



February 12, 2010

Ms. Jaclynne Drummond
NCDENR DWM Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

**RE: Soil Analytical Results
Waste Relocation and Mitigation
Avery County Landfill
Spruce Pine, North Carolina**

Dear Ms. Drummond:

As you know, Richardson Smith Gardner and Associates, Inc. (RSG) has been assisting Avery County Landfill personnel in responding to a Compliance Order from NCDENR dated September 22, 2008. The Compliance Order addressed, in part, waste that was placed outside the permitted boundary of the landfill. Under Condition #3 for Compliance, Avery County agreed to prepare a plan for assessment of any impact to soils by wastes located outside the permitted boundary.

You may recall we spoke at that time and it was agreed that one soil sample would be collected from each area of waste removal to evaluate any potential impact to the soils.

As shown on **Figure 1**, there were 4 areas where waste was originally planned to be removed (two to the east of Phase 2, one to the south of Phase 2 and one to the west of Phase 2). Upon excavation, the area to the west of Phase 2 was found to have insignificant amounts of waste. Therefore, no soil sample was collected from that area. Soil samples were collected from the remaining three areas (Samples 2 – 4) and a background sample (Sample #1) was also collected.

An initial soil sampling event was conducted on October 28, 2009. The soil samples were submitted to Environment 1 for laboratory analysis of Appendix I constituents. The results of this preliminary sampling event indicated no detectable concentrations of organic constituents. However, concentrations exceeding the soil remediation guidelines were detected for cobalt in three (3) samples (Sample #2 – Sample #4) and for vanadium in one sample (Sample #2). The sampling locations are shown on **Figure 1** and the analytical results are included in **Attachment 1**.

The soil remediation goal for cobalt is 4.6 mg/kg. Results from the initial sampling indicate concentrations ranging from 12 mg/kg to 33 mg/kg. The soil remediation goal for vanadium is 110 mg/kg. Sample #2 indicated a vanadium concentration of 135 mg/kg. The remaining soils analysis indicated concentrations below the soil remediation goals.

Due to these elevated concentrations of cobalt and vanadium, a second sample event was conducted on January 6, 2010. During this sampling event, the background sample, Sample #1, was also re-sampled along with the locations exhibiting elevated concentrations for comparison with the results. During this re-sampling event, the same approximate sampling locations were used.

Results from the re-sampling event indicate that the vanadium concentrations were detected below the soil remediation goals. The detected cobalt concentrations remained above the soil remediation goals, however, the background concentration (Sample #1) was 16 mg/kg. The analyzed concentrations for the remaining samples were:

- Sample #2 - 40 mg/kg;
- Sample #3 - 18 mg/kg; and
- Sample #4 - 11 mg/kg.

These results are also included in **Attachment 1**. Given the expected natural variability of inorganic constituents across sites located in the Blue Ridge Physiographic Province these results appear to be consistent with the analyzed background concentrations. As such, these results indicate that no impacted soils remain in these areas of waste removal.

This concludes the assessment activities related to the waste relocation and mitigation at the Avery County Landfill. If you have any questions, or require additional information, please call me at 919-828-0577 x 221 at your earliest convenience.

Sincerely,

Richardson Smith Gardner and Associates, Inc.

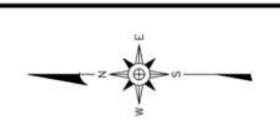
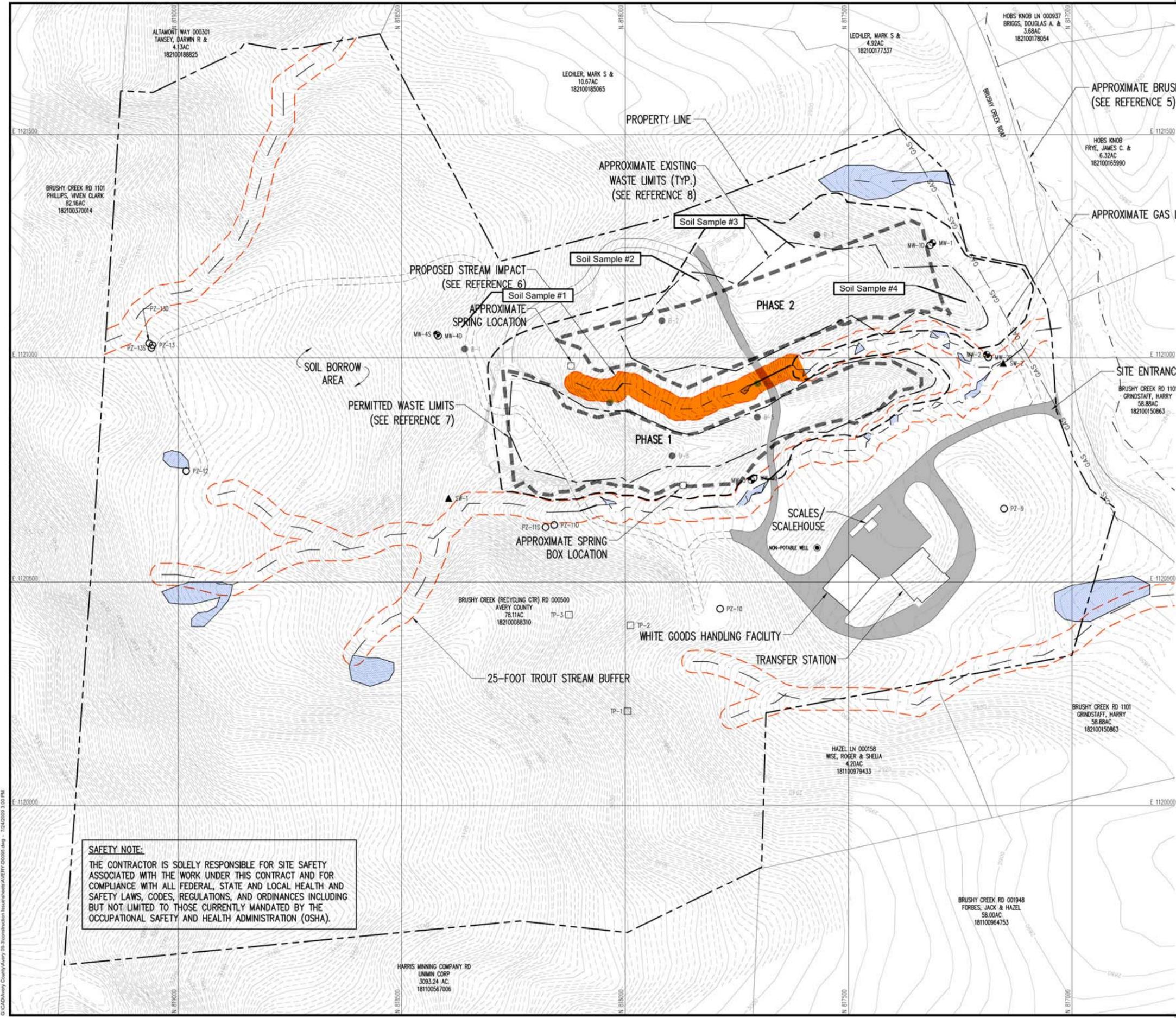


Joan A. Smyth, P.G.
Senior Hydrogeologist

Attachments

Cc: Buddy Norris – Avery County
Bill Wagner – NCDENR ARO

Figure



ISSUED FOR CONSTRUCTION	REVISION
7/20/09	DATE
	NO.
	SCALE
	PROJECT TITLE
	DRAWING TITLE
	DESIGNED BY
	CHECKED BY
	SCALE
	AS SHOWN
	DATE
	FILE NAME
	SHEET NO.
	DRAWING NO.

RICHARDSON SMITH GARDNER & ASSOCIATES
 14 N. Boylan Ave.
 Raleigh, N.C. 27603
 PH: 919.828.3855
 FAX: 919.828.3859
 www.rsginc.com

ISSUED FOR CONSTRUCTION

- LEGEND**
- EXISTING 10' CONTOUR (SEE REFERENCE 1)
 - EXISTING 2' CONTOUR
 - - - PROPERTY LINE (SEE REFERENCE 2)
 - - - PERMITTED WASTE LIMITS
 - - - GAS
 - - - APPROXIMATE GAS LINE (CONTRACTOR SHALL VERIFY)
 - - - APPROX. STREAM LOCATION (SEE REFERENCES 3, 4)
 - WETLANDS (SEE REFERENCES 3, 4)
 - - - 25-FOOT TROUT STREAM BUFFER
 - ROAD/ABC
 - MONITORING WELL
 - PIEZOMETER
 - △ SURFACE WATER MONITORING POINT
 - BORING
 - TEST PIT
 - NON-POTABLE WELL

- REFERENCES**
1. OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPO IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C.
 2. SITE PROPERTY LINE AND MONITORING WELL LOCATIONS FROM FIELD SURVEYS DATED 9/07 AND 1/14/08, BY SURVEYING SOLUTIONS, P.C.
 3. STREAM AND WETLAND LOCATIONS IN NORTHERN SECTOR OF SITE OBTAINED FROM GPS FIELD SURVEY DATED 4/07, BY CAROLINA ECOSYSTEMS, INC.
 4. STREAMS AND WETLANDS NEAR PHASE 1 AND 2 FROM FIELD SURVEY DATED 2/18/08 BY SURVEYING SOLUTIONS, P.C.
 5. BRUSHY CREEK LOCATION FROM AVERY COUNTY GIS DEPARTMENT.
 6. ALL IMPACT AREAS ARE UNDER APPROVAL OF ACTION I.D. 2008-03130 NATIONWIDE PERMIT NO. 39 BY THE US ARMY CORPS OF ENGINEERS DATED NOVEMBER 9, 2008 AND NC DIVISION OF WATER QUALITY DATED NOVEMBER 21, 2008 DWQ PROJECT NO. 08-1464.
 7. PERMITTED WASTE LIMITS APPROVED ACCORDING TO THE "WASTE RELOCATION AND MITIGATION PLAN" NC SOLID WASTE PERMIT NO. 06-03 DATED OCTOBER 2008 AND REVISED APRIL 2009.
 8. APPROXIMATE EXISTING WASTE LIMITS - SEE DRAWING "TEST PITS & EXISTING WASTE LIMITS" PREPARED BY RSG, DATED OCTOBER 2008.



SAFETY NOTE:
 THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SITE SAFETY ASSOCIATED WITH THE WORK UNDER THIS CONTRACT AND FOR COMPLIANCE WITH ALL FEDERAL, STATE AND LOCAL HEALTH AND SAFETY LAWS, CODES, REGULATIONS, AND ORDINANCES INCLUDING BUT NOT LIMITED TO THOSE CURRENTLY MANDATED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).

PROJECT TITLE
 AVERY COUNTY C&D LANDFILL
 WASTE RELOCATION AND
 SITE IMPROVEMENTS
CONSTRUCTION DRAWINGS

DRAWING TITLE
 Soil Sampling Locations

DESIGNED BY	DRAWN BY
S.A.S.	JAS
CHECKED BY	PROJECT NO.
	AVERY 09-3
SCALE	DATE
AS SHOWN	Feb 2010
FILE NAME	
AVERY-00095	
SHEET NO.	DRAWING NO.
1	S1

G:\CAD\Avery County\Avery 09-3\Construction Issues\AVERY-00095.dwg - 1/24/2009 3:00 PM

Attachment 1
Soil Analytical Reports

Environment 1, Incorporated

REC'D DEC 10 2009

Drinking Water ID: 37715
Wastewater ID: 10

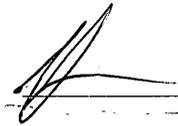
P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

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

ID#: 1007

AVERY COUNTY (SPECIAL)
C/O MS. JOAN SMYTH
RICHARDSON SMITH GARDNER
14 N. BOYLAN AVENUE
RALEIGH, NC 27603

DATE COLLECTED: 10/28/09
DATE REPORTED : 12/08/09

REVIEWED BY: 

PARAMETERS	Sample #1	Sample #2	Sample #3	Sample #4	Analysis Date	Analyst	Method Code
Antimony (dry wt. basis), mg/kg	<1.5	<1.5	<1.5	<1.5	11/11/09	CMF	EPA7041
Arsenic (dry wt. basis), mg/kg	<2.5	<2.5	<2.5	<2.5	11/12/09	CMF	SM3113B
Barium (dry wt. basis), mg/kg	< 50	104	128	71	11/10/09	LFJ	EPA200.7
Beryllium (dry wt. basis), mg/kg	0.7	3	4	2	11/18/09	LFJ	EPA200.7
Cadmium (dry wt. basis), mg/kg	<0.5	<0.5	<0.5	<0.5	11/13/09	LFJ	SM3113B
Cobalt (dry wt. basis), mg/kg	<5.0	33	25	12	11/12/09	LFJ	EPA200.7
Copper (dry wt. basis), mg/kg	<5.0	54	12	17	11/10/09	LFJ	EPA200.7
Chromium, T.(dry wt. basis),mg/kg	14	70	25	28	11/10/09	LFJ	EPA200.7
Lead (dry weight basis), mg/kg	9	12	9	14	11/18/09	CMF	SM3113B
Nickel (dry wt. basis), mg/kg	<5.0	35	11	11	11/10/09	LFJ	EPA200.7
Selenium (dry wt. basis), mg/kg	<5.0	<5.0	<5.0	<5.0	11/10/09	CMF	SM3113B
Silver (dry wt. basis), mg/kg	<2.5	<2.5	<2.5	<2.5	11/10/09	LFJ	EPA200.7
Thallium (dry wt. basis), mg/kg	<0.5	<0.5	<0.5	<0.5	11/09/09	CMF	EPA7841
Vanadium (dry wt. basis), mg/kg	27	135	99	63	11/10/09	LFJ	EPA200.7
Zinc (dry wt. basis), mg/kg	22	76	67	55	11/12/09	ADD	SM3111B

Environment 1, Incorporated

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

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

METHOD 8260 GC/MS

VOLATILE ORGANIC COMPOUNDS IN SOILS

(Prep Method: 5030)

AVERY COUNTY (SPECIAL)
MS. JOAN SMYTH
RICHARDSON SMITH GARDNER
14 N. BOYLAN AVENUE
RALEIGH, NC 27603

Client ID#: 1007
Analyst: MAO
Date Collected: 10/28/09
Date Analyzed: 11/11/09
Date Reported: 12/08/09

Reviewed by: 

<u>Location</u>	<u>Sample</u> #1 ^x	<u>Sample</u> #2	<u>Sample</u> #3	<u>Sample</u> #4
Dilution Factor *	1	1	1	1
<i>(All Results in mg/kg)</i>				
Chloromethane	<0.005	<0.005	<0.005	<0.005
Vinyl Chloride	<0.010	<0.010	<0.010	<0.010
Bromomethane	<0.010	<0.010	<0.010	<0.010
Chloroethane	<0.010	<0.010	<0.010	<0.010
Trichlorofluoromethane	<0.005	<0.005	<0.005	<0.005
1,1-Dichloroethene	<0.005	<0.005	<0.005	<0.005
Acetone	<0.050	<0.050	<0.050	<0.050
Iodomethane	<0.010	<0.010	<0.010	<0.010
Carbon Disulfide	<0.010	<0.010	<0.010	<0.010
Methylene chloride	<0.005	<0.005	<0.005	<0.005
trans-1,2-Dichloroethene	<0.005	<0.005	<0.005	<0.005
1,1-Dichloroethane	<0.005	<0.005	<0.005	<0.005
Vinyl acetate	<0.025	<0.025	<0.025	<0.025
cis-1,2-Dichloroethene	<0.005	<0.005	<0.005	<0.005
2-Butanone	<0.100	<0.100	<0.100	<0.100
Bromochloromethane	<0.005	<0.005	<0.005	<0.005
Chloroform	<0.005	<0.005	<0.005	<0.005
1,1,1-Trichloroethane	<0.005	<0.005	<0.005	<0.005
Carbon Tetrachloride	<0.005	<0.005	<0.005	<0.005
Benzene	<0.005	<0.005	<0.005	<0.005
1,2-Dichloroethane	<0.005	<0.005	<0.005	<0.005
Trichloroethene	<0.005	<0.005	<0.005	<0.005
1,2-Dichloropropane	<0.005	<0.005	<0.005	<0.005
Bromodichloromethane	<0.005	<0.005	<0.005	<0.005
cis-1,3-Dichloropropene	<0.005	<0.005	<0.005	<0.005
4-Methyl-2-pentanone	<0.050	<0.050	<0.050	<0.050

(Continued; page 2)

Environment 1, Incorporated

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

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

Page 2, Continued: Method 8260 GC/MS
Volatile Organic Compounds in Soils

**AVERY COUNTY (SPECIAL)
MS. JOAN SMYTH
RICHARDSON SMITH GARDNER
14 N. BOYLAN AVENUE
RALEIGH, NC 27603**

**Client ID#: 1007
Analyst: MAO
Date Collected: 10/28/09
Date Analyzed: 11/11/09
Date Reported: 12/08/09**

<u>Location</u>	<u>Sample</u> #1 ^x	<u>Sample</u> #2	<u>Sample</u> #3	<u>Sample</u> #4
<i>(All Results in mg/kg)</i>				
Toluene	<0.005	<0.005	<0.005	<0.005
trans-1,3-Dichloropropene	<0.005	<0.005	<0.005	<0.005
1,1,2-Trichloroethane	<0.005	<0.005	<0.005	<0.005
Tetrachloroethene	<0.005	<0.005	<0.005	<0.005
2-Hexanone	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	<0.005	<0.005	<0.005	<0.005
1,2-Dibromoethane	<0.005	<0.005	<0.005	<0.005
Chlorobenzene	<0.005	<0.005	<0.005	<0.005
1,1,1,2-Tetrachloroethane	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	<0.010	<0.010	<0.010	<0.010
Dibromomethane	<0.005	<0.005	<0.005	<0.005
Styrene	<0.005	<0.005	<0.005	<0.005
Bromoform	<0.005	<0.005	<0.005	<0.005
1,1,1,2,2-Tetrachloroethane	<0.050	<0.050	<0.050	<0.050
1,2,3-Trichloropropane	<0.010	<0.010	<0.010	<0.010
1,4-Dichlorobenzene	<0.010	<0.010	<0.010	<0.010
1,2-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005
1,2-Dibromo-3-Chloropropane	<0.005	<0.005	<0.005	<0.005
Acrylonitrile	<0.005	<0.005	<0.005	<0.005
trans-1,4-Dichloro-2-Butene	<0.005	<0.005	<0.005	<0.005

* Dilution Factor = 1 for Low Level analysis. DF = 50 or higher for high level analysis.

x Sample had low Internal Standard recovery.

Environment 1, Inc.
 P.O. Box 7085, 114 Oakmont Dr.
 Greenville, NC 27858

Phone (252) 756-6208 • Fax (252) 756-0633

CLIENT: 1007 Week: 1

AVERY COUNTY (SPECIAL)
 C/O MS. JOAN SMYTH
 RICHARDSON SMITH GARDNER
 14 N. BOYLAN AVENUE
 RALEIGH NC 27603

(919) 828-3899

CHAIN OF CUSTODY RECORD

DISINFECTION

CHLORINE

UV

NONE

Metals

EPA 8260B

8260 Dup. 1

A E E

P G G

SAMPLE LOCATION	COLLECTION		TOTAL CHLORINE, mg/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	Metals	EPA 8260B	8260 Dup. 1	DATE/TIME	DATE/TIME	RECEIVED BY (SIG.)	RECEIVED BY (SIG.)	DATE/TIME	DATE/TIME
	DATE	TIME												
Sample #1	10/28/09	12:45			3									
Sample #2	10/28/09	12:00			3									
Sample #3	10/28/09	1:15			3									
Sample #4	10/28/09	1:30			3									
Sample #5					3									
Sample #6					3									
Sample #7					3									

CHLORINE NEUTRALIZED AT COLLECTION

pH CHECK (LAB)

CONTAINER TYPE, P/G

CHEMICAL PRESERVATION

A - NONE D - NaOH

B - HNO₃ E - HCL

C - H₂SO₄ F - ZINC ACETATE

G - Na THIOSULFATE

CLASSIFICATION:

WASTEWATER (NPDES)

DRINKING WATER

DWQ/GW

SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY

SAMPLES COLLECTED BY: Don M

(Please Print)

SAMPLES RECEIVED IN LAB AT 03 °C

COMMENTS:

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

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

No 193147

Environment 1, Incorporated

Drinking Water ID: 57715
Wastewater ID: 10

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

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

ID#: 1007

AVERY COUNTY (SPECIAL)
C/O MS. JOAN SMYTH
RICHARDSON SMITH GARDNER
133 SPRING AVENUE
FUQUAY VARINA ,NC 27526

DATE COLLECTED: 01/06/10
DATE REPORTED : 02/01/10

REVIEWED BY: 

PARAMETERS	Sample #1	Sample #2	Sample #3	Sample #4	Analysis Date	Analyst	Method Code
Cobalt (dry wt. basis), mg/kg	16	40	18	11	01/22/10	LFJ	EPA200.7
Vanadium (dry wt. basis), mg/kg	36	74			01/12/10	LFJ	EPA200.7