
Semi-Annual Water Quality Monitoring Report

Prepared for

Hertford County Closed Unlined MSWLF
Winton, North Carolina

**December 2011
and
January 2012**

Permit Number: 46-01

MESCO Project Number: G11012.0

Submitted on June 11, 2012

P.O. Box 97
Garner, NC 27529
License No. C-0281



Municipal Engineering Services Company, P.A.
Garner and Boone, North Carolina

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

Instructions:

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

Solid Waste Monitoring Data Submittal Information

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

Municipal Engineering Services Co., PA

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

Name: Jonathan Pfohl Phone: (919)772-5393

E-mail: jpfohl@mesco.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Hertford County Closed Unlined MSWLF	227 Mount Moriah Road Winton, NC 27986	46-01	.0500	December 15, 2011 January 19, 2012(verification)

Environmental Status: (Check all that apply)

- Initial/Background Monitoring
 Detection Monitoring
 Assessment Monitoring
 Corrective Action

Type of data submitted: (Check all that apply)

- Groundwater monitoring data from monitoring wells
 Methane gas monitoring data
 Groundwater monitoring data from private water supply wells
 Corrective action data (specify) _____
 Leachate monitoring data
 Other(specify) _____
 Surface water monitoring data

Notification attached?

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

Certification

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

D. Mark Durway, L.G. Geologist (919) 772-5393

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

D. Mark Durway 6/11/12
 Signature Date

Affix NC Licensed/ Professional Geologist Seal

P.O. Box 97, Garner, NC 27529

Facility Representative Address

C-0281

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

Revised 6/2009



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June 11, 2012

Mr. Ervin Lane
Solid Waste Section
 NC DENR Division of Waste Management
 1646 Mail Service Center
 Raleigh, NC 27699-1646

Re: Semi-Annual Water Quality Monitoring Report (December 2011/January 2012)
 Hertford County Closed Unlined Landfill
 Permit No. 46-01
 MESCO Project No. G11012.0

Dear Mr. Lane:

Introduction

The Hertford County Closed Unlined MSWLF located near Winton, North Carolina operated under permit 46-01 and is required to submit semi-annual compliance reports as a condition of rule 15A NCAC 13B .0500. This water quality monitoring event was reportedly performed by Environment 1 Incorporated (E1) personnel of Greenville NC on June 7, 2011 in accordance with the semi-annual monitoring schedule prescribed by the NC Solid Waste Section (SWS) rules/regulations. A verification sample was collected from surface water location SW-4 and analyzed for total metals by E1 on January 19, 2012. Laboratory analytical results indicate volatile organic compounds (VOCs) continue to persist within the surficial aquifer at the closed MSWLF, but natural attenuation processes appear to be occurring.

Water quality monitoring at this facility includes sampling at locations outlined in the approved site specific Sampling and Analysis Plan (SAP) submitted in the facility *Transition Plan* in November 1995. As required in SWS rules and the SWS Environmental Monitoring Report Form, this report contains sampling procedures, field and laboratory results, groundwater and surface water characterization, and findings. A detections compared to standards table, groundwater flow directions and rates table, groundwater potentiometric map, quality assurance/quality control data, and laboratory analytical data are also provided.

Sampling Procedures

During the December 2011 sampling event, water samples were collected from thirteen groundwater monitoring wells (MW-A through MW-M) and four surface water sample points (SW-1 through SW-4). Quality control measures were also implemented during this event which included submittal and subsequent quantification of an equipment blank (EB) and trip blank (TB). Monitoring locations are shown on Figure 1.

Sampling was reported to be performed using methods outlined in the NCDENR *Solid Waste Section Guidelines for Groundwater, Soil, and Surface Water Sampling* revised April 2008. Static water levels were measured, and a potentiometric map was constructed, as provided in **Plate 1**. Samples were transported under chain-of-custody (C-O-C) protocol within the specified hold times for each analysis.

Field Parameter Data

Field parameters (pH, specific conductance and temperature) were recorded and are presented in the laboratory report in **Appendix A**. Field parameters are generally consistent with historically reported data.

Laboratory Results

Groundwater samples and EB were analyzed for the Appendix I list of VOCs by method EPA 8260B, Appendix I total unfiltered metals and mercury via EPA 200.8. The surface waters were analyzed for the same parameters and methods except mercury was not a target analyte. Quality control sample TB was tested for Appendix I VOCs.

Water samples were reported to laboratory specific Method Detection Limits (MDL) which are quantifiable at or below current Solid Waste Section Limits (SWSL). **Table 1** summarizes constituents detected in water samples in concentrations exceeding the current SWSL, Groundwater Protection Standards (GWP), North Carolina Groundwater Standards (2L) or the North Carolina Surface Water Standards (2B) for Class C surface waters. Laboratory results and C-O-Cs are presented in **Appendix A**.

Quality Control Samples

Metals were detected in non-quantifiable concentrations in equipment blank EB; however, it appears that this laboratory/field induced artifact contamination had no effect on the validity of the data set.

Groundwater Samples

The only total metal detected above its respective 2L Standard was nickel in downgradient well MW-H. One or more VOCs were detected in concentrations above their respective 2L Standards in MW-A, MW-B, MW-D, MW-E, MW-F, MW-G, MW-H, MW-I, MW-J, and MW-L. Vinyl chloride, a common biodegradation byproduct of reductive dechlorination, continues to be the most prevalently detected contaminant.

Surface Water Samples

Total chromium, lead and zinc were detected in SW-4 at concentrations exceeding the 2B Standard on December 15, 2011. However, these constituents were not detected in quantifiable concentrations in the verification sample collected 35 days later on January 19, 2012. VOCs were not detected in concentrations exceeding the applicable 2B Standards.

Groundwater and Surface Water Characterization

A potentiometric map constructed from groundwater elevation data obtained by E1 during the December 2011 sampling event is presented as **Figure 1**. Groundwater flow rates and directions were calculated and are included on **Table 2**. Groundwater in the surficial aquifer flows in a general north-northwestern direction towards Potecasi Creek. Groundwater flow rates range from about 1 ft/yr (MW-C) to 57 ft/yr (MW-H), and average 22 ft/yr. Flow directions and gradients are consistent with historical observations.

Findings

Results from the latest semi-annual sampling event indicate that VOCs continue to persist in the surficial aquifer. Landfill gas has previously been detected at the facility and may be a factor in the occurrence and migration of VOCs in groundwater, especially in MW-A, MW-B and MW-G which are located hydraulically upgradient of the waste boundary. Constituents detected in groundwater samples at levels exceeding 2L Standards have previously been detected at similar concentrations, and therefore, do not appear to be increasing.

The December 15, 2011 downgradient sample SW-4 from along Potecasi Creek contained concentrations of total chromium, copper, and zinc above the 2B Standard. No metals were detected in SW-4 at levels above the 2B Standard in the verification sample collected January 19, 2012. E1 reported that the SW-4 sample location was observed to be very low and stagnant during both sample collection events. E1 reported that during collection of the verification sample that more caution was taken to minimize introducing sediment into the sample container. The total metal concentrations detected in SW-4 in December, therefore, appears to be influenced by high sediment content in the sample. E1 indicated they plan to improve their sample collection protocols to obtain more representative samples which should potentially minimize future false positives.

The facility is located in a rural setting and the residents in closest proximity to the property boundary are connected to municipal water, limiting the potential of human exposure to groundwater.

Closing

Water quality monitoring at the facility will continue and the next event is tentatively scheduled for June 2012. If you have any questions or comments regarding this report, please contact us by phone at (919) 772-5393 or by email at jpfohl@mesco.com or mdurway@mesco.com.

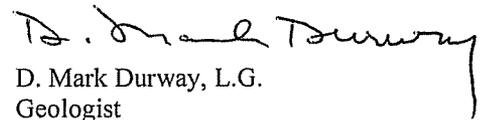
Sincerely,
MUNICIPAL ENGINEERING SERVICES CO., P.A.



Jonathan Pfohl
Environmental Specialist

Enclosures

cc: Mr. Melvin Nichols
Hertford County



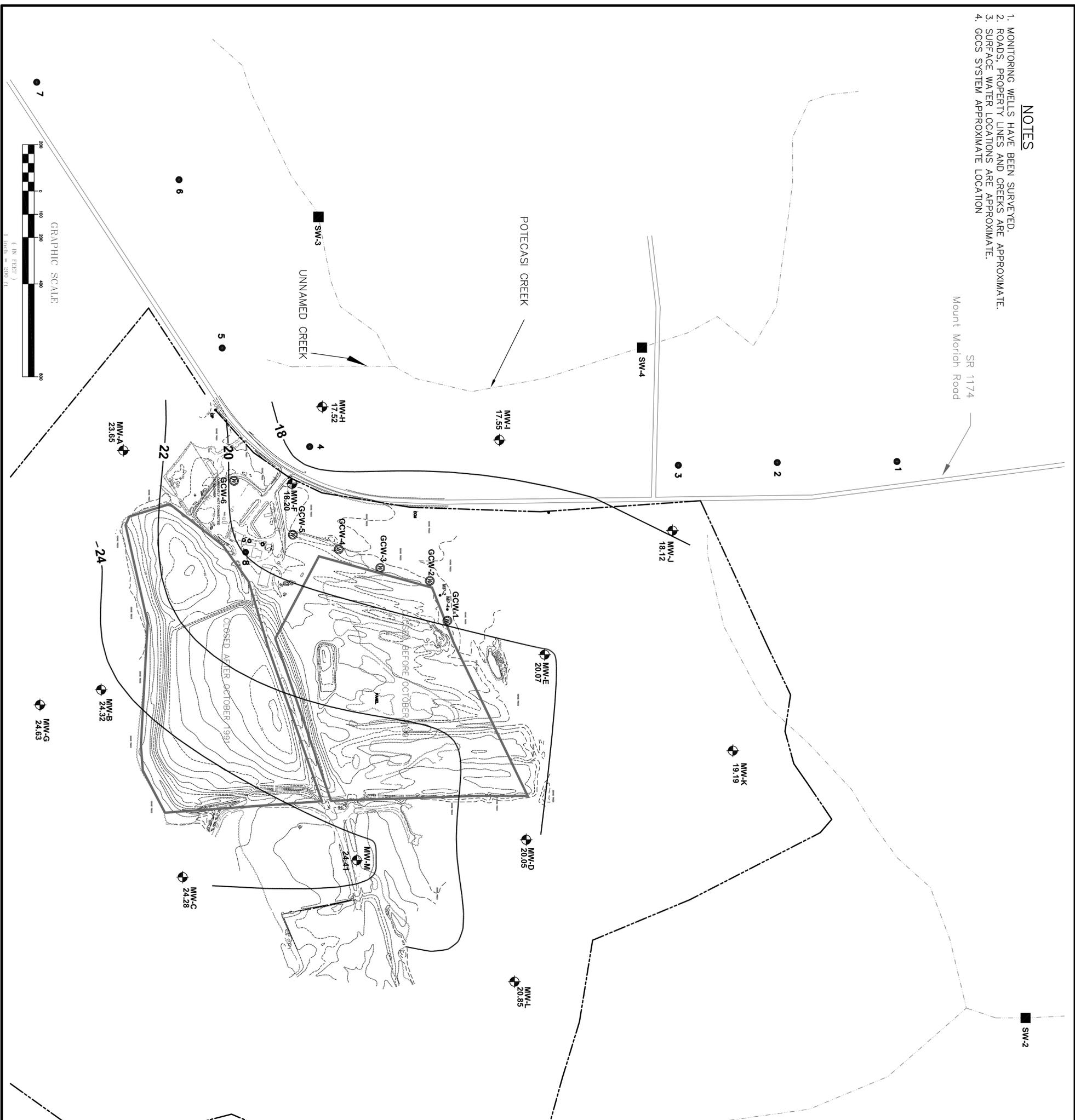
D. Mark Durway, L.G.
Geologist



Figures

NOTES

1. MONITORING WELLS HAVE BEEN SURVEYED.
2. ROADS, PROPERTY LINES AND CREEKS ARE APPROXIMATE.
3. SURFACE WATER LOCATIONS ARE APPROXIMATE.
4. GCOS SYSTEM APPROXIMATE LOCATION



LEGEND

- 2 EXISTING WATER SUPPLY WELL
- ⊕ MW-D GROUNDWATER MONITORING WELL
- SW-4 SURFACE WATER SAMPLING LOCATION
- ROAD
- PROPERTY LINES
- EXISTING CONTOUR
- ESTIMATED EXTENT OF WASTE
- EQUIPOTENTIAL GROUNDWATER CONTOURS
- ⊕ GCW-1 GAS EXTRACTION WELLS
- MR-2 LFG MIGRATION MONITORING PROBES

WATER SUPPLY WELLS

1. Howard Godwin
2. John Eley
3. Hattie Casey
4. Mt. Moriah Church
5. Snoll Frame House
6. Arthur Williams
7. Armstead Sharp
8. Landfill

ALL SUPPLY WELLS REPORTEDLY NOT IN USE.
BUILDINGS NOW CONNECTED TO MUNICIPAL WATER.

Groundwater Elevations

December 15, 2011

WELL #	TOP OF CASING ELEVATION (FT. AMSL)	DEPTH TO GROUNDWATER (FT. BTOC)	GROUNDWATER POTENTIOMETRIC ELEVATION (FT. AMSL)
MW-A	50.25	28.60	23.65
MW-B	49.77	29.45	24.32
MW-C	48.58	21.30	24.28
MW-D	48.31	28.28	20.05
MW-E	47.86	27.79	20.07
MW-F	49.49	31.29	18.2
MW-G	50.10	29.47	24.63
MW-H	45.46	27.94	17.52
MW-I	48.00	30.45	18.12
MW-J	46.26	28.14	19.19
MW-K	48.81	29.62	20.85
MW-L	46.41	25.56	20.85
MW-M	47.77	23.36	24.41

Depth to groundwater recorded by Environmental Technology personnel on December 15, 2011



FIGURE 1

DATE	BY	REV.	DESCRIPTION
5/12/12	J. PROHL		
	M. GORNAVY		

SCALE: 1" = 200'

DRWN. BY: J. PROHL
 CADD. BY: M. GORNAVY
 PROJECT NUMBER: G17012.0
 SHEET NO.: 1 OF 1

**CLOSED UNLINED
MSW LANDFILL FACILITY
HERTFORD COUNTY
NORTH CAROLINA**

**SINGLE DAY POTENTIOMETRIC MAP
UPPERMOST AQUIFER**

LICENSE #C-0281

Municipal Services
 P.O. BOX 97 GARNER, N.C. 27529
 (919) 772-5393



Engineering Company, P.A.
 P.O. BOX 349 BOONE, N.C. 27529
 (704) 262-1767

Tables

Table 1
Detections in Water Samples that Attain or Exceed SWSL, GWP, 2L or 2B
December 15, 2011
January 19, 2012 (SW-4 Metal Verification Sample)

Sample ID	Parameter Name ¹	Sample Date	Result	Unit	MDL ²	SWSL ³	2L ⁴	2B ⁵	GWP ⁶	Exceedance	Preliminary Cause ⁷
MW-A	1,4-Dichlorobenzene	12/15/2011	1.1	ug/l	0.39	1	6				
MW-A	Barium, Total	12/15/2011	130	ug/l	0.02	100	700				
MW-A	Benzene	12/15/2011	1.4	ug/l	0.24	1	1			0.4	L &/or LFG
MW-A	Chlorobenzene	12/15/2011	4.6	ug/l	0.3	3	50				
MW-A	Cobalt, Total	12/15/2011	115	ug/l	0.03	10			70	45	
MW-A	Vinyl Chloride	12/15/2011	1	ug/l	0.63	1	0.03			0.97	L &/or LFG
MW-A	Zinc, Total	12/15/2011	16	ug/l	0.24	10	1050				
MW-B	Arsenic, Total	12/15/2011	10	ug/l	0.1	10	10				
MW-B	Barium, Total	12/15/2011	117	ug/l	0.02	100	700				
MW-B	Cobalt, Total	12/15/2011	49	ug/l	0.03	10			70		
MW-B	Trichloroethene	12/15/2011	7.1	ug/l	0.23	1	3			4.1	L &/or LFG
MW-B	Vinyl Chloride	12/15/2011	7.6	ug/l	0.63	1	0.03			7.57	L &/or LFG
MW-B	Zinc, Total	12/15/2011	18	ug/l	0.24	10	1050				
MW-C	Beryllium, Total	12/15/2011	1	ug/l	0.02	1			4		
MW-C	Zinc, Total	12/15/2011	34	ug/l	0.24	10	1050				
MW-D	Barium, Total	12/15/2011	125	ug/l	0.02	100	700				
MW-D	Cobalt, Total	12/15/2011	75	ug/l	0.03	10			70	5	
MW-D	Vinyl Chloride	12/15/2011	1.4	ug/l	0.63	1	0.03			1.37	L &/or LFG
MW-D	Zinc, Total	12/15/2011	60	ug/l	0.24	10	1050				
MW-E	1,4-Dichlorobenzene	12/15/2011	4.5	ug/l	0.39	1	6				
MW-E	Barium, Total	12/15/2011	113	ug/l	0.02	100	700				
MW-E	Benzene	12/15/2011	3	ug/l	0.24	1	1			2	L &/or LFG
MW-E	Chlorobenzene	12/15/2011	23.5	ug/l	0.3	3	50				
MW-E	Cobalt, Total	12/15/2011	72	ug/l	0.03	10			70	2	
MW-E	Vinyl Chloride	12/15/2011	1.4	ug/l	0.63	1	0.03			1.37	L &/or LFG
MW-E	Zinc, Total	12/15/2011	13	ug/l	0.24	10	1050				

Sample ID	Parameter Name ¹	Sample Date	Result	Unit	MDL ²	SWSL ³	2L ⁴	2B ⁵	GWP ⁶	Exceedance	Preliminary Cause ⁷
MW-F	1,4-Dichlorobenzene	12/15/2011	4.8	ug/l	0.39	1	6				
MW-F	Barium, Total	12/15/2011	486	ug/l	0.02	100	700				
MW-F	Benzene	12/15/2011	2.9	ug/l	0.24	1	1			1.9	L &/or LFG
MW-F	Beryllium, Total	12/15/2011	1	ug/l	0.02	1			4		
MW-F	Cadmium, Total	12/15/2011	1	ug/l	0.02	1	1.75				
MW-F	Chlorobenzene	12/15/2011	15.5	ug/l	0.3	3	50				
MW-F	Cis-1,2-Dichloroethene	12/15/2011	30	ug/l	0.25	5	70				
MW-F	Cobalt, Total	12/15/2011	105	ug/l	0.03	10			70	35	
MW-F	Mercury	12/15/2011	0.82	ug/l	0.05	0.2	1.05				
MW-F	Thallium, Total	12/15/2011	1 j	ug/l	0.02	5.5			0.28	0.72	
MW-F	Trichloroethene	12/15/2011	1.4	ug/l	0.23	1	3				
MW-F	Vanadium, Total	12/15/2011	12.8 j	ug/l	0.14	25			3.5	9.3	
MW-F	Vinyl Chloride	12/15/2011	8.9	ug/l	0.63	1	0.03			8.87	L &/or LFG
MW-F	Zinc, Total	12/15/2011	715	ug/l	0.24	10	1050				
MW-G	Barium, Total	12/15/2011	127	ug/l	0.02	100	700				
MW-G	Vinyl Chloride	12/15/2011	1.9	ug/l	0.63	1	0.03			1.87	L &/or LFG
MW-G	Zinc, Total	12/15/2011	33	ug/l	0.24	10	1050				
MW-H	Barium, Total	12/15/2011	186	ug/l	0.02	100	700				
MW-H	Cobalt, Total	12/15/2011	241	ug/l	0.03	10			70	171	
MW-H	Nickel, Total	12/15/2011	184	ug/l	0.04	50	100			84	N
MW-H	Thallium, Total	12/15/2011	9	ug/l	0.02	5.5			0.28	8.72	
MW-H	Zinc, Total	12/15/2011	17	ug/l	0.24	10	1050				
MW-I	1,4-Dichlorobenzene	12/15/2011	5.8	ug/l	0.39	1	6				
MW-I	Barium, Total	12/15/2011	213	ug/l	0.02	100	700				
MW-I	Benzene	12/15/2011	3.7	ug/l	0.24	1	1			2.7	L &/or LFG
MW-I	Chlorobenzene	12/15/2011	21.4	ug/l	0.3	3	50				
MW-I	Cobalt, Total	12/15/2011	68	ug/l	0.03	10			70		
MW-I	Vinyl Chloride	12/15/2011	11.7	ug/l	0.63	1	0.03			11.67	L &/or LFG
MW-I	Zinc, Total	12/15/2011	37	ug/l	0.24	10	1050				
MW-J	Tetrachloroethene	12/15/2011	0.8 j	ug/l	0.17	1	0.7			0.1	L &/or LFG
MW-J	Vinyl Chloride	12/15/2011	1.9	ug/l	0.63	1	0.03			1.87	L &/or LFG
MW-J	Zinc, Total	12/15/2011	17	ug/l	0.24	10	1050				
MW-L	Cobalt, Total	12/15/2011	70	ug/l	0.03	10			70		
MW-L	Vinyl Chloride	12/15/2011	2.2	ug/l	0.63	1	0.03			2.17	L &/or LFG
MW-L	Zinc, Total	12/15/2011	451	ug/l	0.24	10	1050				

Sample ID	Parameter Name ¹	Sample Date	Result	Unit	MDL ²	SWSL ³	2L ⁴	2B ⁵	GWP ⁶	Exceedance	Preliminary Cause ⁷
SW-1	Cobalt, Total	12/15/2011	13	ug/l	0.03	10		270			
SW-2	Cobalt, Total	12/15/2011	11	ug/l	0.03	10		270			
SW-3	Barium, Total	12/15/2011	231	ug/l	0.02	100		200000			
SW-3	Zinc, Total	12/15/2011	14	ug/l	0.24	10		50			
SW-4	Barium, Total	12/15/2011	638	ug/l	0.02	100		200000			
SW-4	Barium, Total	01/19/2012	103	ug/l	0.02	100		200000			
SW-4	Chromium, Total	12/15/2011	13	ug/l	0.04	10		50		3	N &/or A
SW-4	Chromium, Total	01/19/2012	0.53 j	ug/l	0.04	10		50			
SW-4	Cobalt, Total	12/15/2011	73	ug/l	0.03	10		270			
SW-4	Cobalt, Total	01/19/2012	4.2 j	ug/l	0.03	10		270			
SW-4	Copper, Total	12/15/2011	16	ug/l	0.02	10		7		9	N &/or A
SW-4	Copper, Total	01/19/2012	1 j	ug/l	0.02	10		7			
SW-4	Lead, Total	12/15/2011	19	ug/l	0.02	10		25		4	N &/or A
SW-4	Lead, Total	01/19/2012	0.73 j	ug/l	0.02	10		25			
SW-4	Silver, Total	12/15/2011	0.1 j	ug/l	0.02	10		0.06		0.04	N &/or A
SW-4	Silver, Total	01/19/2012	ND	ug/l	0.02	10		0.06			
SW-4	Toluene	12/15/2011	3.7	ug/l	0.23	1		11			
SW-4	Vanadium, Total	12/15/2011	28	ug/l	0.14	25		NE			
SW-4	Vanadium, Total	01/19/2012	1.2 j	ug/l	0.14	25		NE			
SW-4	Zinc, Total	12/15/2011	174	ug/l	0.24	10		50		124	N &/or A
SW-4	Zinc, Total	01/19/2012	7.9 j	ug/l	0.24	10		50			

¹ Table contains constituents detected at or above SWSL, GWP, 2L, or 2B

² MDL = Method Detection Limit

³ SWSL = Solid Waste Section Reporting Limit

⁴ 2L = North Carolina 15A NCAC 2L Groundwater Quality Standard

⁵ 2B = North Carolina 15 NCAC 2B Surface Water Quality Standard for this Specific Stream Classification

⁶ GWP = Groundwater Protection Standard

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

⁷ Preliminary Cause = Refers to a preliminary analysis of the cause and/or source of a detection over the respective 2L/2B Standard. A definitive source of the detection was not determined as part of this report.

ND = Not Detected above MDL

A = Artifact contamination. Laboratory &/ or field induced as not detected in verification resample

L = Leachate

LFG = Landfill Gas

N = Natural from erosion of natural deposits

BOLD = Concentration > 2L, or 2B Standard

Table 2
Hydrologic Properties at Monitoring Well Locations
December 15, 2011

Monitoring Location	Hydraulic Conductivity (cm/second)	Effective Porosity (%)	Hydraulic Gradient (feet/feet)	Groundwater Average Linear Velocity Rate (feet/year)	Flow Direction	Depth to Groundwater (ft btoc)	Groundwater Potentiometric Elevation (ft amsl)	Screened Interval Lithology	Direction in Relation to MSWLF Boundary
MW-A	7.30E-04	20	0.0096	36	N02E	26.60	23.65	Sand	Crossgradient
MW-B	6.90E-04	20	0.0041	15	N32W	25.45	24.32	Sand	Upgradient
MW-C	1.10E-04	20	0.0009	1	N56W	21.30	24.28	Clayey Sand	Upgradient
MW-D	4.40E-04	20	0.0065	15	N00W	28.26	20.05	Clayey Silt	Downgradient
MW-E	3.10E-03	20	0.0008	14	N79W	27.79	20.07	Sand	Downgradient
MW-F	3.10E-03	20	0.0020	32	N58W	31.29	18.20	Clayey Sand	Downgradient
MW-G	1.80E-03	20	0.0018	17	N25W	25.47	24.63	Sand	Upgradient
MW-H	4.60E-03	20	0.0024	57	N15W	27.94	17.52	Sand	Downgradient
MW-I	1.10E-03	20	0.0028	16	N79W	30.45	17.55	Sand	Downgradient
MW-J	1.20E-03	20	0.0053	33	N70W	28.14	18.12	Sand	Downgradient
MW-K	3.50E-03	20	0.0010	19	N03E	29.62	19.19	Sand	Downgradient
MW-L	1.60E-04	20	0.0039	3	N35W	25.56	20.85	Sand	Downgradient
MW-M	1.20E-03	20	0.0050	31	N06W	23.36	24.41	Sand	Crossgradient
Minimum	1.10E-04	20	0.0008	1	-	21.30	17.52	-	-
Average	1.67E-03	20	0.0035	22	-	27.02	20.99	-	-
Maximum	7.30E-04	20	0.0096	57	-	31.29	24.63	-	-

NOTE: Values for effective porosity & hydraulic conductivity obtained from GAI Consultants' *Assessment Report* (Feb. 1996).

Hydrologic Gradient from groundwater elevations recorded on December 15, 2011.

Average linear velocity rate (Q) is defined by the equation:

where

$$Q = \frac{K}{n_e} \cdot \frac{dh}{dl}$$

K = hydraulic conductivity

n_e = effective porosity

dh = head difference

dl = horizontal distance

Appendix B
Laboratory Analysis Reports
Chains of Custody
Field Data Reports

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

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

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

ID#: 6025

HERTFORD COUNTY LANDFILL
C/O MUNICIPAL ENGINEERS
P.O. BOX 97
GARNER, NC 27529

DATE COLLECTED: 12/15/11
DATE REPORTED : 01/05/12

REVIEWED BY: 

PARAMETERS	MDL	SWSL	MW-A	MW-B	MW-C	MW-D	MW-E	Analysis		Method
								Date	Analyst	Code
PH (field measurement), Units			6.0	5.6	5.0	5.7	5.8	12/15/11	RJH	SM4500HB
Antimony, ug/l	0.14	6.0	--- U	12/22/11	LFJ	EPA200.8				
Arsenic, ug/l	0.10	10.0	4.2 J	10	--- U	1.8 J	8 J	12/22/11	LFJ	EPA200.8
Barium, ug/l	0.02	100.0	130	117	85.8 J	125	113	12/22/11	LFJ	EPA200.8
Beryllium, ug/l	0.02	1.0	0.07 J	0.12 J	1	0.11 J	--- U	12/22/11	LFJ	EPA200.8
Cadmium, ug/l	0.02	1.0	0.15 J	0.04 J	0.12 J	0.11 J	--- U	12/22/11	LFJ	EPA200.8
Cobalt, ug/l	0.03	10.0	115	49	7.9 J	75	72	12/22/11	LFJ	EPA200.8
Copper, ug/l	0.02	10.0	2.0 J	0.62 J	1.4 J	0.85 J	1.4 J	12/22/11	LFJ	EPA200.8
Total Chromium, ug/l	0.04	10.0	0.14 J	0.55 J	1.6 J	1.0 J	--- U	12/22/11	LFJ	EPA200.8
Lead, ug/l	0.02	10.0	--- U	--- U	0.54 J	--- U	--- U	12/22/11	LFJ	EPA200.8
Mercury, ug/l	0.05	0.20	--- U	12/22/11	LFJ	EPA200.8				
Nickel, ug/l	0.04	50.0	4.3 J	14.1 J	6.7 J	8.0 J	12.3 J	12/22/11	LFJ	EPA200.8
Selenium, ug/l	0.20	10.0	0.37 J	0.34 J	0.60 J	0.21 J	--- U	12/22/11	LFJ	EPA200.8
Silver, ug/l	0.02	10.0	0.06 J	--- U	--- U	--- U	--- U	12/22/11	LFJ	EPA200.8
Thallium, ug/l	0.02	5.5	0.18 J	0.05 J	0.05 J	0.20 J	0.07 J	12/22/11	LFJ	EPA200.8
Vanadium, ug/l	0.14	25.0	0.45 J	1.2 J	3.3 J	1.7 J	0.76 J	12/22/11	LFJ	EPA200.8
Zinc, ug/l	0.24	10.0	16	18	34	60	13	12/22/11	LFJ	EPA200.8
Conductivity (at 25c), uMhos/cm	1.0	1.0	581	269	72	341	480	12/15/11	RJH	SM2510B
Temperature, °C			19	18	17	17	20	12/15/11	RJH	SM2550B
Static Water Level, feet			26.60	25.45	21.30	28.26	27.79	12/15/11	RJH	
Well Depth, feet			30.41	28.85	25.20	35.49	35.39	12/15/11	RJH	

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

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
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HERTFORD COUNTY LANDFILL
C/O MUNICIPAL ENGINEERS
P.O. BOX 97
GARNER ,NC 27529

DATE COLLECTED: 12/15/11
DATE REPORTED : 01/05/12

REVIEWED BY: 

PARAMETERS	MDL	MW-F SWSL	MW-G	MW-H	MW-I	MW-J	Analysis		Method Code	
							Date	Analyst		
PH (field measurement), Units			6.1	5.9	6.4	5.8	5.7	12/15/11	RJH	SM4500HB
Antimony, ug/l	0.14	6.0	0.28 J	---	---	---	---	12/22/11	LFJ	EPA200.8
Arsenic, ug/l	0.10	10.0	7 J	1.1 J	1.1 J	2.6 J	---	12/22/11	LFJ	EPA200.8
Barium, ug/l	0.02	100.0	486	127	186	213	86.2 J	12/22/11	LFJ	EPA200.8
Beryllium, ug/l	0.02	1.0	1	0.16 J	---	0.13 J	0.09 J	12/22/11	LFJ	EPA200.8
Cadmium, ug/l	0.02	1.0	1	0.06 J	---	0.21 J	0.11 J	12/22/11	LFJ	EPA200.8
Cobalt, ug/l	0.03	10.0	105	8.7 J	241	68	8.5 J	12/22/11	LFJ	EPA200.8
Copper, ug/l	0.02	10.0	4.9 J	0.90 J	---	0.43 J	0.08 J	12/22/11	LFJ	EPA200.8
Total Chromium, ug/l	0.04	10.0	7.6 J	1.2 J	---	0.38 J	0.26 J	12/22/11	LFJ	EPA200.8
Lead, ug/l	0.02	10.0	6.5 J	0.31 J	---	---	---	12/22/11	LFJ	EPA200.8
Mercury, ug/l	0.05	0.20	0.82					01/04/12	ADD	EPA245.1
Mercury, ug/l	0.05	0.20		---	---	0.16 J	---	12/22/11	LFJ	EPA200.8
Nickel, ug/l	0.04	50.0	11.7 J	9.4 J	184	7.1 J	5.0 J	12/22/11	LFJ	EPA200.8
Selenium, ug/l	0.20	10.0	0.92 J	0.25 J	---	0.70 J	0.34 J	12/22/11	LFJ	EPA200.8
Silver, ug/l	0.02	10.0	---	---	---	---	---	12/22/11	LFJ	EPA200.8
Thallium, ug/l	0.02	5.5	1.0 J	0.03 J	9	0.07 J	---	12/22/11	LFJ	EPA200.8
Vanadium, ug/l	0.14	25.0	12.8 J	2.4 J	---	0.83 J	0.33 J	12/22/11	LFJ	EPA200.8
Zinc, ug/l	0.24	10.0	715	33	17	37	17	12/22/11	LFJ	EPA200.8
Conductivity (at 25c), uMhos/cm	1.0	1.0	971	308	192	554	232	12/15/11	RJH	SM2510B
Temperature, °C			20	18	17	17	17	12/15/11	RJH	SM2550B
Static Water Level, feet			31.29	25.47	27.94	30.45	28.14	12/15/11	RJH	
Well Depth, feet			35.28	29.65	37.11	36.47	38.45	12/15/11	RJH	

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Drinking Water ID: 37715
Wastewater ID: 10

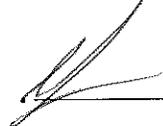
P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
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ID#: 6025

HERTFORD COUNTY LANDFILL
C/O MUNICIPAL ENGINEERS
P.O. BOX 97
GARNER, NC 27529

DATE COLLECTED: 12/15/11
DATE REPORTED : 01/05/12

REVIEWED BY: 

PARAMETERS	MDL	MW-K SWSL	MW-L	MW-M	Equipment Blank	Trip Blank	Analysis		Method Code
							Date	Analyst	
PH (field measurement), Units			5.9	5.6	5.3		12/15/11	RJH	SM4500HB
Antimony, ug/l	0.14	6.0	0.39 J	--- U	--- U	--- U	12/22/11	LFJ	EPA200.8
Arsenic, ug/l	0.10	10.0	--- U	0.60 J	--- U	--- U	12/22/11	LFJ	EPA200.8
Barium, ug/l	0.02	100.0	55.9 J	99.0 J	77.7 J	0.14 J	12/22/11	LFJ	EPA200.8
Beryllium, ug/l	0.02	1.0	--- U	0.18 J	0.23 J	--- U	12/22/11	LFJ	EPA200.8
Cadmium, ug/l	0.02	1.0	0.13 J	0.18 J	0.05 J	--- U	12/22/11	LFJ	EPA200.8
Cobalt, ug/l	0.03	10.0	0.08 J	70	2.8 J	0.05 J	12/22/11	LFJ	EPA200.8
Copper, ug/l	0.02	10.0	1.0 J	0.19 J	0.36 J	--- U	12/22/11	LFJ	EPA200.8
Total Chromium, ug/l	0.04	10.0	1.4 J	0.24 J	0.50 J	--- U	12/22/11	LFJ	EPA200.8
Lead, ug/l	0.02	10.0	--- U	--- U	--- U	--- U	12/22/11	LFJ	EPA200.8
Mercury, ug/l	0.05	0.20	--- U	--- U	0.08 J	--- U	12/22/11	LFJ	EPA200.8
Nickel, ug/l	0.04	50.0	2.6 J	7.1 J	1.7 J	--- U	12/22/11	LFJ	EPA200.8
Selenium, ug/l	0.20	10.0	0.41 J	--- U	0.74 J	--- U	12/22/11	LFJ	EPA200.8
Silver, ug/l	0.02	10.0	0.04 J	--- U	--- U	--- U	12/22/11	LFJ	EPA200.8
Thallium, ug/l	0.02	5.5	0.09 J	--- U	--- U	0.19 J	12/22/11	LFJ	EPA200.8
Vanadium, ug/l	0.14	25.0	0.32 J	0.85 J	--- U	--- U	12/22/11	LFJ	EPA200.8
Zinc, ug/l	0.24	10.0	7.4 J	451	9.6 J	5.0 J	12/22/11	LFJ	EPA200.8
Conductivity (at 25c), uMhos/cm	1.0	1.0	180	210	93		12/15/11	RJH	SM2510B
Temperature, °C			17	18	20		12/15/11	RJH	SM2550B
Static Water Level, feet			29.62	25.56	23.36		12/15/11	RJH	
Well Depth, feet			42.92	35.19	39.83		12/15/11	RJH	

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Wastewater ID: 10

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CLIENT: HERTFORD COUNTY LANDFILL
C/O MUNICIPAL ENGINEERS
P.O. BOX 97
GARNER, NC 27529

CLIENT ID: 6025
ANALYST: MAO
DATE COLLECTED: 12/15/11
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REVIEWED BY: 

VOLATILE ORGANICS EPA METHOD 8260B

PARAMETERS, ug/l	Date Analyzed:		12/19/11	12/19/11	12/19/11	12/19/11	12/19/11	
	MDL	SWSL	MW-A	MW-B	MW-C	MW-D	MW-E	
1. Chloromethane	0.77	1.0	---	U	---	U	---	U
2. Vinyl Chloride	0.63	1.0	1.00		---	U	1.40	1.40
3. Bromomethane	0.67	10.0	---	U	---	U	---	U
4. Chloroethane	0.48	10.0	0.70	J	---	U	---	U
5. Trichlorofluoromethane	0.24	1.0	---	U	---	U	---	U
6. 1,1-Dichloroethene	0.17	5.0	---	U	---	U	---	U
7. Acetone	9.06	100.0	---	U	---	U	---	U
8. Iodomethane	0.26	10.0	---	U	---	U	---	U
9. Carbon Disulfide	0.23	100.0	---	U	---	U	---	U
10. Methylene Chloride	0.64	1.0	---	U	---	U	---	U
11. trans-1,2-Dichloroethene	0.23	5.0	---	U	0.30	J	---	U
12. 1,1-Dichloroethane	0.20	5.0	0.90	J	1.20	J	0.50	J
13. Vinyl Acetate	0.20	50.0	---	U	---	U	---	U
14. Cis-1,2-Dichloroethene	0.25	5.0	0.60	J	3.80	J	2.70	J
15. 2-Butanone	2.21	100.0	---	U	---	U	---	U
16. Bromochloromethane	0.27	3.0	---	U	---	U	---	U
17. Chloroform	0.25	5.0	---	U	---	U	---	U
18. 1,1,1-Trichloroethane	0.19	1.0	---	U	---	U	---	U
19. Carbon Tetrachloride	0.22	1.0	---	U	---	U	---	U
20. Benzene	0.24	1.0	1.40		0.30	J	0.90	J
21. 1,2-Dichloroethane	0.27	1.0	---	U	---	U	---	U
22. Trichloroethene	0.23	1.0	---	U	7.10		0.30	J
23. 1,2-Dichloropropane	0.21	1.0	---	U	---	U	---	U
24. Bromodichloromethane	0.21	1.0	---	U	---	U	---	U
25. Cis-1,3-Dichloropropene	0.24	1.0	---	U	---	U	---	U
26. 4-Methyl-2-Pentanone	1.19	100.0	---	U	---	U	---	U
27. Toluene	0.23	1.0	---	U	---	U	---	U
28. trans-1,3-Dichloropropene	0.28	1.0	---	U	---	U	---	U
29. 1,1,2-Trichloroethane	0.25	1.0	---	U	---	U	---	U
30. Tetrachloroethene	0.17	1.0	---	U	0.20	J	0.40	J
31. 2-Hexanone	1.57	50.0	---	U	---	U	---	U
32. Dibromochloromethane	0.24	3.0	---	U	---	U	---	U
33. 1,2-Dibromoethane	0.26	1.0	---	U	---	U	---	U
34. Chlorobenzene	0.30	3.0	4.60		0.70	J	1.20	J
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	---	U	---	U	---	U
36. Ethylbenzene	0.21	1.0	---	U	---	U	---	U
37. Xylenes	0.68	5.0	---	U	---	U	---	U
38. Dibromomethane	0.28	10.0	---	U	---	U	---	U
39. Styrene	0.19	1.0	---	U	---	U	---	U
40. Bromoform	0.20	3.0	---	U	---	U	---	U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	---	U	---	U	---	U
42. 1,2,3-Trichloropropane	0.43	1.0	---	U	---	U	---	U
43. 1,4-Dichlorobenzene	0.39	1.0	1.10		---	U	0.90	J
44. 1,2-Dichlorobenzene	0.32	5.0	---	U	---	U	---	U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	---	U	---	U	---	U
46. Acrylonitrile	2.72	200.0	---	U	---	U	---	U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	---	U	---	U	---	U

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

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

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

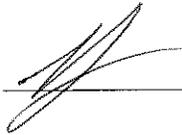
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CLIENT: HERTFORD COUNTY LANDFILL
C/O MUNICIPAL ENGINEERS
P.O. BOX 97
GARNER, NC 27529

CLIENT ID: 6025

ANALYST: MAO
DATE COLLECTED: 12/15/11
DATE REPORTED: 01/05/12

Page: 2

REVIEWED BY: 

VOLATILE ORGANICS EPA METHOD 8260B

PARAMETERS, ug/l	Date Analyzed:		12/20/11	12/19/11	12/19/11	12/19/11	12/20/11		
	MDL	SWSL	MW-F	MW-G	MW-H	MW-I	MW-J		
1. Chloromethane	0.77	1.0	---	U	---	U	---	U	
2. Vinyl Chloride	0.63	1.0	8.90		1.90		11.70	1.90	
3. Bromomethane	0.67	10.0	---	U	---	U	---	U	
4. Chloroethane	0.48	10.0	---	U	---	U	0.90 J	---	U
5. Trichlorofluoromethane	0.24	1.0	---	U	---	U	---	U	
6. 1,1-Dichloroethene	0.17	5.0	---	U	---	U	---	U	
7. Acetone	9.06	100.0	---	U	---	U	---	U	
8. Iodomethane	0.26	10.0	---	U	---	U	---	U	
9. Carbon Disulfide	0.23	100.0	---	U	---	U	---	U	
10. Methylene Chloride	0.64	1.0	---	U	---	U	---	U	
11. trans-1,2-Dichloroethene	0.23	5.0	0.40 J		---	U	---	U	
12. 1,1-Dichloroethane	0.20	5.0	3.80 J		---	U	1.80 J	0.60 J	
13. Vinyl Acetate	0.20	50.0	---	U	---	U	---	U	
14. Cis-1,2-Dichloroethene	0.25	5.0	30.00		---	U	0.80 J	4.60 J	4.40 J
15. 2-Butanone	2.21	100.0	---	U	---	U	---	U	
16. Bromochloromethane	0.27	3.0	---	U	---	U	---	U	
17. Chloroform	0.25	5.0	---	U	---	U	---	U	
18. 1,1,1-Trichloroethane	0.19	1.0	---	U	---	U	---	U	
19. Carbon Tetrachloride	0.22	1.0	---	U	---	U	---	U	
20. Benzene	0.24	1.0	2.90		---	U	3.70	0.50 J	
21. 1,2-Dichloroethane	0.27	1.0	---	U	---	U	---	U	
22. Trichloroethene	0.23	1.0	1.40		---	U	---	0.60 J	
23. 1,2-Dichloropropane	0.21	1.0	---	U	---	U	---	U	
24. Bromodichloromethane	0.21	1.0	---	U	---	U	---	U	
25. Cis-1,3-Dichloropropene	0.24	1.0	---	U	---	U	---	U	
26. 4-Methyl-2-Pentanone	1.19	100.0	---	U	---	U	---	U	
27. Toluene	0.23	1.0	0.30 J		---	U	---	U	
28. trans-1,3-Dichloropropene	0.28	1.0	---	U	---	U	---	U	
29. 1,1,2-Trichloroethane	0.25	1.0	---	U	---	U	---	U	
30. Tetrachloroethene	0.17	1.0	0.30 J		0.30 J		---	0.80 J	
31. 2-Hexanone	1.57	50.0	---	U	---	U	---	U	
32. Dibromochloromethane	0.24	3.0	---	U	---	U	---	U	
33. 1,2-Dibromoethane	0.26	1.0	---	U	---	U	---	U	
34. Chlorobenzene	0.30	3.0	15.50		---	U	0.50 J	21.40	0.50 J
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	---	U	---	U	---	U	
36. Ethylbenzene	0.21	1.0	---	U	---	U	---	U	
37. Xylenes	0.68	5.0	---	U	---	U	---	U	
38. Dibromomethane	0.28	10.0	---	U	---	U	---	U	
39. Styrene	0.19	1.0	---	U	---	U	---	U	
40. Bromoform	0.20	3.0	---	U	---	U	---	U	
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	---	U	---	U	---	U	
42. 1,2,3-Trichloropropane	0.43	1.0	---	U	---	U	---	U	
43. 1,4-Dichlorobenzene	0.39	1.0	4.80		---	U	5.80	---	U
44. 1,2-Dichlorobenzene	0.32	5.0	0.40 J		---	U	---	U	
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	---	U	---	U	---	U	
46. Acrylonitrile	2.72	200.0	---	U	---	U	---	U	
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	---	U	---	U	---	U	

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CLIENT ID: 6025

ANALYST: MAO
DATE COLLECTED: 12/15/11
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Page: 3

REVIEWED BY: 

VOLATILE ORGANICS EPA METHOD 8260B

PARAMETERS, ug/l	Date Analyzed:		12/19/11	12/20/11	12/20/11	12/20/11	12/20/11
	MDL	SWSL	MW-K	MW-L	MW-M	Equipment Blank	Trip Blank
1. Chloromethane	0.77	1.0	--- U	--- U	--- U	--- U	--- U
2. Vinyl Chloride	0.63	1.0	--- U	2.20	--- U	--- U	--- U
3. Bromomethane	0.67	10.0	--- U	--- U	--- U	--- U	--- U
4. Chloroethane	0.48	10.0	--- U	--- U	--- U	--- U	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U	--- U	--- U	--- U	--- U
6. 1,1-Dichloroethene	0.17	5.0	--- U	--- U	--- U	--- U	--- U
7. Acetone	9.06	100.0	--- U	--- U	--- U	--- U	--- U
8. Iodomethane	0.26	10.0	--- U	--- U	--- U	--- U	--- U
9. Carbon Disulfide	0.23	100.0	--- U	--- U	--- U	--- U	--- U
10. Methylene Chloride	0.64	1.0	--- U	--- U	--- U	--- U	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U	--- U	--- U	--- U	--- U
12. 1,1-Dichloroethane	0.20	5.0	--- U	0.40 J	--- U	--- U	--- U
13. Vinyl Acetate	0.20	50.0	--- U	--- U	--- U	--- U	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	--- U	3.10 J	0.40 J	--- U	--- U
15. 2-Butanone	2.21	100.0	--- U	--- U	--- U	--- U	--- U
16. Bromochloromethane	0.27	3.0	--- U	--- U	--- U	--- U	--- U
17. Chloroform	0.25	5.0	--- U	--- U	--- U	--- U	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U	--- U	--- U	--- U	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U	--- U	--- U	--- U	--- U
20. Benzene	0.24	1.0	--- U	0.70 J	--- U	--- U	--- U
21. 1,2-Dichloroethane	0.27	1.0	--- U	--- U	--- U	--- U	--- U
22. Trichloroethene	0.23	1.0	--- U	0.30 J	--- U	--- U	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U	--- U	--- U	--- U	--- U
24. Bromodichloromethane	0.21	1.0	--- U	--- U	--- U	--- U	--- U
25. Cis-1,3-Dichloropropane	0.24	1.0	--- U	--- U	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U	--- U	--- U	--- U	--- U
27. Toluene	0.23	1.0	--- U	--- U	--- U	--- U	--- U
28. trans-1,3-Dichloropropane	0.28	1.0	--- U	--- U	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U	--- U	--- U	--- U	--- U
30. Tetrachloroethene	0.17	1.0	--- U	--- U	--- U	--- U	--- U
31. 2-Hexanone	1.57	50.0	--- U	--- U	--- U	--- U	--- U
32. Dibromochloromethane	0.24	3.0	--- U	--- U	--- U	--- U	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U	--- U	--- U	--- U	--- U
34. Chlorobenzene	0.30	3.0	--- U	0.80 J	1.30 J	--- U	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U	--- U	--- U	--- U	--- U
36. Ethylbenzene	0.21	1.0	--- U	--- U	--- U	--- U	--- U
37. Xylenes	0.68	5.0	--- U	--- U	--- U	--- U	--- U
38. Dibromomethane	0.28	10.0	--- U	--- U	--- U	--- U	--- U
39. Styrene	0.19	1.0	--- U	--- U	--- U	--- U	--- U
40. Bromoform	0.20	3.0	--- U	--- U	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U	--- U	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U	--- U	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U	0.70 J	--- U	--- U	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U	--- U	--- U	--- U	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U	--- U	--- U	--- U	--- U
46. Acrylonitrile	2.72	200.0	--- U	--- U	--- U	--- U	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U	--- U	--- U	--- U	--- U

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

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

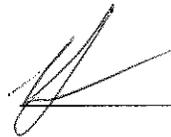
P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

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

ID#: 6025 A

HERTFORD COUNTY LANDFILL
C/O MUNICIPAL ENGINEERS
P.O. BOX 97
GARNER, NC 27529

DATE COLLECTED: 12/15/11
DATE REPORTED : 12/28/11

REVIEWED BY: 

PARAMETERS	MDL	SWSL	SW-1	SW-2	SW-3	SW-4	Analysis	Method
							Date	Analyst
PH (field measurement), Units			6.2	6.2	6.2	6.1	12/15/11 RJH	SM4500HB
Antimony, ug/l	0.14	6.0	--- U	--- U	--- U	0.18 J	12/22/11 LFG	EPA200.8
Arsenic, ug/l	0.10	10.0	1.1 J	1.8 J	3.3 J	8 J	12/22/11 LFG	EPA200.8
Barium, ug/l	0.02	100.0	60.0 J	50.1 J	231	638	12/22/11 LFG	EPA200.8
Beryllium, ug/l	0.02	1.0	0.11 J	0.06 J	0.09 J	0.85 J	12/22/11 LFG	EPA200.8
Cadmium, ug/l	0.02	1.0	--- U	0.05 J	0.04 J	0.44 J	12/22/11 LFG	EPA200.8
Cobalt, ug/l	0.03	10.0	13	11	8.0 J	73	12/22/11 LFG	EPA200.8
Copper, ug/l	0.02	10.0	0.94 J	0.60 J	1.3 J	16	12/22/11 LFG	EPA200.8
Total Chromium, ug/l	0.04	10.0	1.6 J	1.1 J	2.7 J	13	12/22/11 LFG	EPA200.8
Lead, ug/l	0.02	10.0	1.1 J	0.59 J	2.2 J	19	12/22/11 LFG	EPA200.8
Nickel, ug/l	0.04	50.0	2.2 J	1.6 J	1.9 J	12.9 J	12/22/11 LFG	EPA200.8
Selenium, ug/l	0.20	10.0	0.38 J	0.37 J	0.61 J	1.6 J	12/22/11 LFG	EPA200.8
Silver, ug/l	0.02	10.0	--- U	--- U	--- U	0.10 J	12/22/11 LFG	EPA200.8
Thallium, ug/l	0.02	5.5	0.08 J	0.04 J	0.03 J	0.43 J	12/22/11 LFG	EPA200.8
Vanadium, ug/l	0.14	25.0	4.3 J	3.6 J	8.9 J	28	12/22/11 LFG	EPA200.8
Zinc, ug/l	0.24	10.0	9.6 J	5.8 J	14	174	12/22/11 LFG	EPA200.8
Conductivity (at 25c), uMhos/cm	1.0	1.0	62	72	327	178	12/15/11 RJH	SM2510B
Temperature, °C			12	12	12	12	12/15/11 RJH	SM2550B

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

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

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

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

CLIENT: HERTFORD COUNTY LANDFILL
C/O MUNICIPAL ENGINEERS
P.O. BOX 97
GARNER, NC 27529

CLIENT ID: 6025 A

ANALYST: MAO
DATE COLLECTED: 12/15/11
DATE ANALYZED: 12/20/11
DATE REPORTED: 12/28/11

Page: 1

REVIEWED BY: 

VOLATILE ORGANICS EPA METHOD 8260B

PARAMETERS, ug/l	MDL	SWSL	SW-1	SW-2	SW-3	SW-4
1. Chloromethane	0.77	1.0	--- U	--- U	--- U	--- U
2. Vinyl Chloride	0.63	1.0	--- U	--- U	--- U	--- U
3. Bromomethane	0.67	10.0	--- U	--- U	--- U	--- U
4. Chloroethane	0.48	10.0	--- U	--- U	--- U	0.70 J
5. Trichlorofluoromethane	0.24	1.0	--- U	--- U	--- U	--- U
6. 1,1-Dichloroethene	0.17	5.0	--- U	--- U	--- U	--- U
7. Acetone	9.06	100.0	--- U	--- U	--- U	--- U
8. Iodomethane	0.26	10.0	--- U	--- U	--- U	--- U
9. Carbon Disulfide	0.23	100.0	--- U	--- U	--- U	--- U
10. Methylene Chloride	0.64	1.0	--- U	--- U	--- U	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U	--- U	--- U	--- U
12. 1,1-Dichloroethane	0.20	5.0	--- U	--- U	--- U	--- U
13. Vinyl Acetate	0.20	50.0	--- U	--- U	--- U	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	--- U	--- U	0.30 J	--- U
15. 2-Butanone	2.21	100.0	--- U	--- U	--- U	--- U
16. Bromochloromethane	0.27	3.0	--- U	--- U	--- U	--- U
17. Chloroform	0.25	5.0	--- U	--- U	--- U	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U	--- U	--- U	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U	--- U	--- U	--- U
20. Benzene	0.24	1.0	--- U	--- U	--- U	--- U
21. 1,2-Dichloroethane	0.27	1.0	--- U	--- U	--- U	--- U
22. Trichloroethene	0.23	1.0	--- U	--- U	--- U	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U	--- U	--- U	--- U
24. Bromodichloromethane	0.21	1.0	--- U	--- U	--- U	--- U
25. Cis-1,3-Dichloropropane	0.24	1.0	--- U	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U	--- U	--- U	--- U
27. Toluene	0.23	1.0	--- U	0.30 J	--- U	3.70
28. trans-1,3-Dichloropropene	0.28	1.0	--- U	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U	--- U	--- U	--- U
30. Tetrachloroethene	0.17	1.0	--- U	--- U	--- U	--- U
31. 2-Hexanone	1.57	50.0	--- U	--- U	--- U	--- U
32. Dibromochloromethane	0.24	3.0	--- U	--- U	--- U	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U	--- U	--- U	--- U
34. Chlorobenzene	0.30	3.0	--- U	--- U	--- U	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U	--- U	--- U	--- U
36. Ethylbenzene	0.21	1.0	--- U	--- U	--- U	--- U
37. Xylenes	0.68	5.0	--- U	--- U	--- U	--- U
38. Dibromomethane	0.28	10.0	--- U	--- U	--- U	--- U
39. Styrene	0.19	1.0	--- U	--- U	--- U	--- U
40. Bromoform	0.20	3.0	--- U	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U	--- U	--- U	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U	--- U	--- U	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U	--- U	--- U	--- U
46. Acrylonitrile	2.72	200.0	--- U	--- U	--- U	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U	--- U	--- U	--- U

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

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

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

CLIENT: 6025 A Week: 50

HERTFORD COUNTY LANDFILL
 C/O MUNICIPAL ENGINEERS
 P.O. BOX 97
 GARNER NC 27529

(919) 772-5393

CHAIN OF CUSTODY RECORD

SAMPLE LOCATION	COLLECTION		TOTAL CHLORINE, mg/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	DISINFECTION		Field pH	Metals	Conductivity	Temperature	EPA 8260B	8260 Dup. 1	COMMENTS:	PARAMETERS
	DATE	TIME				<input type="checkbox"/> CHLORINE	<input type="checkbox"/> UV								
SW-1	12/15/11	12:15	12	12	4	<input type="checkbox"/>	<input type="checkbox"/>								CLASSIFICATION: <input type="checkbox"/> WASTEWATER (NPDES) <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> DWQ/GW <input checked="" type="checkbox"/> SOLID WASTE SECTION CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY SAMPLES COLLECTED BY: <i>H. [Signature]</i> (Please Print) <i>SC</i> SAMPLES RECEIVED IN LAB AT <u>02</u> °C
SW-2	12/15/11	13:05	12	12	4	<input type="checkbox"/>	<input type="checkbox"/>								
SW-3	12/15/11	12:40	12	12	4	<input type="checkbox"/>	<input type="checkbox"/>								
SW-4	12/15/11	11:05	12	12	4	<input type="checkbox"/>	<input type="checkbox"/>								
RELINQUISHED BY (SIG.)			DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	DISINFECTION									
<i>[Signature]</i>			12/15/11	<i>[Signature]</i>	12/15/11	<input type="checkbox"/>	<input type="checkbox"/>								
RELINQUISHED BY (SIG.)			DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	DISINFECTION									
<i>[Signature]</i>				<i>[Signature]</i>		<input type="checkbox"/>	<input type="checkbox"/>								

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 227721

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

CHAIN OF CUSTODY RECORD

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

CLIENT: 6025 Week: 50

HERTFORD COUNTY LANDFILL
 C/O MUNICIPAL ENGINEERS
 P.O. BOX 97
 GARNER NC 27529

(919) 772-5393

SAMPLE LOCATION	COLLECTION		TOTAL CHLORINE, mg/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	DISINFECTION		Field pH	Metals	Conductivity	Temperature	Field Parameter	EPA 8260B	8260 Dup. 1	8260 Dup. 2	CHLORINE NEUTRALIZED AT COLLECTION	pH CHECK (LAB)	CONTAINER TYPE, P/G	CHEMICAL PRESERVATION
	DATE	TIME				CHLORINE	UV												
MW-L	12/15/11	11:55		18	4	<input type="checkbox"/>	<input type="checkbox"/>												
MW-M	12/15/11	09:35		20	5	<input type="checkbox"/>	<input type="checkbox"/>												
Equipment Blank	12/15/11				3	<input type="checkbox"/>	<input type="checkbox"/>												
Trip Blank					2	<input type="checkbox"/>	<input type="checkbox"/>												
REINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
<i>Bob H. [Signature]</i>	12/15/11	<i>[Signature]</i>	12/15/11	<i>[Signature]</i>	12/15/20	<i>[Signature]</i>	12/15/20	<i>[Signature]</i>											
REINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

FORM #5

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

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

No 227722

SAMPLES COLLECTED BY: *M. [Signature]*
 (Please Print)
 CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY
 SOLID WASTE SECTION
 WASTEWATER (NPDES)
 DRINKING WATER
 DWQ/GW
 CLASSIFICATION:
 A - NONE D - NAOH
 B - HNO₃ E - HCL
 C - H₂SO₄ F - ZINC ACETATE
 G - NA THIOSULFATE

COMMENTS:

SAMPLES RECEIVED IN LAB AT 02 °C

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

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

CLIENT: 6025 Week: 50

HERTFORD COUNTY LANDFILL
 C/O MUNICIPAL ENGINEERS
 P.O. BOX 97
 GARNER NC 27529

(919) 772-5393

CHAIN OF CUSTODY RECORD

SAMPLE LOCATION	COLLECTION		TOTAL CHLORINE, mg/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	DISINFECTION		Field pH	Metals	Conductivity	Temperature	Field Parameter	EPA 8260B	8260 Dup. 1	8260 Dup. 2	PARAMETERS	CLASSIFICATION:
	DATE	TIME				CHLORINE	UV										
MW-A	12/15/11	10:20	19	19	5	<input type="checkbox"/>	<input type="checkbox"/>										
MW-B	12/15/11	09:05	18	18	4	<input type="checkbox"/>	<input type="checkbox"/>										
MW-C	12/15/11	09:40	17	17	4	<input type="checkbox"/>	<input type="checkbox"/>										
MW-D	12/15/11	11:35	17	17	4	<input type="checkbox"/>	<input type="checkbox"/>										
MW-E	12/15/11	11:20	20	20	4	<input type="checkbox"/>	<input type="checkbox"/>										
MW-F	12/15/11	10:55	20	20	4	<input type="checkbox"/>	<input type="checkbox"/>										
MW-G	12/15/11	09:20	18	18	4	<input type="checkbox"/>	<input type="checkbox"/>										
MW-H	12/15/11	10:35	17	17	4	<input type="checkbox"/>	<input type="checkbox"/>										
MW-I	12/15/11	10:45	17	17	4	<input type="checkbox"/>	<input type="checkbox"/>										
MW-J	12/15/11	11:20	17	17	4	<input type="checkbox"/>	<input type="checkbox"/>										
MW-K	12/15/11	11:40	17	17	4	<input type="checkbox"/>	<input type="checkbox"/>										
RELINQUISHED BY (SIG.)	DATE/TIME	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME	DATE/TIME
<i>Bob Nape</i>	12/25/11		<i>[Signature]</i>	12/15/20													
COMMENTS: CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY SAMPLES COLLECTED BY: <i>Nape</i> Fof SAMPLES RECEIVED IN LAB AT <i>02</i> °C CLASSIFICATION: <input checked="" type="checkbox"/> WASTEWATER (NPDES) <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> DWQ/GW <input checked="" type="checkbox"/> SOLID WASTE SECTION																	

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 227723

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

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

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

ID#: 6025 A

HERTFORD COUNTY LANDFILL
C/O MUNICIPAL ENGINEERS
P.O. BOX 97
GARNER, NC 27529

DATE COLLECTED: 01/19/12
DATE REPORTED : 02/06/12

REVIEWED BY: 

PARAMETERS	MDL	SWSL	SW-4		Analysis		Method Code
					Date	Analyst	
Antimony, ug/l	0.14	6.0	---	U	02/03/12	CMF	EPA200.8
Arsenic, ug/l	0.10	10.0	---	U	02/03/12	CMF	EPA200.8
Barium, ug/l	0.02	100.0	103		02/03/12	CMF	EPA200.8
Beryllium, ug/l	0.02	1.0	---	U	02/03/12	CMF	EPA200.8
Cadmium, ug/l	0.02	1.0	---	U	02/03/12	CMF	EPA200.8
Cobalt, ug/l	0.03	10.0	4.2	J	02/03/12	CMF	EPA200.8
Copper, ug/l	0.02	10.0	1.0	J	02/03/12	CMF	EPA200.8
Total Chromium, ug/l	0.04	10.0	0.53	J	02/03/12	CMF	EPA200.8
Lead, ug/l	0.02	10.0	0.73	J	02/03/12	CMF	EPA200.8
Nickel, ug/l	0.04	50.0	0.98	J	02/03/12	CMF	EPA200.8
Selenium, ug/l	0.20	10.0	---	U	02/03/12	CMF	EPA200.8
Silver, ug/l	0.02	10.0	---	U	02/03/12	CMF	EPA200.8
Thallium, ug/l	0.02	5.5	---	U	02/03/12	CMF	EPA200.8
Vanadium, ug/l	0.14	25.0	1.2	J	02/03/12	CMF	EPA200.8
Zinc, ug/l	0.24	10.0	7.9	J	02/03/12	CMF	EPA200.8

