated sampling location.
 2. Collect the ambient or background samples first, and store them in separate ice chests or separate shipping containers within the same ice chest (e.g. untreated plastic bags).
 3. Collect samples in flowing water at designated locations from upstream to downstream.
- b.) Do not store or ship highly contaminated samples (concentrated wastes, free product, etc.) or samples suspect of containing high concentrations of contaminants in the same ice chest or shipping containers with other environmental samples.
 1. Isolate these sample containers by sealing them in separate, untreated plastic bags immediately after collecting, preserving, labeling, etc.
 2. Use a clean, untreated plastic bag to line the ice chest or shipping container.
- c.) All sampling equipment should be thoroughly decontaminated and transported in a manner that does not allow it to become contaminated. Arrangements should be made ahead of time to decontaminate any sampling or measuring equipment that will be reused when taking samples from more than one well. Field decontamination of

sampling equipment will be necessary before sampling each well to minimize the risk of cross contamination. Decontamination procedures should be included in reports as necessary. Certified pre-cleaned sampling equipment and containers may be used. When collecting aqueous samples, rinse the sample collection equipment with a portion of the sample water before taking the actual sample. Sample containers do not need to be rinsed. In the case of petroleum hydrocarbons, oil and grease, or containers with pre-measured preservatives, the sample containers cannot be rinsed.

- d.) Place all fuel-powered equipment away from, and downwind of, any site activities (e.g., purging, sampling, decontamination).
 1. If field conditions preclude such placement (i.e., the wind is from the upstream direction in a boat), place the fuel source(s) as far away as possible from the sampling activities and describe the conditions in the field notes.
 2. Handle fuel (i.e., filling vehicles and equipment) prior to the sampling day. If such activities must be performed during sampling, the personnel must wear disposable gloves.
 3. Dispense all fuels downwind. Dispose of gloves well away from the sampling activities.

Filling Out Sample Labels

Fill out label, adhere to vial and collect sample. Print legibly with indelible ink. At a minimum, the label or tag should identify the sample with the following information:

1. Sample location and/or well number
2. Sample identification number
3. Date and time of collection
4. Analysis required/requested
5. Sampler's initials
6. Preservative(s) used, if any [i.e., HCl, Na₂S₂O₃, NO₃, ice, etc.]
7. Any other pertinent information for sample identification

Sample Collection Order

Unless field conditions justify other sampling regimens, collect samples in the following order:

1. Volatile Organics and Volatile Inorganics
2. Extractable Organics, Petroleum Hydrocarbons, Aggregate Organics and Oil and Grease
3. Total Metals
4. Inorganic Nonmetallics, Physical and Aggregate Properties, and Biologicals
5. Microbiological

NOTE: *If the pump used to collect groundwater samples cannot be used to collect volatile or extractable organics then collect all other parameters and withdraw the pump and tubing. Then collect the volatile and extractable organics.*

Health and Safety

Implement all local, state, and federal requirements relating to health and safety. Follow all local, state and federal requirements pertaining to the storage and disposal of any hazardous or investigation derived wastes.

- a.) The Solid Waste Section recommends wearing protective gloves when conducting all sampling activities.
 1. Gloves serve to protect the sample collector from potential exposure to sample constituents, minimize accidental contamination of samples by the collector, and preserve accurate tare weights on preweighed sample containers.
 2. Do not let gloves come into contact with the sample or with the interior or lip of the sample container. Use clean, new, unpowdered and disposable gloves. Various types of gloves may be used as long as the construction materials do not contaminate the sample or if internal safety protocols require greater protection.
 3. Note that certain materials that may potentially be present in concentrated effluent can pass through certain glove types and be absorbed in the skin. Many vendor catalogs provide information about the permeability of different gloves and the circumstances under which the glove material might be applicable. The powder in powdered gloves can contribute significant contamination. Powdered gloves are not recommended unless it can be demonstrated that the powder does not interfere with the sample analysis.
 4. Change gloves after preliminary activities, after collecting all the samples at a single sampling point, if torn or used to handle extremely dirty or highly contaminated surfaces. Properly dispose of all used gloves as investigation derived wastes.
- b.) Properly manage all investigation derived waste (IDW).
 5. To prevent contamination into previously uncontaminated areas, properly manage all IDW. This includes all water, soil, drilling mud, decontamination wastes, discarded personal protective equipment (PPE), etc. from site investigations, exploratory borings, piezometer and monitoring well installation, refurbishment, abandonment, and other investigative activities. Manage all IDW that is determined to be RCRA-regulated hazardous waste according to the local, state and federal requirements.
 6. Properly dispose of IDW that is not a RCRA-regulated hazardous waste but is contaminated above the Department's Soil Cleanup Target Levels or the state standards and/or minimum criteria for ground water quality. If the drill cuttings/mud or purged well water is contaminated with hazardous waste, contact the DWM Hazardous Waste Section (919-508-8400) for disposal options. Maintain all containers holding IDW in good condition. Periodically inspect the containers for damage and ensure that all required labeling (DOT, RCRA, etc.) are clearly visible.

Sample Storage and Transport

Store samples for transport carefully. Pack samples to prevent from breaking and to maintain a temperature of approximately 4 degrees Celsius (°C), adding ice if necessary. Transport samples to a North Carolina-certified laboratory as soon as possible. Avoid unnecessary handling of sample containers. Avoid heating (room temperature or above, including exposure to sunlight) or freezing of the sample containers. Reduce the time between sample collection and delivery to a laboratory whenever possible and be sure that the analytical holding times of your samples can be met by the laboratory.

- a.) A complete chain-of-custody (COC) form must be maintained to document all transfers and receipts of the samples. Be sure that the sample containers are labeled with the sample location and/or well number, sample identification, the date and time of collection, the analysis to be performed, the preservative added (if any), the sampler's initials, and any other pertinent information for sample identification. The labels should contain a unique identifier (i.e., unique well numbers) that can be traced to the COC form. The details of sample collection must be documented on the COC. The COC must include the following:
 1. Description of each sample (including QA/QC samples) and the number of containers (sample location and identification)
 2. Signature of the sampler
 3. Date and time of sample collection
 4. Analytical method to be performed
 5. Sample type (i.e., water or soil)
 6. Regulatory agency (i.e., NCDENR/DWM – SW Section)
 7. Signatures of all persons relinquishing and receiving custody of the samples
 8. Dates and times of custody transfers
- b.) Pack samples so that they are segregated by site, sampling location or by sample analysis type. When COC samples are involved, segregate samples in coolers by site. If samples from multiple sites will fit in one cooler, they may be packed in the same cooler with the associated field sheets and a single COC form for all. Coolers should not exceed a maximum weight of 50 lbs. Use additional coolers as necessary. All sample containers should be placed in plastic bags (segregated by analysis and location) and completely surrounded by ice.
 1. Prepare and place trip blanks in an ice filled cooler before leaving for the field.
 2. Segregate samples by analysis and place in sealable plastic bags.
 3. Pack samples carefully in the cooler placing ice around the samples.
 4. Review the COC. The COC form must accompany the samples to the laboratory. The trip blank(s) must also be recorded on the COC form.
 5. Place completed COC form in a waterproof bag, sealed and taped under the lid of the cooler.
 6. Secure shipping containers with strapping tape to avoid accidental opening.
 7. For COC samples, a tamper-proof seal may also be placed over the cooler lid or over a bag or container containing the samples inside the shipping cooler.

8. "COC" or "EMERG" should be written in indelible ink on the cooler seal to alert sample receipt technicians to priority or special handling samples.
9. The date and sample handler's signature must also be written on the COC seal.
10. Deliver the samples to the laboratory or ship by commercial courier.

NOTE: *If transport time to the laboratory is not long enough to allow samples to be cooled to 4° C, a temperature reading of the sample source must be documented as the field temperature on the COC form. A downward trend in temperature will be adequate even if cooling to 4° C is not achieved. The field temperature should always be documented if there is any question as to whether samples will have time to cool to 4° C during shipment. Thermometers must be calibrated annually against an NIST traceable thermometer and documentation must be retained.*

Appendix A - Decontamination of Field Equipment

Decontamination of personnel, sampling equipment, and containers - before and after sampling - must be used to ensure collection of representative samples and to prevent the potential spread of contamination. Decontamination of personnel prevents ingestion and absorption of contaminants. It must be done with a soap and water wash and deionized or distilled water rinse. Certified pre-cleaned sampling equipment and containers may also be used.

All previously used sampling equipment must be properly decontaminated before sampling and between sampling locations. This prevents the introduction of contamination into uncontaminated samples and avoids cross-contamination of samples. Cross-contamination can be a significant problem when attempting to characterize extremely low concentrations of organic compounds or when working with soils that are highly contaminated.

Clean, solvent-resistant gloves and appropriate protective equipment must be worn by persons decontaminating tools and equipment.

Cleaning Reagents

Recommendations for the types and grades of various cleaning supplies are outlined below. The recommended reagent types or grades were selected to ensure that the cleaned equipment is free from any detectable contamination.

- a.) Detergents: Use Liqui-Nox (or a non-phosphate equivalent) or Alconox (or equivalent). Liqui-Nox (or equivalent) is recommended by EPA, although Alconox (or equivalent) may be substituted if the sampling equipment will not be used to collect phosphorus or phosphorus containing compounds.
- b.) Solvents: Use pesticide grade isopropanol as the rinse solvent in routine equipment cleaning procedures. This grade of alcohol must be purchased from a laboratory supply vendor. Rubbing alcohol or other commonly available sources of isopropanol **are not acceptable**. Other solvents, such as acetone or methanol, may be used as the final rinse solvent if they are pesticide grade. However, methanol is more toxic to the environment and acetone may be an analyte of interest for volatile organics.
 1. **Do not** use acetone if volatile organics are of interest
 2. Containerize all methanol wastes (including rinses) and dispose as a hazardous waste.

Pre-clean equipment that is heavily contaminated with organic analytes. Use reagent grade acetone and hexane or other suitable solvents. Use pesticide grade methylene chloride when cleaning sample containers. Store all solvents away from potential sources of contamination.

- c.) Analyte-Free Water Sources: Analyte-free water is water in which all analytes of interest and all interferences are below method detection limits. Maintain documentation (such as results from equipment blanks) to demonstrate the reliability and purity of analyte-free water source(s). The source of the water must meet the requirements of the analytical method and must be free from the analytes of interest. In general, the following water types are associated with specific analyte groups:
 1. *Milli-Q (or equivalent polished water)*: suitable for all analyses.

2. *Organic-free*: suitable for volatile and extractable organics.
3. *Deionized water*: may not be suitable for volatile and extractable organics.
4. *Distilled water*: not suitable for volatile and extractable organics, metals or ultratrace metals.

Use analyte-free water for blank preparation and the final decontamination water rinse. In order to minimize long-term storage and potential leaching problems, obtain or purchase analyte-free water just prior to the sampling event. If obtained from a source (such as a laboratory), fill the transport containers and use the contents for a single sampling event. Empty the transport container(s) at the end of the sampling event. Discard any analyte-free water that is transferred to a dispensing container (such as a wash bottle or pump sprayer) at the end of each sampling day.

d.) Acids:

1. *Reagent Grade Nitric Acid*: 10 - 15% (one volume concentrated nitric acid and five volumes deionized water). Use for the acid rinse unless nitrogen components (e.g., nitrate, nitrite, etc.) are to be sampled. If sampling for ultra-trace levels of metals, use an ultra-pure grade acid.
2. *Reagent Grade Hydrochloric Acid*: 10% hydrochloric acid (one volume concentrated hydrochloric and three volumes deionized water). Use when nitrogen components are to be sampled.
3. If samples for both metals and the nitrogen-containing components are collected with the equipment, use the hydrochloric acid rinse, or thoroughly rinse with hydrochloric acid after a nitric acid rinse. If sampling for ultra trace levels of metals, use an ultra-pure grade acid.
4. Freshly prepared acid solutions may be recycled during the sampling event or cleaning process. Dispose of any unused acids according to local ordinances.

Reagent Storage Containers

The contents of all containers must be clearly marked.

a.) Detergents:

1. Store in the original container or in a HDPE or PP container.

b.) Solvents:

1. Store solvents to be used for cleaning or decontamination in the original container until use in the field. If transferred to another container for field use, use either a glass or Teflon container.
2. Use dispensing containers constructed of glass, Teflon or stainless steel. Note: If stainless steel sprayers are used, any gaskets that contact the solvents must be constructed of inert materials.

c.) Analyte-Free Water:

1. Transport in containers appropriate for the type of water stored. If the water is commercially purchased (e.g., grocery store), use the original containers when transporting the water to the field. Containers made of glass, Teflon, polypropylene or HDPE are acceptable.
2. Use glass or Teflon to transport organic-free sources of water on-site. Polypropylene or HDPE may be used, but are not recommended.

3. Dispense water from containers made of glass, Teflon, HDPE or polypropylene.
4. Do not store water in transport containers for more than three days before beginning a sampling event.
5. If working on a project that has oversight from EPA Region 4, use glass containers for the transport and storage of all water.
6. Store and dispense acids using containers made of glass, Teflon or plastic.

General Requirements

- a.) Prior to use, clean/decontaminate all sampling equipment (pumps, tubing, lanyards, split spoons, etc.) that will be exposed to the sample.
- b.) Before installing, clean (or obtain as certified pre-cleaned) all equipment that is dedicated to a single sampling point and remains in contact with the sample medium (e.g., permanently installed groundwater pump). If you use certified pre-cleaned equipment no cleaning is necessary.
 1. Clean this equipment any time it is removed for maintenance or repair.
 2. Replace dedicated tubing if discolored or damaged.
- c.) Clean all equipment in a designated area having a controlled environment (house, laboratory, or base of field operations) and transport it to the field, pre-cleaned and ready to use, unless otherwise justified.
- d.) Rinse all equipment with water after use, even if it is to be field-cleaned for other sites. Rinse equipment used at contaminated sites or used to collect in-process (e.g., untreated or partially treated wastewater) samples immediately with water.
- e.) Whenever possible, transport sufficient clean equipment to the field so that an entire sampling event can be conducted without the need for cleaning equipment in the field.
- f.) Segregate equipment that is only used once (i.e., not cleaned in the field) from clean equipment and return to the in-house cleaning facility to be cleaned in a controlled environment.
- g.) Protect decontaminated field equipment from environmental contamination by securely wrapping and sealing with one of the following:
 1. Aluminum foil (commercial grade is acceptable)
 2. Untreated butcher paper
 3. Clean, untreated, disposable plastic bags. Plastic bags may be used for all analyte groups except volatile and extractable organics. Plastic bags may be used for volatile and extractable organics, if the equipment is first wrapped in foil or butcher paper, or if the equipment is completely dry.

Cleaning Sample Collection Equipment

- a.) On-Site/In-Field Cleaning – Cleaning equipment on-site is not recommended because environmental conditions cannot be controlled and wastes (solvents and acids) must be containerized for proper disposal.
 1. Ambient temperature water may be substituted in the hot, sudsy water bath and hot water rinses.

NOTE: Properly dispose of all solvents and acids.

2. Rinse all equipment with water after use, even if it is to be field-cleaned for other sites.
 3. Immediately rinse equipment used at contaminated sites or used to collect in-process (e.g., untreated or partially treated wastewater) samples with water.
- b.) Heavily Contaminated Equipment - In order to avoid contaminating other samples, isolate heavily contaminated equipment from other equipment and thoroughly decontaminate the equipment before further use. Equipment is considered heavily contaminated if it:
1. Has been used to collect samples from a source known to contain significantly higher levels than background.
 2. Has been used to collect free product.
 3. Has been used to collect industrial products (e.g., pesticides or solvents) or their byproducts.

NOTE: *Cleaning heavily contaminated equipment in the field is not recommended.*

c.) On-Site Procedures:

1. Protect all other equipment, personnel and samples from exposure by isolating the equipment immediately after use.
2. At a minimum, place the equipment in a tightly sealed, untreated, plastic bag.
3. Do not store or ship the contaminated equipment next to clean, decontaminated equipment, unused sample containers, or filled sample containers.
4. Transport the equipment back to the base of operations for thorough decontamination.
5. If cleaning must occur in the field, document the effectiveness of the procedure, collect and analyze blanks on the cleaned equipment.

d.) Cleaning Procedures:

1. If organic contamination cannot be readily removed with scrubbing and a detergent solution, pre-rinse equipment by thoroughly rinsing or soaking the equipment in acetone.
2. Use hexane only if preceded and followed by acetone.
3. In extreme cases, it may be necessary to steam clean the field equipment before proceeding with routine cleaning procedures.
4. After the solvent rinses (and/or steam cleaning), use the appropriate cleaning procedure. Scrub, rather than soak, all equipment with sudsy water. If high levels of metals are suspected and the equipment cannot be cleaned without acid rinsing, soak the equipment in the appropriate acid. Since stainless steel equipment should not be exposed to acid rinses, do not use stainless steel equipment when heavy metal contamination is suspected or present.
5. If the field equipment cannot be cleaned utilizing these procedures, discard unless further cleaning with stronger solvents and/or oxidizing solutions is effective as evidenced by visual observation and blanks.
6. Clearly mark or disable all discarded equipment to discourage use.

- e.) General Cleaning - Follow these procedures when cleaning equipment under controlled conditions. Check manufacturer's instructions for cleaning restrictions and/or recommendations.
1. *Procedure for Teflon, stainless steel and glass sampling equipment:* This procedure must be used when sampling for ALL analyte groups. (Extractable organics, metals, nutrients, etc. or if a single decontamination protocol is desired to clean all Teflon, stainless steel and glass equipment.) Rinse equipment with hot tap water. Soak equipment in a hot, sudsy water solution (Liqui-Nox or equivalent). If necessary, use a brush to remove particulate matter or surface film. Rinse thoroughly with hot tap water. If samples for trace metals or inorganic analytes will be collected with the equipment that is not stainless steel, thoroughly rinse (wet all surfaces) with the appropriate acid solution. Rinse thoroughly with analyte-free water. Make sure that all equipment surfaces are thoroughly flushed with water. If samples for volatile or extractable organics will be collected, rinse with isopropanol. Wet equipment surfaces thoroughly with free-flowing solvent. Rinse thoroughly with analyte-free water. Allow to air dry. Wrap and seal as soon as the equipment has air-dried. If isopropanol is used, the equipment may be air-dried without the final analyte-free water rinse; however, the equipment must be completely dry before wrapping or use. Wrap clean sampling equipment according to the procedure described above.
 2. *General Cleaning Procedure for Plastic Sampling Equipment:* Rinse equipment with hot tap water. Soak equipment in a hot, sudsy water solution (Liqui-Nox or equivalent). If necessary, use a brush to remove particulate matter or surface film. Rinse thoroughly with hot tap water. Thoroughly rinse (wet all surfaces) with the appropriate acid solution. Check manufacturer's instructions for cleaning restrictions and/or recommendations. Rinse thoroughly with analyte-free water. Be sure that all equipment surfaces are thoroughly flushed. Allow to air dry as long as possible. Wrap clean sampling equipment according to the procedure described above.

Appendix B - Collecting Soil Samples

Soil samples are collected for a variety of purposes. A methodical sampling approach must be used to assure that sample collection activities provide reliable data. Sampling must begin with an evaluation of background information, historical data and site conditions.

Soil Field Screening Procedures

Field screening is the use of portable devices capable of detecting petroleum contaminants on a real-time basis or by a rapid field analytical technique. Field screening should be used to help assess locations where contamination is most likely to be present.

When possible, field-screening samples should be collected directly from the excavation or from the excavation equipment's bucket. If field screening is conducted only from the equipment's bucket, then a minimum of one field screening sample should be collected from each 10 cubic yards of excavated soil. If instruments or other observations indicate contamination, soil should be separated into stockpiles based on apparent degrees of contamination. At a minimum, soil suspected of contamination must be segregated from soil observed to be free of contamination.

- a.) Field screening devices – Many field screen instruments are available for detecting contaminants in the field on a rapid or real-time basis. Acceptable field screening instruments must be suitable for the contaminant being screened. The procedure for field screening using photoionization detectors (PIDs) and flame ionization detectors (FIDs) is described below. If other instruments are used, a description of the instrument or method and its intended use must be provided to the Solid Waste Section. Whichever field screening method is chosen, its accuracy must be verified throughout the sampling process. Use appropriate standards that match the use intended for the data. Unless the Solid Waste Section indicates otherwise, wherever field screening is recommended in this document, instrumental or analytical methods of detection must be used, not olfactory or visual screening methods.
- b.) Headspace analytical screening procedure for field screening (semi-quantitative field screening) - The most commonly used field instruments for Solid Waste Section site assessments are FIDs and PIDs. When using FIDs and PIDs, use the following headspace screening procedure to obtain and analyze field-screening samples:
 1. Partially fill (one-third to one-half) a clean jar or clean ziplock bag with the sample to be analyzed. The total capacity of the jar or bag may not be less than eight ounces (app. 250 ml), but the container should not be so large as to allow vapor diffusion and stratification effects to significantly affect the sample.
 2. If the sample is collected from a spilt-spoon, it must be transferred to the jar or bag for headspace analysis immediately after opening the split-spoon. If the sample is collected from an excavation or soil pile, it must be collected from freshly uncovered soil.

3. If a jar is used, it must be quickly covered with clean aluminum foil or a jar lid; screw tops or thick rubber bands must be used to tightly seal the jar. If a zip lock bag is used, it must be quickly sealed shut.
4. Headspace vapors must be allowed to develop in the container for at least 10 minutes but no longer than one hour. Containers must be shaken or agitated for 15 seconds at the beginning and the end of the headspace development period to assist volatilization. Temperatures of the headspace must be warmed to at least 5° C (approximately 40° F) with instruments calibrated for the temperature used.
5. After headspace development, the instrument sampling probe must be inserted to a point about one-half the headspace depth. The container opening must be minimized and care must be taken to avoid the uptake of water droplets and soil particulates.
6. After probe insertion, the highest meter reading must be taken and recorded. This will normally occur between two and five seconds after probe insertion. If erratic meter response occurs at high organic vapor concentrations or conditions of elevated headspace moisture, a note to that effect must accompany the headspace data.
7. All field screening results must be documented in the field record or log book.

Soil Sample Collection Procedures for Laboratory Samples

The number and type of laboratory samples collected depends on the purpose of the sampling activity. Samples analyzed with field screening devices may not be substituted for required laboratory samples.

- a.) General Sample Collection - When collecting samples from potentially contaminated soil, care should be taken to reduce contact with skin or other parts of the body. Disposable gloves should be worn by the sample collector and should be changed between samples to avoid cross-contamination. Soil samples should be collected in a manner that causes the least disturbance to the internal structure of the sample and reduces its exposure to heat, sunlight and open air. Likewise, care should be taken to keep the samples from being contaminated by other materials or other samples collected at the site. When sampling is to occur over an extended period of time, it is necessary to insure that the samples are collected in a comparable manner. All samples must be collected with disposable or clean tools that have been decontaminated. Disposable gloves must be worn and changed between sample collections. Sample containers must be filled quickly. Soil samples must be placed in containers in the order of volatility, for example, volatile organic aromatic samples must be taken first, organics next, then heavier range organics, and finally soil classification samples. Containers must be quickly and adequately sealed, and rims must be cleaned before tightening lids. Tape may be used only if known not to affect sample analysis. Sample containers must be clearly labeled. Containers must immediately be preserved according to procedures in this Section. Unless specified

- otherwise, at a minimum, the samples must be immediately cooled to $4 \pm 2^{\circ}\text{C}$ and this temperature must be maintained throughout delivery to the laboratory.
- b.) Surface Soil Sampling - Surface soil is generally classified as soil between the ground surface and 6-12 inches below ground surface. Remove leaves, grass and surface debris from the area to be sampled. Select an appropriate, pre-cleaned sampling device and collect the sample. Transfer the sample to the appropriate sample container. Clean the outside of the sample container to remove excess soil. Label the sample container, place on wet ice to preserve at 4°C , and complete the field notes.
 - c.) Subsurface Soil Sampling – The interval begins at approximately 12 inches below ground surface. Collect samples for volatile organic analyses. For other analyses, select an appropriate, pre-cleaned sampling device and collect the sample. Transfer the sample to the appropriate sample container. Clean the outside of the sample container to remove excess soil. Label the sample container, place on wet ice to preserve at 4°C , and complete field notes.
 - d.) Equipment for Reaching the Appropriate Soil Sampling Depth - Samples may be collected using a hollow stem soil auger, direct push, Shelby tube, split-spoon sampler, or core barrel. These sampling devices may be used as long as an effort is made to reduce the loss of contaminants through volatilization. In these situations, obtain a sufficient volume of so the samples can be collected without volatilization and disturbance to the internal structure of the samples. Samples should be collected from cores of the soil. Non-disposable sampling equipment must be decontaminated between each sample location. **NOTE:** *If a confining layer has been breached during sampling, grout the hole to land.*
 - e.) Equipment to Collect Soil Samples - Equipment and materials that may be used to collect soil samples include disposable plastic syringes and other “industry-standard” equipment and materials that are contaminant-free. Non-disposable sampling equipment must be decontaminated between each sample location.

Appendix C - Collecting Groundwater Samples

Groundwater samples are collected to identify, investigate, assess and monitor the concentration of dissolved contaminant constituents. To properly assess groundwater contamination, first install sampling points (monitoring wells, etc.) to collect groundwater samples and then perform specific laboratory analyses. All monitoring wells should be constructed in accordance with 15A NCAC 2C .0100 and sampled as outlined in this section. Groundwater monitoring is conducted using one of two methods:

1. Portable Monitoring: Monitoring that is conducted using sampling equipment that is discarded between sampling locations. Equipment used to collect a groundwater sample from a well such as bailers, tubing, gloves, and etc. are disposed of after sample collection. A new set of sampling equipment is used to collect a groundwater sample at the next monitor well.
2. Dedicated Monitoring: Monitoring that utilizes permanently affixed down-well and well head components that are capped after initial set-up. Most dedicated monitoring systems are comprised of an in-well submersible bladder pump, with air supply and sample discharge tubing, and an above-ground driver/controller for regulation of flow rates and volumes. The pump and all tubing housed within the well should be composed of Teflon or stainless steel components. This includes seals inside the pump, the pump body, and fittings used to connect tubing to the pump. Because ground water will not be in contact with incompatible constituents and because the well is sealed from the surface, virtually no contamination is possible from intrinsic sources during sampling and between sampling intervals. All dedicated monitoring systems must be approved by the Solid Waste Section before installation.

Groundwater samples may be collected from a number of different configurations. Each configuration is associated with a unique set of sampling equipment requirements and techniques:

1. Wells without Plumbing: These wells require equipment to be brought to the well to purge and sample unless dedicated equipment is placed in the well.
2. Wells with In-Place Plumbing: Wells with in-place plumbing do not require equipment to be brought to the well to purge and sample. In-place plumbing is generally considered permanent equipment routinely used for purposes other than purging and sampling, such as for water supply.
3. Air Strippers or Remedial Systems: These types of systems are installed as remediation devices.

Groundwater Sample Preparation

The type of sample containers used depends on the type of analysis performed. First, determine the type(s) of contaminants expected and the proper analytical method(s). Be sure to consult your selected laboratory for its specific needs and requirements prior to sampling.

Next, prepare the storage and transport containers (ice chest, etc.) before taking any samples so that each sample can be placed in a chilled environment immediately after collection.

Use groundwater purging and sampling equipment constructed of only non-reactive, non-leachable materials that are compatible with the environment and the selected analytes. In selecting groundwater purging and sampling equipment, give consideration to the depth of the well, the depth to groundwater, the volume of water to be evacuated, the sampling and purging technique, and the analytes of interest. Additional supplies, such as reagents and preservatives, may be necessary.

All sampling equipment (bailers, tubing, containers, etc.) must be selected based on its chemical compatibility with the source being sampled (e.g., water supply well, monitoring well) and the contaminants potentially present.

- a.) Pumps - All pumps or pump tubing must be lowered and retrieved from the well slowly and carefully to minimize disturbance to the formation water. This is especially critical at the air/water interface.
 1. *Above-Ground Pumps*
 - Variable Speed Peristaltic Pump: Use a variable speed peristaltic pump to purge groundwater from wells when the static water level in the well is no greater than 20- 25 feet below land surface (BLS). If the water levels are deeper than 18-20 feet BLS, the pumping velocity will decrease. A variable speed peristaltic pump can be used for normal purging and sampling, and sampling low permeability aquifers or formations. Most analyte groups can be sampled with a peristaltic pump if the tubing and pump configurations are appropriate.
 - Variable Speed Centrifugal Pump: A variable speed centrifugal pump can be used to purge groundwater from 2-inch and larger internal diameter wells. **Do not use** this type of pump to collect groundwater samples. When purging is complete, do not allow the water that remains in the tubing to fall back into the well. Install a check valve at the end of the purge tubing.
 2. *Submersible Pumps*
 - Variable Speed Electric Submersible Pump: A variable speed submersible pump can be used to purge and sample groundwater from 2-inch and larger internal diameter wells. A variable speed submersible pump can be used for normal purging and sampling, and sampling low permeability aquifers or formations. The pump housing, fittings, check valves and associated hardware must be constructed of stainless steel. All other materials must be

compatible with the analytes of interest. Install a check valve at the output side of the pump to prevent backflow. If purging **and** sampling for organics, the entire length of the delivery tube must be Teflon, polyethylene or polypropylene (PP) tubing; the electrical cord must be sealed in Teflon, polyethylene or PP and any cabling must be sealed in Teflon, polyethylene or PP, or be constructed of stainless steel; and all interior components that contact the sample water (impeller, seals, gaskets, etc.) must be constructed of stainless steel or Teflon.

3. *Variable Speed Bladder Pump*: A variable speed, positive displacement, bladder pump can be used to purge and sample groundwater from 3/4-inch and larger internal diameter wells.
 - A variable speed bladder pump can be used for normal purging and sampling, and sampling low permeability aquifers or formations.
 - The bladder pump system is composed of the pump, the compressed air tubing, the water discharge tubing, the controller and a compressor, or a compressed gas supply.
 - The pump consists of a bladder and an exterior casing or pump body that surrounds the bladder and two (2) check valves. These parts can be composed of various materials, usually combinations of polyvinyl chloride (PVC), Teflon, polyethylene, PP and stainless steel. Other materials must be compatible with the analytes of interest.
 - If purging and sampling for organics, the pump body must be constructed of stainless steel. The valves and bladder must be Teflon, polyethylene or PP; the entire length of the delivery tube must be Teflon, polyethylene or PP; and any cabling must be sealed in Teflon, polyethylene or PP, or be constructed of stainless steel.
 - Permanently installed pumps may have a PVC pump body as long as the pump remains in contact with the water in the well.

b.) Bailers

1. *Purging*: Bailers must be used with caution because improper bailing can cause changes in the chemistry of the water due to aeration and loosening particulate matter in the space around the well screen. Use a bailer if there is non-aqueous phase liquid (free product) in the well or if non-aqueous phase liquid is suspected to be in the well.
2. *Sampling*: Bailers must be used with caution.
3. *Construction and Type*: Bailers must be constructed of materials compatible with the analytes of interest. Stainless steel, Teflon, rigid medical grade PVC, polyethylene and PP bailers may be used to sample all analytes. Use disposable bailers when sampling grossly contaminated sample sources. NCDENR recommends using dual check valve bailers when collecting samples. Use bailers with a controlled flow bottom to collect volatile organic samples.

4. *Contamination Prevention*: Keep the bailer wrapped (foil, butcher paper, etc.) until just before use. Use protective gloves to handle the bailer once it is removed from its wrapping. Handle the bailer by the lanyard to minimize contact with the bailer surface.

c.) Lanyards

1. Lanyards must be made of non-reactive, non-leachable material. They may be cotton twine, nylon, stainless steel, or may be coated with Teflon, polyethylene or PP.
2. Discard cotton twine, nylon, and non-stainless steel braided lanyards after sampling each monitoring well.
3. Decontaminate stainless steel, coated Teflon, polyethylene and PP lanyards between monitoring wells. They do not need to be decontaminated between purging and sampling operations.

Water Level and Purge Volume Determination

The amount of water that must be purged from a well is determined by the volume of water and/or field parameter stabilization.

a.) General Equipment Considerations - Selection of appropriate purging equipment depends on the analytes of interest, the well diameter, transmissivity of the aquifer, the depth to groundwater, and other site conditions.

1. Use of a pump to purge the well is recommended unless no other equipment can be used or there is non-aqueous phase liquid in the well, or non-aqueous phase liquid is suspected to be in the well.
2. Bailers must be used with caution because improper bailing:
 - Introduces atmospheric oxygen, which may precipitate metals (i.e., iron) or cause other changes in the chemistry of the water in the sample (i.e., pH).
 - Agitates groundwater, which may bias volatile and semi-volatile organic analyses due to volatilization.
 - Agitates the water in the aquifer and resuspends fine particulate matter.
 - Surges the well, loosening particulate matter in the annular space around the well screen.
 - May introduce dirt into the water column if the sides of the casing wall are scraped.

NOTE: *It is critical for bailers to be slowly and gently immersed into the top of the water column, particularly during the final stages of purging. This minimizes turbidity and disturbance of volatile organic constituents.*

b.) Initial Inspection

1. Remove the well cover and remove all standing water around the top of the well casing (manhole) before opening the well.
2. Inspect the exterior protective casing of the monitoring well for damage. Document the results of the inspection if there is a problem.
3. It is recommended that you place a protective covering around the well head. Replace the covering if it becomes soiled or ripped.

4. Inspect the well lock and determine whether the cap fits tightly. Replace the cap if necessary.
- c.) Water Level Measurements - Use an electronic probe or chalked tape to determine the water level. Decontaminate all equipment before use. Measure the depth to groundwater from the top of the well casing to the nearest 0.01 foot. Always measure from the same reference point or survey mark on the well casing. Record the measurement.
1. *Electronic Probe*: Decontaminate all equipment before use. Follow the manufacturer's instructions for use. Record the measurement.
 2. *Chalked Line Method*: Decontaminate all equipment before use. Lower chalked tape into the well until the lower end is in the water. This is usually determined by the sound of the weight hitting the water. Record the length of the tape relative to the reference point. Remove the tape and note the length of the wetted portion. Record the length. Determine the depth to water by subtracting the length of the wetted portion from the total length. Record the result.
- d.) Water Column Determination - To determine the length of the water column, subtract the depth to the top of the water column from the total well depth (or gauged well depth if silting has occurred). The total well depth depends on the well construction. If gauged well depth is used due to silting, report total well depth also. Some wells may be drilled in areas of sinkhole, karst formations or rock leaving an open borehole. Attempt to find the total borehole depth in cases where there is an open borehole below the cased portion.
- e.) Well Water Volume - Calculate the total volume of water, in gallons, in the well using the following equation:

$$V = (0.041)d \times d \times h$$

Where:

V = volume in gallons

d = well diameter in inches

h = height of the water column in feet

The total volume of water in the well may also be determined with the following equation by using a casing volume per foot factor (Gallons per Foot of Water) for the appropriate diameter well:

$$V = [\text{Gallons per Foot of Water}] \times h$$

Where:

V = volume in gallons

h = height of the water column in feet

Record all measurements and calculations in the field records.

- f.) Purging Equipment Volume - Calculate the total volume of the pump, associated tubing and flow cell (if used), using the following equation:

$$V = p + ((0.041)d \times d \times l) + fc$$

Where:

V = volume in gallons

p = volume of pump in gallons

d = tubing diameter in inches

l = length of tubing in feet

fc = volume of flow cell in gallons

- g.) If the groundwater elevation data are to be used to construct groundwater elevation contour maps, all water level measurements must be taken within the same 24 hour time interval when collecting samples from multiple wells on a site, unless a shorter time period is required. If the site is tidally influenced, complete the water level measurements within the time frame of an incoming or outgoing tide.

Well Purging Techniques

The selection of the purging technique and equipment is dependent on the hydrogeologic properties of the aquifer, especially depth to groundwater and hydraulic conductivity.

- a.) Measuring the Purge Volume - The volume of water that is removed during purging must be recorded. Therefore, you must measure the volume during the purging operation.
1. Collect the water in a graduated container and multiply the number of times the container was emptied by the volume of the container, OR
 2. Estimate the volume based on pumping rate. This technique may be used only if the pumping rate is constant. Determine the pumping rate by measuring the amount of water that is pumped for a fixed period of time, or use a flow meter.
 - Calculate the amount of water that is discharged per minute: $D = \text{Measured Amount} / \text{Total Time In Minutes}$
 - Calculate the time needed to purge one (1) well volume or one (1) purging equipment volume: $\text{Time} = V / D$
Where: $V = \text{well volume or purging equipment volume}$
 $D = \text{discharge rate}$
 - Make new measurements each time the pumping rate is changed.
 3. Use a totalizing flow meter.
 - Record the reading on the totalizer prior to purging.
 - Record the reading on the totalizer at the end of purging.
 - To obtain the volume purged, subtract the reading on the totalizer prior to purging from the reading on the totalizer at the end of purging.
 - Record the times that purging begins and ends in the field records.
- b.) Purging Measurement Frequency - When purging a well that has the well screen fully submerged and the pump or intake tubing is placed within the well casing above the well screen or open hole, purge a minimum of one (1) well volume prior to collecting measurements of the field parameters. Allow at least one quarter (1/4) well volume to purge between subsequent measurements. When purging a well that has the pump or intake tubing placed within a fully submerged well screen or open hole, purge until the water level has stabilized (well recovery rate equals the purge rate), then purge a minimum of one (1) volume of the pump, associated tubing and flow cell (if used) prior to collecting measurements of the field parameters. Take measurements of the field parameters no sooner than two (2) to three (3) minutes apart. Purge at least

three (3) volumes of the pump, associated tubing and flow cell, if used, prior to collecting a sample. When purging a well that has a partially submerged well screen, purge a minimum of one (1) well volume prior to collecting measurements of the field parameters. Take measurements of the field parameters no sooner than two (2) to three (3) minutes apart.

c.) Purging Completion - Wells must be adequately purged prior to sample collection to ensure representation of the aquifer formation water, rather than stagnant well water. This may be achieved by purging three volumes from the well or by satisfying any one of the following three purge completion criteria:

1.) Three (3) consecutive measurements in which the three (3) parameters listed below are within the stated limits, dissolved oxygen is no greater than 20 percent of saturation at the field measured temperature, and turbidity is no greater than 20 Nephelometric Turbidity Units (NTUs).

- Temperature: + 0.2° C
- pH: + 0.2 Standard Units
- Specific Conductance: + 5.0% of reading

Document and report the following, as applicable. The last four items only need to be submitted once:

- Purging rate.
- Drawdown in the well, if any.
- A description of the process and the data used to design the well.
- The equipment and procedure used to install the well.
- The well development procedure.
- Pertinent lithologic or hydrogeologic information.

2.) If it is impossible to get dissolved oxygen at or below 20 percent of saturation at the field measured temperature or turbidity at or below 20 NTUs, then three (3) consecutive measurements of temperature, pH, specific conductance and the parameter(s) dissolved oxygen and/or turbidity that do not meet the requirements above must be within the limits below. The measurements are:

- Temperature: + 0.2° C
- pH: + 0.2 Standard Units
- Specific Conductance: + 5.0% of reading
- Dissolved Oxygen: + 0.2 mg/L or 10%, whichever is greater
- Turbidity: + 5 NTUs or 10%, whichever is greater

Additionally, document and report the following, as applicable, except that the last four(4) items only need to be submitted once:

- Purging rate.
- Drawdown in the well, if any.
- A description of conditions at the site that may cause the dissolved oxygen to be high and/or dissolved oxygen measurements made within the screened or open hole portion of the well with a downhole dissolved oxygen probe.

- A description of conditions at the site that may cause the turbidity to be high and any procedures that will be used to minimize turbidity in the future.
 - A description of the process and the data used to design the well.
 - The equipment and procedure used to install the well.
 - The well development procedure.
 - Pertinent lithologic or hydrogeologic information.
- 3.) If after five (5) well volumes, three (3) consecutive measurements of the field parameters temperature, pH, specific conductance, dissolved oxygen, and turbidity are not within the limits stated above, check the instrument condition and calibration, purging flow rate and all tubing connections to determine if they might be affecting the ability to achieve stable measurements. It is at the discretion of the consultant/contractor whether or not to collect a sample or to continue purging. Further, the report in which the data are submitted must include the following, as applicable. The last four (4) items only need to be submitted once.
- Purging rate.
 - Drawdown in the well, if any.
 - A description of conditions at the site that may cause the Dissolved Oxygen to be high and/or Dissolved Oxygen measurements made within the screened or open hole portion of the well with a downhole dissolved oxygen probe.
 - A description of conditions at the site that may cause the turbidity to be high and any procedures that will be used to minimize turbidity in the future.
 - A description of the process and the data used to design the well.
 - The equipment and procedure used to install the well.
 - The well development procedure.
 - Pertinent lithologic or hydrogeologic information.

If wells have previously and consistently purged dry, and the current depth to groundwater indicates that the well will purge dry during the current sampling event, minimize the amount of water removed from the well by using the same pump to purge and collect the sample:

- Place the pump or tubing intake within the well screened interval.
- Use very small diameter Teflon, polyethylene or PP tubing and the smallest possible pump chamber volume. This will minimize the total volume of water pumped from the well and reduce drawdown.
- Select tubing that is thick enough to minimize oxygen transfer through the tubing walls while pumping.

- Pump at the lowest possible rate (100 mL/minute or less) to reduce drawdown to a minimum.
- Purge at least two (2) volumes of the pumping system (pump, tubing and flow cell, if used).
- Measure pH, specific conductance, temperature, dissolved oxygen and turbidity, then begin to collect the samples.

Collect samples immediately after purging is complete. The time period between completing the purge and sampling cannot exceed six hours. If sample collection does not occur within one hour of purging completion, re-measure the five field parameters: temperature, pH, specific conductance, dissolved oxygen and turbidity, just prior to collecting the sample. If the measured values are not within 10 percent of the previous measurements, re-purge the well. The exception is “dry” wells.

d.) Lanyards

1. Securely fasten lanyards, if used, to any downhole equipment (bailers, pumps, etc.).
2. Use bailer lanyards in such a way that they do not touch the ground surface.

Wells Without Plumbing

a.) Tubing/Pump Placement

1. If attempting to minimize the volume of purge water, position the intake hose or pump at the midpoint of the screened or open hole interval.
2. If monitoring well conditions do not allow minimizing of the purge water volume, position the pump or intake hose near the top of the water column. This will ensure that all stagnant water in the casing is removed.
3. If the well screen or borehole is partially submerged, and the pump will be used for both purging and sampling, position the pump midway between the measured water level and the bottom of the screen. Otherwise, position the pump or intake hose near the top of the water column.

b.) Non-dedicated (portable) pumps

1. *Variable Speed Peristaltic Pump*

- Wear sampling gloves to position the decontaminated pump and tubing.
- Attach a short section of tubing to the discharge side of the pump and into a graduated container.
- Attach one end of a length of new or precleaned tubing to the pump head flexible hose.
- Place the tubing as described in one of the options listed above.
- Change gloves before beginning to purge.
- Measure the depth to groundwater at frequent intervals.
- Record these measurements.
- Adjust the purging rate so that it is equivalent to the well recovery rate to minimize drawdown.

- If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdrawal rate with the recharge rate.
- If the water table continues to drop during pumping, lower the tubing at the approximate rate of drawdown so that water is removed from the top of the water column.
- Record the purging rate each time the rate changes.
- Measure the purge volume.
- Record this measurement.
- Decontaminate the pump and tubing between wells (see Appendix C) or if precleaned tubing is used for each well, only the pump.

2. *Variable Speed Centrifugal Pump*

- Position fuel powered equipment downwind and at least 10 feet from the well head. Make sure that the exhaust faces downwind.
- Wear sampling gloves to position the decontaminated pump and tubing.
- Place the decontaminated suction hose so that water is always pumped from the top of the water column.
- Change gloves before beginning to purge.
- Equip the suction hose with a foot valve to prevent purge water from re-entering the well.
- Measure the depth to groundwater at frequent intervals.
- Record these measurements.
- To minimize drawdown, adjust the purging rate so that it is equivalent to the well recovery rate.
- If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdrawal rate with the recharge rate.
- If the water table continues to drop during pumping, lower the tubing at the approximate rate of drawdown so that the water is removed from the top of the water column.
- Record the purging rate each time the rate changes.
- Measure the purge volume.
- Record this measurement.
- Decontaminate the pump and tubing between wells or if precleaned tubing is used for each well, only the pump.

3. *Variable Speed Electric Submersible Pump*

- Position fuel powered equipment downwind and at least 10 feet from the well head. Make sure that the exhaust faces downwind.
- Wear sampling gloves to position the decontaminated pump and tubing.
- Carefully position the decontaminated pump.

- Change gloves before beginning to purge.
- Measure the depth to groundwater at frequent intervals.
- Record these measurements.
- To minimize drawdown, adjust the purging rate so that it is equivalent to the well recovery rate.
- If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdrawal rate with the recharge rate.
- If the water table continues to drop during pumping, lower the tubing or pump at the approximate rate of drawdown so that water is removed from the top of the water column.
- Record the purging rate each time the rate changes.
- Measure the purge volume.
- Record this measurement.
- Decontaminate the pump and tubing between wells or only the pump if precleaned tubing is used for each well.

4. *Variable Speed Bladder Pump*

- Position fuel powered equipment downwind and at least 10 feet from the well head. Make sure that the exhaust faces downwind.
- Wear sampling gloves to position the decontaminated pump and tubing.
- Attach the tubing and carefully position the pump.
- Change gloves before beginning purging.
- Measure the depth to groundwater at frequent intervals.
- Record these measurements.
- To minimize drawdown, adjust the purging rate so that it is equivalent to the well recovery rate.
- If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdrawal rate with the recharge rate.
- If the water table continues to drop during pumping, lower the tubing or pump at the approximate rate of drawdown so that water is removed from the top of the water column.
- Record the purging rate each time the rate changes.
- Measure the purge volume.
- Record this measurement.
- Decontaminate the pump and tubing between wells or if precleaned tubing is used for each well, only the pump.

c.) Dedicated Portable Pumps

1. *Variable Speed Electric Submersible Pump*

- Position fuel powered equipment downwind and at least 10 feet from the well head. Make sure that the exhaust faces downwind.
- Wear sampling gloves.

- Measure the depth to groundwater at frequent intervals.
 - Record these measurements.
 - Adjust the purging rate so that it is equivalent to the well recovery rate to minimize drawdown.
 - If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdraw with the recharge rate.
 - Record the purging rate each time the rate changes.
 - Measure the purge volume.
 - Record this measurement.
2. *Variable Speed Bladder Pump*
- Position fuel powered equipment downwind and at least 10 feet from the well head. Make sure that the exhaust faces downwind.
 - Wear sampling gloves.
 - Measure the depth to groundwater at frequent intervals.
 - Record these measurements.
 - Adjust the purging rate so that it is equivalent to the well recovery rate to minimize drawdown.
 - If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdraw with the recharge rate.
 - Record the purging rate each time the rate changes.
 - Measure the purge volume.
 - Record this measurement.
3. *Bailers* - Using bailers for purging is not recommended unless care is taken to use proper bailing technique, or if free product is present in the well or suspected to be in the well.
- Minimize handling the bailer as much as possible.
 - Wear sampling gloves.
 - Remove the bailer from its protective wrapping just before use.
 - Attach a lanyard of appropriate material.
 - Use the lanyard to move and position the bailer.
 - Lower and retrieve the bailer slowly and smoothly.
 - Lower the bailer carefully into the well to a depth approximately a foot above the water column.
 - When the bailer is in position, lower the bailer into the water column at a rate of 2 cm/sec until the desired depth is reached.
 - Do not lower the top of the bailer more than one (1) foot below the top of the water table so that water is removed from the top of the water column.
 - Allow time for the bailer to fill with aquifer water as it descends into the water column.

- Carefully raise the bailer. Retrieve the bailer at the same rate of 2 cm/sec until the bottom of the bailer has cleared to top of the water column.
- Measure the purge volume.
- Record the volume of the bailer.
- Continue to carefully lower and retrieve the bailer as described above until the purging is considered complete, based on either the removal of 3 well volumes.
- Remove at least one (1) well volume before collecting measurements of the field parameters. Take each subsequent set of measurements after removing at least one quarter (1/4) well volume between measurements.

Groundwater Sampling Techniques

- a.) Purge wells.
- b.) Replace protective covering around the well if it is soiled or torn after completing purging operations.
- c.) Equipment Considerations
 1. The following pumps are approved to collect volatile organic samples:
 - Stainless steel and Teflon variable speed submersible pumps
 - Stainless steel and Teflon or polyethylene variable speed bladder pumps
 - Permanently installed PVC bodied pumps (As long as the pump remains in contact with the water in the well at all times)
 2. Collect sample from the sampling device and store in sample container. Do not use intermediate containers.
 3. To avoid contamination or loss of analytes from the sample, handle sampling equipment as little as possible and minimize equipment exposure to the sample.
 4. To reduce chances of cross-contamination, use dedicated equipment whenever possible. “Dedicated” is defined as equipment that is to be used solely for one location for the life of that equipment (e.g., permanently mounted pump). Purchase dedicated equipment with the most sensitive analyte of interest in mind.
 - Clean or make sure dedicated pumps are clean before installation. They do not need to be cleaned prior to each use, but must be cleaned if they are withdrawn for repair or servicing.
 - Clean or make sure any permanently mounted tubing is clean before installation.
 - Change or clean tubing when the pump is withdrawn for servicing.
 - Clean any replaceable or temporary parts.

- Collect equipment blanks on dedicated pumping systems when the tubing is cleaned or replaced.
- Clean or make sure dedicated bailers are clean before placing them into the well.
- Collect an equipment blank on dedicated bailers before introducing them into the water column.
- Suspend dedicated bailers above the water column if they are stored in the well.

Sampling Wells Without Plumbing

a.) Sampling with Pumps – The following pumps may be used to sample for organics:

- Peristaltic pumps
- Stainless steel, Teflon or polyethylene bladder pumps
- Variable speed stainless steel and Teflon submersible pumps

1. *Peristaltic Pump*

- Volatile Organics: One of three methods may be used.
 - Remove the drop tubing from the inlet side of the pump; submerge the drop tubing into the water column; prevent the water in the tubing from flowing back into the well; remove the drop tubing from the well; carefully allow the groundwater to drain into the sample vials; avoid turbulence; do not aerate the sample; repeat steps until enough vials are filled. OR
 - Use the pump to fill the drop tubing; quickly remove the tubing from the pump; prevent the water in the tubing from flowing back into the well; remove the drop tubing from the well; carefully allow the groundwater to drain into the sample vials; avoid turbulence; do not aerate the sample; repeat steps until enough vials are filled. OR
 - Use the pump to fill the drop tubing; withdraw the tubing from the well; reverse the flow on the peristaltic pumps to deliver the sample into the vials at a slow, steady rate; repeat steps until enough vials are filled.
- Extractable Organics: If delivery tubing is not polyethylene or PP, or is not Teflon lined, use pump and vacuum trap method. Connect the outflow tubing from the container to the influent side of the peristaltic pump. Turn pump on and reduce flow until smooth and even. Discard a

small portion of the sample to allow for air space. Preserve (if required), label, and complete field notes.

- Inorganic samples: These samples may be collected from the effluent tubing. If samples are collected from the pump, decontaminate all tubing (including the tubing in the head) or change it between wells. Preserve (if required), label, and complete field notes.

2. *Variable Speed Bladder Pump*

- If sampling for organics, the pump body must be constructed of stainless steel and the valves and bladder must be Teflon. All tubing must be Teflon, polyethylene, or PP and any cabling must be sealed in Teflon, polyethylene or PP, or made of stainless steel.
- After purging to a smooth even flow, reduce the flow rate.
- When sampling for volatile organic compounds, reduce the flow rate to 100-200mL/minute, if possible.

3. *Variable Speed Submersible Pump*

- The housing must be stainless steel.
- If sampling for organics, the internal impellers, seals and gaskets must be constructed of stainless steel, Teflon, polyethylene or PP. The delivery tubing must be Teflon, polyethylene or PP; the electrical cord must be sealed in Teflon; any cabling must be sealed in Teflon or constructed of stainless steel.
- After purging to a smooth even flow, reduce the flow rate.
- When sampling for volatile organic compounds, reduce the flow rate to 100-200mL/minute, if possible.

b.) Sampling with Bailers - A high degree of skill and coordination are necessary to collect representative samples with a bailer.

1. *General Considerations*

- Minimize handling of bailer as much as possible.
- Wear sampling gloves.
- Remove bailer from protective wrapping just before use.
- Attach a lanyard of appropriate material.
- Use the lanyard to move and position the bailers.
- Do not allow bailer or lanyard to touch the ground.
- If bailer is certified precleaned, no rinsing is necessary.
- If both a pump and a bailer are to be used to collect samples, rinse the exterior and interior of the bailer with sample water from the pump before removing the pump.
- If the purge pump is not appropriate for collecting samples (e.g., non-inert components), rinse the bailer by collecting a single bailer of the groundwater to be sampled.
- Discard the water appropriately.

- Do not rinse the bailer if Oil and Grease samples are to be collected.

2. *Bailing Technique*

- Collect all samples that are required to be collected with a pump before collecting samples with the bailer.
- Raise and lower the bailer gently to minimize stirring up particulate matter in the well and the water column, which can increase sample turbidity.
- Lower the bailer carefully into the well to a depth approximately a foot above the water column. When the bailer is in position, lower the bailer into the water column at a rate of 2 cm/sec until the desired depth is reached.
- Do not lower the top of the bailer more than one foot below the top of the water table, so that water is removed from the top of the water column.
- Allow time for the bailer to fill with aquifer water as it descends into the water column.
- Do not allow the bailer to touch the bottom of the well or particulate matter will be incorporated into the sample. Carefully raise the bailer. Retrieve the bailer at the same rate of 2 cm/sec until the bottom of the bailer has cleared to top of the water column.
- Lower the bailer to approximately the same depth each time.
- Collect the sample. Install a device to control the flow from the bottom of the bailer and discard the first few inches of water. Fill the appropriate sample containers by allowing the sample to slowly flow down the side of the container. Discard the last few inches of water in the bailer.
- Repeat steps for additional samples.
- As a final step measure the DO, pH, temperature, turbidity and specific conductance after the final sample has been collected. Record all measurements and note the time that sampling was completed.

c.) Sampling Low Permeability Aquifers or Wells that have Purged Dry

1. Collect the sample(s) after the well has been purged. Minimize the amount of water removed from the well by using the same pump to purge and collect the sample. If the well has purged dry, collect samples as soon as sufficient sample water is available.
2. Measure the five field parameters temperature, pH, specific conductance, dissolved oxygen and turbidity at the time of sample collection.
3. Advise the analytical laboratory and the client that the usual amount of sample for analysis may not be available.

Appendix D - Collecting Samples from Wells with Plumbing in Place

In-place plumbing is generally considered permanent equipment routinely used for purposes other than purging and sampling, such as for water supply.

- a.) Air Strippers or Remedial Systems - These types of systems are installed as remediation devices. Collect influent and effluent samples from air stripping units as described below.
1. Remove any tubing from the sampling port and flush for one to two minutes.
 2. Remove all hoses, aerators and filters (if possible).
 3. Open the spigot and purge sufficient volume to flush the spigot and lines and until the purging completion criteria have been met.
 4. Reduce the flow rate to approximately 500 mL/minute (a 1/8" stream) or approximately 0.1 gal/minute before collecting samples.
 5. Follow procedures for collecting samples from water supply wells as outlined below.
- b.) Water Supply Wells – Water supply wells with in-place plumbing do not require equipment to be brought to the well to purge and sample. Water supply wells at UST facilities must be sampled for volatile organic compounds (VOCs) and semivolatile compounds (SVOCs).

1. *Procedures for Sampling Water Supply Wells*

- Label sample containers prior to sample collection.
- Prepare the storage and transport containers (ice chest, etc.) before taking any samples so each collected sample can be placed in a chilled environment immediately after collection.
- You must choose the tap closest to the well, preferably at the wellhead. The tap must be before any holding or pressurization tank, water softener, ion exchange, disinfection process or before the water line enters the residence, office or building. If no tap fits the above conditions, a new tap that does must be installed.
- The well pump must not be lubricated with oil, as that may contaminate the samples.
- The sampling tap must be protected from exterior contamination associated with being too close to a sink bottom or to the ground. If the tap is too close to the ground for direct collection into the appropriate container, it is acceptable to use a smaller (clean) container to transfer the sample to a larger container.
- Leaking taps that allow water to discharge from around the valve stem handle and down the outside of the faucet, or taps in which water tends to run up on the outside of the lip, are to be avoided as sampling locations.

- Disconnect any hoses, filters, or aerators attached to the tap before sampling.
- Do not sample from a tap close to a gas pump. The gas fumes could contaminate the sample.

2. *Collecting Volatile Organic Samples*

- Equipment Needed: VOC sample vials [40 milliliters, glass, may contain 3 to 4 drops of hydrochloric acid (HCl) as preservative]; Disposable gloves and protective goggles; Ice chest/cooler; Ice; Packing materials (sealable plastic bags, bubble wrap, etc.); and Lab forms.
- Sampling Procedure: Run water from the well for at least 15 minutes. If the well is deep, run water longer (purging three well volumes is best). If tap or spigot is located directly before a holding tank, open a tap after the holding tank to prevent any backflow into the tap where you will take your sample. This will ensure that the water you collect is “fresh” from the well and not from the holding tank. After running the water for at least 15 minutes, reduce the flow of water. The flow should be reduced to a trickle but not so slow that it begins to drip. A smooth flow of water will make collection easier and more accurate. Remove the cap of a VOC vial and hold the vial under the stream of water to fill it. Be careful not to spill any acid that is in the vial. For best results use a low flow of water and angle the vial slightly so that the water runs down the inside of the vial. This will help keep the sample from being agitated, aerated or splashed out of the vial. It will also increase the accuracy of the sample. As the vial fills and is almost full, turn the vial until it is straight up and down so the water won't spill out. Fill the vial until the water is just about to spill over the lip of the vial. The surface of the water sample should become mounded. It is a good idea not to overfill the vial, especially if an acid preservative is present in the vial. Carefully replace and screw the cap onto the vial. Some water may overflow as the cap is put on. After the cap is secure, turn the vial upside down and gently tap the vial to see if any bubbles are present. If bubbles are present in the vial, remove the cap, add more water and check again to see if bubbles are present. Repeat as necessary. After two samples without bubbles have been collected, the samples should be labeled and prepared for shipment. Store samples at 4° C.

3. *Collecting Extractable Organic and/or Metals Samples*

- Equipment Needed: SVOC sample bottle [1 liter, amber glass] and/or Metals sample bottle [0.5 liter, polyethylene or glass, 5 milliliters of nitric acid (HNO₃) preservative]; Disposable gloves and protective goggles; Ice Chest/Cooler; Ice; Packing materials (sealable plastic bags, bubble wrap, etc.); and Lab forms.
- Sampling Procedure: Run water from the well for at least 15 minutes. If the well is deep, run the water longer (purging three well volumes is best). If tap or spigot is located directly before a holding tank, open a tap after the holding tank to prevent any backflow into the tap where you will take your sample. This will ensure that the water you collect is “fresh” from the well and not from the holding tank. After running the water for at least 15 minutes, reduce the flow. Low water flow makes collection easier and more accurate. Remove the cap of a SVOC or metals bottle and hold it under the stream of water to fill it. The bottle does not have to be completely filled (i.e., you can leave an inch or so of headspace in the bottle). After filling, screw on the cap, label the bottle and prepare for shipment. Store samples at 4° C.

Appendix E - Collecting Surface Water Samples

The following topics include 1.) acceptable equipment selection and equipment construction materials and 2.) standard grab, depth-specific and depth-composited surface water sampling techniques.

Facilities which contain or border small rivers, streams or branches should include surface water sampling as part of the monitoring program for each sampling event. A simple procedure for selecting surface water monitoring sites is to locate a point on a stream where drainage leaves the site. This provides detection of contamination through, and possibly downstream of, site via discharge of surface waters. The sampling points selected should be downstream from any waste areas. An upstream sample should be obtained in order to determine water quality upstream of the influence of the site.

a.) General Cautions

1. When using watercraft take samples near the bow away and upwind from any gasoline outboard engine. Orient watercraft so that bow is positioned in the upstream direction.
2. When wading, collect samples upstream from the body. Avoid disturbing sediments in the immediate area of sample collection.
3. Collect water samples prior to taking sediment samples when obtaining both from the same area (site).
4. Unless dictated by permit, program or order, sampling at or near man-made structures (e.g., dams, weirs or bridges) may not provide representative data because of unnatural flow patterns.
5. Collect surface water samples from downstream towards upstream.

b.) Equipment and Supplies - Select equipment based on the analytes of interest, specific use, and availability.

c.) Surface Water Sampling Techniques - Adhere to all general protocols applicable to aqueous sampling when following the surface water sampling procedures addressed below.

1. *Manual Sampling*: Use manual sampling for collecting grab samples for immediate in-situ field analyses. Use manual sampling in lieu of automatic equipment over extended periods of time for composite sampling, especially when it is necessary to observe and/or note unusual conditions.
 - Surface Grab Samples - Do not use sample containers containing premeasured amounts of preservatives to collect grab samples. If the sample matrix is homogeneous, then the grab method is a simple and effective technique for collection purposes. If homogeneity is not apparent, based on flow or vertical variations (and should never be assumed), then use other collection protocols. Where practical, use the actual sample container submitted to the laboratory for collecting samples to be analyzed for oil and grease, volatile organic compounds (VOCs), and microbiological samples. This procedure eliminates the possibility of contaminating the sample with an intermediate collection container. The use of

unpreserved sample containers as direct grab samplers is encouraged since the same container can be submitted for laboratory analysis after appropriate preservation. This procedure reduces sample handling and eliminates potential contamination from other sources (e.g., additional sampling equipment, environment, etc.).

1. Grab directly into sample container.
 2. Slowly submerge the container, opening neck first, into the water.
 3. Invert the bottle so the neck is upright and pointing towards the direction of water flow (if applicable). Allow water to run slowly into the container until filled.
 4. Return the filled container quickly to the surface.
 5. Pour out a few mL of sample away from and downstream of the sampling location. This procedure allows for the addition of preservatives and sample expansion. Do not use this step for volatile organics or other analytes where headspace is not allowed in the sample container.
 6. Add preservatives, securely cap container, label, and complete field notes. If sample containers are attached to a pole via a clamp, submerge the container and follow steps 3 – 5 but omit steps 1 and 2.
- Sampling with an Intermediate Vessel or Container: If the sample cannot be collected directly into the sample container to be submitted to the laboratory, or if the laboratory provides prepreserved sample containers, use an unpreserved sample container or an intermediate vessel (e.g., beakers, buckets or dippers) to obtain the sample. These vessels must be constructed appropriately, including any poles or extension arms used to access the sample location.
 1. Rinse the intermediate vessel with ample amounts of site water prior to collecting the first sample.
 2. Collect the sample as outlined above using the intermediate vessel.
 3. Use pole mounted containers of appropriate construction to sample at distances away from shore, boat, etc. Follow the protocols above to collect samples.
 - Peristaltic Pump and Tubing: The most portable pump for this technique is a 12 volt peristaltic pump. Use appropriately precleaned, silastic tubing in the pump head and attach polyethylene, Tygon, etc. tubing to the pump. This technique is not acceptable for Oil and Grease, EPH, VPH or VOCs. Extractable organics can be collected through the pump if flexible interior-wall Teflon, polyethylene or PP tubing is used in the pump head or if used with the organic trap setup.

1. Lower appropriately precleaned tubing to a depth of 6 – 12 inches below water surface, where possible.
 2. Pump 3 – 5 tube volumes through the system to acclimate the tubing before collecting the first sample.
 3. Fill individual sample bottles via the discharge tubing. Be careful not to remove the inlet tubing from the water.
 4. Add preservatives, securely cap container, label, and complete field notes.
- Mid-Depth Grab Samples: Mid-depth samples or samples taken at a specific depth can approximate the conditions throughout the entire water column. The equipment that may be used for this type of sampling consists of the following depth-specific sampling devices: Kemmerer, Niskin, Van Dorn type, etc. You may also use pumps with tubing or double check-valve bailers. Certain construction material details may preclude its use for certain analytes. Many Kemmerer samplers are constructed of plastic and rubber that preclude their use for all volatile and extractable organic sampling. Some newer devices are constructed of stainless steel or are all Teflon or Teflon-coated. These are acceptable for all analyte groups without restriction.
 1. Measure the water column to determine maximum depth and sampling depth prior to lowering the sampling device.
 2. Mark the line attached to the sampler with depth increments so that the sampling depth can be accurately recorded.
 3. Lower the sampler slowly to the appropriate sampling depth, taking care not to disturb the sediments.
 4. At the desired depth, send the messenger weight down to trip the closure mechanism.
 5. Retrieve the sampler slowly.
 6. Rinse the sampling device with ample amounts of site water prior to collecting the first sample. Discard rinsate away from and downstream of the sampling location.
 7. Fill the individual sample bottles via the discharge tube.
 - Double Check-Valve Bailers: Collect samples using double check-valve bailers if the data requirements do not necessitate a sample from a strictly discrete interval of the water column. Bailers with an upper and lower check-valve can be lowered through the water column. Water will continually be displaced through the bailer until the desired depth is reached, at which point the bailer is retrieved. Sampling with this type of bailer must follow the same protocols outlined above, except that a messenger weight is not applicable. Although not designed specifically for this kind of sampling, a bailer is acceptable when a mid-depth sample is required

1. As the bailer is dropped through the water column, water is displaced through the body of the bailer. The degree of displacement depends upon the check-valve ball movement to allow water to flow freely through the bailer body.
 2. Slowly lower the bailer to the appropriate depth. Upon retrieval, the two check valves seat, preventing water from escaping or entering the bailer.
 3. Rinse the sampling device with ample amounts of site water prior to collecting the first sample.
 4. Fill the individual sample bottles via the discharge tube. Sample bottles must be handled as described above.
- Peristaltic Pump and Tubing: The most portable pump for this technique is a 12 volt peristaltic pump. Use appropriately precleaned, silastic tubing in the pump head and attach HDPE, Tygon, etc. tubing to the pump. This technique is not acceptable for Oil and Grease, EPH, VPH or VOCs. Extractable organics can be collected through the pump if flexible interior-wall Teflon, polyethylene or PP tubing is used in the pump head, or if used with an organic trap setup.
 1. Measure the water column to determine the maximum depth and the sampling depth.
 2. Tubing will need to be tied to a stiff pole or be weighted down so the tubing placement will be secure. Do not use a lead weight. Any dense, non-contaminating, non-interfering material will work (brick, stainless steel weight, etc.). Tie the weight with a lanyard (braided or monofilament nylon, etc.) so that it is located below the inlet of the tubing.
 3. Turn the pump on and allow several tubing volumes of water to be discharged before collecting the first sample.
 4. Fill the individual sample bottles via the discharge tube. Sample bottles must be handled as described above.

APPENDIX III

Results of July 30, 2014 Surface Water Sampling

TABLE 1
Surface Water Quality Summary
Edgecombe County Landfill
July 30, 2014 Sampling Event
S&ME Project No. 1054-13-276A & 1054-13-280A

APPENDIX I VOCs EPA METHOD 8260B	UNITS	2B STANDARD Freshwater Aquatic Life	2B STANDARD Water Supply	SURFACE WATER	
				UPSTREAM (SW-1)	DOWNSTREAM (SW-2)
Acetone	ug/l	2,000	NS	<1.2	4.6J
Benzene	ug/l	NS	1.19	<0.15	<0.15
Chlorobenzene	ug/l	140	488	<0.17	<0.17
1,4-Dichlorobenzene	ug/l	100	488	<0.19	<0.19
1,1-Dichloroethane	ug/l	LD	6	<0.13	<0.13
cis-1,2-Dichloroethene	ug/l	NS	60	<0.15	<0.15
trans-1,2-Dichloroethene	ug/l	NS	140	<0.21	<0.21
1,2-Dichloropropane	ug/l	NS	0.5	<0.10	<0.10
Dibromochloromethane	ug/l	NL	NL	3.3	<0.17
Methylene chloride	ug/l	NS	4.6	<0.23	<0.23
Trichloroethene	ug/l	NS	2.5	<0.15	<0.15
Vinyl chloride	ug/l	NS	0.025	<0.32*	<0.32*
APPENDIX I INORGANIC COMPOUNDS EPA METHOD 6010B					
Antimony (Total)	ug/l	NS	5.6	<0.22	<0.22
Arsenic (Total)	ug/l	50	10	<2.8	<2.8
Barium (Total)	ug/l	LD	1,000	60.7 J	60.4 J
Beryllium (Total)	ug/l	6.5	NS	<0.10	<0.10
Cadmium (Total)	ug/l	2 (N)	NS	<0.36	<0.36
Chromium (Total)	ug/l	50	NS	<1.4	<1.4
Cobalt (Total)	ug/l	NS	3	1.77 J	1.70 J
Copper (Total)	ug/l	7 (AL)	NS	<1.6	<1.6
Lead (Total)	ug/l	25 (N)	NS	<2.1	<2.1
Nickel (Total)	ug/l	88 (N)	25	<1.8	<1.8
Selenium (Total)	ug/l	5	NS	<0.91	<0.91
Silver (Total)	ug/l	0.06 (N)	NS	<1.9*	<1.9*
Thallium (Total)	ug/l	NS	0.24	<0.11	<0.11
Vanadium (Total)	ug/l	NL	NL	1.83 J	<1.4
Zinc (Total)	ug/l	50 (AL)	NS	7.82 J	5.60 J
FIELD PARAMETERS					
pH	standard	NE	NE	6.13	6.8
Specific Conductance	mS/cm	NE	NE	0.086	0.107
Oxygen Reduction Potential	mV	NE	NE	128.8	57.2
Dissolved Oxygen	mg/L	NE	NE	3.85	5.81
Turbidity	NTUs	NE	NE	575.6	17.1
Temperature	°C	NE	NE	25.54	23.05

NOTES:

Samples were collected by S&ME on July 30, 2014 and analyzed by Environmental Conservation Laboratories, Inc. (ENCO). This summary table only shows those constituents detected above method detection limits. Detection limits are shown on laboratory reports.

Values which are **BOLD** indicate levels above laboratory detection limits.

Values which are **BOLD** and shaded indicate levels above their respective NCDENR 2L or GWPST.

DAF Computation = Dilution/Attenuation Factor Computation (ref. S&ME Alternate Source Demonstration, June 2008).

SWSL = Solid Waste Section Limit. (ref. NCDENR-DWM, Solid Waste Section February 23, 2007 memorandum)

J = Analyte detected, but below the laboratory reporting limit therefore the result is an estimated concentration.

ug/L = Micrograms Per Liter

VOCs = Volatile Organic Compounds

Appendix I compounds not shown were not detected during this sampling event. See **Appendix I** of the report for laboratory reports.

NS = No Standard Value Listed

NL = Constituent not Listed

(AL) = Action Level Standard - See 2B.0211 for additional information

(N) = Narrative Standard - See 2B.0211

LD = Limited Data Available

* = Method Detection Limit is greater than the 2B Standard

“To the reader, routine monitoring of monitor wells and surface water was conducted in July 2014 for another program. The data presented herein reflects only the monitoring of the two surface water samples collected for SW-1 and SW-2. Laboratory data for the MW-designated wells locations are presented in a separate report and have been redacted from this report.

Environmental Conservation Laboratories, Inc.

102-A Woodwinds Industrial Court

Cary NC, 27511

Phone: 919.467.3090 FAX: 919.467.3515



www.encolabs.com

Monday, February 3, 2014

S&ME, Inc. (SM001)

Attn: Sam Watts

3201 Spring Forest Road

Raleigh, NC 27616

RE: Laboratory Results for

Project Number: 1054-13-276-P2, Project Name/Desc: Edgecombe County Landfill - App I

ENCO Workorder(s): C400184

Dear Sam Watts,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Friday, January 24, 2014.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Cary. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink that reads "Chuck Smith". The signature is written in a cursive, flowing style.

Chuck Smith

Project Manager

Enclosure(s)



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Client ID: 3301-MW15 Lab ID: C400184-10

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Chromium - Total	1.53	J	1	1.40	10.0	10	ug/L	EPA 6010C	
cis-1,2-Dichloroethene	9.9		1	0.15	1.0	5	ug/L	EPA 8260B	
Cobalt - Total	15.4		1	1.10	10.0	10	ug/L	EPA 6010C	
Nickel - Total	9.59	J	1	1.80	10.0	50	ug/L	EPA 6010C	
trans-1,2-Dichloroethene	0.43	J	1	0.21	1.0	5	ug/L	EPA 8260B	
Vinyl chloride	3.6		1	0.32	1.0	1	ug/L	EPA 8260B	

Client ID: 3301-MW16 Lab ID: C400184-11

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Arsenic - Total	8.39	J	1	5.40	10.0	10	ug/L	EPA 6010C	
Barium - Total	310		1	1.00	10.0	100	ug/L	EPA 6010C	
Cobalt - Total	1.83	J	1	1.10	10.0	10	ug/L	EPA 6010C	
Zinc - Total	4.28	J	1	3.80	10.0	10	ug/L	EPA 6010C	

Client ID: 3301-SW1 Lab ID: C400184-12

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Barium - Total	66.2	J	1	1.00	10.0	100	ug/L	EPA 6010C	
Cobalt - Total	1.88	J	1	1.10	10.0	10	ug/L	EPA 6010C	
Zinc - Total	11.3		1	3.80	10.0	10	ug/L	EPA 6010C	

Client ID: 3301-SW2 Lab ID: C400184-13

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Barium - Total	59.7	J	1	1.00	10.0	100	ug/L	EPA 6010C	
Cobalt - Total	1.43	J	1	1.10	10.0	10	ug/L	EPA 6010C	
Zinc - Total	10.4		1	3.80	10.0	10	ug/L	EPA 6010C	

Client ID: 3301-Duplicate Lab ID: C400184-14

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Arsenic - Total	56.4		1	5.40	10.0	10	ug/L	EPA 6010C	
Barium - Total	269		1	1.00	10.0	100	ug/L	EPA 6010C	
Cobalt - Total	189		1	1.10	10.0	10	ug/L	EPA 6010C	
Lead - Total	12.3		1	2.10	10.0	10	ug/L	EPA 6010C	
Nickel - Total	59.2		1	1.80	10.0	50	ug/L	EPA 6010C	
Thallium - Total	0.128	J	1	0.110	1.00	5.5	ug/L	EPA 6020A	
Zinc - Total	78.7		1	3.80	10.0	10	ug/L	EPA 6010C	

Client ID: 3301-Duplicate Lab ID: C400184-14RE1

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
1,1-Dichloroethane	5.6	D	5	0.65	5.0	5	ug/L	EPA 8260B	
1,4-Dichlorobenzene	11	D	5	0.95	5.0	1	ug/L	EPA 8260B	
Benzene	4.8	JD	5	0.75	5.0	1	ug/L	EPA 8260B	
Chlorobenzene	14	D	5	0.85	5.0	3	ug/L	EPA 8260B	
cis-1,2-Dichloroethene	370	D	5	0.75	5.0	5	ug/L	EPA 8260B	
trans-1,2-Dichloroethene	3.6	JD	5	1.0	5.0	5	ug/L	EPA 8260B	
Vinyl chloride	24	D	5	1.6	5.0	1	ug/L	EPA 8260B	

Client ID: 3301-EquipmentBlank Lab ID: C400184-15

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Acetone	11	J	1	1.2	5.0	100	ug/L	EPA 8260B	
Barium - Total	1.32	J	1	1.00	10.0	100	ug/L	EPA 6010C	



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Description: 3301-SW1

Lab Sample ID: C400184-12

Received: 01/24/14 16:45

Matrix: Ground Water

Sampled: 01/24/14 12:00

Work Order: C400184

Project: Edgecombe County Landfill - App I

Sampled By: J WATERS/ B BRYANT/ Ale

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.17	U	ug/L	1	0.17	1.0	5	EPA 8260B	01/31/14 22:55	REF	
1,1,1-Trichloroethane [71-55-6] ^	0.12	U	ug/L	1	0.12	1.0	1	EPA 8260B	01/31/14 22:55	REF	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.28	U	ug/L	1	0.28	1.0	3	EPA 8260B	01/31/14 22:55	REF	
1,1,2-Trichloroethane [79-00-5] ^	0.14	U	ug/L	1	0.14	1.0	1	EPA 8260B	01/31/14 22:55	REF	
1,1-Dichloroethane [75-34-3] ^	0.13	U	ug/L	1	0.13	1.0	5	EPA 8260B	01/31/14 22:55	REF	
1,1-Dichloroethene [75-35-4] ^	0.21	U	ug/L	1	0.21	1.0	5	EPA 8260B	01/31/14 22:55	REF	
1,2,3-Trichloropropane [96-18-4] ^	0.23	U	ug/L	1	0.23	1.0	1	EPA 8260B	01/31/14 22:55	REF	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	01/31/14 22:55	REF	
1,2-Dibromoethane [106-93-4] ^	0.66	U	ug/L	1	0.66	1.0	1	EPA 8260B	01/31/14 22:55	REF	
1,2-Dichlorobenzene [95-50-1] ^	0.19	U	ug/L	1	0.19	1.0	5	EPA 8260B	01/31/14 22:55	REF	
1,2-Dichloroethane [107-06-2] ^	0.21	U	ug/L	1	0.21	1.0	1	EPA 8260B	01/31/14 22:55	REF	
1,2-Dichloropropane [78-87-5] ^	0.10	U	ug/L	1	0.10	1.0	1	EPA 8260B	01/31/14 22:55	REF	
1,4-Dichlorobenzene [106-46-7] ^	0.19	U	ug/L	1	0.19	1.0	1	EPA 8260B	01/31/14 22:55	REF	
2-Butanone [78-93-3] ^	1.3	U	ug/L	1	1.3	5.0	100	EPA 8260B	01/31/14 22:55	REF	
2-Hexanone [591-78-6] ^	0.88	U	ug/L	1	0.88	5.0	50	EPA 8260B	01/31/14 22:55	REF	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	01/31/14 22:55	REF	
Acetone [67-64-1] ^	1.2	U	ug/L	1	1.2	5.0	100	EPA 8260B	01/31/14 22:55	REF	
Acrylonitrile [107-13-1] ^	3.5	U	ug/L	1	3.5	10	200	EPA 8260B	01/31/14 22:55	REF	
Benzene [71-43-2] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/31/14 22:55	REF	
Bromochloromethane [74-97-5] ^	0.48	U	ug/L	1	0.48	1.0	3	EPA 8260B	01/31/14 22:55	REF	
Bromodichloromethane [75-27-4] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/31/14 22:55	REF	
Bromoform [75-25-2] ^	0.22	U	ug/L	1	0.22	1.0	3	EPA 8260B	01/31/14 22:55	REF	
Bromomethane [74-83-9] ^	0.14	U	ug/L	1	0.14	1.0	10	EPA 8260B	01/31/14 22:55	REF	
Carbon disulfide [75-15-0] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	01/31/14 22:55	REF	
Carbon tetrachloride [56-23-5] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/31/14 22:55	REF	
Chlorobenzene [108-90-7] ^	0.17	U	ug/L	1	0.17	1.0	3	EPA 8260B	01/31/14 22:55	REF	
Chloroethane [75-00-3] ^	0.23	U	ug/L	1	0.23	1.0	10	EPA 8260B	01/31/14 22:55	REF	
Chloroform [67-66-3] ^	0.18	U	ug/L	1	0.18	1.0	5	EPA 8260B	01/31/14 22:55	REF	
Chloromethane [74-87-3] ^	0.13	U	ug/L	1	0.13	1.0	1	EPA 8260B	01/31/14 22:55	REF	
cis-1,2-Dichloroethene [156-59-2] ^	0.15	U	ug/L	1	0.15	1.0	5	EPA 8260B	01/31/14 22:55	REF	
cis-1,3-Dichloropropene [10061-01-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	01/31/14 22:55	REF	
Dibromochloromethane [124-48-1] ^	0.17	U	ug/L	1	0.17	1.0	3	EPA 8260B	01/31/14 22:55	REF	
Dibromomethane [74-95-3] ^	0.27	U	ug/L	1	0.27	1.0	10	EPA 8260B	01/31/14 22:55	REF	
Ethylbenzene [100-41-4] ^	0.13	U	ug/L	1	0.13	1.0	1	EPA 8260B	01/31/14 22:55	REF	
Iodomethane [74-88-4] ^	1.7	U	ug/L	1	1.7	5.0	10	EPA 8260B	01/31/14 22:55	REF	
Methylene chloride [75-09-2] ^	0.23	U	ug/L	1	0.23	1.0	1	EPA 8260B	01/31/14 22:55	REF	
Styrene [100-42-5] ^	0.11	U	ug/L	1	0.11	1.0	1	EPA 8260B	01/31/14 22:55	REF	
Tetrachloroethene [127-18-4] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/31/14 22:55	REF	
Toluene [108-88-3] ^	0.14	U	ug/L	1	0.14	1.0	1	EPA 8260B	01/31/14 22:55	REF	
trans-1,2-Dichloroethene [156-60-5] ^	0.21	U	ug/L	1	0.21	1.0	5	EPA 8260B	01/31/14 22:55	REF	
trans-1,3-Dichloropropene [10061-02-6] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/31/14 22:55	REF	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.70	U	ug/L	1	0.70	1.0	100	EPA 8260B	01/31/14 22:55	REF	
Trichloroethene [79-01-6] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/31/14 22:55	REF	
Trichlorofluoromethane [75-69-4] ^	0.24	U	ug/L	1	0.24	1.0	1	EPA 8260B	01/31/14 22:55	REF	
Vinyl acetate [108-05-4] ^	0.95	U	ug/L	1	0.95	5.0	50	EPA 8260B	01/31/14 22:55	REF	
Vinyl chloride [75-01-4] ^	0.32	U	ug/L	1	0.32	1.0	1	EPA 8260B	01/31/14 22:55	REF	



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Description: 3301-SW1

Lab Sample ID: C400184-12

Received: 01/24/14 16:45

Matrix: Ground Water

Sampled: 01/24/14 12:00

Work Order: C400184

Project: Edgecombe County Landfill - App I

Sampled By: J WATERS/ B BRYANT/ Ale

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC.SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.45	U	ug/L	1	0.45	3.0	5	EPA 8260B	01/31/14 22:55	REF	
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	50	1	50.0	100 %	51-122	4A31025	EPA 8260B	01/31/14 22:55	REF		
Dibromofluoromethane	48	1	50.0	97 %	68-117	4A31025	EPA 8260B	01/31/14 22:55	REF		
Toluene-d8	44	1	50.0	89 %	67-127	4A31025	EPA 8260B	01/31/14 22:55	REF		



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Description: 3301-SW1

Lab Sample ID: C400184-12

Received: 01/24/14 16:45

Matrix: Ground Water

Sampled: 01/24/14 12:00

Work Order: C400184

Project: Edgecombe County Landfill - App I

Sampled By: J WATERS/ B BRYANT/ Ale

Metals (total recoverable) by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC.SWSL	Method	Analyzed	By	Notes
Antimony [7440-36-0] ^	0.220	U	ug/L	1	0.220	2.00	6	EPA 6020A	01/30/14 15:21	VLO	
Arsenic [7440-38-2] ^	5.40	U	ug/L	1	5.40	10.0	10	EPA 6010C	01/30/14 13:30	JDH	
Barium [7440-39-3] ^	66.2	J	ug/L	1	1.00	10.0	100	EPA 6010C	01/30/14 13:30	JDH	
Beryllium [7440-41-7] ^	0.100	U	ug/L	1	0.100	1.00	1	EPA 6010C	01/30/14 13:30	JDH	
Cadmium [7440-43-9] ^	0.360	U	ug/L	1	0.360	1.00	1	EPA 6010C	01/30/14 13:30	JDH	
Chromium [7440-47-3] ^	1.40	U	ug/L	1	1.40	10.0	10	EPA 6010C	01/30/14 13:30	JDH	
Cobalt [7440-48-4] ^	1.88	J	ug/L	1	1.10	10.0	10	EPA 6010C	01/30/14 13:30	JDH	
Copper [7440-50-8] ^	1.60	U	ug/L	1	1.60	10.0	10	EPA 6010C	01/30/14 13:30	JDH	
Lead [7439-92-1] ^	2.10	U	ug/L	1	2.10	10.0	10	EPA 6010C	01/30/14 13:30	JDH	
Nickel [7440-02-0] ^	1.80	U	ug/L	1	1.80	10.0	50	EPA 6010C	01/30/14 13:30	JDH	
Selenium [7782-49-2] ^	0.910	U	ug/L	1	0.910	1.00	10	EPA 6020A	01/30/14 15:21	VLO	
Silver [7440-22-4] ^	1.90	U	ug/L	1	1.90	10.0	10	EPA 6010C	01/30/14 13:30	JDH	
Thallium [7440-28-0] ^	0.110	U	ug/L	1	0.110	1.00	5.5	EPA 6020A	01/30/14 15:21	VLO	
Vanadium [7440-62-2] ^	1.40	U	ug/L	1	1.40	10.0	25	EPA 6010C	01/30/14 13:30	JDH	
Zinc [7440-66-6] ^	11.3		ug/L	1	3.80	10.0	10	EPA 6010C	01/30/14 13:30	JDH	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.



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Description: 3301-SW2

Lab Sample ID: C400184-13

Received: 01/24/14 16:45

Matrix: Ground Water

Sampled: 01/24/14 13:30

Work Order: C400184

Project: Edgecombe County Landfill - App I

Sampled By: J WATERS/ B BRYANT/ Ale

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.17	U	ug/L	1	0.17	1.0	5	EPA 8260B	01/31/14 23:24	REF	
1,1,1-Trichloroethane [71-55-6] ^	0.12	U	ug/L	1	0.12	1.0	1	EPA 8260B	01/31/14 23:24	REF	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.28	U	ug/L	1	0.28	1.0	3	EPA 8260B	01/31/14 23:24	REF	
1,1,2-Trichloroethane [79-00-5] ^	0.14	U	ug/L	1	0.14	1.0	1	EPA 8260B	01/31/14 23:24	REF	
1,1-Dichloroethane [75-34-3] ^	0.13	U	ug/L	1	0.13	1.0	5	EPA 8260B	01/31/14 23:24	REF	
1,1-Dichloroethene [75-35-4] ^	0.21	U	ug/L	1	0.21	1.0	5	EPA 8260B	01/31/14 23:24	REF	
1,2,3-Trichloropropane [96-18-4] ^	0.23	U	ug/L	1	0.23	1.0	1	EPA 8260B	01/31/14 23:24	REF	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	01/31/14 23:24	REF	
1,2-Dibromoethane [106-93-4] ^	0.66	U	ug/L	1	0.66	1.0	1	EPA 8260B	01/31/14 23:24	REF	
1,2-Dichlorobenzene [95-50-1] ^	0.19	U	ug/L	1	0.19	1.0	5	EPA 8260B	01/31/14 23:24	REF	
1,2-Dichloroethane [107-06-2] ^	0.21	U	ug/L	1	0.21	1.0	1	EPA 8260B	01/31/14 23:24	REF	
1,2-Dichloropropane [78-87-5] ^	0.10	U	ug/L	1	0.10	1.0	1	EPA 8260B	01/31/14 23:24	REF	
1,4-Dichlorobenzene [106-46-7] ^	0.19	U	ug/L	1	0.19	1.0	1	EPA 8260B	01/31/14 23:24	REF	
2-Butanone [78-93-3] ^	1.3	U	ug/L	1	1.3	5.0	100	EPA 8260B	01/31/14 23:24	REF	
2-Hexanone [591-78-6] ^	0.88	U	ug/L	1	0.88	5.0	50	EPA 8260B	01/31/14 23:24	REF	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	01/31/14 23:24	REF	
Acetone [67-64-1] ^	1.2	U	ug/L	1	1.2	5.0	100	EPA 8260B	01/31/14 23:24	REF	
Acrylonitrile [107-13-1] ^	3.5	U	ug/L	1	3.5	10	200	EPA 8260B	01/31/14 23:24	REF	
Benzene [71-43-2] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/31/14 23:24	REF	
Bromochloromethane [74-97-5] ^	0.48	U	ug/L	1	0.48	1.0	3	EPA 8260B	01/31/14 23:24	REF	
Bromodichloromethane [75-27-4] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/31/14 23:24	REF	
Bromoform [75-25-2] ^	0.22	U	ug/L	1	0.22	1.0	3	EPA 8260B	01/31/14 23:24	REF	
Bromomethane [74-83-9] ^	0.14	U	ug/L	1	0.14	1.0	10	EPA 8260B	01/31/14 23:24	REF	
Carbon disulfide [75-15-0] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	01/31/14 23:24	REF	
Carbon tetrachloride [56-23-5] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/31/14 23:24	REF	
Chlorobenzene [108-90-7] ^	0.17	U	ug/L	1	0.17	1.0	3	EPA 8260B	01/31/14 23:24	REF	
Chloroethane [75-00-3] ^	0.23	U	ug/L	1	0.23	1.0	10	EPA 8260B	01/31/14 23:24	REF	
Chloroform [67-66-3] ^	0.18	U	ug/L	1	0.18	1.0	5	EPA 8260B	01/31/14 23:24	REF	
Chloromethane [74-87-3] ^	0.13	U	ug/L	1	0.13	1.0	1	EPA 8260B	01/31/14 23:24	REF	
cis-1,2-Dichloroethene [156-59-2] ^	0.15	U	ug/L	1	0.15	1.0	5	EPA 8260B	01/31/14 23:24	REF	
cis-1,3-Dichloropropene [10061-01-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	01/31/14 23:24	REF	
Dibromochloromethane [124-48-1] ^	0.17	U	ug/L	1	0.17	1.0	3	EPA 8260B	01/31/14 23:24	REF	
Dibromomethane [74-95-3] ^	0.27	U	ug/L	1	0.27	1.0	10	EPA 8260B	01/31/14 23:24	REF	
Ethylbenzene [100-41-4] ^	0.13	U	ug/L	1	0.13	1.0	1	EPA 8260B	01/31/14 23:24	REF	
Iodomethane [74-88-4] ^	1.7	U	ug/L	1	1.7	5.0	10	EPA 8260B	01/31/14 23:24	REF	
Methylene chloride [75-09-2] ^	0.23	U	ug/L	1	0.23	1.0	1	EPA 8260B	01/31/14 23:24	REF	
Styrene [100-42-5] ^	0.11	U	ug/L	1	0.11	1.0	1	EPA 8260B	01/31/14 23:24	REF	
Tetrachloroethene [127-18-4] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/31/14 23:24	REF	
Toluene [108-88-3] ^	0.14	U	ug/L	1	0.14	1.0	1	EPA 8260B	01/31/14 23:24	REF	
trans-1,2-Dichloroethene [156-60-5] ^	0.21	U	ug/L	1	0.21	1.0	5	EPA 8260B	01/31/14 23:24	REF	
trans-1,3-Dichloropropene [10061-02-6] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/31/14 23:24	REF	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.70	U	ug/L	1	0.70	1.0	100	EPA 8260B	01/31/14 23:24	REF	
Trichloroethene [79-01-6] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/31/14 23:24	REF	
Trichlorofluoromethane [75-69-4] ^	0.24	U	ug/L	1	0.24	1.0	1	EPA 8260B	01/31/14 23:24	REF	
Vinyl acetate [108-05-4] ^	0.95	U	ug/L	1	0.95	5.0	50	EPA 8260B	01/31/14 23:24	REF	
Vinyl chloride [75-01-4] ^	0.32	U	ug/L	1	0.32	1.0	1	EPA 8260B	01/31/14 23:24	REF	



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Description: 3301-SW2

Lab Sample ID: C400184-13

Received: 01/24/14 16:45

Matrix: Ground Water

Sampled: 01/24/14 13:30

Work Order: C400184

Project: Edgecombe County Landfill - App I

Sampled By: J WATERS/ B BRYANT/ Ale

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.45	U	ug/L	1	0.45	3.0	5	EPA 8260B	01/31/14 23:24	REF	
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	49	1	50.0	98 %	51-122	4A31025	EPA 8260B	01/31/14 23:24	REF		
Dibromofluoromethane	48	1	50.0	96 %	69-117	4A31025	EPA 8260B	01/31/14 23:24	REF		
Toluene-d8	45	1	50.0	89 %	67-127	4A31025	EPA 8260B	01/31/14 23:24	REF		



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Description: 3301-SW2

Lab Sample ID: C400184-13

Received: 01/24/14 16:45

Matrix: Ground Water

Sampled: 01/24/14 13:30

Work Order: C400184

Project: Edgecombe County Landfill - App I

Sampled By: J WATERS/ B BRYANT/ Ale

Metals (total recoverable) by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Antimony [7440-36-0] ^	0.220	U	ug/L	1	0.220	2.00	6	EPA 6020A	01/30/14 15:25	VLO	
Arsenic [7440-38-2] ^	5.40	U	ug/L	1	5.40	10.0	10	EPA 6010C	01/30/14 13:32	JDH	
Barium [7440-39-3] ^	59.7	J	ug/L	1	1.00	10.0	100	EPA 6010C	01/30/14 13:32	JDH	
Beryllium [7440-41-7] ^	0.100	U	ug/L	1	0.100	1.00	1	EPA 6010C	01/30/14 13:32	JDH	
Cadmium [7440-43-9] ^	0.360	U	ug/L	1	0.360	1.00	1	EPA 6010C	01/30/14 13:32	JDH	
Chromium [7440-47-3] ^	1.40	U	ug/L	1	1.40	10.0	10	EPA 6010C	01/30/14 13:32	JDH	
Cobalt [7440-48-4] ^	1.43	J	ug/L	1	1.10	10.0	10	EPA 6010C	01/30/14 13:32	JDH	
Copper [7440-50-8] ^	1.60	U	ug/L	1	1.60	10.0	10	EPA 6010C	01/30/14 13:32	JDH	
Lead [7439-92-1] ^	2.10	U	ug/L	1	2.10	10.0	10	EPA 6010C	01/30/14 13:32	JDH	
Nickel [7440-02-0] ^	1.80	U	ug/L	1	1.80	10.0	50	EPA 6010C	01/30/14 13:32	JDH	
Selenium [7782-49-2] ^	0.910	U	ug/L	1	0.910	1.00	10	EPA 6020A	01/30/14 15:25	VLO	
Silver [7440-22-4] ^	1.90	U	ug/L	1	1.90	10.0	10	EPA 6010C	01/30/14 13:32	JDH	
Thallium [7440-28-0] ^	0.110	U	ug/L	1	0.110	1.00	5.5	EPA 6020A	01/30/14 15:25	VLO	
Vanadium [7440-62-2] ^	1.40	U	ug/L	1	1.40	10.0	25	EPA 6010C	01/30/14 13:32	JDH	
Zinc [7440-66-6] ^	10.4		ug/L	1	3.80	10.0	10	EPA 6010C	01/30/14 13:32	JDH	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.



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Description: 3301-EquipmentBlank

Lab Sample ID: C400184-15

Received: 01/24/14 16:45

Matrix: Water

Sampled: 01/24/14 14:15

Work Order: C400184

Project: Edgecombe County Landfill - App I

Sampled By: J WATERS/ B BRYANT/ Ale

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.17	U	ug/L	1	0.17	1.0	5	EPA 8260B	01/31/14 23:54	REF	
1,1,1-Trichloroethane [71-55-6] ^	0.12	U	ug/L	1	0.12	1.0	1	EPA 8260B	01/31/14 23:54	REF	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.28	U	ug/L	1	0.28	1.0	3	EPA 8260B	01/31/14 23:54	REF	
1,1,2-Trichloroethane [79-00-5] ^	0.14	U	ug/L	1	0.14	1.0	1	EPA 8260B	01/31/14 23:54	REF	
1,1-Dichloroethane [75-34-3] ^	0.13	U	ug/L	1	0.13	1.0	5	EPA 8260B	01/31/14 23:54	REF	
1,1-Dichloroethane [75-35-4] ^	0.21	U	ug/L	1	0.21	1.0	5	EPA 8260B	01/31/14 23:54	REF	
1,2,3-Trichloropropane [96-18-4] ^	0.23	U	ug/L	1	0.23	1.0	1	EPA 8260B	01/31/14 23:54	REF	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	01/31/14 23:54	REF	
1,2-Dibromoethane [106-93-4] ^	0.66	U	ug/L	1	0.66	1.0	1	EPA 8260B	01/31/14 23:54	REF	
1,2-Dichlorobenzene [95-50-1] ^	0.19	U	ug/L	1	0.19	1.0	5	EPA 8260B	01/31/14 23:54	REF	
1,2-Dichloroethane [107-06-2] ^	0.21	U	ug/L	1	0.21	1.0	1	EPA 8260B	01/31/14 23:54	REF	
1,2-Dichloropropane [78-87-5] ^	0.10	U	ug/L	1	0.10	1.0	1	EPA 8260B	01/31/14 23:54	REF	
1,4-Dichlorobenzene [106-46-7] ^	0.19	U	ug/L	1	0.19	1.0	1	EPA 8260B	01/31/14 23:54	REF	
2-Butanone [78-93-3] ^	1.3	U	ug/L	1	1.3	5.0	100	EPA 8260B	01/31/14 23:54	REF	
2-Hexanone [591-78-6] ^	0.88	U	ug/L	1	0.88	5.0	50	EPA 8260B	01/31/14 23:54	REF	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	01/31/14 23:54	REF	
Acetone [67-64-1] ^	1.1	J	ug/L	1	1.2	5.0	100	EPA 8260B	01/31/14 23:54	REF	
Acrylonitrile [107-13-1] ^	3.5	U	ug/L	1	3.5	10	200	EPA 8260B	01/31/14 23:54	REF	
Benzene [71-43-2] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/31/14 23:54	REF	
Bromochloromethane [74-97-5] ^	0.48	U	ug/L	1	0.48	1.0	3	EPA 8260B	01/31/14 23:54	REF	
Bromodichloromethane [75-27-4] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/31/14 23:54	REF	
Bromoform [75-25-2] ^	0.22	U	ug/L	1	0.22	1.0	3	EPA 8260B	01/31/14 23:54	REF	
Bromomethane [74-83-9] ^	0.14	U	ug/L	1	0.14	1.0	10	EPA 8260B	01/31/14 23:54	REF	
Carbon disulfide [75-15-0] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	01/31/14 23:54	REF	
Carbon tetrachloride [56-23-5] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/31/14 23:54	REF	
Chlorobenzene [108-90-7] ^	0.17	U	ug/L	1	0.17	1.0	3	EPA 8260B	01/31/14 23:54	REF	
Chloroethane [75-00-3] ^	0.23	U	ug/L	1	0.23	1.0	10	EPA 8260B	01/31/14 23:54	REF	
Chloroform [67-66-3] ^	0.18	U	ug/L	1	0.18	1.0	5	EPA 8260B	01/31/14 23:54	REF	
Chloromethane [74-87-3] ^	0.13	U	ug/L	1	0.13	1.0	1	EPA 8260B	01/31/14 23:54	REF	
cis-1,2-Dichloroethene [156-59-2] ^	0.15	U	ug/L	1	0.15	1.0	5	EPA 8260B	01/31/14 23:54	REF	
cis-1,3-Dichloropropene [10061-01-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	01/31/14 23:54	REF	
Dibromochloromethane [124-48-1] ^	0.17	U	ug/L	1	0.17	1.0	3	EPA 8260B	01/31/14 23:54	REF	
Dibromomethane [74-95-3] ^	0.27	U	ug/L	1	0.27	1.0	10	EPA 8260B	01/31/14 23:54	REF	
Ethylbenzene [100-41-4] ^	0.13	U	ug/L	1	0.13	1.0	1	EPA 8260B	01/31/14 23:54	REF	
Iodomethane [74-88-4] ^	1.7	U	ug/L	1	1.7	5.0	10	EPA 8260B	01/31/14 23:54	REF	
Methylene chloride [75-09-2] ^	0.23	U	ug/L	1	0.23	1.0	1	EPA 8260B	01/31/14 23:54	REF	
Styrene [100-42-5] ^	0.11	U	ug/L	1	0.11	1.0	1	EPA 8260B	01/31/14 23:54	REF	
Tetrachloroethene [127-18-4] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/31/14 23:54	REF	
Toluene [108-88-3] ^	0.14	U	ug/L	1	0.14	1.0	1	EPA 8260B	01/31/14 23:54	REF	
trans-1,2-Dichloroethene [156-60-5] ^	0.21	U	ug/L	1	0.21	1.0	5	EPA 8260B	01/31/14 23:54	REF	
trans-1,3-Dichloropropene [10061-02-6] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/31/14 23:54	REF	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.70	U	ug/L	1	0.70	1.0	100	EPA 8260B	01/31/14 23:54	REF	
Trichloroethene [79-01-6] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/31/14 23:54	REF	
Trichlorofluoromethane [75-69-4] ^	0.24	U	ug/L	1	0.24	1.0	1	EPA 8260B	01/31/14 23:54	REF	
Vinyl acetate [108-05-4] ^	0.95	U	ug/L	1	0.95	5.0	50	EPA 8260B	01/31/14 23:54	REF	
Vinyl chloride [75-01-4] ^	0.32	U	ug/L	1	0.32	1.0	1	EPA 8260B	01/31/14 23:54	REF	



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Description: 3301-EquipmentBlank

Lab Sample ID: C400184-15

Received: 01/24/14 16:45

Matrix: Water

Sampled: 01/24/14 14:15

Work Order: C400184

Project: Edgecombe County Landfill - App I

Sampled By: J WATERS/ B BRYANT/ Ale

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.45	U	ug/L	1	0.45	3.0	5	EPA 8260B	01/31/14 23:54	REF	
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	48	1	50.0	97 %	51-122	4A31025	EPA 8260B	01/31/14 23:54	REF		
Dibromofluoromethane	48	1	50.0	96 %	68-117	4A31025	EPA 8260B	01/31/14 23:54	REF		
Toluene-d8	45	1	50.0	89 %	67-127	4A31025	EPA 8260B	01/31/14 23:54	REF		



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Description: 3301-EquipmentBlank

Lab Sample ID: C400184-15

Received: 01/24/14 16:45

Matrix: Water

Sampled: 01/24/14 14:15

Work Order: C400184

Project: Edgecombe County Landfill - App I

Sampled By: J WATERS/ B BRYANT/ Ak

Metals (total recoverable) by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Antimony [7440-36-0] ^	0.220	U	ug/L	1	0.220	2.00	6	EPA 6020A	01/30/14 15:33	VLO	
Arsenic [7440-38-2] ^	5.40	U	ug/L	1	5.40	10.0	10	EPA 6010C	01/30/14 13:38	JDH	
Barium [7440-39-3] ^	1.32	J	ug/L	1	1.00	10.0	100	EPA 6010C	01/30/14 13:38	JDH	
Beryllium [7440-41-7] ^	0.100	U	ug/L	1	0.100	1.00	1	EPA 6010C	01/30/14 13:38	JDH	
Cadmium [7440-43-9] ^	0.360	U	ug/L	1	0.360	1.00	1	EPA 6010C	01/30/14 13:38	JDH	
Chromium [7440-47-3] ^	1.40	U	ug/L	1	1.40	10.0	10	EPA 6010C	01/30/14 13:38	JDH	
Cobalt [7440-48-4] ^	1.10	U	ug/L	1	1.10	10.0	10	EPA 6010C	01/30/14 13:38	JDH	
Copper [7440-50-8] ^	1.60	U	ug/L	1	1.60	10.0	10	EPA 6010C	01/30/14 13:38	JDH	
Lead [7439-92-1] ^	2.10	U	ug/L	1	2.10	10.0	10	EPA 6010C	01/30/14 13:38	JDH	
Nickel [7440-02-0] ^	1.80	U	ug/L	1	1.80	10.0	50	EPA 6010C	01/30/14 13:38	JDH	
Selenium [7782-49-2] ^	0.910	U	ug/L	1	0.910	1.00	10	EPA 6020A	01/30/14 15:33	VLO	
Silver [7440-22-4] ^	1.90	U	ug/L	1	1.90	10.0	10	EPA 6010C	01/30/14 13:38	JDH	
Thallium [7440-28-0] ^	0.110	U	ug/L	1	0.110	1.00	5.5	EPA 6020A	01/30/14 15:33	VLO	
Vanadium [7440-62-2] ^	1.40	U	ug/L	1	1.40	10.0	25	EPA 6010C	01/30/14 13:38	JDH	
Zinc [7440-66-6] ^	3.80	U	ug/L	1	3.80	10.0	10	EPA 6010C	01/30/14 13:38	JDH	

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Description: 3301-TripBlank

Matrix: Ground Water

Project: Edgecombe County Landfill - App I

Lab Sample ID: C400184-16

Sampled: 01/23/14 10:44

Sampled By: ENCO

Received: 01/24/14 16:45

Work Order: C400184

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.17	U	ug/L	1	0.17	1.0	5	EPA 8260B	01/28/14 20:14	REF	
1,1,1-Trichloroethane [71-55-6] ^	0.12	U	ug/L	1	0.12	1.0	1	EPA 8260B	01/28/14 20:14	REF	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.28	U	ug/L	1	0.28	1.0	3	EPA 8260B	01/28/14 20:14	REF	
1,1,2-Trichloroethane [79-00-5] ^	0.14	U	ug/L	1	0.14	1.0	1	EPA 8260B	01/28/14 20:14	REF	
1,1-Dichloroethane [75-34-3] ^	0.13	U	ug/L	1	0.13	1.0	5	EPA 8260B	01/28/14 20:14	REF	
1,1-Dichloroethene [75-35-4] ^	0.21	U	ug/L	1	0.21	1.0	5	EPA 8260B	01/28/14 20:14	REF	
1,2,3-Trichloropropane [96-18-4] ^	0.23	U	ug/L	1	0.23	1.0	1	EPA 8260B	01/28/14 20:14	REF	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	01/28/14 20:14	REF	
1,2-Dibromoethane [106-93-4] ^	0.66	U	ug/L	1	0.66	1.0	1	EPA 8260B	01/28/14 20:14	REF	
1,2-Dichlorobenzene [95-50-1] ^	0.19	U	ug/L	1	0.19	1.0	5	EPA 8260B	01/28/14 20:14	REF	
1,2-Dichloroethane [107-06-2] ^	0.21	U	ug/L	1	0.21	1.0	1	EPA 8260B	01/28/14 20:14	REF	
1,2-Dichloropropane [78-87-5] ^	0.10	U	ug/L	1	0.10	1.0	1	EPA 8260B	01/28/14 20:14	REF	
1,4-Dichlorobenzene [106-46-7] ^	0.19	U	ug/L	1	0.19	1.0	1	EPA 8260B	01/28/14 20:14	REF	
2-Butanone [78-93-3] ^	1.3	U	ug/L	1	1.3	5.0	100	EPA 8260B	01/28/14 20:14	REF	
2-Hexanone [591-78-6] ^	0.88	U	ug/L	1	0.88	5.0	50	EPA 8260B	01/28/14 20:14	REF	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	01/28/14 20:14	REF	
Acetone [67-64-1] ^	1.2	U	ug/L	1	1.2	5.0	100	EPA 8260B	01/28/14 20:14	REF	
Acrylonitrile [107-13-1] ^	3.5	U	ug/L	1	3.5	10	200	EPA 8260B	01/28/14 20:14	REF	
Benzene [71-43-2] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/28/14 20:14	REF	
Bromochloromethane [74-97-5] ^	0.48	U	ug/L	1	0.48	1.0	3	EPA 8260B	01/28/14 20:14	REF	
Bromodichloromethane [75-27-4] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/28/14 20:14	REF	
Bromoform [75-25-2] ^	0.22	U	ug/L	1	0.22	1.0	3	EPA 8260B	01/28/14 20:14	REF	
Bromomethane [74-83-9] ^	0.14	U	ug/L	1	0.14	1.0	10	EPA 8260B	01/28/14 20:14	REF	
Carbon disulfide [75-15-0] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	01/28/14 20:14	REF	
Carbon tetrachloride [56-23-5] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/28/14 20:14	REF	
Chlorobenzene [108-90-7] ^	0.17	U	ug/L	1	0.17	1.0	3	EPA 8260B	01/28/14 20:14	REF	
Chloroethane [75-00-3] ^	0.23	U	ug/L	1	0.23	1.0	10	EPA 8260B	01/28/14 20:14	REF	
Chloroform [67-66-3] ^	0.18	U	ug/L	1	0.18	1.0	5	EPA 8260B	01/28/14 20:14	REF	
Chloromethane [74-87-3] ^	0.13	U	ug/L	1	0.13	1.0	1	EPA 8260B	01/28/14 20:14	REF	
cis-1,2-Dichloroethene [156-59-2] ^	0.15	U	ug/L	1	0.15	1.0	5	EPA 8260B	01/28/14 20:14	REF	
cis-1,3-Dichloropropene [10061-01-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	01/28/14 20:14	REF	
Dibromochloromethane [124-48-1] ^	0.17	U	ug/L	1	0.17	1.0	3	EPA 8260B	01/28/14 20:14	REF	
Dibromomethane [74-95-3] ^	0.27	U	ug/L	1	0.27	1.0	10	EPA 8260B	01/28/14 20:14	REF	
Ethylbenzene [100-41-4] ^	0.13	U	ug/L	1	0.13	1.0	1	EPA 8260B	01/28/14 20:14	REF	
Iodomethane [74-88-4] ^	1.7	U	ug/L	1	1.7	5.0	10	EPA 8260B	01/28/14 20:14	REF	
Methylene chloride [75-09-2] ^	0.23	U	ug/L	1	0.23	1.0	1	EPA 8260B	01/28/14 20:14	REF	
Styrene [100-42-5] ^	0.11	U	ug/L	1	0.11	1.0	1	EPA 8260B	01/28/14 20:14	REF	
Tetrachloroethene [127-18-4] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	01/28/14 20:14	REF	
Toluene [108-88-3] ^	0.14	U	ug/L	1	0.14	1.0	1	EPA 8260B	01/28/14 20:14	REF	
trans-1,2-Dichloroethene [156-60-5] ^	0.21	U	ug/L	1	0.21	1.0	5	EPA 8260B	01/28/14 20:14	REF	
trans-1,3-Dichloropropene [10061-02-6] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/28/14 20:14	REF	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.70	U	ug/L	1	0.70	1.0	100	EPA 8260B	01/28/14 20:14	REF	
Trichloroethene [79-01-6] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	01/28/14 20:14	REF	
Trichlorofluoromethane [75-69-4] ^	0.24	U	ug/L	1	0.24	1.0	1	EPA 8260B	01/28/14 20:14	REF	
Vinyl acetate [108-05-4] ^	0.95	U	ug/L	1	0.95	5.0	50	EPA 8260B	01/28/14 20:14	REF	
Vinyl chloride [75-01-4] ^	0.32	U	ug/L	1	0.32	1.0	1	EPA 8260B	01/28/14 20:14	REF	



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Description: 3301-TripBlank

Lab Sample ID: C400184-16

Received: 01/24/14 16:45

Matrix: Ground Water

Sampled: 01/23/14 10:44

Work Order: C400184

Project: Edgecombe County Landfill - App I

Sampled By: ENCO

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.45	U	ug/L	1	0.45	3.0	5	EPA 8260B	01/28/14 20:14	REF	
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	41	1	50.0	81 %	51-122	4A28030	EPA 8260B	01/28/14 20:14	REF		
Dibromofluoromethane	36	1	50.0	73 %	68-117	4A28030	EPA 8260B	01/28/14 20:14	REF		
Toluene-d8	40	1	50.0	80 %	67-127	4A28030	EPA 8260B	01/28/14 20:14	REF		

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QUALITY CONTROL**Volatile Organic Compounds by GCMS - Quality Control**

Batch 4A27023 - EPA 5030B_MS

Blank (4A27023-BLK1)

Prepared: 01/27/2014 12:38 Analyzed: 01/27/2014 21:26

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	0.17	U	1.0	ug/L							
1,1,1-Trichloroethane	0.12	U	1.0	ug/L							
1,1,2,2-Tetrachloroethane	0.28	U	1.0	ug/L							
1,1,2-Trichloroethane	0.14	U	1.0	ug/L							
1,1-Dichloroethane	0.13	U	1.0	ug/L							
1,1-Dichloroethene	0.21	U	1.0	ug/L							
1,2,3-Trichloropropane	0.23	U	1.0	ug/L							
1,2-Dibromo-3-chloropropane	0.48	U	1.0	ug/L							
1,2-Dibromoethane	0.66	U	1.0	ug/L							
1,2-Dichlorobenzene	0.19	U	1.0	ug/L							
1,2-Dichloroethane	0.21	U	1.0	ug/L							
1,2-Dichloropropane	0.10	U	1.0	ug/L							
1,4-Dichlorobenzene	0.19	U	1.0	ug/L							
2-Butanone	1.3	U	5.0	ug/L							
2-Hexanone	0.88	U	5.0	ug/L							
4-Methyl-2-pentanone	1.1	U	5.0	ug/L							
Acetone	1.2	U	5.0	ug/L							
Acrylonitrile	3.5	U	10	ug/L							
Benzene	0.15	U	1.0	ug/L							
Bromochloromethane	0.48	U	1.0	ug/L							
Bromodichloromethane	0.17	U	1.0	ug/L							
Bromoform	0.22	U	1.0	ug/L							
Bromomethane	0.14	U	1.0	ug/L							
Carbon disulfide	1.5	U	5.0	ug/L							
Carbon tetrachloride	0.17	U	1.0	ug/L							
Chlorobenzene	0.17	U	1.0	ug/L							
Chloroethane	0.23	U	1.0	ug/L							
Chloroform	0.18	U	1.0	ug/L							
Chloromethane	0.13	U	1.0	ug/L							
cis-1,2-Dichloroethene	0.15	U	1.0	ug/L							
cis-1,3-Dichloropropene	0.20	U	1.0	ug/L							
Dibromochloromethane	0.17	U	1.0	ug/L							
Dibromomethane	0.27	U	1.0	ug/L							
Ethylbenzene	0.13	U	1.0	ug/L							
Iodomethane	1.7	U	5.0	ug/L							
Methylene chloride	0.23	U	1.0	ug/L							
Styrene	0.11	U	1.0	ug/L							
Tetrachloroethene	0.17	U	1.0	ug/L							
Toluene	0.14	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.21	U	1.0	ug/L							
trans-1,3-Dichloropropene	0.15	U	1.0	ug/L							
trans-1,4-Dichloro-2-butene	0.70	U	1.0	ug/L							
Trichloroethene	0.15	U	1.0	ug/L							
Trichlorofluoromethane	0.24	U	1.0	ug/L							
Vinyl acetate	0.95	U	5.0	ug/L							
Vinyl chloride	0.32	U	1.0	ug/L							
Xylenes (Total)	0.45	U	3.0	ug/L							

Surrogate: 4-Bromofluorobenzene

41

ug/L

50.0

81

51-122



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QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 4A27023 - EPA 5030B_MS

Blank (4A27023-BLK1) Continued

Prepared: 01/27/2014 12:38 Analyzed: 01/27/2014 21:26

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Surrogate: Dibromofluoromethane	36			ug/L	50.0		72	68-117			
Surrogate: Toluene-d8	41			ug/L	50.0		82	67-127			

LCS (4A27023-BS1)

Prepared: 01/27/2014 12:38 Analyzed: 01/27/2014 21:56

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	19		1.0	ug/L	20.0		93	75-133			
Benzene	19		1.0	ug/L	20.0		94	81-134			
Chlorobenzene	23		1.0	ug/L	20.0		114	83-117			
Toluene	19		1.0	ug/L	20.0		95	71-118			
Trichloroethene	21		1.0	ug/L	20.0		104	74-119			

Matrix Spike (4A27023-MS1)

Prepared: 01/27/2014 12:38 Analyzed: 01/27/2014 22:26

Source: C401068-03

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	20		1.0	ug/L	20.0	0.21 U	101	75-133			
Benzene	21		1.0	ug/L	20.0	0.15 U	103	81-134			
Chlorobenzene	22		1.0	ug/L	20.0	0.17 U	110	83-117			
Toluene	20		1.0	ug/L	20.0	0.14 U	98	71-118			
Trichloroethene	22		1.0	ug/L	20.0	0.15 U	109	74-119			

Matrix Spike Dup (4A27023-MSD1)

Prepared: 01/27/2014 12:38 Analyzed: 01/27/2014 22:56

Source: C401068-03

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	19		1.0	ug/L	20.0	0.21 U	93	75-133	8	20	
Benzene	19		1.0	ug/L	20.0	0.15 U	97	81-134	6	17	
Chlorobenzene	21		1.0	ug/L	20.0	0.17 U	104	83-117	6	16	
Toluene	18		1.0	ug/L	20.0	0.14 U	92	71-118	7	17	
Trichloroethene	21		1.0	ug/L	20.0	0.15 U	103	74-119	6	22	

Batch 4A28030 - EPA 5030B_MS

Blank (4A28030-BLK1)

Prepared: 01/28/2014 14:00 Analyzed: 01/28/2014 14:19

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	0.17	U	1.0	ug/L							
1,1,1-Trichloroethane	0.12	U	1.0	ug/L							
1,1,2,2-Tetrachloroethane	0.28	U	1.0	ug/L							
1,1,2-Trichloroethane	0.14	U	1.0	ug/L							
1,1-Dichloroethane	0.13	U	1.0	ug/L							
1,1-Dichloroethene	0.21	U	1.0	ug/L							
1,2,3-Trichloropropane	0.23	U	1.0	ug/L							
1,2-Dibromo-3-chloropropane	0.48	U	1.0	ug/L							
1,2-Dibromoethane	0.66	U	1.0	ug/L							
1,2-Dichlorobenzene	0.19	U	1.0	ug/L							



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QUALITY CONTROL**Volatile Organic Compounds by GCMS - Quality Control**

Batch 4A28030 - EPA 5030B_MS

Blank (4A28030-BLK1) Continued

Prepared: 01/28/2014 14:00 Analyzed: 01/28/2014 14:19

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2-Dichloroethane	0.21	U	1.0	ug/L							
1,2-Dichloropropane	0.10	U	1.0	ug/L							
1,4-Dichlorobenzene	0.19	U	1.0	ug/L							
2-Butanone	1.3	U	5.0	ug/L							
2-Hexanone	0.88	U	5.0	ug/L							
4-Methyl-2-pentanone	1.1	U	5.0	ug/L							
Acetone	1.2	U	5.0	ug/L							
Acrylonitrile	3.5	U	10	ug/L							
Benzene	0.15	U	1.0	ug/L							
Bromochloromethane	0.48	U	1.0	ug/L							
Bromodichloromethane	0.17	U	1.0	ug/L							
Bromoform	0.22	U	1.0	ug/L							
Bromomethane	0.14	U	1.0	ug/L							
Carbon disulfide	1.5	U	5.0	ug/L							
Carbon tetrachloride	0.17	U	1.0	ug/L							
Chlorobenzene	0.17	U	1.0	ug/L							
Chloroethane	0.23	U	1.0	ug/L							
Chloroform	0.18	U	1.0	ug/L							
Chloromethane	0.13	U	1.0	ug/L							
cis-1,2-Dichloroethene	0.15	U	1.0	ug/L							
cis-1,3-Dichloropropene	0.20	U	1.0	ug/L							
Dibromochloromethane	0.17	U	1.0	ug/L							
Dibromomethane	0.27	U	1.0	ug/L							
Ethylbenzene	0.13	U	1.0	ug/L							
Iodomethane	1.7	U	5.0	ug/L							
Methylene chloride	0.23	U	1.0	ug/L							
Styrene	0.11	U	1.0	ug/L							
Tetrachloroethene	0.17	U	1.0	ug/L							
Toluene	0.14	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.21	U	1.0	ug/L							
trans-1,3-Dichloropropene	0.15	U	1.0	ug/L							
trans-1,4-Dichloro-2-butene	0.70	U	1.0	ug/L							
Trichloroethene	0.15	U	1.0	ug/L							
Trichlorofluoromethane	0.24	U	1.0	ug/L							
Vinyl acetate	0.95	U	5.0	ug/L							
Vinyl chloride	0.32	U	1.0	ug/L							
Xylenes (Total)	0.45	U	3.0	ug/L							
Surrogate: 4-Bromofluorobenzene	40			ug/L	50.0		79	51-122			
Surrogate: Dibromofluoromethane	36			ug/L	50.0		72	68-117			
Surrogate: Toluene-d8	39			ug/L	50.0		78	67-127			

LCS (4A28030-B51)

Prepared: 01/28/2014 14:40 Analyzed: 01/28/2014 14:49

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	19		1.0	ug/L	20.0		95	75-133			
Benzene	21		1.0	ug/L	20.0		104	81-134			
Chlorobenzene	23		1.0	ug/L	20.0		113	83-117			
Toluene	20		1.0	ug/L	20.0		98	71-118			



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QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 4A28030 - EPA 5030B_MS

LCS (4A28030-BS1) Continued

Prepared: 01/28/2014 14:40 Analyzed: 01/28/2014 14:49

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Trichloroethene	22		1.0	ug/L	20.0		110	74-119			

Matrix Spike (4A28030-MS1)

Prepared: 01/28/2014 14:40 Analyzed: 01/28/2014 15:19

Source: C401068-06

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	18		1.0	ug/L	20.0	0.21 U	90	75-133			
Benzene	20		1.0	ug/L	20.0	0.15 U	100	81-134			
Chlorobenzene	23		1.0	ug/L	20.0	0.17 U	115	83-117			
Toluene	19		1.0	ug/L	20.0	0.14 U	97	71-118			
Trichloroethene	23		1.0	ug/L	20.0	0.15 U	113	74-119			

Matrix Spike Dup (4A28030-MSD1)

Prepared: 01/28/2014 14:40 Analyzed: 01/28/2014 15:48

Source: C401068-06

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	18		1.0	ug/L	20.0	0.21 U	90	75-133	0.1	20	
Benzene	19		1.0	ug/L	20.0	0.15 U	97	81-134	4	17	
Chlorobenzene	21		1.0	ug/L	20.0	0.17 U	107	83-117	7	16	
Toluene	19		1.0	ug/L	20.0	0.14 U	93	71-118	4	17	
Trichloroethene	20		1.0	ug/L	20.0	0.15 U	102	74-119	10	22	

Batch 4A31025 - EPA 5030B_MS

Blank (4A31025-BLK1)

Prepared: 01/31/2014 11:22 Analyzed: 01/31/2014 18:00

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	0.17	U	1.0	ug/L							
1,1,1-Trichloroethane	0.12	U	1.0	ug/L							
1,1,2,2-Tetrachloroethane	0.28	U	1.0	ug/L							
1,1,2-Trichloroethane	0.14	U	1.0	ug/L							
1,1-Dichloroethane	0.13	U	1.0	ug/L							
1,1-Dichloroethene	0.21	U	1.0	ug/L							
1,2,3-Trichloropropane	0.23	U	1.0	ug/L							
1,2-Dibromo-3-chloropropane	0.48	U	1.0	ug/L							
1,2-Dibromoethane	0.66	U	1.0	ug/L							
1,2-Dichlorobenzene	0.19	U	1.0	ug/L							
1,2-Dichloroethane	0.21	U	1.0	ug/L							
1,2-Dichloropropane	0.10	U	1.0	ug/L							
1,4-Dichlorobenzene	0.19	U	1.0	ug/L							
2-Butanone	1.3	U	5.0	ug/L							
2-Hexanone	0.88	U	5.0	ug/L							
4-Methyl-2-pentanone	1.1	U	5.0	ug/L							
Acetone	1.2	U	5.0	ug/L							
Acrylonitrile	3.5	U	10	ug/L							
Benzene	0.15	U	1.0	ug/L							
Bromochloromethane	0.48	U	1.0	ug/L							
Bromodichloromethane	0.17	U	1.0	ug/L							



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QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 4A31025 - EPA 5030B_MS

Blank (4A31025-BLK1) Continued

Prepared: 01/31/2014 11:22 Analyzed: 01/31/2014 18:00

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Bromoform	0.22	U	1.0	ug/L							
Bromomethane	0.14	U	1.0	ug/L							
Carbon disulfide	1.5	U	5.0	ug/L							
Carbon tetrachloride	0.17	U	1.0	ug/L							
Chlorobenzene	0.17	U	1.0	ug/L							
Chloroethane	0.23	U	1.0	ug/L							
Chloroform	0.18	U	1.0	ug/L							
Chloromethane	0.13	U	1.0	ug/L							
cis-1,2-Dichloroethene	0.15	U	1.0	ug/L							
cis-1,3-Dichloropropene	0.20	U	1.0	ug/L							
Dibromochloromethane	0.17	U	1.0	ug/L							
Dibromomethane	0.27	U	1.0	ug/L							
Ethylbenzene	0.13	U	1.0	ug/L							
Iodomethane	1.7	U	5.0	ug/L							
Methylene chloride	0.23	U	1.0	ug/L							
Styrene	0.11	U	1.0	ug/L							
Tetrachloroethene	0.17	U	1.0	ug/L							
Toluene	0.14	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.21	U	1.0	ug/L							
trans-1,3-Dichloropropene	0.15	U	1.0	ug/L							
trans-1,4-Dichloro-2-butene	0.70	U	1.0	ug/L							
Trichloroethene	0.15	U	1.0	ug/L							
Trichlorofluoromethane	0.24	U	1.0	ug/L							
Vinyl acetate	0.95	U	5.0	ug/L							
Vinyl chloride	0.32	U	1.0	ug/L							
Xylenes (Total)	0.45	U	3.0	ug/L							
Surrogate: 4-Bromofluorobenzene	47			ug/L	50.0		94	51-122			
Surrogate: Dibromofluoromethane	49			ug/L	50.0		98	69-117			
Surrogate: Toluene-d8	44			ug/L	50.0		88	67-127			

LCS (4A31025-BS1)

Prepared: 01/31/2014 11:22 Analyzed: 01/31/2014 18:30

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	20		1.0	ug/L	20.0		102	75-133			
Benzene	20		1.0	ug/L	20.0		98	81-134			
Chlorobenzene	21		1.0	ug/L	20.0		104	83-117			
Toluene	20		1.0	ug/L	20.0		101	71-118			
Trichloroethene	20		1.0	ug/L	20.0		99	74-119			

Matrix Spike (4A31025-MS1)

Prepared: 01/31/2014 11:22 Analyzed: 01/31/2014 18:59

Source: C400250-05

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	22		1.0	ug/L	20.0	0.21 U	110	75-133			
Benzene	21		1.0	ug/L	20.0	0.15 U	104	81-134			
Chlorobenzene	21		1.0	ug/L	20.0	0.17 U	107	83-117			
Toluene	21		1.0	ug/L	20.0	0.14 U	104	71-118			
Trichloroethene	21		1.0	ug/L	20.0	0.15 U	104	74-119			



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QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 4A31025 - EPA 5030B_MS

Matrix Spike Dup (4A31025-MSD1)

Prepared: 01/31/2014 11:22 Analyzed: 01/31/2014 19:29

Source: C400250-05

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	22		1.0	ug/L	20.0	0.21 U	108	75-133	2	20	
Benzene	21		1.0	ug/L	20.0	0.15 U	103	81-134	1	17	
Chlorobenzene	21		1.0	ug/L	20.0	0.17 U	107	83-117	0.3	16	
Toluene	21		1.0	ug/L	20.0	0.14 U	105	71-118	0.4	17	
Trichloroethene	20		1.0	ug/L	20.0	0.15 U	101	74-119	3	22	

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 4A27024 - EPA 3005A

Blank (4A27024-BLK1)

Prepared: 01/27/2014 12:48 Analyzed: 01/30/2014 13:57

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	0.220	U	2.00	ug/L							
Selenium	0.910	U	1.00	ug/L							
Thallium	0.110	U	1.00	ug/L							

LCS (4A27024-BS1)

Prepared: 01/27/2014 12:48 Analyzed: 01/30/2014 14:01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	198		2.00	ug/L	200		99	80-120			
Selenium	218		1.00	ug/L	200		109	80-120			
Thallium	197		1.00	ug/L	200		99	80-120			

Matrix Spike (4A27024-MS1)

Prepared: 01/27/2014 12:48 Analyzed: 01/30/2014 14:09

Source: C400184-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	212		2.00	ug/L	200	1.52	105	75-125			
Selenium	222		1.00	ug/L	200	0.910 U	111	75-125			
Thallium	192		1.00	ug/L	200	0.110 U	96	75-125			

Matrix Spike Dup (4A27024-MSD1)

Prepared: 01/27/2014 12:48 Analyzed: 01/30/2014 14:13

Source: C400184-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	213		2.00	ug/L	200	1.52	106	75-125	0.2	20	
Selenium	222		1.00	ug/L	200	0.910 U	111	75-125	0.07	20	
Thallium	196		1.00	ug/L	200	0.110 U	98	75-125	2	20	

Post Spike (4A27024-PS1)

Prepared: 01/27/2014 12:48 Analyzed: 01/30/2014 14:17

Source: C400184-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	224		2.00	ug/L	200	1.52	111	80-120			



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QUALITY CONTROL

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 4A27024 - EPA 3005A

Post Spike (4A27024-PS1) Continued

Prepared: 01/27/2014 12:48 Analyzed: 01/30/2014 14:17

Source: C400184-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Selenium	233		1.00	ug/L	200	0.712	116	80-120			
Thallium	215		1.00	ug/L	200	0.0521	108	80-120			

Batch 4A27025 - EPA 3005A

Blank (4A27025-BLK1)

Prepared: 01/27/2014 12:50 Analyzed: 01/30/2014 11:52

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	5.40	U	10.0	ug/L							
Barium	1.00	U	10.0	ug/L							
Beryllium	0.100	U	1.00	ug/L							
Cadmium	0.360	U	1.00	ug/L							
Chromium	1.40	U	10.0	ug/L							
Cobalt	1.10	U	10.0	ug/L							
Copper	1.60	U	10.0	ug/L							
Lead	2.10	U	10.0	ug/L							
Nickel	1.80	U	10.0	ug/L							
Silver	1.90	U	10.0	ug/L							
Vanadium	1.40	U	10.0	ug/L							
Zinc	3.80	U	10.0	ug/L							

LCS (4A27025-BS1)

Prepared: 01/27/2014 12:50 Analyzed: 01/30/2014 12:38

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	201		10.0	ug/L	200		101	80-120			
Barium	204		10.0	ug/L	200		102	80-120			
Beryllium	19.5		1.00	ug/L	20.0		97	80-120			
Cadmium	20.0		1.00	ug/L	20.0		100	80-120			
Chromium	195		10.0	ug/L	200		97	80-120			
Cobalt	198		10.0	ug/L	200		99	80-120			
Copper	190		10.0	ug/L	200		95	80-120			
Lead	196		10.0	ug/L	200		98	80-120			
Nickel	200		10.0	ug/L	200		100	80-120			
Silver	199		10.0	ug/L	200		99	80-120			
Vanadium	198		10.0	ug/L	200		99	80-120			
Zinc	201		10.0	ug/L	200		100	80-120			

Matrix Spike (4A27025-MS1)

Prepared: 01/27/2014 12:50 Analyzed: 01/30/2014 12:44

Source: C400184-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	209		10.0	ug/L	200	5.40 U	104	75-125			
Barium	272		10.0	ug/L	200	65.5	103	75-125			
Beryllium	19.8		1.00	ug/L	20.0	0.159	98	75-125			
Cadmium	20.2		1.00	ug/L	20.0	0.360 U	101	75-125			
Chromium	195		10.0	ug/L	200	1.40 U	97	75-125			
Cobalt	206		10.0	ug/L	200	5.11	100	75-125			



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QUALITY CONTROL

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 4A27025 - EPA 3005A

Matrix Spike (4A27025-MS1) Continued

Prepared: 01/27/2014 12:50 Analyzed: 01/30/2014 12:44

Source: C400184-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Copper	190		10.0	ug/L	200	1.60 U	95	75-125			
Lead	200		10.0	ug/L	200	2.10 U	100	75-125			
Nickel	206		10.0	ug/L	200	3.33	102	75-125			
Silver	198		10.0	ug/L	200	1.90 U	99	75-125			
Vanadium	199		10.0	ug/L	200	1.40 U	100	75-125			
Zinc	209		10.0	ug/L	200	7.04	101	75-125			

Matrix Spike Dup (4A27025-MSD1)

Prepared: 01/27/2014 12:50 Analyzed: 01/30/2014 12:46

Source: C400184-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	206		10.0	ug/L	200	5.40 U	103	75-125	1	20	
Barium	269		10.0	ug/L	200	65.5	102	75-125	1	20	
Beryllium	19.8		1.00	ug/L	20.0	0.159	98	75-125	0.2	20	
Cadmium	20.2		1.00	ug/L	20.0	0.360 U	101	75-125	0.3	20	
Chromium	195		10.0	ug/L	200	1.40 U	98	75-125	0.2	20	
Cobalt	203		10.0	ug/L	200	5.11	99	75-125	1	20	
Copper	191		10.0	ug/L	200	1.60 U	95	75-125	0.4	20	
Lead	198		10.0	ug/L	200	2.10 U	99	75-125	0.9	20	
Nickel	205		10.0	ug/L	200	3.33	101	75-125	0.9	20	
Silver	198		10.0	ug/L	200	1.90 U	99	75-125	0.2	20	
Vanadium	200		10.0	ug/L	200	1.40 U	100	75-125	0.2	20	
Zinc	208		10.0	ug/L	200	7.04	100	75-125	0.5	20	

Post Spike (4A27025-PS1)

Prepared: 01/27/2014 12:50 Analyzed: 01/30/2014 12:48

Source: C400184-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	0.199		0.0100	mg/L	0.200	0.00412	98	80-120			
Barium	0.266		0.0100	mg/L	0.200	0.0655	100	80-120			
Beryllium	0.0196		0.00100	mg/L	0.0200	0.000159	97	80-120			
Cadmium	0.0199		0.00100	mg/L	0.0200	0.000342	98	80-120			
Chromium	0.192		0.0100	mg/L	0.200	4.17E-6	96	80-120			
Cobalt	0.201		0.0100	mg/L	0.200	0.00511	98	80-120			
Copper	0.188		0.0100	mg/L	0.200	-0.00177	95	80-120			
Lead	0.195		0.0100	mg/L	0.200	-0.00344	99	80-120			
Nickel	0.201		0.0100	mg/L	0.200	0.00333	99	80-120			
Silver	0.191		0.0100	mg/L	0.200	0.000397	95	80-120			
Vanadium	0.197		0.0100	mg/L	0.200	-0.000226	98	80-120			
Zinc	0.205		0.0100	mg/L	0.200	0.00704	99	80-120			



FLAGS/NOTES AND DEFINITIONS

- B** The analyte was detected in the associated method blank.
- D** The sample was analyzed at dilution.
- J** The reported value is between the laboratory method detection limit (MDL) and the laboratory method reporting limit (MRL), adjusted for actual sample preparation data and moisture content, where applicable.
- U** The analyte was analyzed for but not detected to the level shown, adjusted for actual sample preparation data and moisture content, where applicable.
- E** The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate.
- MRL** Method Reporting Limit. The MRL is roughly equivalent to the practical quantitation limit (PQL) and is based on the low point of the calibration curve, when applicable, sample preparation factor, dilution factor, and, in the case of soil samples, moisture content.



ENVIRONMENTAL CONSERVATION LABORATORIES CHAIN-OF-CUSTODY RECORD

10775 Central Port Dr.
Orlando, FL 32824
(407) 826-5314 Fax (407) 850-6945

4810 Executive Park Court Suite 111
Jacksonville, FL 32216-6069
(904) 296-3007 Fax (904) 296-6210

102-A Woodwinds Industrial Ct.
Cary, NC 27511
(919) 487-3090 Fax (919) 467-3515

Client Name S&ME, Inc. (SM001)		Project Number 1054-13-276-P2		Requested Analytes						Requested Turnaround Times						
Address 3201 Spring Forest Road		Project Name/Desc Edgecombe County Landfill - App 1		8260B Appendix 1	Ag, F, As, F, Ba, F, Be, Cd, Cr, Co, Cu, Ni, Pb, Sb, Se, Tl, V, Zn	Ag, As, Ba, Be, Cd, Co, Cr, Cu, Ni, Pb, Sb, Se, Tl, V, Zn							Note: Rush requests subject to acceptance by the facility			
City/ST/Zip Raleigh, NC 27616		PO # / Billing Info											___ Standard		___ Expedited	
Tel (919) 872-2660		Fax (919) 876-3958											Reporting Contact Sam Watts		Due ___/___/___	
Sampler(s) Name, Affiliation (Print) J. Waters, B. Bryant, Alex Culpepper		Billing Contact Accounts Payable											Site Location / Time Zone		Lab Workorder C400184	
Sampler(s) Signature <i>Samuel A. Waters</i>																

Item #	Sample ID (Field Identification)	Collection Date	Collection Time	Comp / Grab	Matrix (see codes)	Total # of Containers	Preservation (See Codes) (Combine as necessary)						Sample Comments	
	3301-MW3B	1/23/14	1114	Grab	GW	5	X	X	X					
	3301-MW4	1/23/14	1044		GW	5	X	X	X					
	3301-MW5	1/23/14	1540		GW	5	X	X	X					
	3301-MW6	1/24/14	1140		GW	5	X	X	X					
	3301-MW7A	1/24/14	1015		GW	5	X	X	X					
	3301-MW9	1/23/14	1208		GW	5	X	X	X					
	3301-MW12	1/24/14	1105		GW	5	X	X	X					
	3301-MW13	1/23/14	1446		GW	5	X	X	X					
	3301-MW14	1/23/14	1520		GW	5	X	X	X					
	3301-MW15	1/23/14	1630		GW	5	X	X	X					
	3301-MW16	1/24/14	1355		GW	5	X	X	X					
	3301-SW1	1/24/14	1200		GW	5	X	X	X					

Sample Kit Prepared By KAV	Date/Time 1/16	Relinquished By <i>Samuel A. Waters</i>	Date/Time 1/24/14 1645	Received By <i>Rachel</i>	Date/Time 1/24/14 1645
Comments/Special Reporting Requirements		Relinquished By	Date/Time	Received By	Date/Time
		Relinquished By	Date/Time	Received By	Date/Time
		Relinquished By	Date/Time	Received By	Date/Time
Cooler #'s & Temps on Receipt C-203 1.8c				Condition Upon Receipt C-958 2.1c	
				<input checked="" type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable	

Matrix: GW-Groundwater SO-Soil DW-Drinking Water SE-Sediment SW-Surface Water WW-Wastewater A-Air O-Other (detail in comments) Preservation: I-Ice H-HCl N-HNO3 S-H2SO4 NO-NaOH O-Other (detail in comments)
 Note: All samples submitted to ENCO Labs are in accordance with the terms and conditions listed on the reverse of this form, unless prior written agreements exist



ENVIRONMENTAL CONSERVATION LABORATORIES CHAIN-OF-CUSTODY RECORD
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 Orlando, FL 32824
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Page 2 of 2

Client Name: **S&ME, Inc. (SM001)**
 Address: **3201 Spring Forest Road**
 City/ST/Zip: **Raleigh, NC 27616**
 Tel: **(919) 872-2660** Fax: **(919) 876-3958**
 Reporting Contact: **Sam Watts**
 Billing Contact: **Accounts Payable**
 Site Location / Time Zone:
 Project Number: **1054-13-276-P2**
 Project Name/Desc: **Edgecombe County Landfill - App I**
 PO # / Billing Info:
 Sampler(s) Name, Affiliation (Print): **J. Watts, B. Bryant, A. Culpepper**
 Sampler(s) Signature: *J. Watts, B. Bryant, A. Culpepper*

Requested Analytes:
 Ag: As, Ba, Be, Cd, Co, Cr, Cu, Ni, Pb, Sb, Se, Ti, V, Zn
 H: Hf, Pb, Bi, Sb, Se, Tl, V, W, Zn
 Ag: As, Ba, Be, Cd, Co, Cr, Cu, Ni, Pb, Sb, Se, Ti, V, Zn
 H: Hf, Pb, Bi, Sb, Se, Tl, V, W, Zn
 Preservation (See Codes) (Combine as necessary)
 Requested Turnaround Times
 Note: Rush requests subject to acceptance by the facility
 Standard
 Expedited
 Due ___/___/___
 Lab Workorder: **C400184**

Item #	Sample ID (Field Identification)	Collection Date	Collection Time	Comp / Grab	Matrix (see codes)	Total # of Containers
	3301-SW2	1/24/14	1330	Grab	GW	5
	3301-Duplicate	1/23/14			GW	5
	3301-Equipment/Blank	1/24/14	1415		WA	5
	Trip Blank				GW	3

Sample Kit Prepared By: _____ Date/Time: _____
 Comments/Special Reporting Requirements: _____
 Relinquished By: *Sam Watts* Date/Time: *1/24/14 1645*
 Relinquished By: _____ Date/Time: _____
 Relinquished By: _____ Date/Time: _____
 Cooler #'s & Temps on Receipt: _____
 Received By: *ENCO* Date/Time: *1/24/14 1645*
 Received By: _____ Date/Time: _____
 Condition Upon Receipt: Acceptable Unacceptable

Matrix: GW-Groundwater SO-Soil DW-Drinking Water SE-Sediment SW-Surface Water WW-Wastewater A-Air O-Other (detail in comments)
 Preservation: H-HCl N-HNO3 S-H2SO4 NO-NaOH O-Other (detail in comments)
 Note: All samples submitted to ENCO Labs are in accordance with the terms and conditions listed on the reverse of this form, unless prior written agreements exist

APPENDIX II

Photo Log of Soil Sample Locations



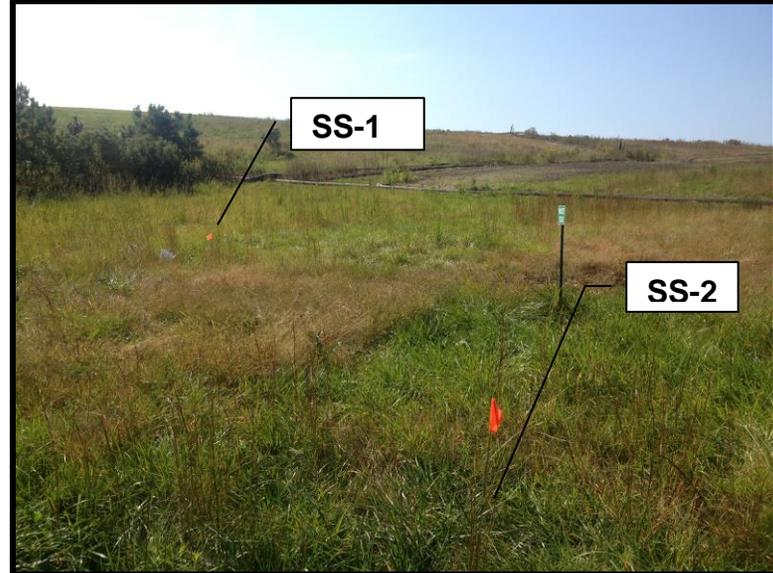
1 View looking northwest at the Edge Of Waste identifier. Soil sample SS-1 marked with orange flag in the bottom left corner and SS-2 in center of the picture.



2 View looking southwest at the Edge Of Waste iron stake identifier and the location of soil sample SS-2 marked with an orange flag.



3 View looking southwest at the location of soil sample SS-1 marked with an orange flag.



4 View looking southwest at the Edge Of Waste iron stake identifier and the locations of soil sample SS-2 and SS-1.



5 View looking west along the southern edge of the landfill where background soil sample SS-3 was collected.

APPENDIX III

Laboratory Report for October 10, 2014 Soil Sampling

Environmental Conservation Laboratories, Inc.

102-A Woodwinds Industrial Court

Cary NC, 27511

Phone: 919.467.3090 FAX: 919.467.3515



www.encolabs.com

Monday, October 27, 2014

S&ME, Inc. (SM001)

Attn: Claudia Irvin

3201 Spring Forest Road

Raleigh, NC 27616

RE: Laboratory Results for

Project Number: 1054-13-280A, Project Name/Desc: Edgecombe County Landfill

ENCO Workorder(s): C413302

Dear Claudia Irvin,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Monday, October 13, 2014.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Cary. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink that reads 'Chuck Smith'.

Chuck Smith

Project Manager

Enclosure(s)



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SAMPLE SUMMARY/LABORATORY CHRONICLE

Client ID:	SS-1	Lab ID: C413302-01	Sampled: 10/10/14 11:25	Received: 10/13/14 12:15
Parameter	Hold Date/Time(s)		Prep Date/Time(s)	Analysis Date/Time(s)
EPA 365.4	11/07/14		10/24/14 11:03	10/27/2014 12:18
EPA 6010C	04/08/15		10/15/14 10:56	10/16/2014 13:31
EPA 8260B	10/24/14		10/16/14 15:27	10/17/2014 10:07
EPA 9045D	10/15/14 10:43		10/15/14 10:29	10/15/2014 11:54
EPA 9056A	11/07/14	11/12/14	10/15/14 11:56	10/15/2014 23:29
SM 5220D-1997	11/07/14	11/17/14	10/20/14 11:35	10/20/2014 17:21

Client ID:	SS-2	Lab ID: C413302-02	Sampled: 10/10/14 11:40	Received: 10/13/14 12:15
Parameter	Hold Date/Time(s)		Prep Date/Time(s)	Analysis Date/Time(s)
EPA 365.4	11/07/14		10/24/14 11:03	10/27/2014 12:22
EPA 8260B	10/24/14		10/16/14 15:27	10/17/2014 10:38
EPA 9045D	10/15/14 10:48		10/15/14 10:34	10/15/2014 11:54
EPA 9056A	11/07/14	11/12/14	10/15/14 11:56	10/15/2014 23:46
SM 5220D-1997	11/07/14	11/17/14	10/20/14 11:35	10/20/2014 17:21

Client ID:	SS-2	Lab ID: C413302-02RE1	Sampled: 10/10/14 11:40	Received: 10/13/14 12:15
Parameter	Hold Date/Time(s)		Prep Date/Time(s)	Analysis Date/Time(s)
EPA 6010C	04/08/15		10/15/14 10:56	10/16/2014 13:57

Client ID:	SS-3	Lab ID: C413302-03	Sampled: 10/10/14 11:55	Received: 10/13/14 12:15
Parameter	Hold Date/Time(s)		Prep Date/Time(s)	Analysis Date/Time(s)
EPA 365.4	11/07/14		10/24/14 11:03	10/27/2014 12:23
EPA 6010C	04/08/15		10/15/14 10:56	10/16/2014 13:47
EPA 8260B	10/24/14		10/16/14 15:27	10/17/2014 11:08
EPA 9045D	10/15/14 10:48		10/15/14 10:34	10/15/2014 11:54
EPA 9056A	11/07/14	11/12/14	10/15/14 11:56	10/16/2014 00:03
SM 5220D-1997	11/07/14	11/17/14	10/20/14 11:35	10/20/2014 17:21



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NORTH CAROLINA SWS SAMPLE DETECTION SUMMARY

Client ID: SS-1 **Lab ID: C413302-01**

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Antimony - Total	0.248	J	1	0.133	1.21	6	mg/kg dry	EPA 6010C	
Arsenic - Total	1.39	J	1	0.121	0.603	10	mg/kg dry	EPA 6010C	
Barium - Total	20.0	J	1	0.121	0.603	100	mg/kg dry	EPA 6010C	
Beryllium - Total	0.191	J	1	0.0145	0.0603	1	mg/kg dry	EPA 6010C	
Chemical Oxygen Demand	480		1	120	120	NE	mg/kg dry	SM 5220D-1997	
Chromium - Total	8.05	J	1	0.121	0.603	10	mg/kg dry	EPA 6010C	
Cobalt - Total	1.02	J	1	0.121	0.603	10	mg/kg dry	EPA 6010C	
Copper - Total	1.69	J	1	0.229	0.603	10	mg/kg dry	EPA 6010C	
Lead - Total	5.55	J	1	0.145	0.603	10	mg/kg dry	EPA 6010C	
Nickel - Total	1.91	J	1	0.434	3.02	50	mg/kg dry	EPA 6010C	
Phosphorus	160		1	3.5	9.6	NE	mg/kg dry	EPA 365.4	
Sulfate as SO4	67	J	1	35	60	250000	mg/kg dry	EPA 9056A	
Vanadium - Total	14.7	J	1	0.121	0.603	25	mg/kg dry	EPA 6010C	
Zinc - Total	7.38	J	1	1.33	3.02	10	mg/kg dry	EPA 6010C	

Client ID: SS-2 **Lab ID: C413302-02**

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
2-Butanone	0.007	J	1	0.0008	0.005	100	mg/kg dry	EPA 8260B	
Chemical Oxygen Demand	560		1	120	120	NE	mg/kg dry	SM 5220D-1997	
Phosphorus	240		1	3.4	9.3	NE	mg/kg dry	EPA 365.4	
Sulfate as SO4	140	J	1	33	58	250000	mg/kg dry	EPA 9056A	

Client ID: SS-2 **Lab ID: C413302-02RE1**

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Antimony - Total	1.83	JD	2	0.255	2.32	6	mg/kg dry	EPA 6010C	R-05
Arsenic - Total	19.1	D	2	0.232	1.16	10	mg/kg dry	EPA 6010C	R-05
Barium - Total	11.4	JD	2	0.232	1.16	100	mg/kg dry	EPA 6010C	R-05
Beryllium - Total	0.346	JD	2	0.0279	0.116	1	mg/kg dry	EPA 6010C	R-05
Chromium - Total	22.8	D	2	0.232	1.16	10	mg/kg dry	EPA 6010C	R-05
Cobalt - Total	0.890	JD	2	0.232	1.16	10	mg/kg dry	EPA 6010C	R-05
Copper - Total	3.26	JD	2	0.441	1.16	10	mg/kg dry	EPA 6010C	R-05
Lead - Total	4.95	JD	2	0.279	1.16	10	mg/kg dry	EPA 6010C	R-05
Vanadium - Total	45.0	D	2	0.232	1.16	25	mg/kg dry	EPA 6010C	R-05
Zinc - Total	6.90	JD	2	2.55	5.81	10	mg/kg dry	EPA 6010C	R-05

Client ID: SS-3 **Lab ID: C413302-03**

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Antimony - Total	0.392	J	1	0.120	1.09	6	mg/kg dry	EPA 6010C	
Arsenic - Total	1.68	J	1	0.109	0.546	10	mg/kg dry	EPA 6010C	
Barium - Total	13.8	J	1	0.109	0.546	100	mg/kg dry	EPA 6010C	
Beryllium - Total	0.0359	J	1	0.0131	0.0546	1	mg/kg dry	EPA 6010C	
Cadmium - Total	0.0454	J	1	0.0105	0.0546	1	mg/kg dry	EPA 6010C	
Chemical Oxygen Demand	1500		1	110	110	NE	mg/kg dry	SM 5220D-1997	
Chromium - Total	5.73	J	1	0.109	0.546	10	mg/kg dry	EPA 6010C	
Cobalt - Total	0.528	J	1	0.109	0.546	10	mg/kg dry	EPA 6010C	
Copper - Total	1.38	J	1	0.208	0.546	10	mg/kg dry	EPA 6010C	
Lead - Total	6.10	J	1	0.131	0.546	10	mg/kg dry	EPA 6010C	
Nickel - Total	1.28	J	1	0.393	2.73	50	mg/kg dry	EPA 6010C	
Phosphorus	140		1	3.2	8.7	NE	mg/kg dry	EPA 365.4	



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Client ID: SS-3 Lab ID: C413302-03

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Sulfate as SO4	40	J	1	31	55	250000	mg/kg dry	EPA 9056A	
Vanadium - Total	10.1	J	1	0.109	0.546	25	mg/kg dry	EPA 6010C	
Zinc - Total	7.12	J	1	1.20	2.73	10	mg/kg dry	EPA 6010C	



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ANALYTICAL RESULTS

Description: SS-1

Lab Sample ID: C413302-01

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:25

Work Order: C413302

Project: Edgecombe County Landfill

Sampled By: Client

% Solids: 82.9

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.0001	U	mg/kg dry	1	0.0001	0.0008	5	EPA 8260B	10/17/14 10:07	MSZ	
1,1,1-Trichloroethane [71-55-6] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	3	EPA 8260B	10/17/14 10:07	MSZ	
1,1,2-Trichloroethane [79-00-5] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
1,1-Dichloroethane [75-34-3] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	5	EPA 8260B	10/17/14 10:07	MSZ	
1,1-Dichloroethene [75-35-4] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	5	EPA 8260B	10/17/14 10:07	MSZ	
1,2,3-Trichloropropane [96-18-4] ^	0.0005	U	mg/kg dry	1	0.0005	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.0006	U	mg/kg dry	1	0.0006	0.0008	13	EPA 8260B	10/17/14 10:07	MSZ	
1,2-Dibromoethane [106-93-4] ^	0.0004	U	mg/kg dry	1	0.0004	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
1,2-Dichlorobenzene [95-50-1] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	5	EPA 8260B	10/17/14 10:07	MSZ	
1,2-Dichloroethane [107-06-2] ^	0.0003	U	mg/kg dry	1	0.0003	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
1,2-Dichloropropane [78-87-5] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
1,4-Dichlorobenzene [106-46-7] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
2-Butanone [78-93-3] ^	0.0006	U	mg/kg dry	1	0.0006	0.004	100	EPA 8260B	10/17/14 10:07	MSZ	
2-Hexanone [591-78-6] ^	0.0006	U	mg/kg dry	1	0.0006	0.004	50	EPA 8260B	10/17/14 10:07	MSZ	
4-Methyl-2-pentanone [108-10-1] ^	0.0005	U	mg/kg dry	1	0.0005	0.004	100	EPA 8260B	10/17/14 10:07	MSZ	
Acetone [67-64-1] ^	0.001	U	mg/kg dry	1	0.001	0.004	100	EPA 8260B	10/17/14 10:07	MSZ	
Acrylonitrile [107-13-1] ^	0.001	U	mg/kg dry	1	0.001	0.008	200	EPA 8260B	10/17/14 10:07	MSZ	
Benzene [71-43-2] ^	0.0001	U	mg/kg dry	1	0.0001	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
Bromochloromethane [74-97-5] ^	0.0003	U	mg/kg dry	1	0.0003	0.0008	3	EPA 8260B	10/17/14 10:07	MSZ	
Bromodichloromethane [75-27-4] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
Bromoform [75-25-2] ^	0.0004	U	mg/kg dry	1	0.0004	0.0008	3	EPA 8260B	10/17/14 10:07	MSZ	
Bromomethane [74-83-9] ^	0.0003	U	mg/kg dry	1	0.0003	0.0008	10	EPA 8260B	10/17/14 10:07	MSZ	
Carbon disulfide [75-15-0] ^	0.0003	U	mg/kg dry	1	0.0003	0.004	100	EPA 8260B	10/17/14 10:07	MSZ	
Carbon tetrachloride [56-23-5] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
Chlorobenzene [108-90-7] ^	0.0001	U	mg/kg dry	1	0.0001	0.0008	3	EPA 8260B	10/17/14 10:07	MSZ	
Chloroethane [75-00-3] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	10	EPA 8260B	10/17/14 10:07	MSZ	
Chloroform [67-66-3] ^	0.0001	U	mg/kg dry	1	0.0001	0.0008	5	EPA 8260B	10/17/14 10:07	MSZ	
Chloromethane [74-87-3] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
cis-1,2-Dichloroethene [156-59-2] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	5	EPA 8260B	10/17/14 10:07	MSZ	
cis-1,3-Dichloropropene [10061-01-5] ^	0.0001	U	mg/kg dry	1	0.0001	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
Dibromochloromethane [124-48-1] ^	0.0003	U	mg/kg dry	1	0.0003	0.0008	3	EPA 8260B	10/17/14 10:07	MSZ	
Dibromomethane [74-95-3] ^	0.0003	U	mg/kg dry	1	0.0003	0.0008	10	EPA 8260B	10/17/14 10:07	MSZ	
Ethylbenzene [100-41-4] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
Iodomethane [74-88-4] ^	0.0004	U	mg/kg dry	1	0.0004	0.004	10	EPA 8260B	10/17/14 10:07	MSZ	
m,p-Xylenes [108-38-3/106-42-3] ^	0.0003	U	mg/kg dry	1	0.0003	0.002	NE	EPA 8260B	10/17/14 10:07	MSZ	
Methylene chloride [75-09-2] ^	0.0006	U	mg/kg dry	1	0.0006	0.002	1	EPA 8260B	10/17/14 10:07	MSZ	
o-Xylene [95-47-6] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	NE	EPA 8260B	10/17/14 10:07	MSZ	
Styrene [100-42-5] ^	0.0008	U	mg/kg dry	1	0.0008	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
Tetrachloroethene [127-18-4] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
Toluene [108-88-3] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
trans-1,2-Dichloroethene [156-60-5] ^	0.0003	U	mg/kg dry	1	0.0003	0.0008	5	EPA 8260B	10/17/14 10:07	MSZ	
trans-1,3-Dichloropropene [10061-02-6] ^	0.0003	U	mg/kg dry	1	0.0003	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	



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Description: SS-1

Lab Sample ID: C413302-01

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:25

Work Order: C413302

Project: Edgecombe County Landfill

Sampled By: Client

% Solids: 82.9

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.0003	U	mg/kg dry	1	0.0003	0.0008	100	EPA 8260B	10/17/14 10:07	MSZ	
Trichloroethene [79-01-6] ^	0.0003	U	mg/kg dry	1	0.0003	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
Trichlorofluoromethane [75-69-4] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
Vinyl acetate [108-05-4] ^	0.0004	U	mg/kg dry	1	0.0004	0.004	50	EPA 8260B	10/17/14 10:07	MSZ	
Vinyl chloride [75-01-4] ^	0.0002	U	mg/kg dry	1	0.0002	0.0008	1	EPA 8260B	10/17/14 10:07	MSZ	
Xylenes (Total) [1330-20-7] ^	0.0005	U	mg/kg dry	1	0.0005	0.002	5	EPA 8260B	10/17/14 10:07	MSZ	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	33	1	50.0	67 %	50-127	4J16044	EPA 8260B	10/17/14 10:07	MSZ	
Dibromofluoromethane	41	1	50.0	82 %	52-128	4J16044	EPA 8260B	10/17/14 10:07	MSZ	
Toluene-d8	39	1	50.0	77 %	57-124	4J16044	EPA 8260B	10/17/14 10:07	MSZ	



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Description: SS-1

Lab Sample ID: C413302-01

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:25

Work Order: C413302

Project: Edgecombe County Landfill

Sampled By: Client

% Solids: 82.9

Metals by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Antimony [7440-36-0] ^	0.248	J	mg/kg dry	1	0.133	1.21	6	EPA 6010C	10/16/14 13:31	JDH	
Arsenic [7440-38-2] ^	1.39	J	mg/kg dry	1	0.121	0.603	10	EPA 6010C	10/16/14 13:31	JDH	
Barium [7440-39-3] ^	20.0	J	mg/kg dry	1	0.121	0.603	100	EPA 6010C	10/16/14 13:31	JDH	
Beryllium [7440-41-7] ^	0.191	J	mg/kg dry	1	0.0145	0.0603	1	EPA 6010C	10/16/14 13:31	JDH	
Cadmium [7440-43-9] ^	0.0116	U	mg/kg dry	1	0.0116	0.0603	1	EPA 6010C	10/16/14 13:31	JDH	
Chromium [7440-47-3] ^	8.05	J	mg/kg dry	1	0.121	0.603	10	EPA 6010C	10/16/14 13:31	JDH	
Cobalt [7440-48-4] ^	1.02	J	mg/kg dry	1	0.121	0.603	10	EPA 6010C	10/16/14 13:31	JDH	
Copper [7440-50-8] ^	1.69	J	mg/kg dry	1	0.229	0.603	10	EPA 6010C	10/16/14 13:31	JDH	
Lead [7439-92-1] ^	5.55	J	mg/kg dry	1	0.145	0.603	10	EPA 6010C	10/16/14 13:31	JDH	
Nickel [7440-02-0] ^	1.91	J	mg/kg dry	1	0.434	3.02	50	EPA 6010C	10/16/14 13:31	JDH	
Selenium [7782-49-2] ^	0.121	U	mg/kg dry	1	0.121	0.603	10	EPA 6010C	10/16/14 13:31	JDH	
Silver [7440-22-4] ^	0.121	U	mg/kg dry	1	0.121	0.603	10	EPA 6010C	10/16/14 13:31	JDH	
Thallium [7440-28-0] ^	0.121	U	mg/kg dry	1	0.121	0.603	5.5	EPA 6010C	10/16/14 13:31	JDH	
Vanadium [7440-62-2] ^	14.7	J	mg/kg dry	1	0.121	0.603	25	EPA 6010C	10/16/14 13:31	JDH	
Zinc [7440-66-6] ^	7.38	J	mg/kg dry	1	1.33	3.02	10	EPA 6010C	10/16/14 13:31	JDH	



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Description: SS-1

Lab Sample ID: C413302-01

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:25

Work Order: C413302

Project: Edgecombe County Landfill

Sampled By: Client

% Solids: 82.9

Classical Chemistry Parameters

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>MRL</u>	<u>NC SWSL</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Chemical Oxygen Demand	480		mg/kg dry	1	120	120	NE	SM 5220D-1997	10/20/14 17:21	JOC	
pH	5.3		pH Units	1	1.0	1.0		EPA 9045D	10/15/14 11:54	SHA	Q
Phosphorus [7723-14-0]	160		mg/kg dry	1	3.5	9.6	NE	EPA 365.4	10/27/14 12:18	civ	
Sulfate as SO4 [14808-79-8]	67	J	mg/kg dry	1	35	60	250000	EPA 9056A	10/15/14 23:29	AJB	

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Description: SS-2

Lab Sample ID: C413302-02

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:40

Work Order: C413302

Project: Edgcombe County Landfill

Sampled By: Client

% Solids: 86.1

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Table with 11 columns: Analyte [CAS Number], Results, Flag, Units, DF, MDL, MRL, NC SWSL, Method, Analyzed, By, Notes. It lists various chemical compounds and their detection results.



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Description: SS-2

Lab Sample ID: C413302-02

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:40

Work Order: C413302

Project: Edgcombe County Landfill

Sampled By: Client

% Solids: 86.1

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>MRL</u>	<u>NC SWSL</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Vinyl acetate [108-05-4] ^	0.0005	U	mg/kg dry	1	0.0005	0.005	50	EPA 8260B	10/17/14 10:38	MSZ	
Vinyl chloride [75-01-4] ^	0.0002	U	mg/kg dry	1	0.0002	0.001	1	EPA 8260B	10/17/14 10:38	MSZ	
Xylenes (Total) [1330-20-7] ^	0.0006	U	mg/kg dry	1	0.0006	0.003	5	EPA 8260B	10/17/14 10:38	MSZ	

<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
4-Bromofluorobenzene	33	1	50.0	67 %	50-127	4J16044	EPA 8260B	10/17/14 10:38	MSZ	
Dibromofluoromethane	39	1	50.0	77 %	52-128	4J16044	EPA 8260B	10/17/14 10:38	MSZ	
Toluene-d8	38	1	50.0	77 %	57-124	4J16044	EPA 8260B	10/17/14 10:38	MSZ	



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Description: SS-2

Lab Sample ID: C413302-02

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:40

Work Order: C413302

Project: Edgecombe County Landfill

Sampled By: Client

% Solids: 86.1

Metals by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Antimony [7440-36-0] ^	1.83	JD	mg/kg dry	2	0.255	2.32	6	EPA 6010C	10/16/14 13:57	JDH	R-05
Arsenic [7440-38-2] ^	19.1	D	mg/kg dry	2	0.232	1.16	10	EPA 6010C	10/16/14 13:57	JDH	R-05
Barium [7440-39-3] ^	11.4	JD	mg/kg dry	2	0.232	1.16	100	EPA 6010C	10/16/14 13:57	JDH	R-05
Beryllium [7440-41-7] ^	0.346	JD	mg/kg dry	2	0.0279	0.116	1	EPA 6010C	10/16/14 13:57	JDH	R-05
Cadmium [7440-43-9] ^	0.0223	UD	mg/kg dry	2	0.0223	0.116	1	EPA 6010C	10/16/14 13:57	JDH	R-05
Chromium [7440-47-3] ^	22.8	D	mg/kg dry	2	0.232	1.16	10	EPA 6010C	10/16/14 13:57	JDH	R-05
Cobalt [7440-48-4] ^	0.890	JD	mg/kg dry	2	0.232	1.16	10	EPA 6010C	10/16/14 13:57	JDH	R-05
Copper [7440-50-8] ^	3.26	JD	mg/kg dry	2	0.441	1.16	10	EPA 6010C	10/16/14 13:57	JDH	R-05
Lead [7439-92-1] ^	4.95	JD	mg/kg dry	2	0.279	1.16	10	EPA 6010C	10/16/14 13:57	JDH	R-05
Nickel [7440-02-0] ^	0.836	UD	mg/kg dry	2	0.836	5.81	50	EPA 6010C	10/16/14 13:57	JDH	R-05
Selenium [7782-49-2] ^	0.232	UD	mg/kg dry	2	0.232	1.16	10	EPA 6010C	10/16/14 13:57	JDH	R-05
Silver [7440-22-4] ^	0.232	UD	mg/kg dry	2	0.232	1.16	10	EPA 6010C	10/16/14 13:57	JDH	R-05
Thallium [7440-28-0] ^	0.232	UD	mg/kg dry	2	0.232	1.16	5.5	EPA 6010C	10/16/14 13:57	JDH	R-05
Vanadium [7440-62-2] ^	45.0	D	mg/kg dry	2	0.232	1.16	25	EPA 6010C	10/16/14 13:57	JDH	R-05
Zinc [7440-66-6] ^	6.90	JD	mg/kg dry	2	2.55	5.81	10	EPA 6010C	10/16/14 13:57	JDH	R-05



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Description: SS-2

Lab Sample ID: C413302-02

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:40

Work Order: C413302

Project: Edgecombe County Landfill

Sampled By: Client

% Solids: 86.1

Classical Chemistry Parameters

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>MRL</u>	<u>NC SWSL</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Chemical Oxygen Demand	560		mg/kg dry	1	120	120	NE	SM 5220D-1997	10/20/14 17:21	JOC	
pH	7.0		pH Units	1	1.0	1.0		EPA 9045D	10/15/14 11:54	SHA	Q
Phosphorus [7723-14-0]	240		mg/kg dry	1	3.4	9.3	NE	EPA 365.4	10/27/14 12:22	civ	
Sulfate as SO4 [14808-79-8]	140	J	mg/kg dry	1	33	58	250000	EPA 9056A	10/15/14 23:46	AJB	

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Description: SS-3

Lab Sample ID: C413302-03

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:55

Work Order: C413302

Project: Edgcombe County Landfill

Sampled By: Client

% Solids: 91.6

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Table with 11 columns: Analyte [CAS Number], Results, Flag, Units, DF, MDL, MRL, NC SWSL, Method, Analyzed, By, Notes. It lists various chemical compounds and their corresponding analytical data.



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Description: SS-3

Lab Sample ID: C413302-03

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:55

Work Order: C413302

Project: Edgecombe County Landfill

Sampled By: Client

% Solids: 91.6

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>MRL</u>	<u>NC SWSL</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Vinyl acetate [108-05-4] ^	0.0004	U	mg/kg dry	1	0.0004	0.005	50	EPA 8260B	10/17/14 11:08	MSZ	
Vinyl chloride [75-01-4] ^	0.0002	U	mg/kg dry	1	0.0002	0.0009	1	EPA 8260B	10/17/14 11:08	MSZ	
Xylenes (Total) [1330-20-7] ^	0.0005	U	mg/kg dry	1	0.0005	0.003	5	EPA 8260B	10/17/14 11:08	MSZ	

<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
4-Bromofluorobenzene	35	1	50.0	70 %	50-127	4J16044	EPA 8260B	10/17/14 11:08	MSZ	
Dibromofluoromethane	40	1	50.0	80 %	52-128	4J16044	EPA 8260B	10/17/14 11:08	MSZ	
Toluene-d8	38	1	50.0	76 %	57-124	4J16044	EPA 8260B	10/17/14 11:08	MSZ	



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Description: SS-3

Lab Sample ID: C413302-03

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:55

Work Order: C413302

Project: Edgecombe County Landfill

Sampled By: Client

% Solids: 91.6

Metals by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Antimony [7440-36-0] ^	0.392	J	mg/kg dry	1	0.120	1.09	6	EPA 6010C	10/16/14 13:47	JDH	
Arsenic [7440-38-2] ^	1.68	J	mg/kg dry	1	0.109	0.546	10	EPA 6010C	10/16/14 13:47	JDH	
Barium [7440-39-3] ^	13.8	J	mg/kg dry	1	0.109	0.546	100	EPA 6010C	10/16/14 13:47	JDH	
Beryllium [7440-41-7] ^	0.0359	J	mg/kg dry	1	0.0131	0.0546	1	EPA 6010C	10/16/14 13:47	JDH	
Cadmium [7440-43-9] ^	0.0454	J	mg/kg dry	1	0.0105	0.0546	1	EPA 6010C	10/16/14 13:47	JDH	
Chromium [7440-47-3] ^	5.73	J	mg/kg dry	1	0.109	0.546	10	EPA 6010C	10/16/14 13:47	JDH	
Cobalt [7440-48-4] ^	0.528	J	mg/kg dry	1	0.109	0.546	10	EPA 6010C	10/16/14 13:47	JDH	
Copper [7440-50-8] ^	1.38	J	mg/kg dry	1	0.208	0.546	10	EPA 6010C	10/16/14 13:47	JDH	
Lead [7439-92-1] ^	6.10	J	mg/kg dry	1	0.131	0.546	10	EPA 6010C	10/16/14 13:47	JDH	
Nickel [7440-02-0] ^	1.28	J	mg/kg dry	1	0.393	2.73	50	EPA 6010C	10/16/14 13:47	JDH	
Selenium [7782-49-2] ^	0.109	U	mg/kg dry	1	0.109	0.546	10	EPA 6010C	10/16/14 13:47	JDH	
Silver [7440-22-4] ^	0.109	U	mg/kg dry	1	0.109	0.546	10	EPA 6010C	10/16/14 13:47	JDH	
Thallium [7440-28-0] ^	0.109	U	mg/kg dry	1	0.109	0.546	5.5	EPA 6010C	10/16/14 13:47	JDH	
Vanadium [7440-62-2] ^	10.1	J	mg/kg dry	1	0.109	0.546	25	EPA 6010C	10/16/14 13:47	JDH	
Zinc [7440-66-6] ^	7.12	J	mg/kg dry	1	1.20	2.73	10	EPA 6010C	10/16/14 13:47	JDH	



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Description: SS-3

Lab Sample ID: C413302-03

Received: 10/13/14 12:15

Matrix: Soil

Sampled: 10/10/14 11:55

Work Order: C413302

Project: Edgecombe County Landfill

Sampled By: Client

% Solids: 91.6

Classical Chemistry Parameters

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>MRL</u>	<u>NC SWSL</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Chemical Oxygen Demand	1500		mg/kg dry	1	110	110	NE	SM 5220D-1997	10/20/14 17:21	JOC	
pH	5.3		pH Units	1	1.0	1.0		EPA 9045D	10/15/14 11:54	SHA	Q
Phosphorus [7723-14-0]	140		mg/kg dry	1	3.2	8.7	NE	EPA 365.4	10/27/14 12:23	c1v	
Sulfate as SO4 [14808-79-8]	40	J	mg/kg dry	1	31	55	250000	EPA 9056A	10/16/14 00:03	AJB	

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QUALITY CONTROL

Volatiles Organic Compounds by GCMS - Quality Control

Batch 4J16044 - EPA 5030B_MS

Blank (4J16044-BLK1)

Prepared: 10/16/2014 15:27 Analyzed: 10/17/2014 04:06

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	0.0002	U	0.001	mg/kg wet							
1,1,1-Trichloroethane	0.0002	U	0.001	mg/kg wet							
1,1,2,2-Tetrachloroethane	0.0002	U	0.001	mg/kg wet							
1,1,2-Trichloroethane	0.0002	U	0.001	mg/kg wet							
1,1-Dichloroethane	0.0002	U	0.001	mg/kg wet							
1,1-Dichloroethene	0.0003	U	0.001	mg/kg wet							
1,2,3-Trichloropropane	0.0006	U	0.001	mg/kg wet							
1,2-Dibromo-3-chloropropane	0.0008	U	0.001	mg/kg wet							
1,2-Dibromoethane	0.0005	U	0.001	mg/kg wet							
1,2-Dichlorobenzene	0.0003	U	0.001	mg/kg wet							
1,2-Dichloroethane	0.0004	U	0.001	mg/kg wet							
1,2-Dichloropropane	0.0003	U	0.001	mg/kg wet							
1,4-Dichlorobenzene	0.0002	U	0.001	mg/kg wet							
2-Butanone	0.0008	U	0.005	mg/kg wet							
2-Hexanone	0.0008	U	0.005	mg/kg wet							
4-Methyl-2-pentanone	0.0006	U	0.005	mg/kg wet							
Acetone	0.001	U	0.005	mg/kg wet							
Acrylonitrile	0.002	U	0.010	mg/kg wet							
Benzene	0.0002	U	0.001	mg/kg wet							
Bromochloromethane	0.0004	U	0.001	mg/kg wet							
Bromodichloromethane	0.0002	U	0.001	mg/kg wet							
Bromoform	0.0004	U	0.001	mg/kg wet							
Bromomethane	0.0003	U	0.001	mg/kg wet							
Carbon disulfide	0.0004	U	0.005	mg/kg wet							
Carbon tetrachloride	0.0002	U	0.001	mg/kg wet							
Chlorobenzene	0.0002	U	0.001	mg/kg wet							
Chloroethane	0.0002	U	0.001	mg/kg wet							
Chloroform	0.0002	U	0.001	mg/kg wet							
Chloromethane	0.0002	U	0.001	mg/kg wet							
cis-1,2-Dichloroethene	0.0002	U	0.001	mg/kg wet							
cis-1,3-Dichloropropene	0.0002	U	0.001	mg/kg wet							
Dibromochloromethane	0.0004	U	0.001	mg/kg wet							
Dibromomethane	0.0003	U	0.001	mg/kg wet							
Ethylbenzene	0.0002	U	0.001	mg/kg wet							
Iodomethane	0.0004	U	0.005	mg/kg wet							
m,p-Xylenes	0.0004	U	0.002	mg/kg wet							
Methylene chloride	0.0007	U	0.002	mg/kg wet							
o-Xylene	0.0002	U	0.001	mg/kg wet							
Styrene	0.001	U	0.001	mg/kg wet							
Tetrachloroethene	0.0003	U	0.001	mg/kg wet							
Toluene	0.0002	U	0.001	mg/kg wet							
trans-1,2-Dichloroethene	0.0004	U	0.001	mg/kg wet							
trans-1,3-Dichloropropene	0.0004	U	0.001	mg/kg wet							
trans-1,4-Dichloro-2-butene	0.0004	U	0.001	mg/kg wet							
Trichloroethene	0.0003	U	0.001	mg/kg wet							
Trichlorofluoromethane	0.0003	U	0.001	mg/kg wet							
Vinyl acetate	0.0005	U	0.005	mg/kg wet							
Vinyl chloride	0.0002	U	0.001	mg/kg wet							
Xylenes (Total)	0.0006	U	0.003	mg/kg wet							



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QUALITY CONTROL**Volatile Organic Compounds by GCMS - Quality Control**

Batch 4J16044 - EPA 5030B_MS

Blank (4J16044-BLK1) Continued

Prepared: 10/16/2014 15:27 Analyzed: 10/17/2014 04:06

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Surrogate: 4-Bromofluorobenzene	34			ug/L	50.0		68	50-127			
Surrogate: Dibromofluoromethane	38			ug/L	50.0		75	52-128			
Surrogate: Toluene-d8	37			ug/L	50.0		75	57-124			

LCS (4J16044-BS1)

Prepared: 10/16/2014 15:27 Analyzed: 10/17/2014 02:36

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	0.020		0.001	mg/kg wet	0.0200		102	64-133			
Benzene	0.019		0.001	mg/kg wet	0.0200		96	79-129			
Chlorobenzene	0.018		0.001	mg/kg wet	0.0200		88	79-121			
Toluene	0.019		0.001	mg/kg wet	0.0200		95	77-120			
Trichloroethene	0.018		0.001	mg/kg wet	0.0200		92	78-118			
Surrogate: 4-Bromofluorobenzene	36			ug/L	50.0		72	50-127			
Surrogate: Dibromofluoromethane	39			ug/L	50.0		77	52-128			
Surrogate: Toluene-d8	37			ug/L	50.0		74	57-124			

Matrix Spike (4J16044-MS1)

Prepared: 10/16/2014 15:27 Analyzed: 10/17/2014 03:06

Source: C413672-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	0.020		0.001	mg/kg wet	0.0200	0.0003 U	99	64-133			
Benzene	0.019		0.001	mg/kg wet	0.0200	0.0002 U	95	79-129			
Chlorobenzene	0.017		0.001	mg/kg wet	0.0200	0.0002 U	87	79-121			
Toluene	0.019		0.001	mg/kg wet	0.0200	0.0002 U	94	77-120			
Trichloroethene	0.018		0.001	mg/kg wet	0.0200	0.0003 U	91	78-118			
Surrogate: 4-Bromofluorobenzene	35			ug/L	50.0		70	50-127			
Surrogate: Dibromofluoromethane	39			ug/L	50.0		77	52-128			
Surrogate: Toluene-d8	38			ug/L	50.0		75	57-124			

Matrix Spike Dup (4J16044-MSD1)

Prepared: 10/16/2014 15:27 Analyzed: 10/17/2014 03:36

Source: C413672-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	0.018		0.001	mg/kg wet	0.0200	0.0003 U	90	64-133	9	23	
Benzene	0.017		0.001	mg/kg wet	0.0200	0.0002 U	87	79-129	8	23	
Chlorobenzene	0.016		0.001	mg/kg wet	0.0200	0.0002 U	81	79-121	7	25	
Toluene	0.017		0.001	mg/kg wet	0.0200	0.0002 U	87	77-120	8	23	
Trichloroethene	0.017		0.001	mg/kg wet	0.0200	0.0003 U	84	78-118	8	24	
Surrogate: 4-Bromofluorobenzene	35			ug/L	50.0		71	50-127			
Surrogate: Dibromofluoromethane	38			ug/L	50.0		76	52-128			
Surrogate: Toluene-d8	37			ug/L	50.0		74	57-124			

Metals by EPA 6000/7000 Series Methods - Quality Control

Batch 4J15021 - EPA 3050B

Blank (4J15021-BLK1)

Prepared: 10/15/2014 10:56 Analyzed: 10/16/2014 13:25



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QUALITY CONTROL

Metals by EPA 6000/7000 Series Methods - Quality Control

Batch 4J15021 - EPA 3050B

Blank (4J15021-BLK1) Continued

Prepared: 10/15/2014 10:56 Analyzed: 10/16/2014 13:25

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	0.110	U	1.00	mg/kg wet							
Arsenic	0.100	U	0.500	mg/kg wet							
Barium	0.100	U	0.500	mg/kg wet							
Beryllium	0.0120	U	0.0500	mg/kg wet							
Cadmium	0.00960	U	0.0500	mg/kg wet							
Chromium	0.100	U	0.500	mg/kg wet							
Cobalt	0.100	U	0.500	mg/kg wet							
Copper	0.190	U	0.500	mg/kg wet							
Lead	0.120	U	0.500	mg/kg wet							
Nickel	0.360	U	2.50	mg/kg wet							
Selenium	0.157	J	0.500	mg/kg wet							
Silver	0.100	U	0.500	mg/kg wet							
Thallium	0.100	U	0.500	mg/kg wet							
Vanadium	0.100	U	0.500	mg/kg wet							
Zinc	1.10	U	2.50	mg/kg wet							

LCS (4J15021-BS1)

Prepared: 10/15/2014 10:56 Analyzed: 10/16/2014 13:28

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	8.54		1.00	mg/kg wet	9.62		89	80-120			
Arsenic	8.45		0.500	mg/kg wet	9.62		88	80-120			
Barium	9.14		0.500	mg/kg wet	9.62		95	80-120			
Beryllium	0.899		0.0500	mg/kg wet	0.962		93	80-120			
Cadmium	0.915		0.0500	mg/kg wet	0.962		95	80-120			
Chromium	8.92		0.500	mg/kg wet	9.62		93	80-120			
Cobalt	9.12		0.500	mg/kg wet	9.62		95	80-120			
Copper	8.73		0.500	mg/kg wet	9.62		91	80-120			
Lead	8.85		0.500	mg/kg wet	9.62		92	80-120			
Nickel	9.22		2.50	mg/kg wet	9.62		96	80-120			
Selenium	8.65	B	0.500	mg/kg wet	9.62		90	80-120			
Silver	8.65		0.500	mg/kg wet	9.62		90	80-120			
Thallium	8.51		0.500	mg/kg wet	9.62		89	80-120			
Vanadium	8.62		0.500	mg/kg wet	9.62		90	80-120			
Zinc	9.58		2.50	mg/kg wet	9.62		100	80-120			

Matrix Spike (4J15021-MS1)

Prepared: 10/15/2014 10:56 Analyzed: 10/16/2014 13:33

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	6.06		1.21	mg/kg dry	11.9	0.248	49	75-125			QM-05
Arsenic	12.2		0.603	mg/kg dry	11.9	1.39	91	75-125			
Barium	27.0		0.603	mg/kg dry	11.9	20.0	59	75-125			QM-05
Beryllium	1.36		0.0603	mg/kg dry	1.19	0.191	98	75-125			
Cadmium	1.04		0.0603	mg/kg dry	1.19	0.0116 U	87	75-125			
Chromium	20.2		0.603	mg/kg dry	11.9	8.05	102	75-125			
Cobalt	12.5		0.603	mg/kg dry	11.9	1.02	96	75-125			
Copper	12.3		0.603	mg/kg dry	11.9	1.69	89	75-125			
Lead	17.6		0.603	mg/kg dry	11.9	5.55	101	75-125			



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QUALITY CONTROL**Metals by EPA 6000/7000 Series Methods - Quality Control**

Batch 4J15021 - EPA 3050B

Matrix Spike (4J15021-MS1) Continued

Prepared: 10/15/2014 10:56 Analyzed: 10/16/2014 13:33

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nickel	13.3		3.02	mg/kg dry	11.9	1.91	95	75-125			
Selenium	10.1	B	0.603	mg/kg dry	11.9	0.121 U	85	75-125			
Silver	10.1		0.603	mg/kg dry	11.9	0.121 U	84	75-125			
Thallium	10.3		0.603	mg/kg dry	11.9	0.121 U	86	75-125			
Vanadium	24.4		0.603	mg/kg dry	11.9	14.7	82	75-125			
Zinc	18.8		3.02	mg/kg dry	11.9	7.38	96	75-125			

Matrix Spike Dup (4J15021-MSD1)

Prepared: 10/15/2014 10:56 Analyzed: 10/16/2014 13:35

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	5.75		1.21	mg/kg dry	11.9	0.248	46	75-125	5	20	QM-05
Arsenic	13.0		0.603	mg/kg dry	11.9	1.39	97	75-125	6	20	
Barium	31.2		0.603	mg/kg dry	11.9	20.0	93	75-125	14	20	
Beryllium	1.37		0.0603	mg/kg dry	1.19	0.191	99	75-125	1	20	
Cadmium	1.15		0.0603	mg/kg dry	1.19	0.0116 U	96	75-125	10	20	
Chromium	21.8		0.603	mg/kg dry	11.9	8.05	115	75-125	7	20	
Cobalt	12.9		0.603	mg/kg dry	11.9	1.02	99	75-125	3	20	
Copper	13.3		0.603	mg/kg dry	11.9	1.69	97	75-125	8	20	
Lead	19.8		0.603	mg/kg dry	11.9	5.55	120	75-125	12	20	
Nickel	13.8		3.02	mg/kg dry	11.9	1.91	100	75-125	4	20	
Selenium	10.2	B	0.603	mg/kg dry	11.9	0.121 U	86	75-125	0.7	20	
Silver	10.5		0.603	mg/kg dry	11.9	0.121 U	88	75-125	4	20	
Thallium	10.3		0.603	mg/kg dry	11.9	0.121 U	86	75-125	0.2	20	
Vanadium	26.0		0.603	mg/kg dry	11.9	14.7	95	75-125	6	20	
Zinc	20.7		3.02	mg/kg dry	11.9	7.38	111	75-125	9	20	

Post Spike (4J15021-PS1)

Prepared: 10/15/2014 10:56 Analyzed: 10/16/2014 13:38

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	0.183		0.0200	mg/L	0.200	0.00419	89	80-120			
Arsenic	0.202		0.0100	mg/L	0.200	0.0236	89	80-120			
Barium	0.514		0.0100	mg/L	0.200	0.338	88	80-120			
Beryllium	0.0214		0.00100	mg/L	0.0200	0.00323	91	80-120			
Cadmium	0.0179		0.00100	mg/L	0.0200	-0.000433	90	80-120			
Chromium	0.318		0.0100	mg/L	0.200	0.136	91	80-120			
Cobalt	0.202		0.0100	mg/L	0.200	0.0173	93	80-120			
Copper	0.209		0.0100	mg/L	0.200	0.0286	90	80-120			
Lead	0.273		0.0100	mg/L	0.200	0.0938	89	80-120			
Nickel	0.221		0.0500	mg/L	0.200	0.0323	94	80-120			
Selenium	0.176	B	0.0100	mg/L	0.200	-0.00354	88	80-120			
Silver	0.173		0.0100	mg/L	0.200	-0.0105	86	80-120			
Thallium	0.170		0.0100	mg/L	0.200	-0.00990	85	80-120			
Vanadium	0.420		0.0100	mg/L	0.200	0.248	86	80-120			
Zinc	0.314		0.0500	mg/L	0.200	0.125	95	80-120			



QUALITY CONTROL

Metals by EPA 6000/7000 Series Methods - Quality Control

Batch 4J15021 - EPA 3050B

Classical Chemistry Parameters - Quality Control

Batch 4J15014 - Same

LCS (4J15014-BS1)

Prepared & Analyzed: 10/15/2014 11:54

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
pH	7.0		1.0	pH Units	6.99		100	99-101			

Duplicate (4J15014-DUP1)

Prepared: 10/15/2014 10:29 Analyzed: 10/15/2014 11:54

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
pH	5.3		1.0	pH Units		5.3			0.6	25	

Batch 4J15023 - WETS-88 Soil Leaching

Blank (4J15023-BLK1)

Prepared: 10/15/2014 11:56 Analyzed: 10/15/2014 22:21

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Sulfate as SO4	29	U	50	mg/kg wet							

LCS (4J15023-BS1)

Prepared: 10/15/2014 11:56 Analyzed: 10/15/2014 22:38

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Sulfate as SO4	450		50	mg/kg wet	494		91	80-120			

Matrix Spike (4J15023-MS1)

Prepared: 10/15/2014 11:56 Analyzed: 10/15/2014 22:55

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Sulfate as SO4	240		53	mg/kg dry	214	67	81	80-120			

Matrix Spike Dup (4J15023-MSD1)

Prepared: 10/15/2014 11:56 Analyzed: 10/15/2014 23:12

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Sulfate as SO4	260		60	mg/kg dry	227	67	85	80-120	8	15	

Batch 4J20010 - WETS-88 Soil Leaching

Blank (4J20010-BLK1)

Prepared: 10/20/2014 11:35 Analyzed: 10/20/2014 17:21

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	100	U	100	mg/kg wet							

LCS (4J20010-BS1)

Prepared: 10/20/2014 11:35 Analyzed: 10/20/2014 17:21

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	5000		100	mg/kg wet	4990		99	90-110			



QUALITY CONTROL

Classical Chemistry Parameters - Quality Control

Batch 4J20010 - WETS-88 Soil Leaching

Matrix Spike (4J20010-MS1)

Prepared: 10/20/2014 11:35 Analyzed: 10/20/2014 17:21

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	5900		120	mg/kg dry	6020	480	91	90-110			

Matrix Spike Dup (4J20010-MSD1)

Prepared: 10/20/2014 11:35 Analyzed: 10/20/2014 17:21

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	6200		120	mg/kg dry	6030	480	95	90-110	5	10	

Batch 4J24004 - Same

Blank (4J24004-BLK1)

Prepared: 10/24/2014 11:03 Analyzed: 10/27/2014 12:15

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	2.9	U	8.0	mg/kg wet							

LCS (4J24004-BS1)

Prepared: 10/24/2014 11:03 Analyzed: 10/27/2014 12:17

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	120		8.0	mg/kg wet	124		97	80-120			

Matrix Spike (4J24004-MS1)

Prepared: 10/24/2014 11:03 Analyzed: 10/27/2014 12:19

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	220		9.6	mg/kg dry	59.3	160	89	80-120			

Matrix Spike Dup (4J24004-MSD1)

Prepared: 10/24/2014 11:03 Analyzed: 10/27/2014 12:21

Source: C413302-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus	190		9.6	mg/kg dry	60.9	160	38	80-120	14	25	QM-05

FLAGS/NOTES AND DEFINITIONS

B	The analyte was detected in the associated method blank.
D	The sample was analyzed at dilution.
J	The reported value is between the laboratory method detection limit (MDL) and the laboratory method reporting limit (MRL), adjusted for actual sample preparation data and moisture content, where applicable.
U	The analyte was analyzed for but not detected to the level shown, adjusted for actual sample preparation data and moisture content, where applicable.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate.
MRL	Method Reporting Limit. The MRL is roughly equivalent to the practical quantitation limit (PQL) and is based on the low point of the calibration curve, when applicable, sample preparation factor, dilution factor, and, in the case of soil samples, moisture content.
Q	Analysis performed outside of method - specified holding time.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
R-05	The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.



ENVIRONMENTAL CONSERVATION LABORATORIES CHAIN-OF-CUSTODY RECORD

10775 Central Port Dr.
Orlando, FL 32824
(407) 826-5314 Fax (407) 850-6945

4810 Executive Park Court, Suite 111
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(904) 296-3007 Fax (904) 296-6210

102-A Woodwinds Industrial Ct.
Cary, NC 27511
(919) 467-3090 Fax (919) 467-3515

Client Name S&ME, Inc. (SM001)		Project Number 1054-13-280A		Requested Analyses						Requested Turnaround Times					
Address 3201 Spring Forest Road		Project Name/Desc Edgewcombe County Landfill		%SOMES/Ag/Ag, Ba, Be, Bi, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Se, Si, Sr, Zn SMC 2270 C: CULI.P. P: pH BOD5. Sb. Se. Surfact 8096A.TLV.Zn	8260B Appendix 1							Note : Rush requests subject to acceptance by the facility			
City/ST/Zip Raleigh, NC 27616		PO # / Billing Info										<input type="checkbox"/> Standard <input type="checkbox"/> Expedited Due ___/___/___			
Tel (919) 872-2660		Fax (919) 876-3958				Reporting Contact Gerald Paul								Lab Workorder 413553	
Sampler(s) Name, Affiliation (Print)		Billing Contact Accounts Payable												C413302	
Sampler(s) Signature		Site Location / Time Zone													

Item #	Sample ID (Field Identification)	Collection Date	Collection Time	Comp / Grab	Matrix (see codes)	Total # of Containers	Preservation (See Codes) (Combine as necessary)						Sample Comments	
	SS-1	10/10/14	11:25	Grab	SO	5	X	X						
	SS-2	10/10/14	11:40	↓	SO	5	X	X						
	SS-3	10/10/14	11:55	↓	SO	5	X	X						
	Trip Blank				WA	2			X					

Sample Kit Prepared By	Date/Time	Relinquished By <i>[Signature]</i>	Date/Time 10/10/14 16:30	Received By <i>[Signature]</i>	Date/Time 10/13/14 1130
Comments/Special Reporting Requirements		Relinquished By	Date/Time	Received By	Date/Time
		Relinquished By	Date/Time	Received By <i>[Signature]</i>	Date/Time 10/13/14 1215
	Cooler #'s & Temps on Receipt 3.1°C	Condition Upon Receipt <input checked="" type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable			

Matrix : GW-Groundwater SO-Soil DW-Drinking Water SE-Sediment SW-Surface Water WW-Wastewater A-Air O-Other (detail in comments) Preservation: I-Ice H-HCl N-HNO3 S-H2SO4 NO-NaOH O-Other (detail in comments)
 Note : All samples submitted to ENCO Labs are in accordance with the terms and conditions listed on the reverse of this form, unless prior written agreements exist

APPENDIX IV

**Alternative Source Demonstration Report dated June 10, 2008
prepared by S&ME, Inc.**

**ALTERNATE SOURCE DEMONSTRATION
REPORT**

Edgecombe County Landfill
(Permit #33-01)
Tarboro, North Carolina
S&ME Project No. 1054-07-241

Prepared for:
Edgecombe County
P.O. Box 10
Tarboro, North Carolina 27886

Prepared by:



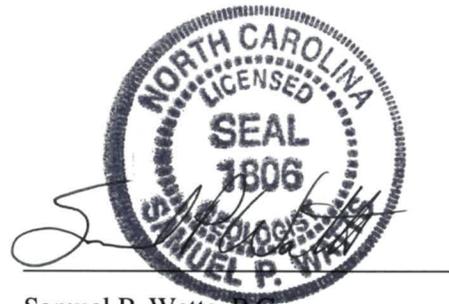
S&ME, Inc.
3201 Spring Forest Road,
Raleigh, North Carolina 27616

June 10, 2008



Connel D. Ware
Project Professional

TR



Samuel P. Watts, P.G.
Senior Project Manager
NC Licensed Geologist No. 1806

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Table 2:	Historical Monitor Well and Piezometer Groundwater Quality Data

FIGURES:

Figure 1:	Site Map – Showing Sample Locations
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ATTACHMENT A:	Alternate Source Demonstration, Laboratory Analytical Results Report
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1.0 INTRODUCTION

1.1 Purpose

This Alternate Source Demonstration (ASD) was performed in response to the inorganic constituent lead being detected at a concentration in exceedance of the groundwater protection standard established by 15A North Carolina Administrative Code (NCAC), Subchapter 2L (2L Standards) in compliance groundwater monitoring well MW-7A at the Edgecombe County Landfill in Tarboro, NC. Additionally, cobalt, thallium, and vanadium which do not have a designated 2L Standard, have been reported at concentrations in exceedance of their respective North Carolina Department of the Environment and Natural Resources (NCDENR) Division of Waste Management's Groundwater Protection Standard (GWPST) in several monitoring wells.

For completeness, efficiency, and because additional metals may be detected in the future which are not currently an issue, the ASD included the entire Appendix I metals suite. The ASD attempts to demonstrate that many of the Appendix I metals are naturally occurring at the site and that the levels of these naturally occurring metals in groundwater quality results reported in the wells are due to influence from the natural occurrence of these metals in the overlying in-situ soil in the vicinity of the affected wells.

1.2 Location

The Edgecombe County Landfill is a Solid Waste Management Facility located at 2872 Colonial Road in Edgecombe County, south of Tarboro, North Carolina.

The landfill is accessed off Colonial Road, and consists of a construction and demolition (C&D) landfill operated on top of a closed municipal solid waste (MSW) landfill regulated under Permit #33-01. The facility is bounded by woodlands to the east, west, and south. Some residential single-family homes are located to the north and east. Jerry's Creek runs along the northern property boundary of the facility. A former landfill, which received waste from 1973-1979, is located adjacent to the active facility, just north of Jerry's Creek. **Figure 1** is a site map of the facility showing the location of the active C&D landfill in relation to the other components of the facility.

1.3 Background

S&ME provides Edgecombe County with environmental engineering services to meet reporting requirements for groundwater, surface water, and methane at the facility as required by the North Carolina Solid Waste Management Rules (15A NCAC 13B). Groundwater has been monitored at the landfill since 1994 in accordance with the facility's *Water Quality Monitoring Plan* (WQMP), dated September 1994. According to section .1634(a) of the Solid Waste Management Rules (15A NCAC 13B), due to monitored constituents detected in compliance groundwater monitoring samples at concentrations above the North Carolina groundwater quality standards, the landfill is currently

monitoring groundwater under the Assessment Monitoring program per 15A NCAC 13B.1636. S&ME is also assisting the county with assessing the nature and extent of groundwater contamination in the vicinity of the landfill.

On March 31, 1999, on behalf of Edgecombe County, S&ME submitted a *Work Plan for Groundwater Assessment – Edgecombe County Landfill* (Work Plan) to the Solid Waste Section (Section) of the NCDENR. The section approved the Work Plan, with comments, on May 10, 1999. Using the revised Work Plan, the County began to assess potential impacts to groundwater quality from the landfill. Since the county began to assess the nature and extent of contamination at the landfill, there have been several significant changes at the facility. Significant changes to the landfill have included: closure of the MSW landfill (1997-1999); Hurricane Floyd (1999); a revision to the WQMP groundwater sampling and analysis plan (1998), revisions to the surface water locations and monitor wells included in the water quality monitoring network (1998-2002). These events so altered the water quality observed at the facility that a re-evaluation of the site-wide water quality was performed. The results of a baseline statistical re-evaluation were reported to DENR in S&ME's report titled *January 2003 Semi-Annual Sampling/Baseline Statistical Analysis*, dated August 19, 2003. These findings indicated a release of Appendix I constituents in the area of MW-5, however, there was no statistical evidence of a release of any Appendix II constituents. Assessment monitoring continues to be conducted at the landfill.

As part of the Assessment Monitoring Program, compliance groundwater samples are analyzed for the North Carolina Appendix I metals suite. During the January 2008 groundwater monitoring event, the metal lead was detected in the groundwater sample from monitor well MW-7A at a reported concentration of 0.046 mg/L which exceeds the 2L Standard for lead of 0.015 mg/L. Additionally, three metals for which there is no corresponding 2L Standard (cobalt, thallium, and, vanadium) were detected above their GWPST during the four most recent groundwater monitoring events (July 2006, January 2007, June 2007, and January 2008). In order to examine if naturally occurring metals concentrations within the in-situ native soils onsite could be influencing groundwater quality, this Alternate Source Demonstration (ASD) for metals was undertaken.

In order to complete this ASD, in-situ soils within the boundaries of the permitted landfill property were sampled and analyzed for the full Appendix I metals suite. Next, a Dilution Attenuation Factor (DAF) was calculated for each metal based on the average concentration of the particular metal within the in-situ soils of the landfill, following the Environmental Protection Agency (EPA) *Soil Screening Guidance: Technical Background Document*, Second Edition, United States Environmental Protection Agency, EPA/540/R95/128, May 1996 (*Soil Screening Guidance 2*). Then the historical groundwater analytical data from the four most recent groundwater monitoring events were compared to the expected concentrations of the Appendix I metals based on the DAF computations.

This Alternate Source Demonstration was prepared for, and included the closed MSW landfill (Permit #33-01) south of Jerry's Creek and the active C&D landfill (Permit #33-01) located on top of the closed MSW landfill.

2.0 GEOLOGY & HYDROGEOLOGY

2.1 Regional Geology

Edgecombe County lies within the Coastal Plain Physiographic Province of North Carolina. The Coastal Plain province is characterized by subdued topographic features and flat low-lying terrain. Literature suggests that the Coastal Plain geologic region was formed during past transgressive and regressive movements of the oceans into and out of North Carolina. These sedimentary deposits were deposited under mostly marine and near marine conditions, and rest on a foundation of crystalline bedrock. On a regional basis the sedimentary units dip eastward and the overall sedimentary package thickens eastward toward the ocean.

Water table conditions generally prevail at shallow depths in shallow aquifers of the Coastal Plain. The water table fluctuates seasonally in response to variation in the amount of precipitation and degree of evapotranspiration. The groundwater table typically mimics surface topography with depth to water from ground surface being deeper on hills and slopes than in low lying areas. Groundwater flow is typically from interstream recharge areas, with streams and flood plains serving as groundwater discharge areas.

2.2 Site Geology

In general, geologic units in the Coastal Plain Region consist of deep, unconsolidated clastic rock. The geology of Tarboro, North Carolina contains local remnants of a Tertiary fossiliferous clay within the Yorktown Formation. The age of the basement units is described as pre-Cretaceous. Other formations in this region from youngest to oldest (top to bottom) include:

- *The Surficial Deposits (Quaternary)*
- *The Yorktown Formation (Tertiary)*
- *The Upper Cape Fear Formation (Cretaceous)*

In the site vicinity, surficial sediments are comprised of the Penholoway, Wicomico, and Sunderland Formations of Pleistocene Age. These formations are generally less than 50 feet thick, with an average of 20 to 30 feet and consist of yellow silty sand and sandy clays. The Yorktown Formation lies beneath the Pleistocene sediments. The Yorktown consists of 30 to 60 feet of blue gray silty clay with sandy clay, shell beds and fine sands. The Yorktown is extensive throughout the county forming an almost continuous layer. Beneath the Yorktown are Cretaceous aged sediments of reddish brown to brown clay, sand and sandy clay with some gravel resting on the irregular bedrock surface. These sediments range in thickness from 30 to 400 feet or more in thickness in the eastern area of the county.

The Cretaceous sediments are underlain by crystalline igneous and metamorphic rocks, with an irregular surface that dips gently to the east. The depth to the bedrock is approximately 300 feet below NGVD (approximately 240 to 400 feet below land surface).

2.3 Soil Description

According to the *Soil Survey of Edgecombe County, North Carolina*, prepared by the United States Department of Agriculture and the Soil Conservation Service (1979), soils in the vicinity of the site are classified as the Norfolk-Aycock-Wagram association. This association is comprised of nearly level to strongly sloping, well-drained soils. The surface layer is loamy sand to fine sandy loam with clay loam to sandy clay loam subsoil. The Norfolk-Aycock-Wagram association is usually found on uplands. The soils in this association are in broad, slightly convex areas that are rounded along the drainageways. They are dissected by many drainageways that have short side slopes and narrow to wide flood plains. The Bibb-Johnston soils are in the drainageways that dissect the association.

Soils in the vicinity of Jerry's Creek and Wright's Creek are classified as the Bibb-Johnston association. These soils are usually found on flood plains in narrow to moderately broad areas along major streams. The Bibb-Johnston association is comprised of nearly level, poorly-drained and very poorly-drained soils that have loamy and sandy underlying material. The surface layer is mucky loam to fine sandy loam. The underlying material is loamy sand to sandy loam.

2.4 Groundwater Hydrogeology

The Coastal Plain Physiographic Region of North Carolina is located between the uplands of the Piedmont and the Atlantic Ocean. Investigations of the Coastal Plain Region have identified as many as 10 aquifers separated by 9 confining units. However, these aquifers can basically be divided into three major deep aquifer systems in North Carolina: the Quaternary Aquifer System, the Tertiary Aquifer System, and the Cretaceous Aquifer System. The Quaternary Aquifer is composed of surficial deposits of sandy silt and clay. The Tertiary Aquifer is composed of glauconitic sands, clayey sands, and limestone. The Cretaceous Aquifer is composed of sand, silty and clayey sand, and clay separated by confining units of clay and silt.

The uppermost aquifer at the site is unconfined and is found in the silty sands of the Sunderland formation. This aquifer is recharged by inflow from upgradient areas and by infiltration of precipitation. The marine clay layer (Yorktown Formation) encountered at 13 to 24 feet below the original ground surface may be acting as a confining layer below the landfill.

Depths to static water levels have been historically measured semi-annually in several monitor wells located at the landfill. Based upon the water table elevations and the resulting potentiometric gradients, groundwater flow direction within the surficial water bearing zone underlying the site is generally to the north-northeast toward the southern tributary of Jerry's Creek at the existing C&D landfill. Groundwater flow direction at the closed landfill north of the C&D landfill is generally to the northeast and south at the property north of the closed landfill, towards Jerry's Creek and Wright's Creek.

3.0 ALTERNATE SOURCE DEMONSTRATION

3.1 Soil Sampling

Soil samples were collected at the facility on June 28, 2007. Six separate sample locations were chosen in native, residual soil within the facility permit boundaries. Two samples were taken at each location, at different depths. From these 12 samples, 7 were chosen for analysis. BKGD-1 and 1A were collected at the southeastern perimeter of the landfill property; BKGD-2 and 2A were collected along the northeastern perimeter on the eastern side of Colonial Road. The remaining soil samples (BKGD-3A, 4A and 5A) were collected along the southern perimeter of the landfill property on the western side of Colonial Road. Soil sample locations are shown on **Figure 1**. The soil samples were collected generally following guidance set forth in EPA's Resource Conservation and Recovery Act (RCRA) Technical Enforcement Guidance Document (SW-846). The collected samples were analyzed for the Appendix I metals suite. **Table 1** summarizes the analytical results of the soil sampling event. The complete Laboratory Analytical Report of the soil sampling results is included in **Attachment A**.

3.2 DAF Computation Methodology

According to the EPA's Soil Screening Guidance: Technical Background Document Second Edition, "As contaminants in soil leach and move through soil and groundwater, they are subjected to physical, chemical, and biological processes that tend to reduce the eventual contaminant concentration at the receptor point" (i.e., groundwater monitoring well). This reduction or attenuation in the concentration of parameters as they percolate through the soils to a ground water aquifer is governed by a variety of processes, the sum of which, are referred to as a Dilution/Attenuation Factor. The Dilution/Attenuation Factor (DAF) is defined as "the ratio of contaminant concentration in soil leachate to the concentration in ground-water at the receptor point. EPA has selected a default DAF of 20 to account for contaminant (parameter) dilution and attenuation during transport through the saturated zone to a compliance point (i.e., a receptor well).

Therefore, if we apply EPA's standard DAF factor of 20 to the overall average concentration of naturally occurring metals in soil samples, we can calculate a DAF for the influence of the overlying soils to groundwater in the subsurface Hydrogeologic Regime. Then we can compute the expected concentration of the particular metal in groundwater at that point source based on the DAF calculations.

The DAF is calculated from the analytical results of the collected soil samples utilizing the following equation:

Soil Concentration milligrams per kilograms (mg/kg) (total metal in soil) \div 20 (DAF) \Rightarrow
Groundwater Concentration milligrams per liter (mg/L) (total metal concentration in ground water).

Concentration mg/L X 1,000 \Rightarrow Concentration micrograms per liter ($\mu\text{g/L}$) = expected groundwater concentration.

The DAF concentration is the expected total metals concentration in the groundwater based on the average concentration of the metal in the natural soil. This result is obtained if we assume that the extraction efficiency is 100%. If we assume that the extraction efficiency is only 15% which is conservative according to the *Soil Screening Guidance 2*, we get the following result:

Total Expected Groundwater Concentration $\mu\text{g/L}$ x 15% = Reasonable Expected Groundwater Concentration of Constituent $\mu\text{g/L}$ in groundwater.

For the constituents arsenic and barium, an extraction efficiency of 20% was used which was based on research conducted by S&ME of several case studies in similar soil types to the Edgecombe County Landfill site. **Table 1** illustrates the DAF calculations based on the average concentration of each inorganic constituent from the analytical results of soil samples collected on June 28, 2007.

3.3 Comparison of Metals within Ground-water to Soil Samples

Table 2 summarizes the historical groundwater quality results from the last two years of groundwater monitoring data (July 2006, January 2007, June 2007, and January 2008) as they pertain to Appendix I metals concentrations. **Table 1** illustrates the DAF calculated concentration expected in groundwater for the analyzed Appendix I metals based on the results of this ASD. The expected metals concentrations in groundwater are also compared to the highest historical detection from Table 2 and their respective 2L Standard or GWPST. The DAF calculations suggest that the groundwater concentrations of all Appendix I metals with the exception of antimony and silver are being influenced by the presence of these naturally occurring metals in the overlying in-situ soils.

Comparison of the expected groundwater concentrations from the DAF calculations to the reported concentrations in the last four groundwater monitoring events in the compliance groundwater monitoring network indicate barium, cobalt, nickel, and thallium were found to be at higher concentrations in the compliance monitoring data than would be expected for these metals in groundwater based on the concentrations of these constituents in the in-situ soil samples collected and analyzed for this ASD. It should be noted that neither barium or nickel have been detected at a concentration higher than their respective 2L Standards during the past four groundwater monitoring events.

For cadmium, chromium, lead, selenium, thallium, and vanadium the expected groundwater concentrations from the DAF calculations are higher than their respective 2L Standards or GWPSTs. It should be noted that neither cadmium, chromium, or selenium has been detected at concentrations higher than their respective 2L Standards during the past four groundwater monitoring events. Also, the detections of thallium and vanadium above their respective GWPST were considered estimated values ("B" and "J" designations) less than their respective Solid Waste Section Limits (SWSLs).

3.4 Comparison to Statistical Evaluation Results

A statistical evaluation of the laboratory analytical data from the historical groundwater monitoring data set was last performed as part of the *July 2006 Semi-Annual Groundwater and Surface Water Sampling Event* for the *Edgecombe County Landfill*. The historical data pool has been updated and included in the subsequent sampling events, however, no statistical analysis was performed due to the changes in sample analytical methods. The change in sample analytical methods was due to the NCDENR DWM revision of the permissible quantitation limit (PQL) to the Solid Waste Section Limit (SWSL). The SWSL was defined by the Solid Waste Section as the lowest amount of analyte in a sample that can be quantitatively determined with suitable precision and accuracy. In addition, the Section also required that laboratories report analytical results to the method detection limits (MDLs) rather than the PQL. Several constituents that have not been reported as detected during sampling events prior to 2007 were detected in the January 2007, June 2007, and January 2008 sampling events due to the fact that the new SWSLs and MDLs are lower than the previous PQLs. In our opinion, these findings generally are not indicative of an increase in the presence of these constituents in the groundwater but rather due to changes in the reporting and evaluation standards. A new baseline sampling event using the lower SWSLs and MDLs is being conducted to “re-establish” background water quality at the facility. In accordance with Section .1634(b) it is recommended that a minimum of four independent samples be collected from each well (background and downgradient) to establish background for the newly detected constituents for statistical analysis. At least one additional sampling event is recommended to evaluate the statistical significance of these low-level detections and “re-establish” background conditions.

In the *July 2006 Semi-Annual Groundwater and Surface Water Sampling Event* for the *Edgecombe County Landfill*, a statistical evaluation of the entire Appendix I Metals suite was completed. This statistical evaluation also included metals detected at concentrations too low in the in-situ soil samples to be sufficient to influence groundwater quality. In order to complete the statistical evaluation, data from the upgradient background wells was pooled to form a background data set. Next the data distribution of the background data set was evaluated to test for a parametric or non-parametric distribution. Due to the large number of non-detects in the background data set the Wilcoxon Rank-Sum Test, a non-parametric statistical analysis, was used to compare individual down-gradient or compliance wells to the up-gradient or background well group for the purpose of evaluating the compliance data for suspected statistically significant increases above background values. Then a non-parametric Upper Prediction Limit was calculated from the background data set. If the downgradient compliance well data exceed the statistically computed non-parametric Upper Prediction Limit, then there is evidence that a statistically significant increase has occurred.

According to the *July 2006 Semi-Annual Groundwater and Surface Water Sampling Event*, the comparison of the downgradient compliance data to the statistically computed background non-parametric Upper Prediction Limits indicate that the concentrations of thallium and vanadium in groundwater samples collected from the downgradient compliance monitoring wells does not represent statistically significant increases over background values. Therefore, it is reasonable to conclude that the exceedances of thallium and vanadium above their respective groundwater quality standard are not indicative of a

release from the facility, but rather from naturally occurring background values of these constituents within the monitored portion of the aquifer.

4.0 CONCLUSIONS

The concentrations of the naturally occurring metals arsenic, beryllium, cadmium, chromium, copper, lead, selenium, vanadium, and zinc within the in-situ soil at the facility are sufficient to influence the concentrations of these metals in ground-water samples collected during the last four groundwater monitoring events from the downgradient compliance monitoring wells. Based upon these results, the historical exceedance of lead above its respective 2L Standard and vanadium above its respective GWPST is not due to a release by the Facility, but instead can be the result of the natural occurrence of these metals in the native, residual soil.

Additionally, the reported concentrations of thallium and vanadium above their respective GWPST do not represent a statistically significant increase (SSI) above background values. Therefore, the elevated concentrations of these two constituents could be attributed to naturally occurring background values of these metals within the hydrogeologic regime.

The concentrations of Cobalt detected in the background soil samples do not support influence to groundwater quality from the natural occurrence of the metal cobalt because, while cobalt was detected in the in-situ soils at the Facility, the naturally occurring levels of cobalt in the soil are not sufficient to attribute the high levels of cobalt detected in the groundwater samples from monitoring well MW-5 solely to its natural occurrence in the overlying soils. Cobalt is the remaining inorganic constituent of concern at the Facility.

5.0 REFERENCES

January 2008 Semi-Annual Groundwater and Surface Water Sampling Event, Edgecombe County Landfill, Tarboro, North Carolina, March 13, 2008, S&ME Job No. 1054-07-241.

Soil Screening Guidance: Technical Background Document, Second Edition, May 1996, United States Environmental Protection Agency (EPA), EPA/540/R95/128, OSWER-9355.4-17A.

RCRA Groundwater Monitoring Technical Enforcement Guidance Document, U.S. Environmental Protection Agency, September 1986.

United States Department of Agriculture and Soil Conservation Service, Soil Survey of Edgecombe County, North Carolina, 1979.

TABLES

Table 1
Alternate Source Demonstration Report
Dilution/Attenuation Factor Calculation Table
Edgecombe County Landfill
Tarboro, North Carolina
S&ME Project No. 1054-07-241

Borrow area
near old Blcd 55-3

Appendix I Inorganic Compounds EPA Method 6010B/6020	EPA Region III RBC Industrial Standard	Soil Analytical Results by Sampling Point (mg/kg dry)							MEAN	DAF COMPUTATION	EXPECTED GROUNDWATER CONCENTRATION mg/L	Highest Historical Detection**		GWPST / 2L Standard
		BKGD 1	BKGD 1A	BKGD 2	BKGD 2A	BKGD 3A	BKGD 4A	BKGD 5A				Value (mg/L)	Monitor Well Identification	
Antimony	820	<0.419	<0.385	<0.355	<0.482	<0.385	<0.475	<0.433	N/A	N/A	N/A	0.0013	MW-4	0.0014*
Arsenic	3.8	5.76	1.17	0.834	12.6	1.46	2.9	2.92	3.95	0.20	0.030	0.027	MW-7A	0.05
Barium	140,000	44.3	62.7	1.64	24	5.93	18.8	8.45	23.69	1.18	0.178	0.322	MW-9	2
Beryllium	4100	0.307	<0.0442	<0.0408	<0.0554	<0.0442	0.511	0.182	0.33	0.017	0.003	0.0025J	MW-3B	0.004*
Cadmium	2000	0.645	<0.00769	<0.00710	0.0367	<0.0077	<0.00949	<0.00866	0.34	0.02	0.003	0.001	MW-3B	0.002
Chromium	6100	22.2	2.14	1.81	32	8.37	17	5.4	12.70	0.64	0.095	0.0031J	MW1A	0.05
Cobalt	120000	0.836	<0.210	<0.194	15.4	<0.210	<0.259	<0.236	8.12	0.41	0.061	0.13	MW-5	0.070*
Copper	82,000	2.66	3.37	0.6	16.8	1.26	2.51	2	4.17	0.21	0.031	0.0054	MW-1A	1
Lead	800	3.65	1.98	2.39	20.1	6.75	10.4	5.43	7.24	0.36	0.054	0.046	MW-7A	0.015
Nickel	41000	3.99	1.56J	0.455	19.3	1.14	1.5	0.652	4.51	0.23	0.034	0.043	MW-5	0.1
Selenium	10000	1.3	1.76	1.5	1.7	1.35	1.21	1.94	1.54	0.08	0.012	0.0031	MW-1A	0.05
Silver	10000	<0.0874	<0.0802	<0.0740	<0.100	<0.0802	<0.0989	<0.0902	N/A	N/A	N/A	0.00676J	MW-5	0.018
Thallium	140	0.152	0.0355	0.0154	0.327	0.0554	0.0709	0.0129	0.10	0.005	0.001	0.0735	MW-5	0.00028*
Vanadium	14000	19	1.6	3.81	25.5	8.19	18.3	17.1	13.36	0.67	0.100	0.0058J	MW-3B	0.0035*
Zinc	610,000	16.4	2.44	1.15	26.6	3.02	6.73	3.38	8.53	0.43	0.064	0.058	MW-5	1.05
SAMPLE DEPTH (ft-bgs)		2.0-2.5'	4.0-4.5'	3.0-3.5'	6.5-7.0'	8.0-10.0'	7.5-8.0'	9.5-10'						
SOIL LITHOLOGY		Gray-white to red-brown silty SAND	Black-gray sandy CLAY	Gray silty medium-coarse SAND	Black gray silty CLAY	Lt. gray w/red clayey SAND	Lt. gray brown sandy CLAY	Gray red brown med-coarse SAND						

NOTES:

N/A = Not Analyzed

EPA Region III Industrial Standard = Environmental Protection Agency Region III Risk Based Industrial Standard

ft-bgs = Feet below ground surface

mg/Kg = Milligram Per Kilogram

mg/L = Milligram Per Liter

Values which are **BOLDED** and shaded indicate levels above their respective EPA Region III Risk Based Industrial Concentration.

Soil samples were collected on June 28, 2007 and analyzed by SGS Environmental Services Inc. (SGS). Detection limits are shown on laboratory reports.

Background soil sampling locations shown on Figure 1.

* Indicates there is currently no 2L Standard. The target analyte was compared to the Solid Waste Groundwater Protection Standard (GWPST).

** Highest detected concentration from the past four semi-annual compliance monitoring events (July 2006, January 2007, June 2007, and January 2008).

Historical groundwater detections are summarized on Table 2 and have previously been reported in semi-annual sampling reports submitted to NCDENR-DWM.

Table 2
 Historical Groundwater Quality Data
 Alternate Source Demonstration Report
 Edgecombe County Landfill
 Tarboro, North Carolina
 S&ME Project No. 1054-07-241

p.1 of 3

APPENDIX I INORGANIC COMPOUNDS	GWPST / 2L STANDARD	Sample Date	Jul-06	Jan-07	Jun-07	Jan-08
ANTIMONY	0.0014*	MW-1A	<0.03	<0.58	<0.00562	0.0008J
		MW-3B	<0.03	<0.58	<0.00562	0.00053J
		MW-4	<0.03	<0.58	<0.00562	0.0013
		MW-5	<0.03	<0.58	<0.00562	0.0006J
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.03	<0.58	<0.00562	0.00071J
		MW-7A	<0.03	<0.58	<0.00562	0.00054J
		MW-9	<0.03	<0.58	<0.00562	0.00076J
		MW-10	NS	NS	NS	NS
ARSENIC	0.05	MW-1A	<0.01	0.0028J	<0.00185B	0.001
		MW-3B	<0.01	<0.002	<0.00185B	0.0051
		MW-4	<0.01	0.0025J	<0.00185B	0.00056J
		MW-5	<0.01	0.0081J	0.0241B	0.021
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.01	0.0026J	<0.00185B	0.0016
		MW-7A	<0.01	<0.002	0.00889B	0.027
		MW-9	<0.01	<0.002	<0.00185B	0.0005J
		MW-10	NS	NS	NS	NS
BARIUM	2	MW-1A	<0.500	0.0804	0.141	0.16
		MW-3B	<0.500	0.11	0.144	0.17
		MW-4	<0.500	0.0528	0.0608	0.049
		MW-5	<0.500	0.235	0.204	0.22
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.500	0.0876	0.137	0.077
		MW-7A	<0.500	0.112	0.152	0.09
		MW-9	<0.500	0.322	0.175	0.25
		MW-10	NS	NS	NS	NS
BERYLLIUM	0.004*	MW-1A	<0.002	<0.0007	<0.00247	0.0003J
		MW-3B	<0.002	<0.0007	<0.00247	0.0025J
		MW-4	<0.002	<0.0007	<0.00247	0.00029J
		MW-5	<0.002	<0.0007	<0.00247	<0.0012
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.002	<0.0007	<0.00247	0.00069J
		MW-7A	<0.002	<0.0007	<0.00247	0.00027J
		MW-9	<0.002	<0.0007	<0.00247	0.00026J
		MW-10	NS	NS	NS	NS
CADMIUM	0.00175	MW-1A	<0.001	<0.0005	<0.00033	0.00039J
		MW-3B	<0.001	<0.0005	<0.00033	0.001
		MW-4	<0.001	<0.0005	<0.00033	0.00047J
		MW-5	<0.001	<0.0005	<0.00033	0.0004J
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.001	<0.0005	<0.00033	0.00069
		MW-7A	<0.001	<0.0005	<0.00033	0.00031J
		MW-9	<0.001	<0.0005	<0.00033	0.00032J
		MW-10	NS	NS	NS	NS

Notes:

All values reported in milligrams per liter (mg/L)

2L STANDARD = North Carolina groundwater standards as promulgated by 15A North Carolina Administrative Code, Subchapter 2L.

* Indicates there is currently no 2L Standard. The target analyte was compared to the Solid Waste Groundwater Protection Standard (GWPST). Values which are **BOLD** and **shaded** indicate levels greater than their respective GWPST or 2L Standard.

D = Data reported from a dilution.

NS = Not Sampled

J = Analyte detected between the laboratory method detection limit (MDL) and reporting limit (RL).

B = Amount in Prep Blank was great then the method detection limit (MDL).

Table 2 (Cont.)
 Historical Groundwater Quality Data
 Alternate Source Demonstration Report
 Edgecombe County Landfill
 Tarboro, North Carolina
 S&ME Project No. 1054-07-241

APPENDIX I INORGANIC COMPOUNDS	GWPST / 2L STANDARD	Sample Date	Jul-06	Jan-07	Jun-07	Jan-08
CHROMIUM	0.05	MW-1A	<0.010	<0.002	<0.00115B	0.0031J
		MW-3B	<0.010	<0.002	<0.00115B	<0.0023
		MW-4	<0.010	<0.002	0.00117JB	<0.0023
		MW-5	<0.010	<0.002	0.0112B	<0.0023
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.010	<0.002	0.00257JB	<0.0023
		MW-7A	<0.010	<0.002	0.00197JB	<0.0023
		MW-9	<0.010	<0.002	<0.00115B	<0.0023
		MW-10	NS	NS	NS	NS
COBALT	0.07*	MW-1A	<0.010	<0.002	0.00556JB	0.0012J
		MW-3B	0.0345	0.0061J	0.0217B	0.026
		MW-4	<0.010	<0.002	0.00397JB	0.0017J
		MW-5	0.12	0.0749	0.131B	0.13
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.010	<0.002	0.00516JB	0.0066J
		MW-7A	<0.010	<0.002	0.00411JB	0.0052J
		MW-9	<0.010	<0.002	0.00352JB	<0.0011
		MW-10	NS	NS	NS	NS
COPPER	1	MW-1A	<0.2	<0.0006	0.00304J	0.0054
		MW-3B	<0.2	<0.0006	0.00209J	0.00055J
		MW-4	<0.2	<0.0006	0.00277J	0.0037
		MW-5	<0.2	<0.0006	0.00331J	0.00068J
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.2	<0.0006	0.00249J	0.0042
		MW-7A	<0.2	<0.0006	0.00339J	<0.0022
		MW-9	<0.2	<0.0006	0.00214J	<0.00045
		MW-10	NS	NS	NS	NS
LEAD	0.015	MW-1A	<0.010	<0.002	<0.00358B	<0.0024
		MW-3B	<0.010	<0.002	<0.00358B	<0.0024
		MW-4	<0.010	<0.002	<0.00358B	<0.0024
		MW-5	0.0108	<0.002	0.0121B	0.014
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.010	<0.002	<0.00358B	<0.0024
		MW-7A	0.0127	<0.002	0.0042JB	0.046
		MW-9	<0.010	<0.002	<0.00358B	<0.0024
		MW-10	NS	NS	NS	NS
NICKEL	0.1	MW-1A	<0.05	0.005J	0.022JB	<0.0098
		MW-3B	<0.05	0.007J	0.0234JB	0.018J
		MW-4	<0.05	<0.002	<0.00474B	<0.0098
		MW-5	<0.05	0.0227	0.0403B	0.043
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.05	<0.002	<0.00474	<0.0098
		MW-7A	<0.05	<0.002	<0.00474	0.018J
		MW-9	<0.05	<0.002	<0.00474B	<0.0098
		MW-10	NS	NS	NS	NS

Notes:

All values reported in micrograms per liter (mg/L)

2L STANDARD = North Carolina groundwater standards as promulgated by 15A North Carolina Administrative Code, Subchapter 2L.

* Indicates there is currently no 2L Standard. The target analyte was compared to the Solid Waste Groundwater Protection Standard (GWPST).

Values which are **BOLD** and **shaded** indicate levels greater than their respective GWPST or 2L Standard.

D = Data reported from a dilution.

NS = Not Sampled

J = Analyte detected between the laboratory method detection limit (MDL) and reporting limit (RL).

B = Amount in Prep Blank was great then the method detection limit (MDL).

Table 2 (Cont.)
Historical Groundwater Quality Data
Alternate Source Demonstration Report
Edgecombe County Landfill
Tarboro, North Carolina
S&ME Project No. 1054-07-241

APPENDIX I INORGANIC COMPOUNDS	GWPST / 2L STANDARD	Sample Date	Jul-06	Jan-07	Jun-07	Jan-08
SELENIUM	0.05	MW-1A	<0.02	<0.002	0.00814J	0.0031
		MW-3B	<0.02	<0.002	0.00858J	0.0014
		MW-4	<0.02	<0.002	0.0093J	0.0008J
		MW-5	<0.02	<0.002	0.0126	0.00051J
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.02	<0.002	<0.0073	0.00091J
		MW-7A	<0.02	<0.002	<0.0073	0.0026J
		MW-9	<0.02	<0.002	<0.0073	0.00044J
		MW-10	NS	NS	NS	NS
SILVER	0.0175	MW-1A	<0.1	<0.002	<0.00081B	<0.0025
		MW-3B	<0.1	<0.002	<0.00081B	<0.0025
		MW-4	<0.1	<0.002	<0.00081B	<0.0025
		MW-5	<0.1	<0.002	0.00676J	0.0055J
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.1	<0.002	<0.00081B	<0.0025
		MW-7A	<0.1	<0.002	<0.00081B	<0.0025
		MW-9	<0.1	<0.002	<0.00081	<0.0025
		MW-10	NS	NS	NS	NS
THALLIUM	0.00028*	MW-1A	<0.01	<0.000044	<0.00521	0.00035J
		MW-3B	<0.01	0.000139	<0.00521	0.00036J
		MW-4	<0.01	NS	<0.00521	0.00034J
		MW-5	0.0735	0.00006	0.00564J	0.00041J
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.01	<0.000044	<0.00521	0.00038J
		MW-7A	<0.01	<0.000044	<0.00521	0.00032J
		MW-9	<0.01	<0.000044	<0.00521	0.00031J
		MW-10	NS	NS	NS	NS
VANADIUM	0.0035*	MW-1A	<0.040	<0.001	0.00622JB	0.0056J
		MW-3B	<0.040	0.0059J	0.0089JB	0.0058J
		MW-4	<0.040	<0.001	0.00777JB	<0.0029
		MW-5	<0.040	<0.001	0.00962JB	<0.0029
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.040	<0.001	0.0108JB	<0.0029
		MW-7A	<0.040	<0.001	0.00556JB	0.0038J
		MW-9	<0.040	<0.001	0.00571JB	<0.0029
		MW-10	NS	NS	NS	NS
ZINC	1.05	MW-1A	<0.05	0.0143	0.0117	0.0096J
		MW-3B	<0.05	0.0044J	0.0233	0.055
		MW-4	<0.05	0.0042J	0.00844J	<0.003
		MW-5	0.058	0.0171	0.0557	0.058
		MW-5S	NS	NS	NS	NS
		MW-5D	NS	NS	NS	NS
		MW-6	<0.05	0.0011J	0.00655J	0.035
		MW-7A	<0.05	<0.001	<0.00399	<0.015
		MW-9	<0.05	<0.001	<0.00399	0.0078J
		MW-10	NS	NS	NS	NS

Notes:

All values reported in micrograms per liter (mg/L)

2L STANDARD = North Carolina groundwater standards as promulgated by 15A North Carolina Administrative Code, Subchapter 2L.

* Indicates there is currently no 2L Standard. The target analyte was compared to the Solid Waste Groundwater Protection Standard (GWPST).

Values which are **BOLD** and **shaded** indicate levels greater than their respective GWPST or 2L Standard.

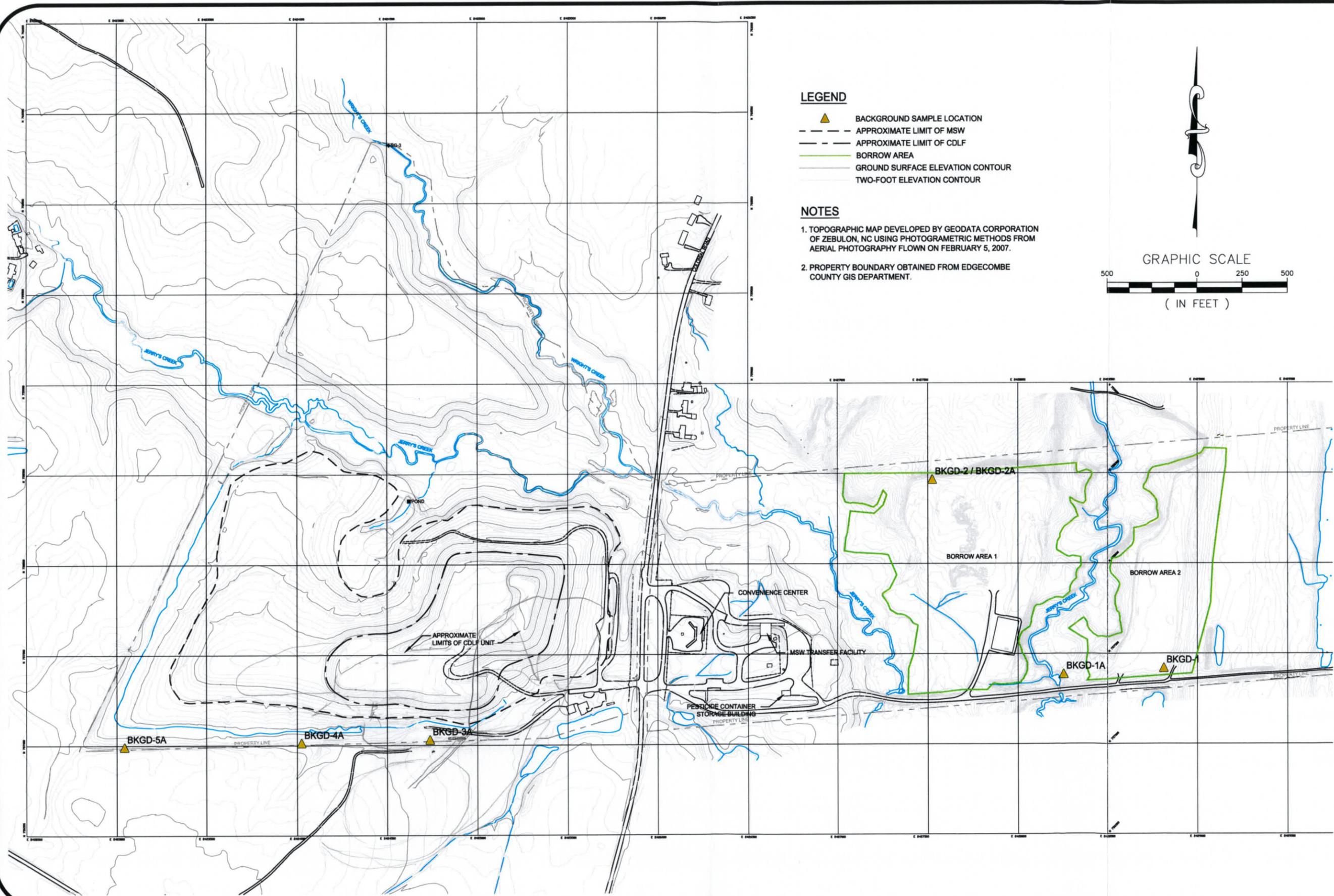
D = Data reported from a dilution.

NS = Not Sampled

J = Analyte detected between the laboratory method detection limit (MDL) and reporting limit (RL).

B = Amount in Prep Blank was great then the method detection limit (MDL).

FIGURES

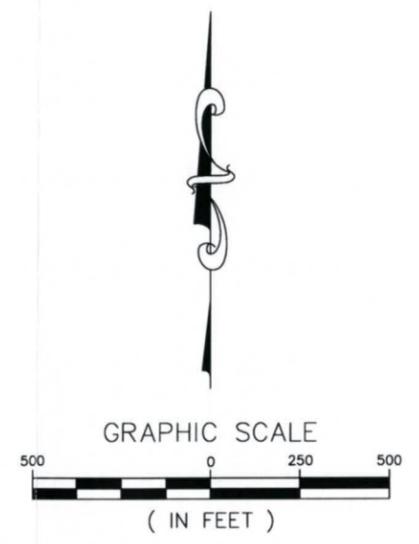


LEGEND

- BACKGROUND SAMPLE LOCATION
- APPROXIMATE LIMIT OF MSW
- APPROXIMATE LIMIT OF CDLF
- BORROW AREA
- GROUND SURFACE ELEVATION CONTOUR
- TWO-FOOT ELEVATION CONTOUR

NOTES

1. TOPOGRAPHIC MAP DEVELOPED BY GEODATA CORPORATION OF ZEBULON, NC USING PHOTOGRAMETRIC METHODS FROM AERIAL PHOTOGRAPHY FLOWN ON FEBRUARY 5, 2007.
2. PROPERTY BOUNDARY OBTAINED FROM EDGEcombe COUNTY GIS DEPARTMENT.



DATE:	FEB. 2008
SCALE:	1" = 500'
DRAWN BY:	BTR
PROJECT NUMBER:	1054-07-241
CHECKED BY:	
DRAWING NUMBER:	B-1051



SITE MAP
ALTERNATE SOURCE DEMONSTRATION
 EDGEcombe COUNTY LANDFILL
 TARBORO, NORTH CAROLINA

FIGURE NO.
1

ATTACHMENT A

Alternate Source Demonstration, Laboratory Analytical Results Report



Mr. David Wells
S&ME
3118 Spring Forest Road
Raleigh NC 27616

Report Number: G108-1770

Client Project: Edgecombe County

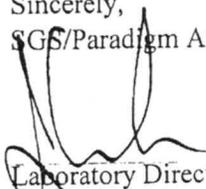
Dear Mr. Wells:

Enclosed are the results of the analytical services performed under the referenced project. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call SGS/Paradigm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS/Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,
SGS/Paradigm Analytical Laboratories, Inc.


Laboratory Director
J. Patrick Weaver

7/12/2007
Date



List of Reporting Abbreviations
and Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantitation Limit (RL or MDL)

DF = Dilution Factor

Dup = Duplicate

D = Detected, but RPD is > 40% between results in dual column method.

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

mg/kg = milligram per kilogram, ppm, parts per million

ug/kg = micrograms per kilogram, ppb, parts per billion

mg/L = milligram per liter, ppm, parts per million

ug/L = micrograms per liter, ppb, parts per billion

% Rec = Percent Recovery

% solids = Percent Solids

Special Notes:

- 1) Metals and mercury samples are digested with a hot block, see the standard operating procedure document for details.
- 2) Uncertainty for all reported data is less than or equal to 30 percent.



Results for Metals

Client Sample ID: BKGD1
 Client Project ID: Edgecombe County
 Lab Sample ID: G108-1770-1
 Lab Project ID: G108-1770
 Batch ID: 8561
 Report Basis: Dry

Analyzed By: AEC
 Date Collected: 6/28/2007 12:45
 Date Received: 6/30/2007
 Matrix: SOIL
 Solids 81.26

Metals	Result	SWSL	MDL	DF	Units	Method	Date Analyzed	Flags
Antimony	BQL	0.741	0.419	1	MG/KG	6010B	7/10/2007	
Arsenic	5.76	0.855	0.657	1	MG/KG	6010B	7/10/2007	
Barium	44.3	6.84	0.467	1	MG/KG	6010B	7/10/2007	
Beryllium	0.307	0.114	0.0482	1	MG/KG	6010B	7/10/2007	
Cadmium	0.645	1.14	0.00839	10	MG/KG	6020	7/9/2007	J
Chromium	22.2	0.855	0.291	1	MG/KG	6010B	7/10/2007	
Cobalt	0.836	1.14	0.229	1	MG/KG	6010B	7/10/2007	J
Copper	2.66	0.855	0.161	1	MG/KG	6010B	7/10/2007	B
Lead	3.65	0.741	0.550	1	MG/KG	6010B	7/10/2007	
Nickel	3.99	3.42	0.391	1	MG/KG	6010B	7/10/2007	
Selenium	1.30	1.14	0.491	1	MG/KG	6010B	7/10/2007	
Silver	BQL	0.855	0.0874	1	MG/KG	6010B	7/10/2007	B
Thallium	0.152	0.114	0.00948	10	MG/KG	6020	7/9/2007	
Vanadium	19.0	2.85	0.530	1	MG/KG	6010B	7/10/2007	B
Zinc	16.4	1.14	0.343	1	MG/KG	6010B	7/10/2007	

Comments

BQL = Below Quantitation Limits
 DF = Dilution Factor
 J = Between MDL and RL
 B= Amount in Prep Blank > MDL

Reviewed By: 
 MET_LIMS_12.XLS



Results for Metals

Client Sample ID: BKGD1A
Client Project ID: Edgecombe County
Lab Sample ID: G108-1770-2
Lab Project ID: G108-1770
Batch ID: 8561
Report Basis: Dry

Analyzed By: AEC
Date Collected: 6/28/2007 13:30
Date Received: 6/30/2007
Matrix: SOIL
Solids 85.43

Metals	Result	SWSL	MDL	DF	Units	Method	Date Analyzed	Flags
Antimony	BQL	0.679	0.385	1	MG/KG	6010B	7/10/2007	
Arsenic	1.17	0.784	0.603	1	MG/KG	6010B	7/10/2007	
Barium	62.7	6.27	0.429	1	MG/KG	6010B	7/10/2007	
Beryllium	BQL	0.105	0.0442	1	MG/KG	6010B	7/10/2007	
Cadmium	BQL	1.05	0.00769	10	MG/KG	6020	7/9/2007	
Chromium	2.14	0.784	0.267	1	MG/KG	6010B	7/10/2007	
Cobalt	BQL	1.05	0.210	1	MG/KG	6010B	7/10/2007	
Copper	3.37	0.784	0.147	1	MG/KG	6010B	7/10/2007	B
Lead	1.98	0.679	0.505	1	MG/KG	6010B	7/10/2007	
Nickel	1.56	3.14	0.358	1	MG/KG	6010B	7/10/2007	J
Selenium	1.76	1.05	0.450	1	MG/KG	6010B	7/10/2007	
Silver	BQL	0.784	0.0802	1	MG/KG	6010B	7/10/2007	B
Thallium	0.0355	0.105	0.00870	10	MG/KG	6020	7/9/2007	J
Vanadium	1.60	2.61	0.486	1	MG/KG	6010B	7/10/2007	JB
Zinc	2.44	1.05	0.315	1	MG/KG	6010B	7/10/2007	

Comments

BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL
B= Amount in Prep Blank > MDL

Reviewed By: 
MET_LIMS_4.2.XLS



Results for Metals

Client Sample ID: BKGD2
Client Project ID: Edgecombe County
Lab Sample ID: G108-1770-3
Lab Project ID: G108-1770
Batch ID: 8561
Report Basis: Dry

Analyzed By: AEC
Date Collected: 6/28/2007 13:45
Date Received: 6/30/2007
Matrix: SOIL
Solids 86.35

Metals	Result	SWSL	MDL	DF	Units	Method	Date Analyzed	Flags
Antimony	BQL	0.627	0.355	1	MG/KG	6010B	7/10/2007	
Arsenic	0.834	0.724	0.557	1	MG/KG	6010B	7/10/2007	
Barium	1.64	5.79	0.396	1	MG/KG	6010B	7/10/2007	J
Beryllium	BQL	0.0965	0.0408	1	MG/KG	6010B	7/10/2007	
Cadmium	BQL	0.965	0.00710	10	MG/KG	6020	7/9/2007	
Chromium	1.81	0.724	0.246	1	MG/KG	6010B	7/10/2007	
Cobalt	BQL	0.965	0.194	1	MG/KG	6010B	7/10/2007	
Copper	0.600	0.724	0.136	1	MG/KG	6010B	7/10/2007	JB
Lead	2.39	0.627	0.466	1	MG/KG	6010B	7/10/2007	
Nickel	0.455	2.90	0.331	1	MG/KG	6010B	7/10/2007	J
Selenium	1.50	0.965	0.416	1	MG/KG	6010B	7/10/2007	
Silver	BQL	0.724	0.0740	1	MG/KG	6010B	7/10/2007	B
Thallium	0.0154	0.0965	0.00803	10	MG/KG	6020	7/9/2007	J
Vanadium	3.81	2.41	0.449	1	MG/KG	6010B	7/10/2007	B
Zinc	1.15	0.965	0.290	1	MG/KG	6010B	7/10/2007	

Comments

BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL
B= Amount in Prep Blank > MDL

Reviewed By: 
MET_LIMS_4.2.XLS



Results for Metals

Client Sample ID: BKGD2A
Client Project ID: Edgecombe County
Lab Sample ID: G108-1770-4
Lab Project ID: G108-1770
Batch ID: 8561
Report Basis: Dry

Analyzed By: AEC
Date Collected: 6/28/2007 13:50
Date Received: 6/30/2007
Matrix: SOIL
Solids: 63.65

Metals	Result	SWSL	MDL	DF	Units	Method	Date Analyzed	Flags
Antimony	BQL	0.851	0.482	1	MG/KG	6010B	7/10/2007	
Arsenic	12.6	0.982	0.755	1	MG/KG	6010B	7/10/2007	
Barium	24.0	7.86	0.537	1	MG/KG	6010B	7/10/2007	
Beryllium	RCL	0.131	0.0554	1	MG/KG	6010B	7/10/2007	
Cadmium	0.0367	1.31	0.00964	10	MG/KG	6020	7/9/2007	J
Chromium	32.0	0.982	0.334	1	MG/KG	6010B	7/10/2007	
Cobalt	15.4	1.31	0.263	1	MG/KG	6010B	7/10/2007	
Copper	16.8	0.982	0.185	1	MG/KG	6010B	7/10/2007	B
Lead	20.1	0.851	0.632	1	MG/KG	6010B	7/10/2007	
Nickel	19.3	3.93	0.449	1	MG/KG	6010B	7/10/2007	
Selenium	1.70	1.31	0.564	1	MG/KG	6010B	7/10/2007	
Silver	BQL	0.982	0.100	1	MG/KG	6010B	7/10/2007	B
Thallium	0.327	0.131	0.0109	10	MG/KG	6020	7/9/2007	
Vanadium	25.5	3.27	0.609	1	MG/KG	6010B	7/10/2007	B
Zinc	26.6	1.31	0.394	1	MG/KG	6010B	7/10/2007	

Comments

BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL
B = Amount in Prep Blank > MDL

Reviewed By: 
MET_LIM_42.XLS



Results for Metals

Client Sample ID: BKGD3A
Client Project ID: Edgecombe County
Lab Sample ID: G108-1770-6
Lab Project ID: G108-1770
Batch ID: 8561
Report Basis: Dry

Analyzed By: AEC
Date Collected: 6/28/2007 14:45
Date Received: 6/30/2007
Matrix: SOIL
Solids 83.89

Metals	Result	SWSL	MDL	DF	Units	Method	Date Analyzed	Flags
Antimony	BQL	0.680	0.385	1	MG/KG	6010B	7/10/2007	
Arsenic	1.46	0.784	0.603	1	MG/KG	6010B	7/10/2007	
Barium	5.93	6.27	0.429	1	MG/KG	6010B	7/10/2007	J
Beryllium	BQL	0.105	0.0442	1	MG/KG	6010B	7/10/2007	
Cadmium	BQL	1.05	0.00770	10	MG/KG	6020	7/9/2007	
Chromium	8.37	0.784	0.267	1	MG/KG	6010B	7/10/2007	
Cobalt	BQL	1.05	0.210	1	MG/KG	6010B	7/10/2007	
Copper	1.26	0.784	0.147	1	MG/KG	6010B	7/10/2007	B
Lead	6.75	0.680	0.505	1	MG/KG	6010B	7/10/2007	
Nickel	1.14	3.14	0.359	1	MG/KG	6010B	7/10/2007	J
Selenium	1.35	1.05	0.451	1	MG/KG	6010B	7/10/2007	
Silver	BQL	0.784	0.0802	1	MG/KG	6010B	7/10/2007	B
Thallium	0.0554	0.105	0.00870	10	MG/KG	6020	7/9/2007	J
Vanadium	8.19	2.61	0.486	1	MG/KG	6010B	7/10/2007	B
Zinc	3.02	1.05	0.315	1	MG/KG	6010B	7/10/2007	

Comments

BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL
B = Amount in Prep Blank > MDL

Reviewed By: 
MET_LIMS/4.2.XLS



Results for Metals

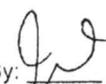
Client Sample ID: BKGD4A
 Client Project ID: Edgecombe County
 Lab Sample ID: G108-1770-8
 Lab Project ID: G108-1770
 Batch ID: 8561
 Report Basis: Dry

Analyzed By: AEC
 Date Collected: 6/28/2007 15:40
 Date Received: 6/30/2007
 Matrix: SOIL
 Solids 74.56

Metals	Result	SWSL	MDL	DF	Units	Method	Date Analyzed	Flags
Antimony	BQL	0.838	0.475	1	MG/KG	6010B	7/10/2007	
Arsenic	2.90	0.967	0.744	1	MG/KG	6010B	7/10/2007	
Barium	18.8	7.74	0.529	1	MG/KG	6010B	7/10/2007	
Beryllium	0.511	0.129	0.0546	1	MG/KG	6010B	7/10/2007	
Cadmium	BQL	1.29	0.00949	10	MG/KG	6020	7/9/2007	
Chromium	17.0	0.967	0.329	1	MG/KG	6010B	7/10/2007	
Cobalt	BQL	1.29	0.259	1	MG/KG	6010B	7/10/2007	
Copper	2.51	0.967	0.182	1	MG/KG	6010B	7/10/2007	B
Lead	10.4	0.838	0.623	1	MG/KG	6010B	7/10/2007	
Nickel	1.50	3.87	0.442	1	MG/KG	6010B	7/10/2007	J
Selenium	1.21	1.29	0.556	1	MG/KG	6010B	7/10/2007	J
Silver	BQL	0.967	0.0989	1	MG/KG	6010B	7/10/2007	B
Thallium	0.0709	0.129	0.0107	10	MG/KG	6020	7/9/2007	J
Vanadium	18.3	3.22	0.600	1	MG/KG	6010B	7/10/2007	B
Zinc	6.73	1.29	0.388	1	MG/KG	6010B	7/10/2007	

Comments

BQL = Below Quantitation Limits
 DF = Dilution Factor
 J = Between MDL and RL
 B= Amount in Prep Blank > MDL

Reviewed By: 
 MET_LIMB_42.XLS



Results for Metals

Client Sample ID: BKGD5A
Client Project ID: Edgecombe County
Lab Sample ID: G108-1770-10
Lab Project ID: G108-1770
Batch ID: 8561
Report Basis: Dry

Analyzed By: AEC
Date Collected: 6/28/2007 15:50
Date Received: 6/30/2007
Matrix: SOIL
Solids 78.72

Metals	Result	SWSL	MDL	DF	Units	Method	Date Analyzed	Flags
Antimony	BQL	0.765	0.433	1	MG/KG	6010B	7/10/2007	
Arsenic	2.92	0.882	0.679	1	MG/KG	6010B	7/10/2007	
Barium	8.45	7.06	0.482	1	MG/KG	6010B	7/10/2007	
Beryllium	0.182	0.118	0.0498	1	MG/KG	6010B	7/10/2007	
Cadmium	BQL	1.18	0.00866	10	MG/KG	6020	7/9/2007	
Chromium	5.40	0.882	0.300	1	MG/KG	6010B	7/10/2007	
Cobalt	BQL	1.18	0.236	1	MG/KG	6010B	7/10/2007	
Copper	2.00	0.882	0.166	1	MG/KG	6010B	7/10/2007	B
Lead	5.43	0.765	0.568	1	MG/KG	6010B	7/10/2007	
Nickel	0.652	3.53	0.403	1	MG/KG	6010B	7/10/2007	J
Selenium	1.94	1.18	0.507	1	MG/KG	6010B	7/10/2007	
Silver	BQL	0.882	0.0902	1	MG/KG	6010B	7/10/2007	B
Thallium	0.0129	0.118	0.00979	10	MG/KG	6020	7/9/2007	J
Vanadium	17.1	2.94	0.547	1	MG/KG	6010B	7/10/2007	B
Zinc	3.38	1.18	0.354	1	MG/KG	6010B	7/10/2007	

Comments

BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL
B = Amount in Prep Blank > MDL

Reviewed By: 
MET_LIMS/4.2.XLS



Results for Metals

Client Sample ID: Lab Blank
Client Project ID:
Lab Sample ID: pb8561
Lab Project ID:
Batch ID: 8561
Report Basis: Dry

Analyzed By: PSW
Date Collected:
Date Received:
Matrix: SOIL
Solids 100.00

Metals	Result	SWSL	MDL	DF	Units	Method	Date Analyzed	Flags
Antimony	BQL	0.650	0.368	1	MG/KG	6010B	7/4/2007	
Arsenic	BQL	0.750	0.577	1	MG/KG	6010B	7/10/2007	
Barium	BQL	6.00	0.410	1	MG/KG	6010B	7/4/2007	
Beryllium	BQL	0.100	0.0423	1	MG/KG	6010B	7/10/2007	
Cadmium	BQL	1.00	0.00736	10	MG/KG	6020	7/9/2007	
Chromium	BQL	0.750	0.255	1	MG/KG	6010B	7/4/2007	
Cobalt	BQL	1.00	0.201	1	MG/KG	6010B	7/10/2007	
Copper	0.305	0.750	0.141	1	MG/KG	6010B	7/10/2007	JB
Lead	BQL	0.650	0.483	1	MG/KG	6010B	7/10/2007	
Nickel	BQL	3.00	0.343	1	MG/KG	6010B	7/10/2007	
Selenium	BQL	1.00	0.431	1	MG/KG	6010B	7/4/2007	
Silver	0.183	0.750	0.0767	1	MG/KG	6010B	7/4/2007	JB
Thallium	BQL	0.100	0.00832	10	MG/KG	6020	7/9/2007	
Vanadium	0.825	2.50	0.465	1	MG/KG	6010B	7/4/2007	JB
Zinc	BQL	1.00	0.301	1	MG/KG	6010B	7/4/2007	

Comments

BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL
B= Amount in Prep Blank > MDL

Reviewed By: 
MET_LIMS_1.2.XLS



METALS Results for LCS/LCD

ICP Batch: 8561
 HG Batch:
 Other:

Matrix: SOIL
 Units: MG/KG

Analyte	TRUE Value	LCS	LCS %REC	LCD	LCD %REC	Limit		RPD	RPD Limit
						Lower	Upper		
Antimony	4.00	3.47	86.8	3.36	84.0	80	120	3.22	20
Arsenic	4.00	3.7	92.5	3.79	94.7	80	120	2.40	20
Barium	20.0	18.7	93.5	18.1	90.5	80	120	3.26	20
Beryllium	4.00	3.84	96.0	3.62	90.5	80	120	5.90	20
Cadmium	4.00	4.12	103	4.06	102	80	120	1.47	20
Chromium	4.00	3.79	94.7	3.66	91.0	80	120	3.49	20
Cobalt	4.00	3.75	93.8	3.87	96.8	80	120	3.15	20
Copper	4.00	3.97	99.3	4.07	102	80	120	2.49	20
Lead	4.00	3.77	94.3	3.76	94.0	80	120	0.266	20
Nickel	4.00	3.78	94.5	3.91	97.8	80	120	3.38	20
Selenium	4.00	3.36	84.0	3.27	81.8	80	120	2.71	20
Silver	4.00	3.77	94.3	3.84	96.0	80	120	1.84	20
Thallium	4.00	3.94	98.5	4.00	100	80	120	1.51	20
Vanadium	4.00	3.73	93.3	3.60	90.0	80	120	3.55	20
Zinc	4.00	3.55	88.8	3.41	85.3	80	120	4.02	20

Comments

*=Out of Limits
 NA = Not applicable, due to sample concentration greater than three times spike concentration

Reviewed By: 



MS/MSD Results for METALS

Lab ID: G197-143-28
MS Lab ID: G197-143-28
MSD Lab ID: G197-143-28
ICP Batch: 8561
HG Batch:
Other:

Analyzed By: PSW
Matrix: Soil
Units: MG/KG
Solids: 61.12

Analyte	Sample Result	SA MS	MS Result	MS %REC	SA MSD	MSD Result	MSD %REC	Limit		RPD	RPD Limit		
								Lower	Upper				
Antimony	BQL	58.4	38.7	66.2	*	59.5	32.7	55.0	*	75	125	16.8	20
Arsenic	BQL	58.4	57.6	98.6		59.5	58.1	97.6		75	125	0.864	20
Barium	271	292	396	42.8	*	297	511	80.8		75	125	25.4	20
Beryllium	0.604	58.4	52.7	89.2		59.5	50.0	83.0		75	125	5.26	20
Cadmium	BQL	58.4	60.8	104		59.5	61.1	103		75	125	0.492	20
Chromium	10.6	58.4	57.9	80.9		59.5	55.6	75.6		75	125	4.05	20
Cobalt	1.83	58.4	61.3	102		59.5	60.8	99.1		75	125	0.819	20
Copper	BQL	58.4	81.0	139	*	59.5	95.8	161	*	75	125	16.7	20
Lead	12.4	58.4	64.8	89.7		59.5	71.1	98.7		75	125	9.27	20
Nickel	BQL	58.4	61.3	105		59.5	61.7	104		75	125	0.650	20
Selenium	BQL	58.4	46.4	79.4	*	59.5	44.5	74.8	*	75	125	4.18	20
Silver	BQL	58.4	42.3	72.4	*	59.5	40.0	67.2	*	75	125	5.59	20
Thallium	BQL	58.4	58.9	101		59.5	60.1	101		75	125	2.02	20
Vanadium	8.17	58.4	57.2	83.9		59.5	55.6	79.7		75	125	2.84	20
Zinc	48.2	58.4	77.4	50.0	*	59.5	90.8	71.6	*	75	125	15.9	20

Comments

*=Out of Limits

NA = Not applicable, due to sample concentration greater than three times spike concentration

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