Semi-Annual Water Quality Monitoring Report

Prepared for

Lenoir County Active C&D and Closed MSWLF
LaGrange, North Carolina

July 2011

Permit Number: 54-03
MESCO Project Number: G11015.0

Submittal Date: November 3, 2011

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

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

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

NC DENR
Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

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

Instructions:

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

Solid Waste Monitoring Data Submittal Information

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

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)
Lenoir County Active C&D Landfill and Closed Unlined MSWLF	2949 Hodges Farm Road LaGrange, NC 28501	54-03	.1600	July 19, 2011

Environmental Status: (Check all that apply)

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

Type of data submitted: (Check all that apply)

☒ Groundwater monitoring data from monitoring wells
☐ Groundwater monitoring data from private water supply wells
☐ Leachate monitoring data
☒ Surface water monitoring data
☐ Methane gas monitoring data
☒ Corrective action data (specify) MNA Analysis For 7 Wells per CAP
☐ Other(specify)

Notification attached?

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

Certification

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

Madeline German, PG — Geologist — (919) 772-5393

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

Signature — 11/4/2011 Date

Affix NC Licensed/ Professional Geologist Seal

NORTH CAROLINA LICENSED SEAL 2275 11/4/2011 GEOLOGIST MADELINE GERMAN

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

TABLE OF CONTENTS

SECTION

Introduction ..... Page 1
Sampling Procedures ..... Page 1
Field Parameter Data ..... Page 2
Laboratory Results ..... Page 2
Quality Control Samples ..... Page 2
Groundwater Samples ..... Page 2
Groundwater Characterization ..... Page 3
Findings ..... Page 3
Closing ..... Page 3

FIGURES

Topographic Map with Site Location ..... Plate 1
Single Day Potentiometric Map of Uppermost Aquifer ..... Plate 2
VOC Detections Above 2L Standard July 19, 2011 ..... Plate 3

TABLES

Sampling and Analysis Summary ..... Table 1
Detections Above Established SWSL, GWP, 2L, or 2B (Appendix I) ..... Table 2
Detections Above MDL (Appendix II Exclusive) ..... Table 2
Hydrologic Properties at Monitoring Well Locations ..... Table 4

APPENDICIES

Corrective Action Summary ..... Appendix A
Laboratory Analysis Reports and Chains of Custody ..... Appendix B

OPERATION/CONSTRUCTION MANAGERS

Municipal Services

CIVIL/SANITARY ENGINEERS

Engineering Company, P.A.

November 3, 2011

Ms. Jaclynne Drummond
Solid Waste Section
Division of Waste Management
North Carolina Department of Environment and Natural Resources
401 Oberlin Road, Suite 150
Raleigh, NC 27605

Re: Semi-Annual Water Quality Monitoring Report
Lenoir County Active C&D and Closed MSWLF
Permit No. 54-03
MESCO Project No. G11015.0

Dear Ms. Drummond:

Introduction

The Lenoir County Active Construction and Demolition (C&D) Landfill and Closed Unlined Sanitary Municipal Solid Waste Landfill (MSWLF) is located on Hodges Farm Road (SR 1524), La Grange, Lenoir County, North Carolina and operates under permit #54-03. Prior to operation as a C&D landfill the site operated as a MSW unlined sanitary landfill. A small area of the MSW, located in the southern portion of the facility stopped receiving waste prior to October 1994 and was closed with a 24 inch soil cover. The remainder was closed prior to October 1998, with an 18-inch cohesive soil cap having a permeability of 1 x 10-5 cm/sec, and 18 inches of erosive layer, as part of the *Lenoir County Transition Plan.* The C&D landfill was constructed and is operating on top of the capped MSW unit. On the same contiguous property and utilizing the same scale house is the existing Subtitle D MSW landfill, which is monitored separately, under permit #54-09. A topographic map showing the facility location is included as **Plate 1**.

The closed MSW and active C&D landfill are contiguous; therefore monitored together for continuity in reporting. The landfill is required to submit semi-annual compliance reports as a condition of the water quality monitoring program. Environment 1 (E1) of Greenville, NC reportedly performed this sampling event on July 19, 2011 in accordance with the semi-annual monitoring schedule prescribed by the NC Solid Waste Section (SWS) rules/regulations as promulgated in 15A NCAC 13B.1600.

As specified within rule 15A NCAC 13B.1632(j) and the SWS Environmental Monitoring Report Form, this report contains sampling procedures, field and laboratory results, groundwater and surface water characterization, and findings. Detection tables, hydrogeologic properties table, a monitoring network field observations table, field parameter data results, potentiometric map, quality assurance/quality control data, and laboratory analytical data results with chains-of-custody (C-O-C) are included. A corrective action summary including monitored natural attenuation (MNA) tables and screening models is presented in **Appendix A**.

PO Box 97, Garner, North Carolina 27529 (919) 772-5393
PO Box 828, Morehead City, NC 28557 (252) 726-9481 PO Box 349, Boone, North Carolina 28607 (828) 262-1767

Sampling Procedure

E1 reportedly performed this sampling event utilizing portable monitoring methodology in accordance with the approved Sampling & Analysis Plan (SAP) contained in the *Corrective Action Plan* (CAP) submitted April 30, 2009. E1 reportedly collected water samples from six downgradient groundwater monitoring wells (MW-3, MW-4, MW-6, MW-9, MW-11 and MW-12), the background well (MW-1). Quality control measures were implemented including submittal and subsequent quantification of a travel blank (TB) and equipment blank (EB). Both surface water points (SW-1 and SW-3) were reported to be dry. Monitoring locations are shown on the single-day potentiometric map (**Plate 2)**.

Static water levels in each well were measured electronically prior to purging. Additional static water level readings were recorded from two supplementary monitoring wells (MW-8 and MW-10) to improve potentiometric map coverage. Collected samples were transported under C-O-C protocol and analyzed within the specified hold times for each method. The field parameters reported by E1 included pH, specific conductance, temperature, turbidity, oxidation reduction potential (ORP) and dissolved oxygen (DO).

Field Parameter Data

Field parameter data, as recorded by E1, is presented in the laboratory analysis results report (**Appendix B**).

Laboratory Results

E1 reportedly analyzed the water samples for the Appendix I list of constituents and total mercury. MW-3 and the background well MW-1 were tested for the Appendix II list of constituents. Additionally, the designated corrective action monitoring wells were analyzed for the MNA parameters list as provided by the SWS. Microseeps Inc. of Pittburgh, PA performed MNA parameter analysis for volatile fatty acids, methane/ethene/ethane, and dissolved hydrogen. A sampling and analysis summary is presented on **Table 1**.

Water samples were analyzed to the laboratory-established Method Detection Limits (MDL), which are at or below the current Solid Waste Section Limit (SWSL). **Table 2** summarizes constituents detected in groundwater and surface water samples above the current SWSL, Groundwater Protection Standards (GWP), North Carolina Groundwater Standards (2L) or the applicable Class C North Carolina Surface Water Standards (2B). **Table 3** summarizes Appendix II exclusive detections (defined in this report as not also listed on Appendix I list) above the MDL. **Appendix A** presents MNA analyses tables. Laboratory results and C-O-Cs are presented in **Appendix B**.

Quality Control Samples

Eight of the seventeen total metals, including the Appendix II constituent tin, were detected in low non-quantifiable ("j" qualified) concentrations in the EB. The detection of tin in the EB indicates that artifact contamination may have attributed to false positives or high bias concentrations of tin as detected in the groundwater samples.

Groundwater Samples

Total metals were not detected in quantifiable concentrations above their respective 2L or GWP Standard.

VOCs were detected in quantifiable concentrations in samples collected from MW-3 (trichloroethene, vinyl chloride, benzene), MW-4 (benzene), MW-11 (vinyl chloride) and MW-12 (benzene, vinyl chloride). Appendix II exclusive parameters were not detected in levels above the SWSL nor established applicable standards. A site map depicting VOC concentrations exceeding the 2L Standard during this event is presented as **Plate 3.**

Groundwater Characterization

A single-day potentiometric map for the uppermost aquifer was created from groundwater elevation data collected during this event and is included as **Plate 2**. Groundwater flow rates and directions were calculated based on collected data and are included in **Table 4.** Flow direction trends in a general northeasterly direction towards Falling Creek. Groundwater flow rates ranged from approximately 7 feet/year (MW-3) to 54 feet/year (MW-11) averaging approximately 25 feet/year. The flow directions and gradients are generally consistent with reported historical observations.

Findings

One or more VOC(s) were detected in concentrations above their respective 2L Standards in samples collected from the northern (MW-11, MW-12) and eastern areas (MW-3, MW-4). Monitoring wells are located within the compliance boundary. Evidence of natural attenuation has been demonstrated and corrective action to remediate the groundwater will continue.

Closing

Semi-annual water quality monitoring will continue at the facility and the next water sample collection event is tentatively scheduled for January 2012. Please contact us either by phone at (919) 772-5393, or by email at jpfohl@mesco.com or mgerman@mesco.com should you have any questions or concerns regarding this report.

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

Jonathan Pfohl
Environmental Specialist

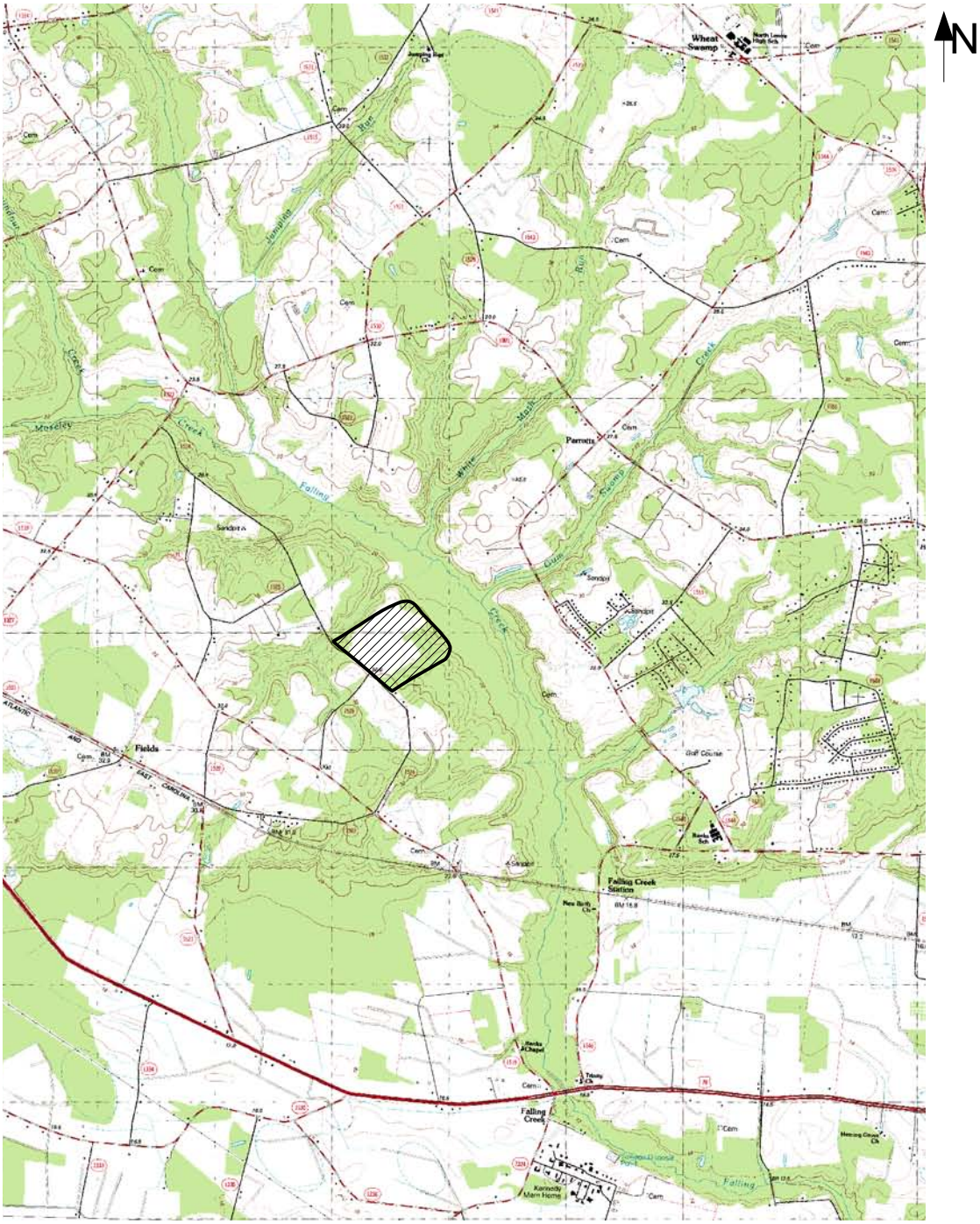
Mardeline German
Professional Geologist

NORTH CAROLINA LICENSED SEAL 2275 GEOLOGIST MARDELINE GERMAN

Enclosures
cc: Mr. Tom Miller
Lenoir County

Figures

Topographic Map with Site Location
Lenoir County Landfill Facility



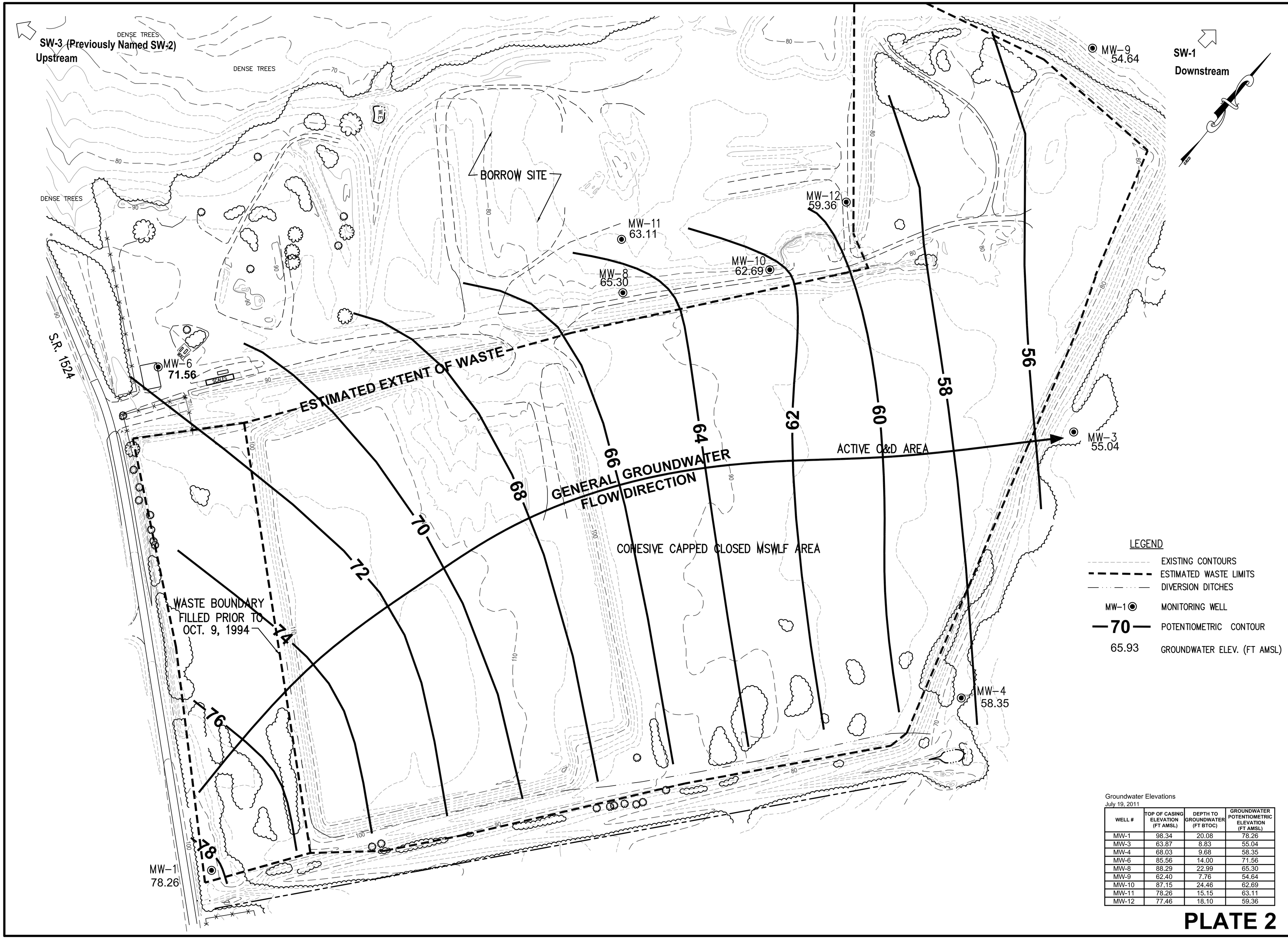
2949 Hodges Farm Rd (SR1524)
LaGrange, NC 28501
Lat:35-17-07.4269
Long:-77-42-32.7453
Northing:561295.59
Easting:2385220.32

QUADRANGLE LEGEND

ROAD CLASSIFICATION

Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

PLATE 1



Groundwater Elevations
July 19, 2011

WELL #	TOP OF CASING ELEVATION (FT AMSL)	DEPTH TO GROUNDWATER (FT BTOC)	GROUNDWATER POTENTIOMETRIC ELEVATION (FT AMSL)
MW-1	98.34	20.08	78.26
MW-3	63.87	8.83	55.04
MW-4	68.03	9.68	58.35
MW-6	85.56	14.00	71.56
MW-8	88.29	22.99	65.30
MW-9	62.40	7.76	54.64
MW-10	87.15	24.46	62.69
MW-11	78.26	15.15	63.11
MW-12	77.46	18.10	59.36

PLATE 2

Municipal Services Engineering Company, P.A.
LICENSE NUMBER: C-0281
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 27529 (704) 262-1767

ACTIVE C&D LANDFILL OVER CLOSED MSWLF
LENOIR COUNTY
NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION

SINGLE DAY POTENTIOMETRIC MAP
UPPERMOST AQUIFER

SCALE:	1"=100'
DATE:	9/30/11
DRWN. BY:	J.PFOHL
CHKD. BY:	M. GERMAN
PROJECT NUMBER	G11015.0
DRAWING NO.	PLATE 2
SHEET NO.	1 OF 1

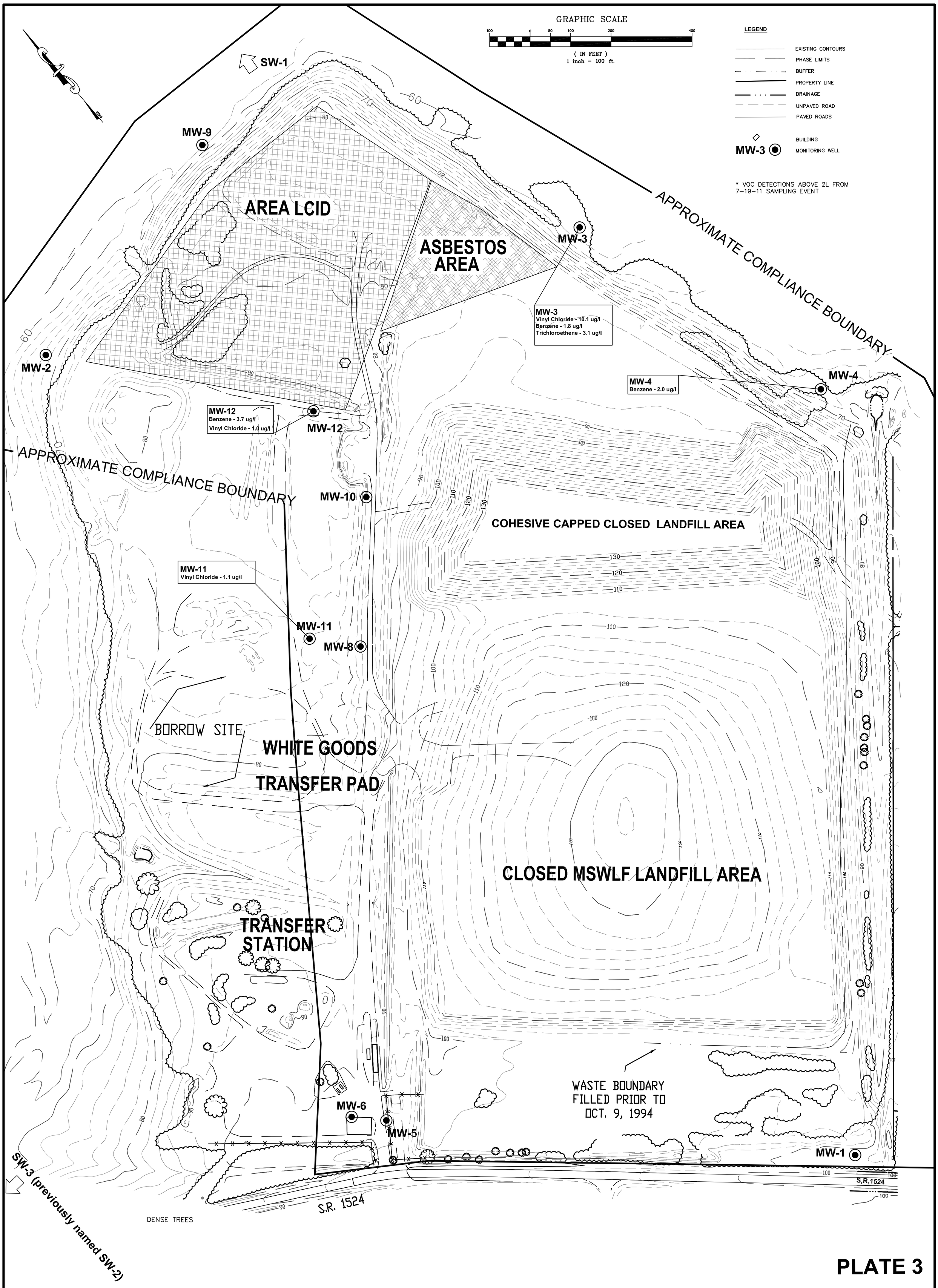


PLATE 3

DATE	BY	REV.	DESCRIPTION	

VOC DETECTIONS ABOVE 2L STANDARD
July 19, 2011

SCALE: 1" =100'
DATE: 09/21/2011
DRWN. BY: K. MCVERRY
CHKD. BY: M. GERMAN
PROJECT NUMBER G11015.0
DRAWING NO. PLATE 3
SHEET NO. 1 OF 1

ACTIVE C&D LANDFILL OVER CLOSED MSW LANDFILL

LENOIR COUNTY NORTH CAROLINA

Municipal Services Engineering Company, P.A.
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767
LICENSE NUMBER: C-0281

Tables

Table 1
Sampling and Analysis Summary
July 19, 2011

		App. I		MNA													Field Parameter						App. II								
	Reason Not Sampled	VOCs	Total Metals	VFA	Hydrogen	Methane/Ethene/Ethane	Dissolved CO2	Alkalinity	Sulfate	Sulfide	Chloride	TOC	COD	BOD	Iron	Nitrate	Dissolved Oxygen (DO)	Oxidation Reduction Potential (ORP)	Temperature	Conductivity	pH	Turbidity	VOCs	Total Metals	Pesticides	Herbicides-Chlorinated	Polychlorinated biphenyl (PCB)	Semivolatile Organics (SVOCs)	Total Cyanide	Sulfide	Mercury
		Lab EPA 8260B	Lab EPA200.8	AM23G	AM20GAX	AM20GAX	SM4500CO2C	SM 2320B	SM426C	SM4500-S2D	SM 4500-CLB	SM 5310C	HACH8000	SM5210B	SM3111B	EPA 353.2	SM4500OG	SM2580B	SM2550B	SM2510B	SM4500HB	SM2130-B	Lab EPA 8260B	Lab EPA200.8	Lab EPA 8081B	Lab SW8151A	Lab EPA 8081B	Lab EPA 8270C	Lab EPA 9014	Lab SM18 4500-S2D	Lab EPA 200.8
MW-1				x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
MW-3				x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
MW-4		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									x
MW-6		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									x
MW-9		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									x
MW-11		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									x
MW-12		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									x
SW-1	Dry																														
SW-3	Dry																														
EB																							x	x							
TB																							x								

App I & II = Appendix Lists from current 40 CFR 258

Table 2
Detections Above Established SWSL, GWP, 2L or 2B (Appendix I)
July 19, 2011

Sample ID	Parameter Name [1]	Sample Date	Result	Unit	MDL [2]	SWSL [3]	2L [4]	2B [5]	GWP [6]	Exceedance	Preliminary Cause [7]
MW-1	Zinc	7/19/11	11	ug/l	0.24	10	1050				
MW-3	1,4-Dichlorobenzene	7/19/11	1.1	ug/l	0.39	1	6				
MW-3	**Benzene**	**7/19/11**	**1.8**	**ug/l**	**0.24**	**1**	**1**			**0.8**	**L &/or LFG**
MW-3	Cis-1,2-Dichloroethene	7/19/11	14.8	ug/l	0.25	5	70				
MW-3	**Trichloroethene**	**7/19/11**	**3.1**	**ug/l**	**0.23**	**1**	**3**			**0.1**	**L &/or LFG**
MW-3	**Vinyl Chloride**	**7/19/11**	**10.1**	**ug/l**	**0.63**	**1**	**0.03**			**10.07**	**L &/or LFG**
MW-3	Zinc	7/19/11	40	ug/l	0.24	10	1050				
MW-4	1,4-Dichlorobenzene	7/19/11	1.1	ug/l	0.39	1	6				
MW-4	**Benzene**	**7/19/11**	**2**	**ug/l**	**0.24**	**1**	**1**			**1**	**L &/or LFG**
MW-4	Chlorobenzene	7/19/11	6.9	ug/l	0.3	3	50				
MW-4	Vanadium	7/19/11	9 j	ug/l	0.14	25			3.5	5.5	
MW-4	Zinc	7/19/11	33	ug/l	0.24	10	1050				
MW-9	Zinc	7/19/11	12	ug/l	0.24	10	1050				
MW-11	**Vinyl Chloride**	**7/19/11**	**1.1**	**ug/l**	**0.63**	**1**	**0.03**			**1.07**	**L &/or LFG**
MW-12	Barium	7/19/11	165	ug/l	0.02	100	700				
MW-12	**Benzene**	**7/19/11**	**3.7**	**ug/l**	**0.24**	**1**	**1**			**2.7**	**L &/or LFG**
MW-12	**Vinyl Chloride**	**7/19/11**	**1**	**ug/l**	**0.63**	**1**	**0.03**			**0.97**	**L &/or LFG**

1 Table contains Appendix I constituents detected at or above established 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

[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.

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

B = Background as detected upgradient/upstream of landfill

L = Leachate

LFG = Landfill Gas

BOLD = Concentration > 2L, or 2B Standard

Table 3
Detections Above MDL (Appendix II Exclusive)
August 16-17, 2011

Sample ID	Parameter Name [1]	Sample Date	Result	Unit	MDL [2]	SWSL [3]	2L [4]	2B [5]	GWP [6]	Exceedance	Preliminary Cause [7]
MW-1	Tin	7/19/11	0.18 j	ug/l	0.16	100	NE		NE		
MW-3	Mercury	7/19/11	0.09 j	ug/l	0.05	0.2	1.05				
MW-3	Dichlorodifluoromethane	7/19/11	1.1 j	ug/l	0.51	5	1400				
MW-3	Tin	7/19/11	0.81 j	ug/l	0.16	100					
MW-9	Mercury	7/19/11	0.16 j	ug/l	0.05	0.2	1.05				
MW-12	Mercury	7/19/11	0.16 j	ug/l	0.05	0.2	1.05				
EB	Tin	7/19/11	0.38 j	ug/l	0.16	100	NE		NE		

1 Table contains detected App II exclusive constituents (Not found on App I list)

[2] MDL = Method Detection Limit

[3] SWSL = Solid Waste Section Reporting Limit

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

[5] GWP = Groundwater Protection Standard

[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.

j =The reported value is estimated & between the laboratory MDL & the SWSL, adjusted for actual sample preparation data and moisture content.

NE = Not Established

BOLD = Concentration >2L, or 2B Standard

Table 4
Hydrologic Properties at Monitoring Well Locations
July 19, 2011

Monitoring Well	Hydraulic Conductivity (cm/sec)	Effective Porosity (%)	Hydraulic Gradient (ft/ft)	Linear Velocity (ft/yr)	Flow Direction	Depth to Groundwater (ft btoc)	Groundwater Potentiometric Elevation (ft amsl)	Screened Interval Lithology
MW-1	4.30E-04	20	0.010	23	N18E	20.08	78.26	Silty Sand
MW-3	1.30E-04	20	0.010	7	N44E	8.83	55.04	Silty Sand
MW-4	5.40E-04	20	0.010	28	N47E	9.68	58.35	Silty Sand
MW-6	-	-	0.007	-	N00E	14.00	71.56	Silty Sand
MW-9	3.80E-04	20	0.015	29	N27E	7.76	54.64	Sandy Clay
MW-11	6.59E-04	20	0.016	54	N22W	15.15	63.11	Sand
MW-12	2.10E-04	20	0.009	10	N10E	18.1	59.36	Sand
Minimum	1.30E-04	20	0.007	7	-	7.76	54.64	-
Average	3.91E-04	20	0.011	25	-	13.37	62.90	-
Maximum	6.59E-04	20	0.016	54	-	20.08	78.26	-

NOTE: 1.Hydraulic conductivity (K) values for MW-1, MW-3, MW-4, MW-6 and MW-9 were obtained from GAI Consultants (June 19
K values for MW-11 and MW-12 were based on slug test results conducted by MESCO in July 1999.
2.Water levels were measured prior to sampling by Environment 1, Inc. on July 19, 2011.
Linear velocidty rate (Q) is defined by the equation:

where

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

K = hydraulic conductivity
ne = effective porosity
dh = head difference
dl = horizontal distance

Appendix A
Corrective Action Summary

Table A1: MNA Parameters at Monitoring Well Locations Summary

Parameters	Method	MDL*	Units	MW-1	MW-3	MW-4	MW-6	MW-9	MW-11	MW-12
				07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11
VFA – Acetic Acid	AM23G	70	ug/L	<70	120	87	<70	<70	<70	<70
VFA – Butyric Acid	AM23G	50	ug/L	<50	180	<50	<50	82	<50	1100
VFA – Hexanoic Acid	AM23G	50	ug/L	<50	<50	<50	<50	<50	<50	<50
VFA – i-Hexanoic Acid	AM23G	50	ug/L	<50	<50	<50	<50	<50	<50	<50
VFA – i-Pentanoic Acid	AM23G	150	ug/L	<150	<150	<150	<150	<150	<150	<150
VFA – Lactic Acid	AM23G	100	ug/L	<100	270	240	170	220	<100	170
VFA – Pentaonic Acid	AM23G	70	ug/L	<70	<70	<70	<70	<70	<70	<70
VFA – Propionic Acid	AM23G	50	ug/L	66	71	70	60	54	51	68
VFA – Pyruvic Acid	AM23G	150	ug/L	<150	<150	<150	<150	<150	<150	<150
Hydrogen	AM20GAX	0.6	nM	2.0	1.9	1.8	1.8	1.9	1.6	1.7
Methane	AM20GAX	0.015	ug/L	0.035	1800	2000	460	18	330	1500
Ethene	AM20GAX	0.010	ug/L	0.014	0.19	0.086	0.015	0.013	0.023	0.23
Ethane	AM20GAX	0.010	ug/L	<0.01	0.12	0.19	<0.01	0.015	0.018	0.022
CO2-Dissolved	SM4500CO2C	1000	ug/L	21000	282000	462000	105000	92000	45000	173000
Alkalinity	SM 2320B	1000	ug/L	<1000	58000	196000	<1000	2000	<1000	<1000
Sulfate	SM426C	5000	ug/L	9700	<5000	17100	22000	29400	8300	50500
Sulfide	SM4500-S2D	100	ug/L	<100	<100	<100	<100	<100	<100	<100
Chloride	SM 4500-CLB	5000	ug/L	8000	58000	8000	<5000	10000	8000	44000
TOC	SM 5310C	300	ug/L	<300	3850	10270	<300	2070	<300	10540
COD	HACH8000	20000	ug/L	<20000	<20000	31000	<20000	<20000	<20000	25000
BOD	SM5210B	2000	ug/L	2100	<2000	<2000	<2000	<2000	<2000	<2000
Iron	SM3111B	15.9	ug/L	825	71450	79350	422	7700	395	96
Nitrate	EPA 353.2	30	ug/L	11380	90	<30	2890	3080	1940	950
Temperature	SM2550B	100	Degrees C	17.29	19.96	20.66	20.4	20.94	19.2	20.43
ORP	SM2580B	-900	mV	352.6	72.8	31.5	388.5	307.6	339.3	361.2
DO	SM4500OG	0	ug/L	7230	780	780	290	1550	2170	1610
pH	SM4500HB	0	Standard Units	4.1	5.57	4.36	4.57	4.6	4.3	4.3
Specific Conductance	SM2510B	1	uMhos	136	510	374	86	186	45	296
Turbidity	SM2130B	1	NTU	8.5	56.30	73.80	1.0	37.30	10	2.90

Notes:
VFA = Volatile Fatty Acids
MDL* = Lowest Method Detection Limit for Lab Parameters or Lowest Field Measurement Possible
Constituents Below Quantitation Limit are shown as <MDL value
Microseeps data (Method AM23G and AM20GAX) reported to the Method Reporting Limit (MRL)

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Lenoir County
MW-3 Area
Run Name

Data Input Instructions:

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

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ◉ Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	6.7	(ft/yr)
or			
Hydraulic Conductivity	K	1.3E-04	(cm/sec)
Hydraulic Gradient	i	0.01	(ft/ft)
Effective Porosity	n	0.2	(-)

2. DISPERSION

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

Calc. Alpha x

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient	Koc			
PCE	426	(L/kg)	4.62	(-)
TCE	130	(L/kg)	2.11	(-)
DCE	125	(L/kg)	2.06	(-)
VC	30	(L/kg)	1.25	(-)
ETH	0	(L/kg)	1.00	(-)
Common R (used in model)* =			**2.06**	

4. BIOTRANSFORMATION

-1st Order Decay Coefficient*

Zone 1	λ (1/yr)	half-life (yrs)	Yield
PCE → TCE	1.195	0.58	0.79
TCE → DCE	0.900	0.77	0.74
DCE → VC	3.300	0.21	0.64
VC → ETH	2.567	0.27	0.45

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

λ HELP

5. GENERAL

Simulation Time*	5	(yr)
Modeled Area Width*	100	(ft)
Modeled Area Length*	150	(ft)
Zone 1 Length*	150	(ft)
Zone 2 Length*	0	(ft)

L, W

Zone 2= L - Zone 1

6. SOURCE DATA

TYPE: Decaying Single Planar

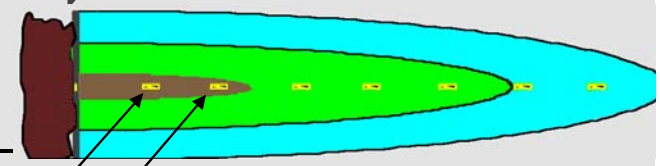
Source Options

Source Thickness in Sat. Zone* 8 (ft)

Width* (ft) Y1 100

Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	.0	0.01
TCE	.01	0.01
DCE	.0	0.01
VC	.075	0.01
ETH	0.001	0.01

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



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	0.0										
TCE Conc. (mg/L)	0.0031										
DCE Conc. (mg/L)	0.0										
VC Conc. (mg/L)	0.0101										
ETH Conc. (mg/L)	0.00019										
Distance from Source (ft)	90										
Date Data Collected	2011										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore Formulas | RESET | SEE OUTPUT | Paste Example

Start Here → ○ PCE ◉ TCE ○ DCE ○ VC ○ ETH

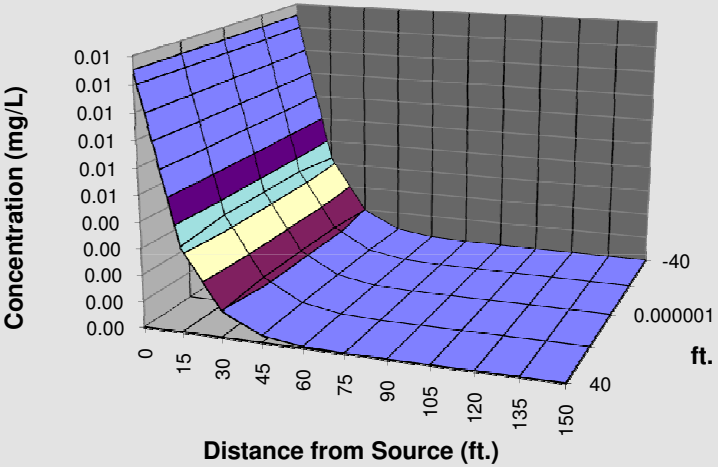
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.010	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.010	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.010	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.010	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.010	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	7.9E-1	2.8E-1	9.1E-2	2.5E-2	5.1E-3	7.6E-4	7.6E-5	5.1E-6	2.2E-7	6.4E-9	7.6E-11

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.005 mg/L Displayed Model: Biotransformation Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)
% Biotransformed =	+44.5%	
% Change in Mass Rate =	100.0 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	0.02	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ◉ DCE ○ VC ○ ETH

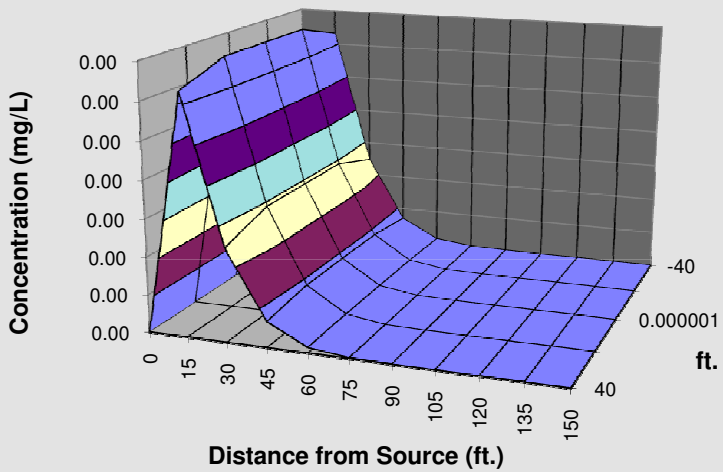
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	1.8E-7	5.5E-2	2.3E-2	6.6E-3	1.4E-3	2.1E-4	2.1E-5	1.4E-6	6.2E-8	1.8E-9	2.1E-11

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.070 mg/L Displayed Model: Biotransformation Displayed Compound: DCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed =

% Change in Mass Rate = 100.0 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ○ DCE ◉ VC ○ ETH

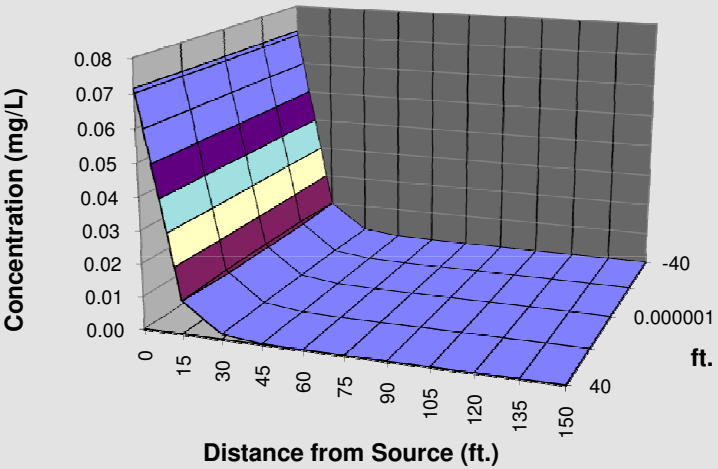
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.071	0.010	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.071	0.011	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.071	0.011	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.071	0.011	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.071	0.010	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	6.0E+0	8.7E-1	1.4E-1	2.3E-2	3.6E-3	4.5E-4	4.2E-5	2.7E-6	1.1E-7	3.0E-9	3.9E-11

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.002 mg/L Displayed Model: Biotransformation Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = +62.8%

% Change in Mass Rate = 100.0 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.04	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

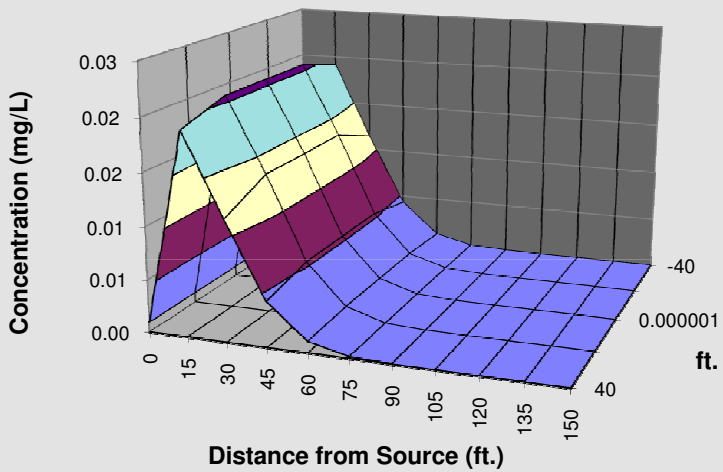
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.001	0.019	0.011	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000
20	0.001	0.021	0.013	0.005	0.001	0.000	0.000	0.000	0.000	0.000	0.000
0	0.001	0.021	0.013	0.005	0.001	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.001	0.021	0.013	0.005	0.001	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.001	0.019	0.011	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	7.9E-2	1.7E+0	1.1E+0	4.1E-1	1.1E-1	1.8E-2	1.9E-3	1.4E-4	6.3E-6	1.8E-7	3.4E-9

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: mg/L Displayed Model: Biotransformation Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = -2195.1 %

% Change in Mass Rate = 100.0 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.05	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ◉ TCE ○ DCE ○ VC ○ ETH

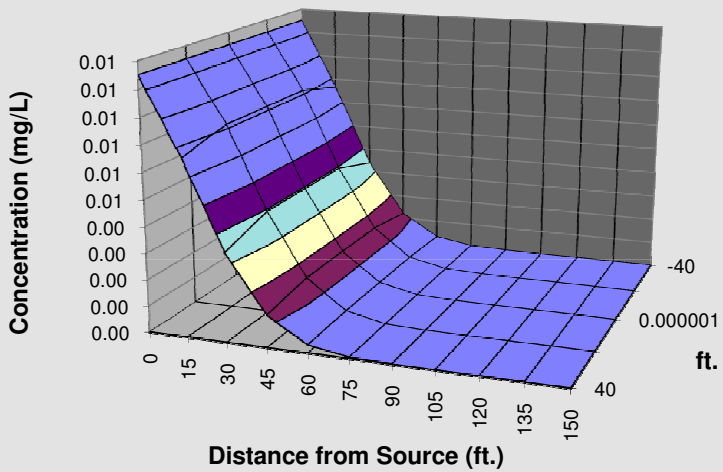
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.010	0.007	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.010	0.007	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.010	0.007	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.010	0.007	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.010	0.007	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	7.9E-1	5.8E-1	3.1E-1	1.2E-1	2.9E-2	4.9E-3	5.4E-4	3.8E-5	1.7E-6	5.1E-8	9.4E-10

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.005 mg/L Displayed Model: No Degradation Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)
% Biotransformed =	**+44.5%**	
% Change in Mass Rate =	**100.0 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	0.04	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ○ DCE ◉ VC ○ ETH

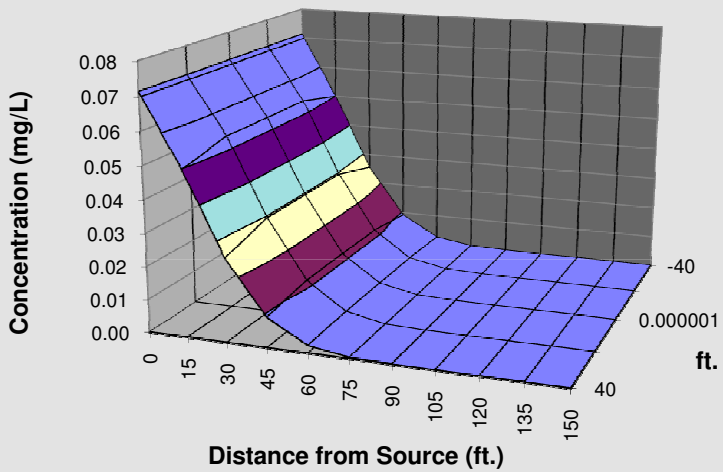
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.071	0.050	0.025	0.009	0.002	0.000	0.000	0.000	0.000	0.000	0.000
20	0.071	0.054	0.030	0.011	0.003	0.000	0.000	0.000	0.000	0.000	0.000
0	0.071	0.054	0.030	0.011	0.003	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.071	0.054	0.030	0.011	0.003	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.071	0.050	0.025	0.009	0.002	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	6.0E+0	4.3E+0	2.3E+0	8.7E-1	2.2E-1	3.7E-2	4.0E-3	2.9E-4	1.3E-5	3.8E-7	7.1E-9

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.002 mg/L Displayed Model: No Degradation Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = +62.8%

% Change in Mass Rate = 100.0 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.07	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

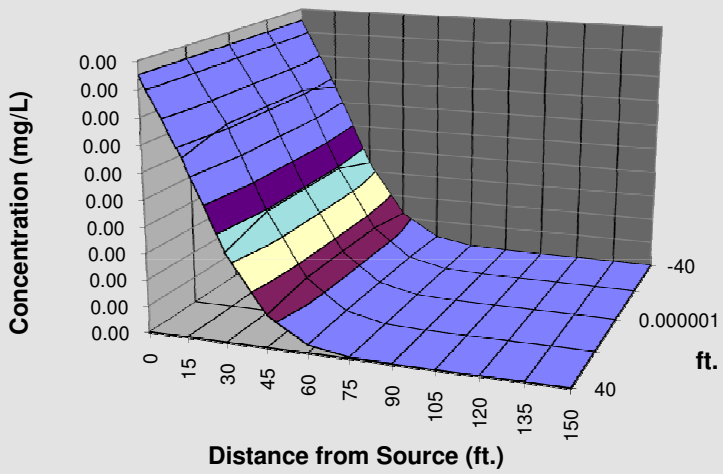
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	7.9E-2	5.8E-2	3.1E-2	1.2E-2	2.9E-3	4.9E-4	5.4E-5	3.8E-6	1.7E-7	5.1E-9	9.4E-11

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: mg/L Displayed Model: No Degradation Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)
% Biotransformed =	**-2195.1 %**	
% Change in Mass Rate =	**100.0 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Lenoir County
MW-3 Area
Run Name

Data Input Instructions:

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

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ◉ Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	6.7	(ft/yr)
or			
Hydraulic Conductivity	K	1.3E-04	(cm/sec)
Hydraulic Gradient	i	0.01	(ft/ft)
Effective Porosity	n	0.2	(-)

2. DISPERSION

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

Calc. Alpha x

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient	Koc			
PCE	426	(L/kg)	4.62	(-)
TCE	130	(L/kg)	2.11	(-)
DCE	125	(L/kg)	2.06	(-)
VC	30	(L/kg)	1.25	(-)
ETH	0	(L/kg)	1.00	(-)
Common R (used in model)* =			**2.06**	

4. BIOTRANSFORMATION

-1st Order Decay Coefficient*

Zone 1	λ (1/yr)	half-life (yrs)	Yield
PCE → TCE	0.070	9.90	0.79
TCE → DCE	0.050	13.90	0.74
DCE → VC	0.178	3.90	0.64
VC → ETH	0.119	5.80	0.45

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

λ HELP

5. GENERAL

Simulation Time*	5	(yr)
Modeled Area Width*	100	(ft)
Modeled Area Length*	150	(ft)
Zone 1 Length*	150	(ft)
Zone 2 Length*	0	(ft)

L, W

Zone 2= L - Zone 1

6. SOURCE DATA

TYPE: Decaying Single Planar

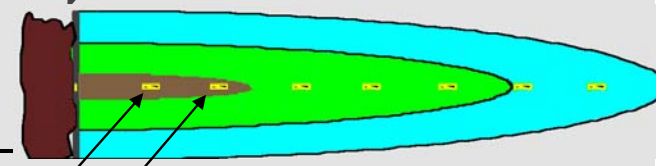
Source Options

Source Thickness in Sat. Zone* 8 (ft)

Y1
Width* (ft) 100

Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	.0	0.01
TCE	.01	0.01
DCE	.0	0.01
VC	.75	0.01
ETH	0.001	0.01

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



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	0.0										
TCE Conc. (mg/L)	0.0031										
DCE Conc. (mg/L)	0.0										
VC Conc. (mg/L)	0.0101										
ETH Conc. (mg/L)	0.00019										
Distance from Source (ft)	90										
Date Data Collected	2011										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore Formulas | RESET | SEE OUTPUT | Paste Example

Start Here → ○ PCE ◉ TCE ○ DCE ○ VC ○ ETH

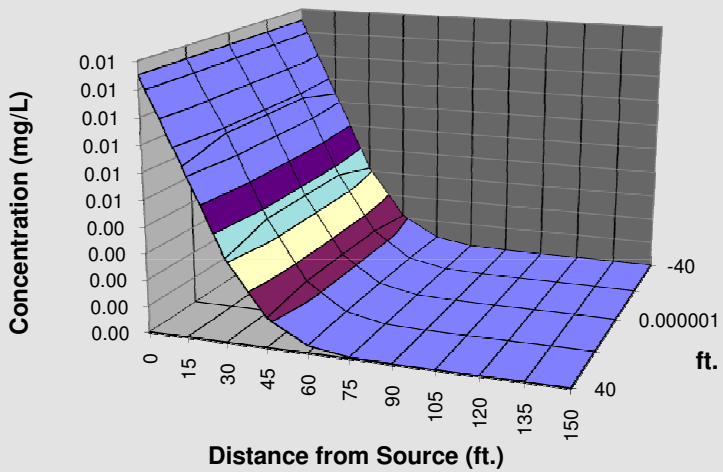
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.010	0.006	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.010	0.007	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.010	0.007	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.010	0.007	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.010	0.006	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	7.9E-1	5.5E-1	2.9E-1	1.1E-1	2.7E-2	4.4E-3	4.8E-4	3.4E-5	1.5E-6	4.5E-8	8.4E-10

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.005 mg/L Displayed Model: Biotransformation Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)
% Biotransformed =	+4.3%	
% Change in Mass Rate =	100.0 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	0.04	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ◉ DCE ○ VC ○ ETH

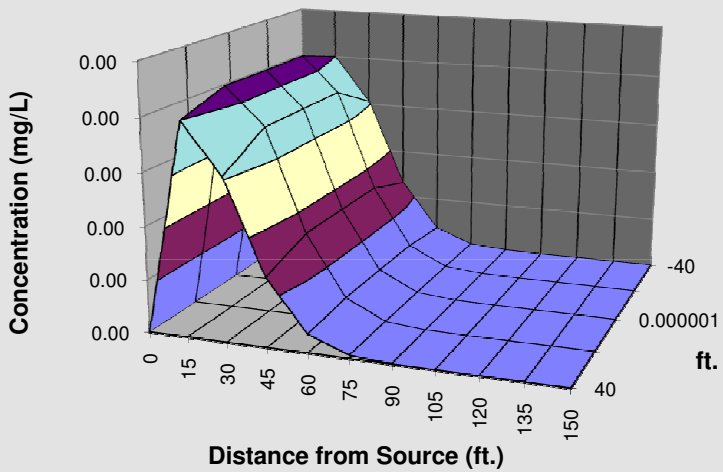
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	2.2E-8	1.7E-2	1.4E-2	6.2E-3	1.7E-3	3.0E-4	3.4E-5	2.4E-6	1.1E-7	3.3E-9	6.0E-11

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.070 mg/L Displayed Model: Biotransformation Displayed Compound: DCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed =

% Change in Mass Rate = 99.7 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ○ DCE ◉ VC ○ ETH

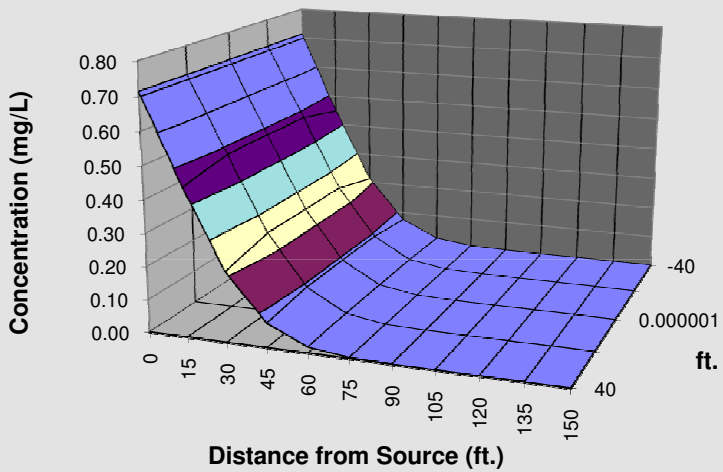
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.713	0.447	0.212	0.074	0.018	0.003	0.000	0.000	0.000	0.000	0.000
20	0.713	0.480	0.248	0.091	0.023	0.004	0.000	0.000	0.000	0.000	0.000
0	0.713	0.480	0.248	0.092	0.023	0.004	0.000	0.000	0.000	0.000	0.000
-20	0.713	0.480	0.248	0.091	0.023	0.004	0.000	0.000	0.000	0.000	0.000
-40	0.713	0.447	0.212	0.074	0.018	0.003	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	6.0E+1	3.9E+1	1.9E+1	7.0E+0	1.7E+0	2.9E-1	3.1E-2	2.2E-3	9.9E-5	2.9E-6	5.4E-8

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: **0.002** mg/L Displayed Model: **Biotransformation** Displayed Compound: **VC**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.2	(Kg)
- Plume Mass If Biotransformation/Production	0.2	(Kg)
Mass Removed	0.0	(Kg)
% Biotransformed =	**+9.8%**	
% Change in Mass Rate =	**100.0 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	0.09	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ○ DCE ○ VC ◉ ETH

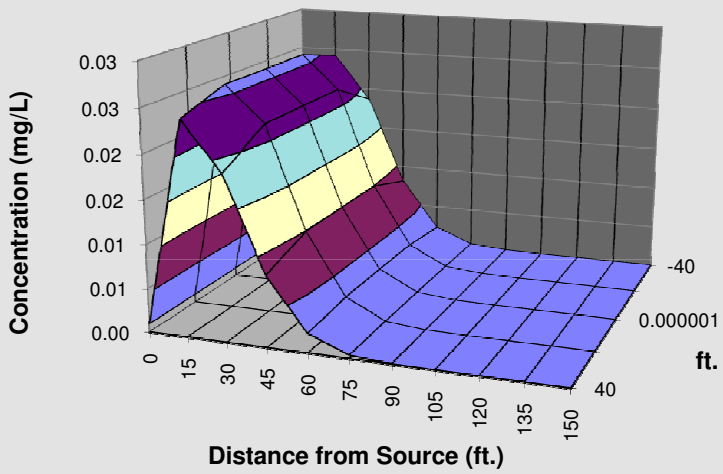
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.001	0.024	0.019	0.008	0.002	0.000	0.000	0.000	0.000	0.000	0.000
20	0.001	0.026	0.022	0.010	0.003	0.000	0.000	0.000	0.000	0.000	0.000
0	0.001	0.026	0.022	0.010	0.003	0.001	0.000	0.000	0.000	0.000	0.000
-20	0.001	0.026	0.022	0.010	0.003	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.001	0.024	0.019	0.008	0.002	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	7.9E-2	2.1E+0	1.7E+0	7.7E-1	2.1E-1	3.8E-2	4.2E-3	3.1E-4	1.4E-5	4.2E-7	7.7E-9

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: mg/L Displayed Model: Biotransformation Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = -3297.8 %

% Change in Mass Rate = 100.0 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.05	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ◉ TCE ○ DCE ○ VC ○ ETH

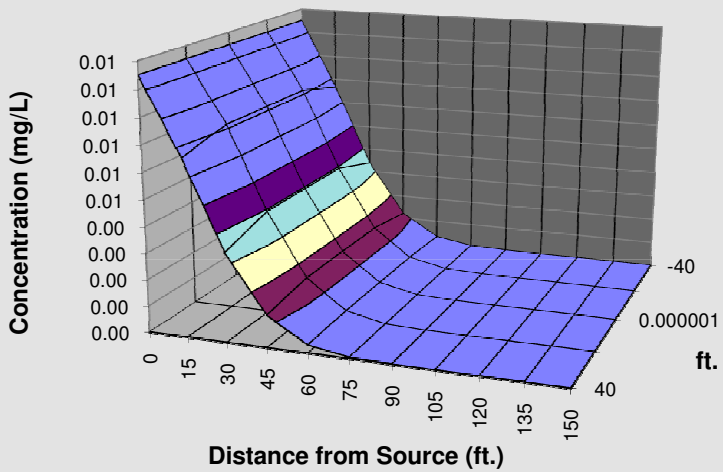
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.010	0.007	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.010	0.007	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.010	0.007	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.010	0.007	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.010	0.007	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	7.9E-1	5.8E-1	3.1E-1	1.2E-1	2.9E-2	4.9E-3	5.4E-4	3.8E-5	1.7E-6	5.1E-8	9.4E-10

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.005 mg/L Displayed Model: No Degradation Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)
% Biotransformed =	+4.3%	
% Change in Mass Rate =	100.0 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	0.04	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

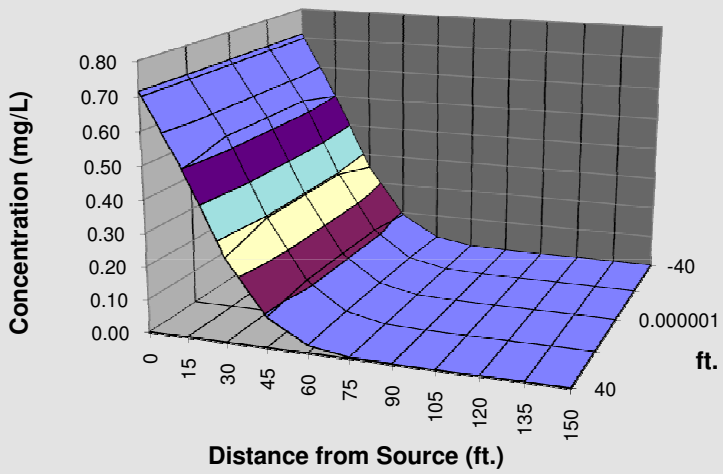
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.713	0.500	0.253	0.091	0.023	0.004	0.000	0.000	0.000	0.000	0.000
20	0.713	0.536	0.295	0.113	0.029	0.005	0.001	0.000	0.000	0.000	0.000
0	0.713	0.536	0.296	0.113	0.029	0.005	0.001	0.000	0.000	0.000	0.000
-20	0.713	0.536	0.295	0.113	0.029	0.005	0.001	0.000	0.000	0.000	0.000
-40	0.713	0.500	0.253	0.091	0.023	0.004	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	6.0E+1	4.3E+1	2.3E+1	8.7E+0	2.2E+0	3.7E-1	4.0E-2	2.9E-3	1.3E-4	3.8E-6	7.1E-8

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.002 mg/L Displayed Model: No Degradation Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.2	(Kg)
- Plume Mass If Biotransformation/Production	0.2	(Kg)
Mass Removed	0.0	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = +9.8%

% Change in Mass Rate = 100.0 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.09	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

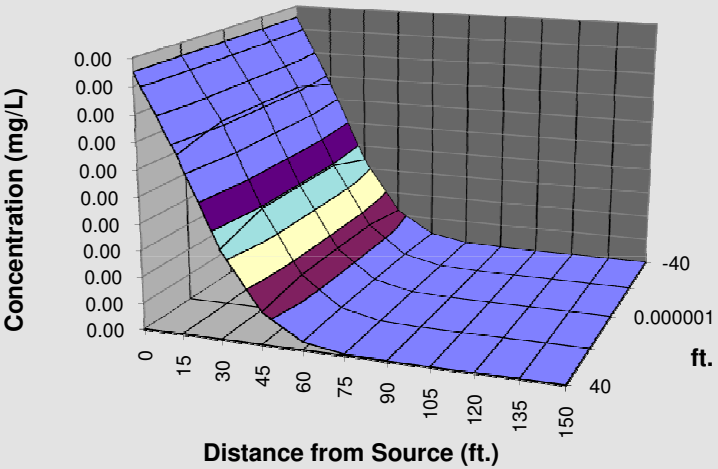
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	15	30	45	60	75	90	105	120	135	150
40	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	7.9E-2	5.8E-2	3.1E-2	1.2E-2	2.9E-3	4.9E-4	5.4E-5	3.8E-6	1.7E-7	5.1E-9	9.4E-11

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: mg/L Displayed Model: No Degradation Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.0	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = -3297.8 %

% Change in Mass Rate = 100.0 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.000	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence — *Version 1.4*

Lenoir County
MW-3: Benzene
Run Name

Data Input Instructions:

115 → *1. Enter value directly....or*
↑ *or*
0.02 → *2. Calculate by filling in grey cells below. (To restore formulas, hit button below).*

Variable* → *Data used directly in model.*
20 → *Value calculated by model. (Don't enter any data).*

1. HYDROGEOLOGY

Seepage Velocity*	*Vs*	6.7	*(ft/yr)*
or		↑ *or*	
Hydraulic Conductivity	*K*	1.3E-04	*(cm/sec)*
Hydraulic Gradient	*i*	0.01	*(ft/ft)*
Porosity	*n*	0.2	*(-)*

2. DISPERSION

Longitudinal Dispersivity*	*alpha x*	7.1	*(ft)*
Transverse Dispersivity*	*alpha y*	0.7	*(ft)*
Vertical Dispersivity*	*alpha z*	0.0	*(ft)*
or		↑ *or*	
Estimated Plume Length	*Lp*	100	*(ft)*

3. ADSORPTION

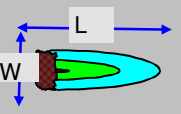
Retardation Factor*	*R*	1.0	*(-)*
or		↑ *or*	
Soil Bulk Density	*rho*		*(kg/l)*
Partition Coefficient	*Koc*		*(L/kg)*
FractionOrganicCarbon	*foc*		*(-)*

4. BIODEGRADATION

1st Order Decay Coeff*	*lambda*	0.35	*(per yr)*
or		↑ *or*	
Solute Half-Life	*t-half*	2.00	*(year)*
or Instantaneous Reaction Model			
Delta Oxygen*	*DO*	0.78	*(mg/L)*
Delta Nitrate*	*NO3*	0.09	*(mg/L)*
Observed Ferrous Iron*	*Fe2+*	71.45	*(mg/L)*
Delta Sulfate*	*SO4*	0	*(mg/L)*
Observed Methane*	*CH4*	18	*(mg/L)*

5. GENERAL

Modeled Area Length*	100	*(ft)*
Modeled Area Width*	700	*(ft)*
Simulation Time*	5	*(yr)*



6. SOURCE DATA

Source Thickness in Sat.Zone* 10 *(ft)*

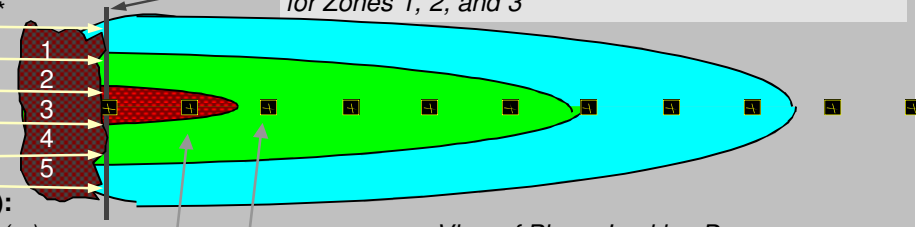
Source Zones:

Width* (ft)	Conc. (mg/L)*
10	0.001
250	0.0025
350	0.005
250	0.0025
10	0.001

Source Halflife (see Help):

Infinite	Infinite	*(yr)*
Inst. React.	1st Order	
Soluble Mass	Infinite	*(Kg)*
In Source NAPL, Soil		

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells
If No Data Leave Blank or Enter "0"

7. FIELD DATA FOR COMPARISON

Dist. from Source (ft)	Concentration (mg/L)
0	
10	
20	
30	
40	
50	
60	
70	
80	0.0018
90	
100	

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE — **View Output**

RUN ARRAY — **View Output**

Help

Recalculate This Sheet

Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

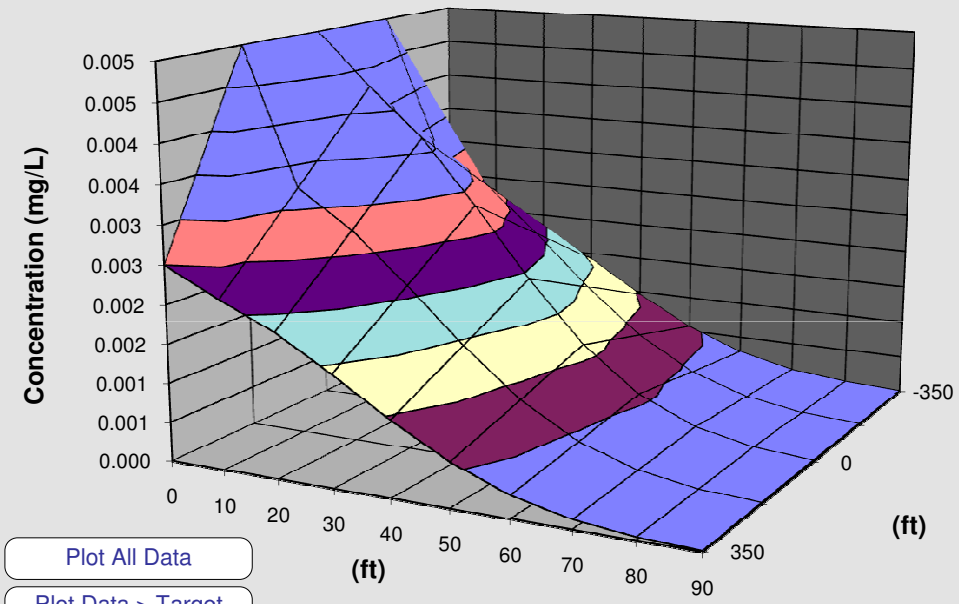
DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse Distance (ft) ↓	Distance from Source (ft) 0	10	20	30	40	50	60	70	80	90	100
350	2.500E-03	2.152E-03	1.835E-03	1.415E-03	9.624E-04	5.655E-04	2.827E-04	1.189E-04	4.167E-05	1.210E-05	2.901E-06
175	5.000E-03	3.228E-03	2.753E-03	2.123E-03	1.444E-03	8.483E-04	4.241E-04	1.783E-04	6.250E-05	1.816E-05	4.351E-06
0	5.000E-03	4.304E-03	3.671E-03	2.830E-03	1.925E-03	1.131E-03	5.654E-04	2.377E-04	8.333E-05	2.421E-05	5.801E-06
-175	5.000E-03	3.228E-03	2.753E-03	2.123E-03	1.444E-03	8.483E-04	4.241E-04	1.783E-04	6.250E-05	1.816E-05	4.351E-06
-350	2.500E-03	2.152E-03	1.835E-03	1.415E-03	9.624E-04	5.655E-04	2.827E-04	1.189E-04	4.167E-05	1.210E-05	2.901E-06
MASS FLUX (mg/day)	3.1E+0	2.7E+0	2.3E+0	1.8E+0	1.2E+0	7.2E-1	3.6E-1	1.5E-1	5.3E-2	1.5E-2	3.7E-3

Model to Display:

- *No Degradation Model*
- *1st Order Decay Model*
- *Instantaneous Reaction Model*

Time: **5 Years** Target Level: **0.001** mg/L Displayed Model: **No Degradation**



Plot All Data

Plot Data > Target

Plume and Source Masses (Order-of-Magnitude Accuracy)

Plume Mass if No Biodegradation	0.0	*(Kg)*
- Actual Plume Mass	0.0	*(Kg)*
= Plume Mass Removed by Biodeg	**0.0**	*(Kg)*
	0 %	

Change in Electron Acceptor/Byproduct Masses:

Oxygen	*Nitrate*	*Iron II*	*Sulfate*	*Methane*	
na	na	na	na	na	*(Kg)*

Contam. Mass in Source (t=0 Years)	Infinite	*(Kg)*
Contam. Mass in Source Now (t=5Years)	Infinite	*(Kg)*
Current Volume of Groundwater in Plume	0.0	*(ac-ft)*
Flowrate of Water Through Source Zone	0.269	*(ac-ft/yr)*

Mass HELP

Recalculate

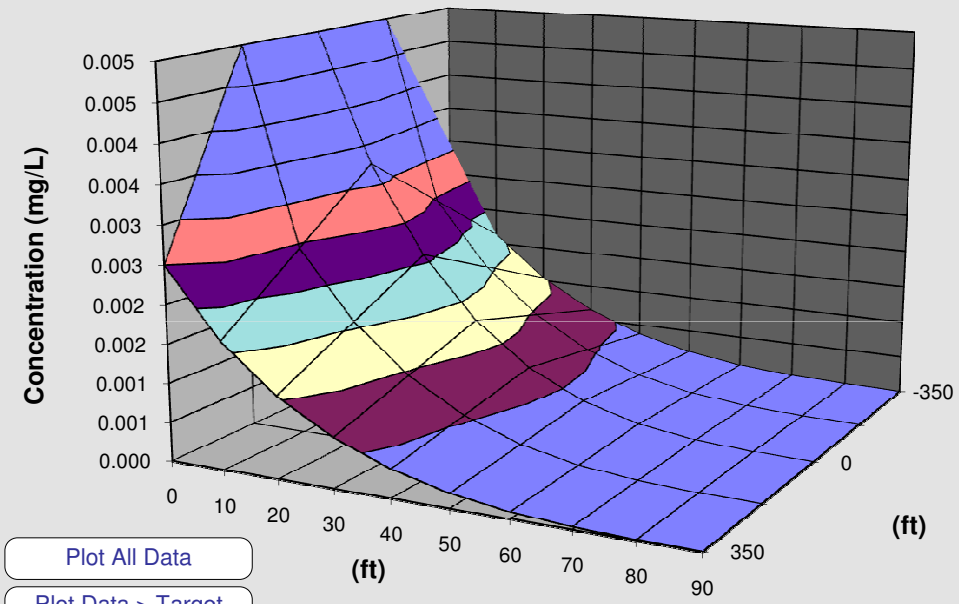
DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse Distance (ft) ↓	Distance from Source (ft) 0	10	20	30	40	50	60	70	80	90	100
350	2.500E-03	1.631E-03	1.045E-03	6.381E-04	3.612E-04	1.845E-04	8.289E-05	3.213E-05	1.058E-05	2.929E-06	6.755E-07
175	5.000E-03	2.447E-03	1.568E-03	9.572E-04	5.419E-04	2.767E-04	1.243E-04	4.820E-05	1.588E-05	4.394E-06	1.013E-06
0	5.000E-03	3.263E-03	2.091E-03	1.276E-03	7.225E-04	3.689E-04	1.658E-04	6.426E-05	2.117E-05	5.858E-06	1.351E-06
-175	5.000E-03	2.447E-03	1.568E-03	9.572E-04	5.419E-04	2.767E-04	1.243E-04	4.820E-05	1.588E-05	4.394E-06	1.013E-06
-350	2.500E-03	1.631E-03	1.045E-03	6.381E-04	3.612E-04	1.845E-04	8.289E-05	3.213E-05	1.058E-05	2.929E-06	6.755E-07
MASS FLUX (mg/day)	3.1E+0	2.1E+0	1.3E+0	8.2E-1	4.6E-1	2.4E-1	1.1E-1	4.1E-2	1.4E-2	3.7E-3	8.6E-4

Model to Display:

- *No Degradation Model*
- *1st Order Decay Model*
- *Instantaneous Reaction Model*

Time: **5 Years** Target Level: **0.001** mg/L Displayed Model: **1st Order Decay**



Plot All Data

Plot Data > Target

Plume and Source Masses (Order-of-Magnitude Accuracy)

Plume Mass if No Biodegradation	0.0	*(Kg)*
- Actual Plume Mass	0.0	*(Kg)*
= Plume Mass Removed by Biodeg	**0.0**	*(Kg)* (39 %)

Change in Electron Acceptor/Byproduct Masses:

Oxygen	*Nitrate*	*Iron II*	*Sulfate*	*Methane*	
na	na	na	na	na	*(Kg)*

Contam. Mass in Source (t=0 Years)	Infinite	*(Kg)*
Contam. Mass in Source Now (t=5Years)	Infinite	*(Kg)*
Current Volume of Groundwater in Plume	0.0	*(ac-ft)*
Flowrate of Water Through Source Zone	0.269	*(ac-ft/yr)*

Mass HELP

Recalculate

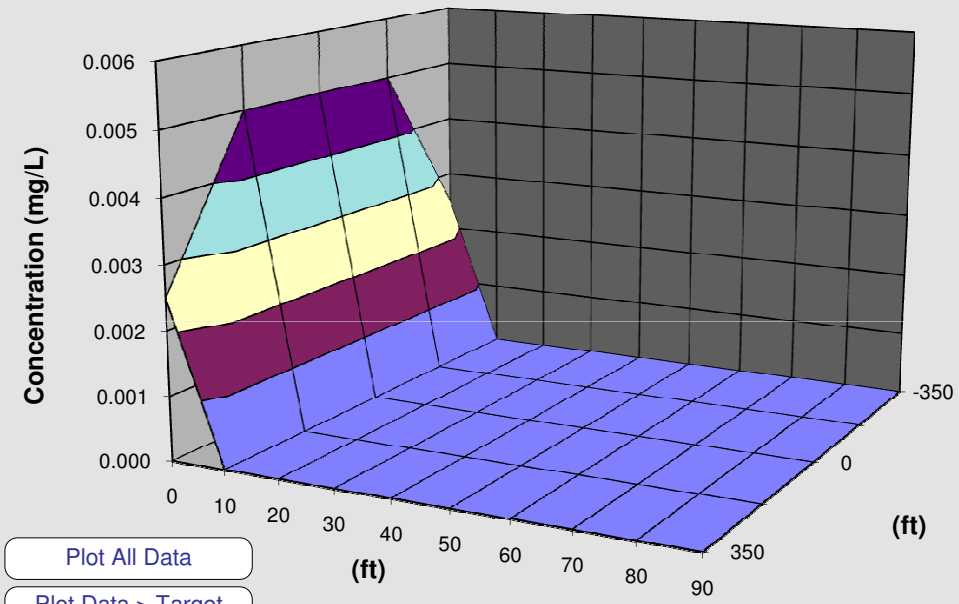
DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse Distance (ft) ↓	Distance from Source (ft) 0	10	20	30	40	50	60	70	80	90	100
350	2.500E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
175	5.000E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0	5.000E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
-175	5.000E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
-350	2.500E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MASS FLUX (mg/day)	3.1E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0

Time: **5 Years** Target Level: **0.001** mg/L Displayed Model: **Inst. Reaction**

Model to Display:

- *No Degradation Model*
- *1st Order Decay Model*
- *Instantaneous Reaction Model*



Plot All Data

Plot Data > Target

Plume and Source Masses (Order-of-Magnitude Accuracy)

Plume Mass if No Biodegradation	44.1	*(Kg)*
- Actual Plume Mass	0.0	*(Kg)*
= Plume Mass Removed by Biodeg	**44.1**	*(Kg)* (100 %)

Change in Electron Acceptor/Byproduct Masses:

Oxygen	*Nitrate*	*Iron II*	*Sulfate*	*Methane*	
-1.3	-0.1	+118.3	+0.0	+29.8	*(Kg)*

Contam. Mass in Source (t=0 Years)	Infinite	*(Kg)*
Contam. Mass in Source Now (t=5Years)	Infinite	*(Kg)*
Current Volume of Groundwater in Plume	0.2	*(ac-ft)*
Flowrate of Water Through Source Zone	0.269	*(ac-ft/yr)*

Mass HELP

Recalculate

Appendix B
Laboratory Analysis Reports
Chains of Custody

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#: 6009

LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON ,NC 28502

DATE COLLECTED: 07/19/11
DATE REPORTED : 09/12/11

REVIEWED BY:

PARAMETERS	MDL	SWSL	MW-1	MW-3	MW-4	MW-6	MW-8	Analysis Date	Analyst	Method Code
PH (field measurement), Units			4.10	5.57	4.36	4.57		07/19/11	RJH	SM4500HB
BOD, mg/l	2.0	2.0	2.1	--- U	--- U	--- U		07/20/11	TRB	SM5210B
COD, mg/l	20.0	20.0	--- U	--- U	31	--- U		07/26/11	TRB	HACH8000
Nitrate Nitrogen as N, mg/l	0.03	10.0	11.38	0.09 J	--- U	2.89 J		07/20/11	ANO	EPA353.2
Total Organic Carbon, mg/l	0.30	1.0	--- U	3.85	10.27	--- U		07/20/11	SEJ	SM5310C
Total Alkalinity, mg/l	1.0	1.0	--- U	58	196	--- U		07/20/11	TRB	SM2320B
Chloride, mg/l	5.0	5.0	8	58	8	--- U		07/20/11	HLB	SM4500-CLB
Cyanide, ug/l	5.0	10.0	--- U	--- U				07/22/11	SEJ	SM4500 CN-
Sulfate, mg/l	5.0	250.0	9.7 J	--- U	17.1 J	22.0 J		07/25/11	TRB	SM426C
Antimony, ug/l	0.14	6.0	--- U	--- U	--- U	--- U		07/27/11	CMF	EPA200.8
Arsenic, ug/l	0.10	10.0	0.82 J	2.4 J	9 J	0.52 J		07/27/11	CMF	EPA200.8
Barium, ug/l	0.02	100.0	68.7 J	65.6 J	21.8 J	56.9 J		07/27/11	CMF	EPA200.8
Beryllium, ug/l	0.02	1.0	0.16 J	0.10 J	0.10 J	0.10 J		07/27/11	CMFD	EPA200.8
Cadmium, ug/l	0.02	1.0	0.08 J	0.08 J	0.06 J	0.08 J		07/27/11	CMF	EPA200.8
Cobalt, ug/l	0.03	10.0	2.1 J	0.60 J	1.0 J	0.52 J		07/27/11	CMF	EPA200.8
Copper, ug/l	0.02	10.0	1.4 J	0.68 J	1.5 J	0.34 J		07/27/11	CMF	EPA200.8
Total Chromium, ug/l	0.04	10.0	--- U	0.62 J	3.2 J	--- U		07/27/11	CMF	EPA200.8
Iron, ug/l	15.9	300.0	825	71450	79350	422		08/03/11	ADD	SM3111B
Lead, ug/l	0.02	10.0	0.91 J	0.50 J	2.6 J	0.40 J		07/27/11	CMF	EPA200.8
Mercury, ug/l	0.05	0.20	--- U	0.09 J	--- U	--- U		07/27/11	CMF	EPA200.8
Nickel, ug/l	0.04	50.0	3.1 J	1.9 J	1.5 J	0.95 J		07/27/11	CMF	EPA200.8
Selenium, ug/l	0.20	10.0	--- U	1.3 J	0.95 J	0.54 J		07/27/11	CMF	EPA200.8
Silver, ug/l	0.02	10.0	--- U	--- U	--- U	--- U		07/27/11	CMF	EPA200.8
Thallium, ug/l	0.02	5.5	0.10 J	0.15 J	0.08 J	0.22 J		07/27/11	CMF	EPA200.8
Tin, ug/l	0.16	100.0	0.18 J	0.81 J				07/27/11	CMF	EPA200.8
Vanadium, ug/l	0.14	25.0	1.6 J	2.9 J	9.0 J	0.66 J		07/27/11	CMF	EPA200.8
Zinc, ug/l	0.24	10.0	11	40	33	5.6 J		07/27/11	CMF	EPA200.8
Turbidity, NTU	1.0	1.0	8.5	56.3	73.8	1.0		07/19/11	RJH	SM2130B
Sulfide, ug/l	100	1000	--- U	--- U	--- U	--- U		07/25/11	LFJ	SM4500-S2D
Conductivity (at 25c), uMhos	1.0	1.0	136	510	374	86		07/19/11	RJH	SM2510B
Dissolved Oxygen, mg/l	0.1	0.1	7.23	0.78	0.78	0.29		07/19/11	RJH	SM4500OG
Temperature, °C			17.29	19.96	20.66	20.40		07/19/11	RJH	SM2550B
Static Water Level, feet			20.08	8.83	9.68	14.00	22.99	07/19/11	RJH	
Well Depth, feet			38.94	15.82	15.84	16.96		07/19/11	RJH	
Carbon Dioxide, mg/l	1.0	1.0	21	282	462	105		07/20/11	TRB	SM4500CO2C
ORP, mv			352.6	72.8	31.5	388.5		07/19/11	RJH	SM2580B

J = Between MDL and SWSL, U = Below ALL Quanititation 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#: 6009

LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON ,NC 28502

DATE COLLECTED: 07/19/11
DATE REPORTED : 09/12/11

REVIEWED BY:

PARAMETERS	MDL	SWSL	MW-9	MW-10	MW-11	MW-12	Equipment Blank	Analysis Date	Analyst	Method Code
PH (field measurement), Units			4.60		4.30	4.30		07/19/11	RJH	SM4500HB
BOD, mg/l	2.0	2.0	--- U		--- U	--- U		07/20/11	TRB	SM5210B
COD, mg/l	20.0	20.0	--- U		--- U	25		07/26/11	TRB	HACH8000
Nitrate Nitrogen as N, mg/l	0.03	10.0	3.08 J		1.94 J	0.95 J		07/20/11	ANO	EPA353.2
Total Organic Carbon, mg/l	0.30	1.0	2.07		--- U	10.54		07/20/11	SEJ	SM5310C
Total Alkalinity, mg/l	1.0	1.0	2		--- U	--- U		07/20/11	TRB	SM2320B
Chloride, mg/l	5.0	5.0	10		8	44		07/20/11	HLB	SM4500-CLB
Sulfate, mg/l	5.0	250.0	29.4 J		8.3 J	50.5 J		07/25/11	TRB	SM426C
Antimony, ug/l	0.14	6.0	--- U		--- U	--- U	--- U	07/27/11	CMF	EPA200.8
Arsenic, ug/l	0.10	10.0	2.9 J		0.58 J	1.0 J	0.51 J	07/27/11	CMF	EPA200.8
Barium, ug/l	0.02	100.0	61.5 J		31.7 J	165	0.16 J	07/27/11	CMF	EPA200.8
Beryllium, ug/l	0.02	1.0	0.17 J		0.08 J	0.24 J	--- U	07/27/11	CMFD	EPA200.8
Cadmium, ug/l	0.02	1.0	0.07 J		--- U	0.42 J	0.3 J	07/27/11	CMF	EPA200.8
Cobalt, ug/l	0.03	10.0	4.6 J		0.27 J	4.6 J	--- U	07/27/11	CMF	EPA200.8
Copper, ug/l	0.02	10.0	0.48 J		1.1 J	1.1 J	0.24 J	07/27/11	CMF	EPA200.8
Total Chromium, ug/l	0.04	10.0	--- U		--- U	--- U	--- U	07/27/11	CMF	EPA200.8
Iron, ug/l	15.9	300.0	7700		395	96 J		08/03/11	ADD	SM3111B
Lead, ug/l	0.02	10.0	0.20 J		0.04 J	--- U	--- U	07/27/11	CMF	EPA200.8
Mercury, ug/l	0.05	0.20	0.16 J		--- U	0.16 J	--- U	07/27/11	CMF	EPA200.8
Nickel, ug/l	0.04	50.0	3.3 J		1.5 J	6.7 J	0.78 J	07/27/11	CMF	EPA200.8
Selenium, ug/l	0.20	10.0	0.28 J		--- U	2.4 J	--- U	07/27/11	CMF	EPA200.8
Silver, ug/l	0.02	10.0	0.04 J		--- U	--- U	--- U	07/27/11	CMF	EPA200.8
Thallium, ug/l	0.02	5.5	0.07 J		0.03 J	0.04 J	--- U	07/27/11	CMF	EPA200.8
Tin, ug/l	0.16	100.0					0.38 J	07/27/11	CMF	EPA200.8
Vanadium, ug/l	0.14	25.0	1.6 J		0.99 J	0.60 J	0.36 J	07/27/11	CMF	EPA200.8
Zinc, ug/l	0.24	10.0	12		5.8 J	6.1 J	1.3 J	07/27/11	CMF	EPA200.8
Turbidity, NTU	1.0	1.0	37.3		10.0	2.9		07/19/11	RJH	SM2130B
Sulfide, ug/l	100	1000	--- U		--- U	--- U		07/25/11	LFJ	SM4500-S2D
Conductivity (at 25c), uMhos	1.0	1.0	186		45	296		07/19/11	RJH	SM2510B
Dissolved Oxygen, mg/l	0.1	0.1	1.55		2.17	1.61		07/19/11	RJH	SM4500OG
Temperature, °C			20.94		19.20	20.43		07/19/11	RJH	SM2550B
Static Water Level, feet			7.76	24.46	15.15	18.10		07/19/11	RJH	
Well Depth, feet			21.82		35.61	38.39		07/19/11	RJH	
Carbon Dioxide, mg/l	1.0	1.0	92		45	173		07/20/11	TRB	SM4500CO2C
ORP, mv			307.6		339.3	361.2		07/19/11	RJH	SM2580B

J = Between MDL and SWSL, U = Below ALL Quanititation 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: LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON, NC 28502

REVIEWED BY:

CLIENT ID: 6009

ANALYST: CHS
DATE COLLECTED: 07/19/11
DATE EXTRACTED: 07/27/11
DATE ANALYZED: 08/24/11
DATE REPORTED: 09/12/11

PESTICIDES AND PCB'S
EPA METHOD 8081B

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

J = Between MDL and SWSL, U = Below ALL Quanititation 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: LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON, NC 28502

REVIEWED BY:

CLIENT ID: 6009

ANALYST: CHS
DATE COLLECTED: 07/19/11
DATE EXTRACTED: 07/27/11
DATE ANALYZED: 08/24/11
DATE REPORTED: 09/12/11

LANDFILL APPENDIX II
EPA METHOD 8151A

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

J = Between MDL and SWSL, U = Below ALL Quanititation 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: LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON, NC 28502

CLIENT ID: 6009

ANALYST: MAO
DATE COLLECTED: 07/19/11
DATE ANALYZED: 07/28/11
DATE REPORTED: 09/12/11

REVIEWED BY: _____

VOLATILE ORGANICS
EPA METHOD 8260B

PARAMETERS, ug/l	MDL	SWSL	MW-4	MW-6	MW-9	MW-11	MW-12
1. Chloromethane	0.77	1.0	--- U	--- U	--- U	--- U	--- U
2. Vinyl Chloride	0.63	1.0	--- U	--- U	--- U	1.10	1.00
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	0.90 J	--- U	--- 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	--- U	--- U	--- 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	2.00	--- U	--- U	--- U	3.70
21. 1,2-Dichloroethane	0.27	1.0	--- U	--- U	--- U	--- U	--- U
22. Trichloroethene	0.23	1.0	--- U	--- U	--- 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-Dichloropropene	0.24	1.0	--- U	--- U	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U	--- U	--- U	--- U	--- U
27. Toluene	0.23	1.0	--- U	--- U	--- U	--- U	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U	--- U	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U	--- U	--- U	--- U	--- U
30. Tetrachloroethene	0.17	1.0	--- U	0.30 J	--- 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	6.90	--- U	--- U	--- 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. Bibromomethane	0.28	10.0	--- U	--- U	--- U	--- U	--- U
39. Styrene	0.19	1.0	--- U	--- U	--- U	--- U	--- U
40. Bromoform	0.20	3.0	--- U	--- U	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U	--- U	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U	--- U	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	1.10	--- U	--- 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 Quanititation 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: LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON, NC 28502

REVIEWED BY:

CLIENT ID: 6009

ANALYST: CHS
DATE COLLECTED: 07/19/11
DATE EXTRACTED: 07/26/11
DATE ANALYZED: 08/24/11
DATE REPORTED: 09/12/11

SEMI-VOLATILE ORGANICS
EPA METHOD 8270C

PARAMETERS, ug/l	MDL	SWSL	MW-1	MW-3
1. Acenaphthene	2.66	10.0	--- U	--- U
2. Acenaphthylene	2.60	10.0	--- U	--- U
3. Anthracene	2.97	10.0	--- U	--- U
4. Benzo[a]antrhacene	4.16	10.0	--- U	--- U
5. Benzo[b]fluoranthene	3.32	10.0	--- U	--- U
6. Benzo[k]fluoranthene	4.23	10.0	--- U	--- U
7. Benzo[g,h,i]perylene	2.61	10.0	--- U	--- U
8. Benzo[a]pyrene	3.27	10.0	--- U	--- U
9. 4-Bromophenyl Phenyl Ether	2.63	10.0	--- U	--- U
10. Butyl Benzyl Phthalate	5.78	10.0	--- U	--- U
11. Bis-(2-Chloroethoxy) Methane	3.14	10.0	--- U	--- U
12. Bis-(2-Chloroethyl) Ether	2.58	10.0	--- U	--- U
13. Bis-(2-Chloroisopropyl) Ether	2.58	10.0	--- U	--- U
14. 2-Chloronaphthalene	2.17	10.0	--- U	--- U
15. 4-Chlorophenyl Phenyl Ether	2.42	10.0	--- U	--- U
16. Chrysene	4.04	10.0	--- U	--- U
17. Dibenzo[a,h]anthracene	2.78	10.0	--- U	--- U
18. Di-N-Butyl Phthalate	3.09	10.0	--- U	--- U
19. Dimethyl Phthalate	3.78	10.0	--- U	--- U
20. Diethyl Phthalate	3.92	6000	--- U	--- U
21. 2,4-Dinitrotoluene	3.95	10.0	--- U	--- U
22. 2,6-Dinitrotoluene	3.88	10.0	--- U	--- U
23. Di-N-Octyl Phthalate	2.81	10.0	--- U	--- U
24. Bis-(2-Ethylhexyl) Phthalate	9.97	15.0	--- U	--- U
25. Fluoranthene	3.92	10.0	--- U	--- U
26. Fluorene	2.95	10.0	--- U	--- U
27. Hexachlorobenzene	2.61	10.0	--- U	--- U
28. Hexachlorocyclopentadiene	4.16	10.0	--- U	--- U
29. Indeno[1,2,3-Cd]pyrene	2.91	10.0	--- U	--- U
30. Isophorone	3.74	10.0	--- U	--- U
31. Nitrobenzene	2.85	10.0	--- U	--- U
32. N-Nitrosodimethylamine	4.25	10.0	--- U	--- U
33. N-Nitrosodiphenylamine	3.95	10.0	--- U	--- U
34. N-Nitrosodi-N-Propylamine	4.06	10.0	--- U	--- U
35. Phenanthrene	3.24	10.0	--- U	--- U
36. Pyrene	3.63	10.0	--- U	--- U
37. 4-Chloro-3-Methylphenol	3.79	20.0	--- U	--- U
38. 2-Chlorophenol	2.75	10.0	--- U	--- U
39. O-Cresol	3.68	10.0	--- U	--- U
40. P-Cresol	4.12	10.0	--- U	--- U
41. 2,4-Dichlorophenol	5.19	10.0	--- U	--- U
42. 2,6-Dichlorophenol	4.89	10.0	--- U	--- U
43. 2,4-Dimethylphenol	3.21	10.0	--- U	--- U
44. 4,6-Dinitro-2-Methylphenol	4.77	50.0	--- U	--- U
45. 2,4-Dinitrophenol	4.37	50.0	--- U	--- U
46. Ethyl Methanesulfonate	5.26	20.0	--- U	--- U
47. Methyl Methanesulfonate	4.92	10.0	--- U	--- U
48. 2-Nitrophenol	3.64	10.0	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quanititation 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: LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON, NC 28502

REVIEWED BY:

CLIENT ID: 6009

ANALYST: CHS
DATE COLLECTED: 07/19/11
DATE EXTRACTED: 07/26/11
DATE ANALYZED: 08/24/11
DATE REPORTED: 09/12/11

SEMI-VOLATILE ORGANICS
EPA METHOD 8270C

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

J = Between MDL and SWSL, U = Below ALL Quanititation 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: LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON, NC 28502

REVIEWED BY:

CLIENT ID: 6009

ANALYST: CHS
DATE COLLECTED: 07/19/11
DATE EXTRACTED: 07/26/11
DATE ANALYZED: 08/24/11
DATE REPORTED: 09/12/11

SEMI-VOLATILE ORGANICS
EPA METHOD 8270C

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

J = Between MDL and SWSL, U = Below ALL Quanititation 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: LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON, NC 28502

CLIENT ID: 6009

ANALYST: MAO
DATE COLLECTED: 07/19/11
DATE ANALYZED: 07/28/11
DATE REPORTED: 09/12/11

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8260B

PARAMETERS, ug/l	MDL	SWSL	MW-1	MW-3	Equipment Blank
1. Chloromethane	0.77	1.0	--- U	--- U	--- U
2. Vinyl Chloride	0.63	1.0	--- U	10.10	--- U
3. Bromomethane	0.67	10.0	--- U	--- U	--- U
4. Chloroethane	0.48	10.0	--- U	--- U	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U	--- U	--- U
6. 1,1-Dichloroethene	0.17	5.0	--- U	--- U	--- U
7. Acetone	9.06	100.0	--- U	--- U	--- U
8. Iodomethane	0.26	10.0	--- U	--- U	--- U
9. Carbon Disulfide	0.23	100.0	--- U	--- U	--- U
10. Methylene Chloride	0.64	1.0	--- U	--- U	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U	--- U	--- U
12. 1,1-Dichloroethane	0.20	5.0	--- U	4.80 J	--- U
13. Vinyl Acetate	0.20	50.0	--- U	--- U	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	--- U	14.80	--- U
15. 2-Butanone	2.21	100.0	--- U	--- U	--- U
16. Bromochloromethane	0.27	3.0	--- U	--- U	--- U
17. Chloroform	0.25	5.0	--- U	--- U	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U	--- U	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U	--- U	--- U
20. Benzene	0.24	1.0	--- U	1.80	--- U
21. 1,2-Dichloroethane	0.21	1.0	--- U	0.90 J	--- U
22. Trichloroethene	0.23	1.0	--- U	3.10	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U	--- U	--- U
24. Bromodichloromethane	0.21	1.0	--- U	--- U	--- U
25. Cis-1,3-Dichloropropene	0.24	1.0	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U	--- U	--- U
27. Toluene	0.23	1.0	--- U	--- U	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U	--- U	--- U
30. Tetrachloroethene	0.17	1.0	--- U	--- U	--- U
31. 2-Hexanone	1.57	50.0	--- U	--- U	--- U
32. Dibromochloromethane	0.24	3.0	--- U	--- U	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U	--- U	--- U
34. Chlorobenzene	0.30	3.0	--- U	0.60 J	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U	--- U	--- U
36. Ethylbenzene	0.21	1.0	--- U	0.40 J	--- U
37. Xylenes	0.68	5.0	--- U	--- U	--- U
38. Dibromomethane	0.28	10.0	--- U	--- U	--- U
39. Styrene	0.19	1.0	--- U	--- U	--- U
40. Bromoform	0.20	3.0	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U	1.10	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U	--- U	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U	--- U	--- U
46. Acrylonitrile	2.72	200.0	--- U	--- U	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U	--- U	--- U
48. Acrolein	40.57	53.0	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quanititation 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: LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON, NC 28502

CLIENT ID: 6009

ANALYST: MAO
DATE COLLECTED: 07/19/11
DATE ANALYZED: 07/28/11
DATE REPORTED: 09/12/11

REVIEWED BY: _____

LANDFILL APPENDIX II
EPA METHOD 8260B

PARAMETERS, ug/l	MDL	SWSL	MW-1	MW-3	Equipment Blank
49. Allyl Chloride	0.20	10.0	--- U	--- U	--- U
50. Chloroprene	0.21	20.0	--- U	--- U	--- U
51. 1,3-Dichlorobenzene	0.41	5.0	--- U	--- U	--- U
52. Dichlorodifluoromethane	0.51	5.0	--- U	1.10 J	--- U
53. 1,3-Dichloropropane	0.28	1.0	--- U	--- U	--- U
54. 2,2-Dichloropropane	0.17	15.0	--- U	--- U	--- U
55. 1,1-Dichloropropene	0.22	5.0	--- U	--- U	--- U
56. Ethyl Methacrylate	0.16	10.0	--- U	--- U	--- U
57. Hexachlorobutadiene	0.57	10.0	--- U	--- U	--- U
58. Isobutyl Alcohol	12.80	100.0	--- U	--- U	--- U
59. Methacrylonitrile	1.93	100.0	--- U	--- U	--- U
60. Methyl Methacrylate	0.25	30.0	--- U	--- U	--- U
61. Naphthalene	0.47	10.0	--- U	--- U	--- U
62. Propionitrile	3.26	150.0	--- U	--- U	--- U
63. 1,2,4-Trichlorobenzene	0.50	10.0	--- U	--- U	--- U
64. Acetonitrile	36.29	55.0	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quanititation 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: LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON, NC 28502

CLIENT ID: 6009 A

ANALYST: MAO
DATE COLLECTED: 07/19/11
DATE ANALYZED: 07/29/11
DATE REPORTED: 08/04/11

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8260B

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

J = Between MDL and SWSL, U = Below ALL Quanititation 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: LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON, NC 28502

CLIENT ID: 6009 A

ANALYST: MAO
DATE COLLECTED: 07/19/11
DATE ANALYZED: 07/29/11
DATE REPORTED: 08/04/11

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8260B

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

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

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

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

CHAIN OF CUSTODY RECORD

CLIENT: 6009 **Week:** 34

LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON NC 28502

(252) 566-4194

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l OR ug/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	Field pH	BOD	COD	Nitrate	TOC	Alkalinity	Chloride	Cyanide	Sulfate	Metals	Turbidity	Sulfide	Conductivity	DO	Temperature	Field Parameter
CHLORINE NEUTRALIZED AT COLLECTION																					
pH CHECK (LAB)								<2		<2			>12		<2		>9				
CONTAINER TYPE, P/G						P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
CHEMICAL PRESERVATION						A	A	C	A	C	A	A	D	A	A	A	F D	A	A	A	
MW-1	07 19 11	0930		17.29	17	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
MW-3	07 19 11	1022		19.96	17	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
MW-4	07 19 11	1058		20.66	13	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G
MW-6	07 19 11	1358		20.40	13	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G
MW-8	07 19 11				1																G
MW-9	07 19 11	1125		20.78	13	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G
MW-10	07 19 11				1																G
MW-11	07 19 11	1315		19.30	13	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G
MW-12	07 19 11	1210		20.73	13	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G
EB	07 19 11														G						
TB	07 19 11																				

PARAMETERS

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

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

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

SAMPLES COLLECTED BY: (Please Print) [illegible]

SAMPLES RECEIVED IN LAB AT 0.2 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Bob Hogge	07 19 11	[illegible]	7/19 1327
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS: SW1 + SW3 DRY ON 7/19/11 AND 7/20/11

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

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

FORM #5

№ 224410

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

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

CHAIN OF CUSTODY RECORD

CLIENT: 6009 **Week:** 34

LENOIR CO. LANDFILL (OLD)
COUNTY OF LENOIR
MR. TOM MILLER
P.O. BOX 756
KINSTON NC 28502

(252) 566-4194

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l OR ug/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	EPA 8260B	8260 Dup. 1	8260 Dup. 2	EPA 8270C	8270C Dup. 1	EPA 8081B	8260B App. II	8260 App. II 1	8151A Landfill	CO2	ORP
CHLORINE NEUTRALIZED AT COLLECTION																
pH CHECK (LAB)						12	12	12				12	12			
CONTAINER TYPE, P/G						G	G	G	G	G	G	G	G	G	P	P
CHEMICAL PRESERVATION						E	E	E	A	A	A	E	E	A	A	A
MW-1	07/19/11	0930		17.29	17				G	G	G	G	G	G	G	G
MW-3	07/19/11	1022		19.96	17				G	G	G	G	G	G	G	G
MW-4	07/19/11	1050		20.66	13	G	G	G							G	G
MW-6	07/19/11	1350		20.40	13	G	G	G							G	G
MW-8					1											
MW-9	07/19/11	1125		20.94	13	G	G	G							G	G
MW-10					1											
MW-11	07/19/11	1315		19.20	13	G	G	G							G	G
MW-12	07/19/11	1210		20.43	13	G	G	G							G	G
EB	07/19/11											G	G			
TB	07/19/11											G	G			

PARAMETERS

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

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

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

SAMPLES COLLECTED BY: (Please Print) H Lyle / F Q

SAMPLES RECEIVED IN LAB AT 02 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Bob H Lyle 07	1911	B	7/19 1327
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

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

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

FORM #5

№ 224409

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

August 18, 2011

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

RE: **LENOIR COUNTY (6009)**
Microseeps Workorder: 1940

Dear Steve Jones:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday, July 20, 2011. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

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

Sincerely, .

Heather Hauser 08/18/2011
hhauser@microseeps.com

Enclosures

Total Number of Pages 19

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

3004.1.0.0

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

SAMPLE SUMMARY

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID	Sample ID	Matrix	Date Collected	Date Received
19400001	MW-1	Water	7/19/2011 00:00	7/20/2011 10:11
19400002	MW-3	Water	7/19/2011 00:00	7/20/2011 10:11
10400003	MW-4	Water	7/19/2011 00:00	7/20/2011 10:11
19400004	MW-6	Water	7/19/2011 00:00	7/20/2011 10:11
19400005	MW-9	Water	7/19/2011 00:00	7/20/2011 10:11
10400006	MW-11	Water	7/19/2011 00:00	7/20/2011 10:11
19400007	MW-12	Water	7/19/2011 00:00	7/20/2011 10:11
19400008	MW-1	Bubble Strip	7/19/2011 00:00	7/20/2011 10:11
19400009	MW-3	Bubble Strip	7/19/2011 00:00	7/20/2011 10:11
19400010	MW-4	Bubble Strip	7/19/2011 00:00	7/20/2011 10:11
19400011	MW-6	Bubble Strip	7/19/2011 00:00	7/20/2011 10:11
19400012	MW-9	Bubble Strip	7/19/2011 00:00	7/20/2011 10:11
19400013	MW-11	Bubble Strip	7/19/2011 00:00	7/20/2011 10:11
19400014	MW-12	Bubble Strip	7/19/2011 00:00	7/20/2011 10:11

CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400001 Date Received: 7/20/2011 10:11 Matrix: Water
Sample ID: MW-1 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
EDonors											
Analysis Desc: AM23G			Analytical Method: AM23G								
Lactic Acid	<0.10	mg/l	0.10	0.010	1			7/31/2011 11:46	KB		
Acetic Acid	<0.070	mg/l	0.070	0.0060	1			7/31/2011 11:46	KB		
Propionic Acid	0.066	mg/l	0.050	0.0070	1			7/31/2011 11:46	KB		
Butyric Acid	<0.050	mg/l	0.050	0.0040	1			7/31/2011 11:46	KB		
Pyruvic Acid	<0.15	mg/l	0.15	0.033	1			7/31/2011 11:46	KB		
i-Pentanoic Acid	<0.15	mg/l	0.15	0.044	1			7/31/2011 11:46	KB		
Pentanoic Acid	<0.070	mg/l	0.070	0.012	1			7/31/2011 11:46	KB		
i-Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 11:46	KB		
Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 11:46	KB		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6000)

Lab ID: 19400002 Date Received: 7/20/2011 10:11 Matrix: Water
Sample ID: MW-3 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
EDonors											
Analysis Desc: AM23G			Analytical Method: AM23G								
Lactic Acid	0.27	mg/l	0.10	0.010	1			7/31/2011 13:53	KB		
Acetic Acid	0.12	mg/l	0.070	0.0060	1			7/31/2011 13:53	KB		
Proplonic Acid	0.071	mg/l	0.050	0.0070	1			7/31/2011 13:53	KB		
Butyric Acid	0.18	mg/l	0.050	0.0040	1			7/31/2011 13:53	KB		
Pyruvic Acid	<0.15	mg/l	0.15	0.033	1			7/31/2011 13:53	KB		
I-Pentanoic Acid	<0.15	mg/l	0.15	0.044	1			7/31/2011 13:53	KB		
Pentanoic Acid	<0.070	mg/l	0.070	0.012	1			7/31/2011 13:53	KB		
I-Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 13:53	KB		
Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 13:53	KB		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400003 Date Received: 7/20/2011 10:11 Matrix: Water
Sample ID: MW-4 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
EDonors											
Analysis Desc: AM23G			Analytical Method: AM23G								
Lactic Acid	0.24	mg/l	0.10	0.010	1			7/31/2011 14:35	KB		
Acetic Acid	0.087	mg/l	0.070	0.0060	1			7/31/2011 14:35	KB		
Propionic Acid	0.070	mg/l	0.050	0.0070	1			7/31/2011 14:35	KB		
Butyric Acid	<0.050	mg/l	0.050	0.0040	1			7/31/2011 14:35	KB		
Pyruvic Acid	<0.15	mg/l	0.15	0.033	1			7/31/2011 14:35	KB		
i-Pentanoic Acid	<0.15	mg/l	0.15	0.044	1			7/31/2011 14:35	KB		
Pentanoic Acid	<0.070	mg/l	0.070	0.012	1			7/31/2011 14:35	KB		
i-Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 14:35	KB		
Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 14:35	KB		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400004 Date Received: 7/20/2011 10:11 Matrix: Water
Sample ID: MW-6 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
EDonors											
Analysis Desc: AM23G			Analytical Method: AM23G								
Lactic Acid	0.17	mg/l	0.10	0.010	1			7/31/2011 15:17	KB		
Acetic Acid	<0.070	mg/l	0.070	0.0060	1			7/31/2011 15:17	KB		
Propionic Acid	0.060	mg/l	0.050	0.0070	1			7/31/2011 15:17	KB		
Butyric Acid	<0.050	mg/l	0.050	0.0040	1			7/31/2011 15:17	KB		
Pyruvic Acid	<0.15	mg/l	0.15	0.033	1			7/31/2011 15:17	KB		
i-Pentanoic Acid	<0.15	mg/l	0.15	0.044	1			7/31/2011 15:17	KB		
Pentanoic Acid	<0.070	mg/l	0.070	0.012	1			7/31/2011 15:17	KB		
i-Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 15:17	KB		
Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 15:17	KB		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400005 Date Received: 7/20/2011 10:11 Matrix: Water
Sample ID: MW-9 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
EDonors											
Analysis Desc: AM23G			Analytical Method: AM23G								
Lactic Acid	0.22	mg/l	0.10	0.010	1			7/31/2011 15:59	KB		
Acetic Acid	<0.070	mg/l	0.070	0.0060	1			7/31/2011 15:59	KB		
Propionic Acid	0.054	mg/l	0.050	0.0070	1			7/31/2011 15:59	KB		
Butyric Acid	0.082	mg/l	0.050	0.0040	1			7/31/2011 15:59	KB		
Pyruvic Acid	<0.15	mg/l	0.15	0.033	1			7/31/2011 15:59	KB		
i-Pentanoic Acid	<0.15	mg/l	0.15	0.044	1			7/31/2011 15:59	KB		
Pentanoic Acid	<0.070	mg/l	0.070	0.012	1			7/31/2011 15:59	KB		
i-Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 15:59	KB		
Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 15:59	KB		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400006 Date Received: 7/20/2011 10:11 Matrix: Water
Sample ID: MW-11 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
EDonors											
Analysis Desc: AM23G			Analytical Method: AM23G								
Lactic Acid	<0.10	mg/l	0.10	0.010	1			7/31/2011 16:41	KB		
Acetic Acid	<0.070	mg/l	0.070	0.0060	1			7/31/2011 16:41	KB		
Propionic Acid	0.051	mg/l	0.050	0.0070	1			7/31/2011 16:41	KB		
Butyric Acid	<0.050	mg/l	0.050	0.0040	1			7/31/2011 16:41	KB		
Pyruvic Acid	<0.15	mg/l	0.15	0.033	1			7/31/2011 16:41	KB		
I-Pentanoic Acid	<0.15	mg/l	0.15	0.044	1			7/31/2011 16:41	KB		
Pentanoic Acid	<0.070	mg/l	0.070	0.012	1			7/31/2011 16:41	KB		
I-Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 16:41	KB		
Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 16:41	KB		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400007 Date Received: 7/20/2011 10:11 Matrix: Water
Sample ID: MW-12 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
EDonors											
Analysis Desc: AM23G			Analytical Method: AM23G								
Lactic Acid	0.17	mg/l	0.10	0.010	1			7/31/2011 17:23	KB		
Acetic Acid	<0.070	mg/l	0.070	0.0060	1			7/31/2011 17:23	KB		
Propionic Acid	0.068	mg/l	0.050	0.0070	1			7/31/2011 17:23	KB		
Butyric Acid	1.1	mg/l	0.050	0.0040	1			7/31/2011 17:23	KB		
Pyruvic Acid	<0.15	mg/l	0.15	0.033	1			7/31/2011 17:23	KB		
I-Pentanoic Acid	<0.15	mg/l	0.15	0.044	1			7/31/2011 17:23	KB		
Pentanoic Acid	<0.070	mg/l	0.070	0.012	1			7/31/2011 17:23	KB		
I-Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 17:23	KB		
Hexanoic Acid	<0.050	mg/l	0.050	0.0060	1			7/31/2011 17:23	KB		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400008 Date Received: 7/20/2011 10:11 Matrix: Bubble Strip
Sample ID: MW-1 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	0.035	ug/l	0.015	0.0030	1			7/31/2011 10:03	MM		
Ethane	<0.010	ug/l	0.010	0.0010	1			7/31/2011 10:03	MM		
Ethane	0.014	ug/l	0.010	0.0020	1			7/31/2011 10:03	MM		
Hydrogen	2.0	nM	0.60	0.25	1			7/31/2011 10:03	MM		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400009 Date Received: 7/20/2011 10:11 Matrix: Bubble Strip
Sample ID: MW-3 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	1800	ug/l	0.015	0.0030	1			7/31/2011 10:16	MM		
Ethane	0.12	ug/l	0.010	0.0010	1			7/31/2011 10:16	MM		
Ethene	0.19	ug/l	0.010	0.0020	1			7/31/2011 10:16	MM		
Hydrogen	1.9	nM	0.60	0.25	1			7/31/2011 10:16	MM		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400010 Date Received: 7/20/2011 10:11 Matrix: Bubble Strip
Sample ID: MW-4 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	2000	ug/l	0.015	0.0030	1			7/31/2011 10:28	MM		
Ethane	0.19	ug/l	0.010	0.0010	1			7/31/2011 10:28	MM		
Ethene	0.086	ug/l	0.010	0.0020	1			7/31/2011 10:28	MM		
Hydrogen	1.8	nM	0.60	0.25	1			7/31/2011 10:28	MM		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400011 Date Received: 7/20/2011 10:11 Matrix: Bubble Strip
Sample ID: MW-6 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	460	ug/l	0.015	0.0030	1			7/31/2011 10:40	MM		
Ethane	<0.010	ug/l	0.010	0.0010	1			7/31/2011 10:40	MM		
Ethene	0.015	ug/l	0.010	0.0020	1			7/31/2011 10:40	MM		
Hydrogen	1.8	nM	0.60	0.25	1			7/31/2011 10:40	MM		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400012 Date Received: 7/20/2011 10:11 Matrix: Bubble Strip
Sample ID: MW-9 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	16	ug/l	0.015	0.0030	1			7/31/2011 10:54	MM		
Ethane	0.015	ug/l	0.010	0.0010	1			7/31/2011 10:54	MM		
Ethene	0.013	ug/l	0.010	0.0020	1			7/31/2011 10:54	MM		
Hydrogen	1.9	nM	0.60	0.25	1			7/31/2011 10:54	MM		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400013 Date Received: 7/20/2011 10:11 Matrix: Bubble Strip
Sample ID: MW-11 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	330	ug/l	0.015	0.0030	1			7/31/2011 11:06	MM		
Ethane	0.018	ug/l	0.010	0.0010	1			7/31/2011 11:06	MM		
Ethene	0.023	ug/l	0.010	0.0020	1			7/31/2011 11:06	MM		
Hydrogen	1.6	nM	0.60	0.25	1			7/31/2011 11:06	MM		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS

Workorder: 1940 LENOIR COUNTY (6009)

Lab ID: 19400014 Date Received: 7/20/2011 10:11 Matrix: Bubble Strip
Sample ID: MW-12 Date Collected: 7/19/2011 00:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	1500	ug/l	0.015	0.0030	1			7/31/2011 11:21	MM		
Ethane	0.022	ug/l	0.010	0.0010	1			7/31/2011 11:21	MM		
Ethene	0.23	ug/l	0.010	0.0020	1			7/31/2011 11:21	MM		
Hydrogen	1.7	nM	0.60	0.25	1			7/31/2011 11:21	MM		

CERTIFICATE OF ANALYSIS
This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

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

ANALYTICAL RESULTS QUALIFIERS

Workorder: 1940 LENOIR COUNTY (6009)

PARAMETER QUALIFIERS

U	Indicates the compound was analyzed for, but not detected.
J	Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (RDL).

CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

3004.1.0.0

Microseeps Lab. Proj. # 1940

CHAIN - OF - CUSTODY RECORD

Microseeps COC cont. #

Phone: (412) 826-5245 Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 Fax No.: (412) 826-3433

Company : ENVIRONMENT 1

Co. Address : 114 OAKMONT DR GREENVILLE, NC 27858

Phone # : 252-756-6268 Fax # : 252-756-0655

Proj. Manager : STEVE JONES

Proj. Name/Number : LENOIR COUNTY (6009)

Sampler's signature : [signature]

Cooler Temp.

Results to : SAME

Invoice to : SAME

Sample ID	Sample Description	Sample Type Water	Vapor	Solid	Date	Time	# bottles			HYDROGEN	METHANE/ETHANE/ETHENE	LL VFA								Remarks :
MONITORING WELL 1	MW-1	✓	✓		7/18/11		4			X	X	X								
MONITORING WELL 3	MW-3	✓	✓				4			X	X	X								PLEASE REPORT IN
MONITORING WELL 4	MW-4	✓	✓				4			X	X	X								NC SWS FORMAT
MONITORING WELL 6	MW-6	✓	✓				4			X	X	X								
MONITORING WELL 9	MW-9	✓	✓				4			X	X	X								FACILITY ID = 5903
MONITORING WELL 11	MW-11	✓	✓				4			X	X	X								
MONITORING WELL 12	MW-12	✓	✓				4			X	X	X								

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
[signature]	ENVIRONMENT 1	7/18/11	4:30p	[signature]	[signature]	7/20/11	1000
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter