Semi-Annual Water Quality Monitoring Report

Prepared for

Alexander County Closed Unlined MSWLF and Active C&D Landfill
Taylorsville, North Carolina

June 2011

Permit Number: 02-01
MESCO Project Number: G10003.0

Submitted: October 3, 2011

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

Municipal Services Garner, NC
Engineering Company, P.A. Boone, NC
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)
Alexander County Active C&D and Closed Unlined MSWLF	2500 Paynes Dairy Road Taylorsville, NC 28681	02-01	.1600	June 28-July 1, 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 12 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 — Professional Geologist — (919) 772-5393

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

Signature — Date: 10-3-2011

Affix NC Licensed/ Professional Geologist Seal

NORTH CAROLINA LICENSED SEAL 2275 GEOLOGIST MADELINE GERMAN 10/3/2011

P.O. BOX 97, Garner, NC 27529

Facility Representative Address

C-0281

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

Revised 6/2009

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OPERATION/CONSTRUCTION MANAGERS

Municipal Services

CIVIL/SANITARY ENGINEERS

Engineering Company, P.A.

October 3, 2011

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

Re: Semi-Annual Water Quality Monitoring Report
Alexander County Active C&D and Closed MSWLF
Permit No. 02-01
MESCO Project No. G10003.0

Dear Ms. Drummond:

Introduction

The Alexander County Active Construction and Demolition (C&D) Landfill and Closed Unlined Municipal Solid Waste Landfill (MSWLF) located near Taylorsville, NC, currently operating under permit #02-01, is required to submit semi-annual water quality compliance reports as a condition of rule 15A NCAC 13B.0601. The closed MSWLF ceased operation prior to 1998 and the C&D landfill continues operation on the eastern unit of the closed MSWLF; they are treated as a single unit for continuity in reporting. This monitoring event was performed June 21-24, 2011 in accordance with the semi-annual monitoring schedule prescribed by the NC Solid Waste Section (SWS) rules/regulations. A site location topographic map is depicted as **Plate 1**.

As specified in rule 15A NCAC 13B.1632(j) and on the SWS Environmental Monitoring Report Form this report contains sampling procedures, field and laboratory results, groundwater and surface water characterization, and findings. A detections table, field data results table, groundwater flow table, field observations table, a potentiometric map, quality assurance/quality control data, and laboratory analytical data are also enclosed. The corrective action summary is presented in **Appendix A**.

Sampling Procedure

Municipal Engineering Services Company, P.A. (MESCO) personnel performed this sampling event following the parameters and frequency established by the SWS review response to the *Corrective Action Evaluation Report (CAER)* (Doc ID 14150) dated June 16, 2011. The water quality monitoring program includes a combination of detection, assessment and corrective action monitoring with specifically defined analysis.

Assessment monitoring was performed on 17 wells (MW-1, MW-1B, MW-2, MW-4R, MW-9, MW-10, MW-13, MW-14, MW-15, MW-17, MW-19 through MW-23, MW-25 and MW-32). Detection monitoring was performed on four surface water points (SW-3, SW-4R, SW-5 and SW-6). Corrective action monitoring was also performed on 12 wells (MW-5, MW-6, MW-11, MW-12, MW-12D, MW-16, MW-24, MW-26, MW-27, MW-31, MW-33, MW-34 and background well MW-18). Quality control measures implemented during this event included submittal and subsequent quantification of an equipment (EB), field (FB), and travel (TB) blanks. Monitoring locations are depicted on the potentiometric map (**Plate 2**).

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PO Box 828, Morehead City, NC 28557 (252) 726-9481 PO Box 349, Boone, North Carolina 28607 (828) 262-1767

Sampling was conducted utilizing portable monitoring methodology outlined in the NCDENR SWS guidance document S*olid Waste Section Guidelines for Groundwater, Soil, and Surface Water Sampling* revised April 2008. Monitoring location function and integrity was visually evaluated and inspection documentation is provided in **Table 5**. The depth to water in each well was electronically gaged prior to purging to quantify the static water level elevation. Low-flow pumping methodology or bailing was utilized to adequately purge the wells to a minimum of three times the volume of standing water in the well or until dry. During purging the field parameters were recorded. The samples were then placed into laboratory-prepared, pre-preserved containers via a new disposable polyethylene bailer. Samples were collected/separated based on likelihood of potential cross-contamination, kept on ice, and transported to a NC-certified laboratory under proper C-O-C protocol within the specified hold times for each analysis.

Field and Laboratory Results

Pace Analytical Laboratories (PACE) and their subcontracted laboratory Microseeps performed the laboratory analysis. Water samples were analyzed for the Appendix I list of VOCs and total unfiltered metals found in 40 CFR 258. Appendix II exclusive parameters (defined as not also included in the Appendix I list) detected during the previous December 2010 semi-annual event were re-analyzed for this report during this event. Additionally, a subset of 12 wells were analyzed for monitored natural attenuation (MNA) parameters as part of corrective action. Quality control measures were also implemented during this event which included submittal and subsequent quantification of blanks for a condensed list of Appendix II constituents. A sampling and analysis table summarizing the locations, target parameters and laboratory methods is presented as **Table 1**. Laboratory results and C-O-Cs are presented in **Appendix B**.

Water samples were reported at the laboratory specific Method Detection Limits (MDL), which are quantifiable at or below the current Solid Waste Section detection limits (SWSL). **Table 2** summarizes Appendix I constituents detected in the water samples in concentrations above the current SWSL, Groundwater Protection Standards (GWP), North Carolina Groundwater Standards (2L) or the North Carolina Surface Water Standards (2B) for the applicable Class C water bodies. **Table 3** summarizes Appendix II exclusive constituents detected above the MDL. **Appendix A** contains tables tabulating MNA analyses.

Field Parameter Data

Field parameters were recorded for pH, specific conductance, temperature, dissolved oxygen (DO), oxidation reduction potential (ORP), total dissolved solids (TDS), dissolved CO_2, and turbidity. A summary of the field parameter data is presented in **Table 6** and the field sampling data sheet is enclosed in **Appendix C**.

Quality Control Samples

A few VOCs were detected in non-quantifiable concentrations in the blanks EB and FB. Despite the few low level blank detections the latest data set validity appears to not be effected by false positives or high bias attributed to field and/or laboratory artifact contamination.

Groundwater Samples

During this event, Appendix I constituent(s) were detected in concentrations in exceedance of the current 2L Standards in 16 of 30 collected groundwater samples. The Appendix I total undissolved metals detected in exceedance of their respective 2L Standard during this event were chromium (MW-5, MW-9, MW-11, MW-24 and background well MW-18) and cadmium (MW-1, MW-2 and MW-4R). The Appendix I VOCs detected in concentrations above the SWSL and in exceedance of their respective 2L Standard during this event were benzene (MW-1, MW-1B, MW-2, MW-4R, MW-5, MW-10, MW-11, MW-12, MW-14, MW-15, MW-16, MW-17 and MW-26), paradichlorobenzene (MW-11, MW-12 and MW-26), tetrachloroethylene (MW-12 and MW-16), and vinyl chloride (MW-2). Additionally, samples collected from MW-16 contained trichloroethene, 1,2-dichloropropane and 1,1-dichloroethane in levels above their respective 2L standard. A site map showing VOC concentrations exceeding the 2L Standard during this monitoring event is presented as **Plate 3**. Appendix II exclusive constituents were not detected in concentrations above their respective SWSL or applicable regulatory standards.

Surface Water Samples

This was the first event a sample was collected from newly established SW-6 which monitors the local discharge feature located on the recently purchased property east of the landfill. No constituents were detected in the surface water samples in concentrations above their respective 2B Standard.

Groundwater and Surface Water Characterization

A single-day potentiometric map created from static groundwater elevations recorded on June 28, 2011 from the wells screened in the uppermost aquifer is included as **Plate 2**. Groundwater flow rates and directions were calculated and are included in **Table 4**. Groundwater flows in the unconfined and upper bedrock water-bearing zones in a general westerly direction, with southwesterly and northwesterly flow away from the waste limits. Hydraulic gradient varies from approximately 0.02 feet/foot to 0.56 feet/foot. Groundwater velocities calculated for wells screened in the unconfined and upper bedrock aquifers were highly variable, ranging from 2 ft/yr (MW-19) to 2,988 ft/yr. (MW-24), with an average of 394 ft/yr. Streams at designated monitoring points were visually observed to be of normal volume, flow rate and low turbidity. The flow directions and gradients are generally consistent with historical observations.

Findings

The semi-annual laboratory results indicate that low level dissolved phase VOCs, consisting primarily of aromatic hydrocarbons and chlorinated solvents, continue to be detected in groundwater samples collected within 250 feet of the waste boundary. The general water quality has consistently improved since the assessment of corrective measures was performed in 2008. Corrective action to remediate the VOCs detected in groundwater will continue.

Closing

Water quality at the facility will continue to be monitored and is tentatively scheduled to be sampled again in December 2011. If you have any questions or comments regarding this report, please contact us at (919) 772-5393 or by email at jpfohl@mesco.com or mgerman@mesco.com.

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

Jonathan Pfohl
Environmental Specialist

Madeline German
Geologist

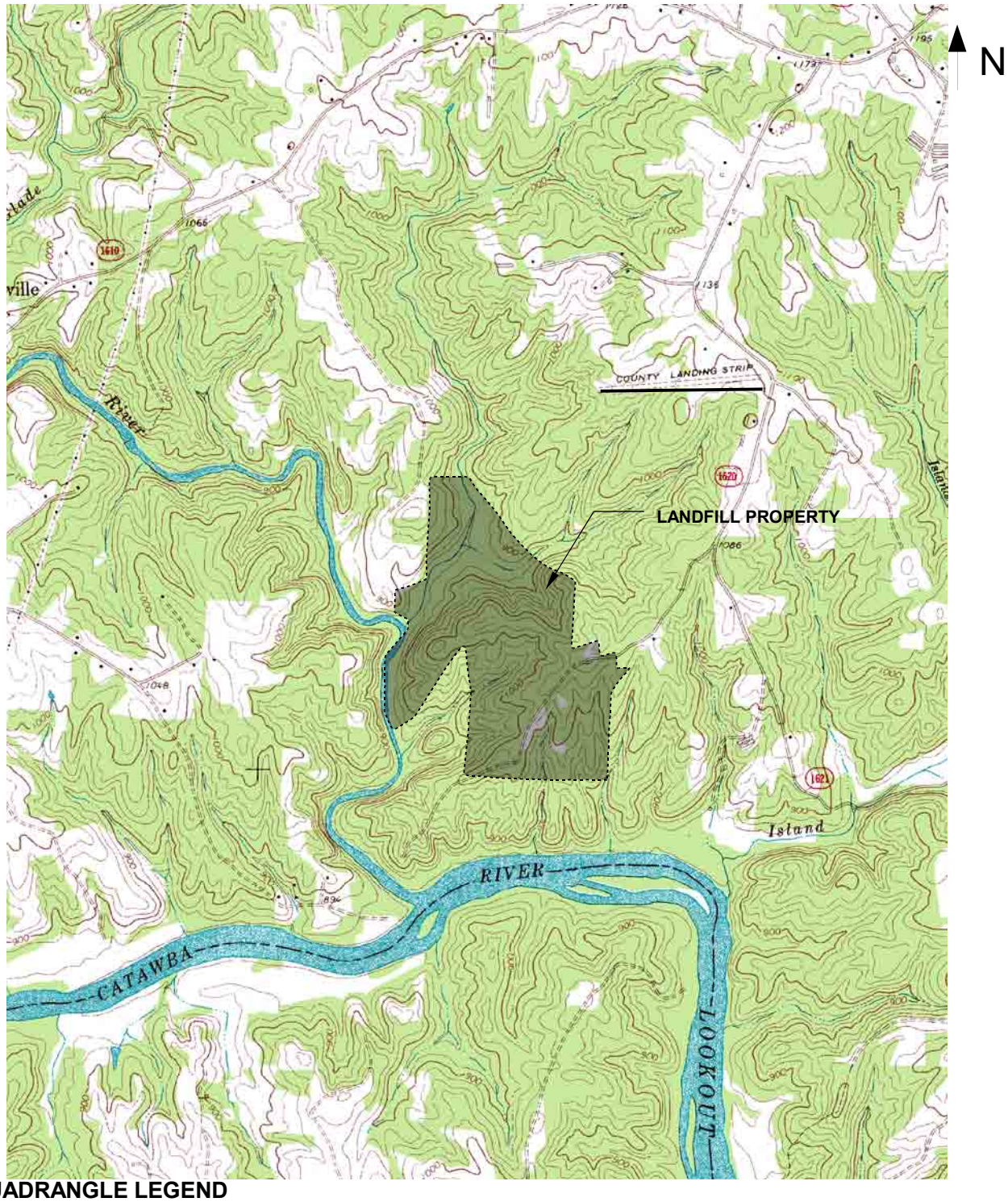
NORTH CAROLINA LICENSED SEAL 2275 10/3/2011 GEOLOGIST MADELINE GERMAN

Enclosures

cc: Mr. Josh Mitchell
Alexander County

Figures

Topographic Map with Site Location
Alexander County C&D and MSW Landfill



QUADRANGLE LEGEND

ROAD CLASSIFICATION

Primary highway, hard surface

Light-duty road, hard or improved surface

Secondary highway, hard surface

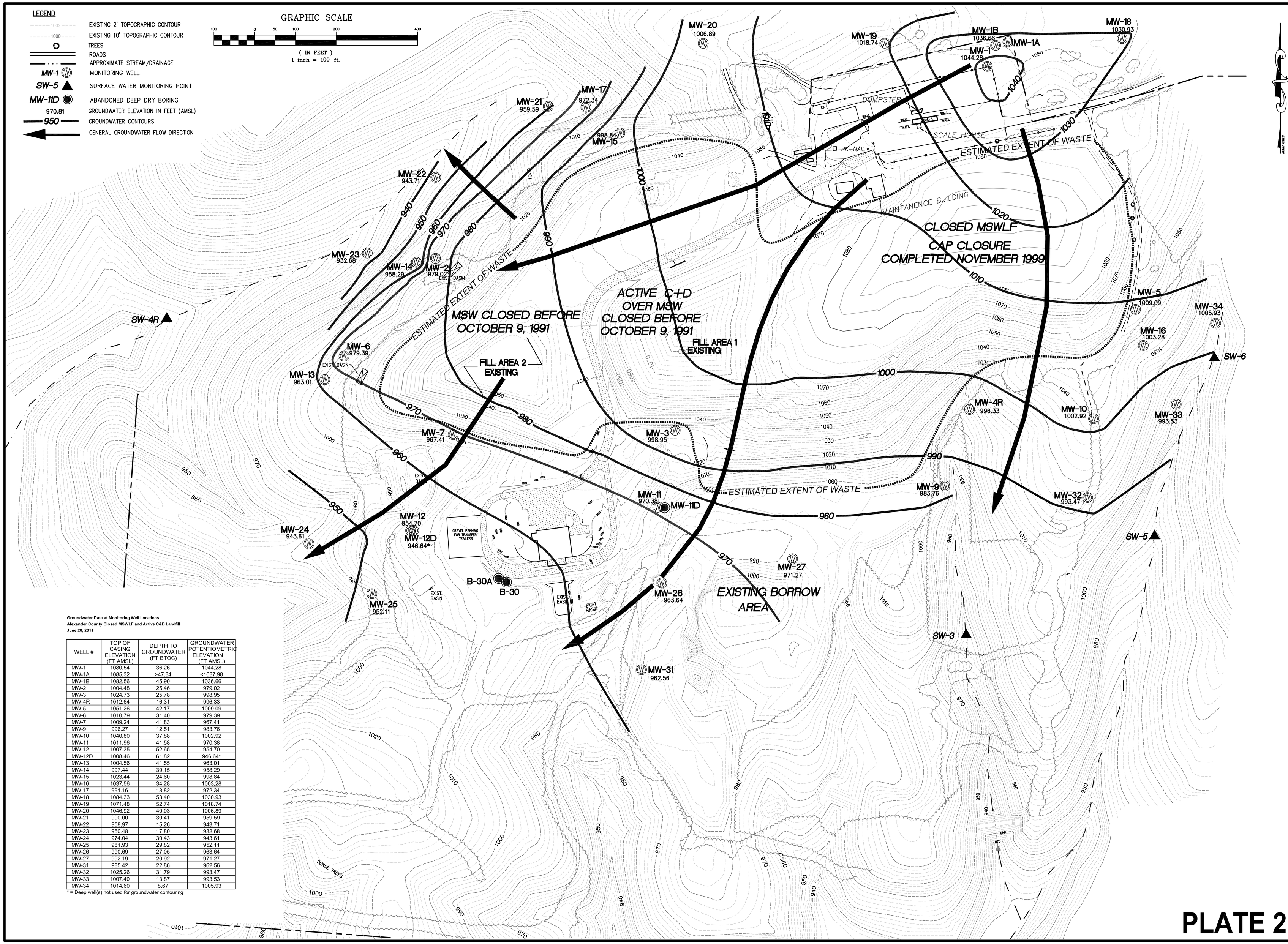
Unimproved road

Interstate Route U. S. Route State Route

0 1/2 1 MILE

NOTE: Topographical map assembled from corresponding USGS 7.5-min. quadrangles of the subject region.

PLATE 1



Groundwater Data at Monitoring Well Locations
Alexander County Closed MSWLF and Active C&D Landfill
June 28, 2011

WELL #	TOP OF CASING ELEVATION (FT AMSL)	DEPTH TO GROUNDWATER (FT BTOC)	GROUNDWATER POTENTIOMETRIC ELEVATION (FT AMSL)
MW-1	1080.54	36.26	1044.28
MW-1A	1085.32	>47.34	<1037.98
MW-1B	1082.56	45.90	1036.66
MW-2	1004.48	25.46	979.02
MW-3	1024.73	25.78	998.95
MW-4R	1012.64	16.31	996.33
MW-5	1051.26	42.17	1009.09
MW-6	1010.79	31.40	979.39
MW-7	1009.24	41.83	967.41
MW-9	996.27	12.51	983.76
MW-10	1040.80	37.88	1002.92
MW-11	1011.96	41.58	970.38
MW-12	1007.35	52.65	954.70
MW-12D	1008.46	61.82	946.64*
MW-13	1004.56	41.55	963.01
MW-14	997.44	39.15	958.29
MW-15	1023.44	24.60	998.84
MW-16	1037.56	34.28	1003.28
MW-17	991.16	18.82	972.34
MW-18	1084.33	53.40	1030.93
MW-19	1071.48	52.74	1018.74
MW-20	1046.92	40.03	1006.89
MW-21	990.00	30.41	959.59
MW-22	958.97	15.26	943.71
MW-23	950.48	17.80	932.68
MW-24	974.04	30.43	943.61
MW-25	981.93	29.82	952.11
MW-26	990.69	27.05	963.64
MW-27	992.19	20.92	971.27
MW-31	985.42	22.86	962.56
MW-32	1025.26	31.79	993.47
MW-33	1007.40	13.87	993.53
MW-34	1014.60	8.67	1005.93

* = Deep well(s) not used for groundwater contouring

PLATE 2

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Municipal Services
P.O. BOX 97 GARNER, N.C. 27529
(919) 772-5393
LICENSE NUMBER: C-0281

ACTIVE CONSTRUCTION AND DEMOLITION
CLOSED UNLINED MSLWF
ALEXANDER COUNTY
NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION

SINGLE DAY POTENTIOMETRIC MAP
JUNE 28, 2011

SCALE:	1" = 100'
DATE:	9/16/2011
DRWN. BY:	J. PFOHL
CHKD. BY:	M. GERMAN
PROJECT NUMBER	G10003.0
DRAWING NO.	PLATE 2
SHEET NO.	1 OF 1

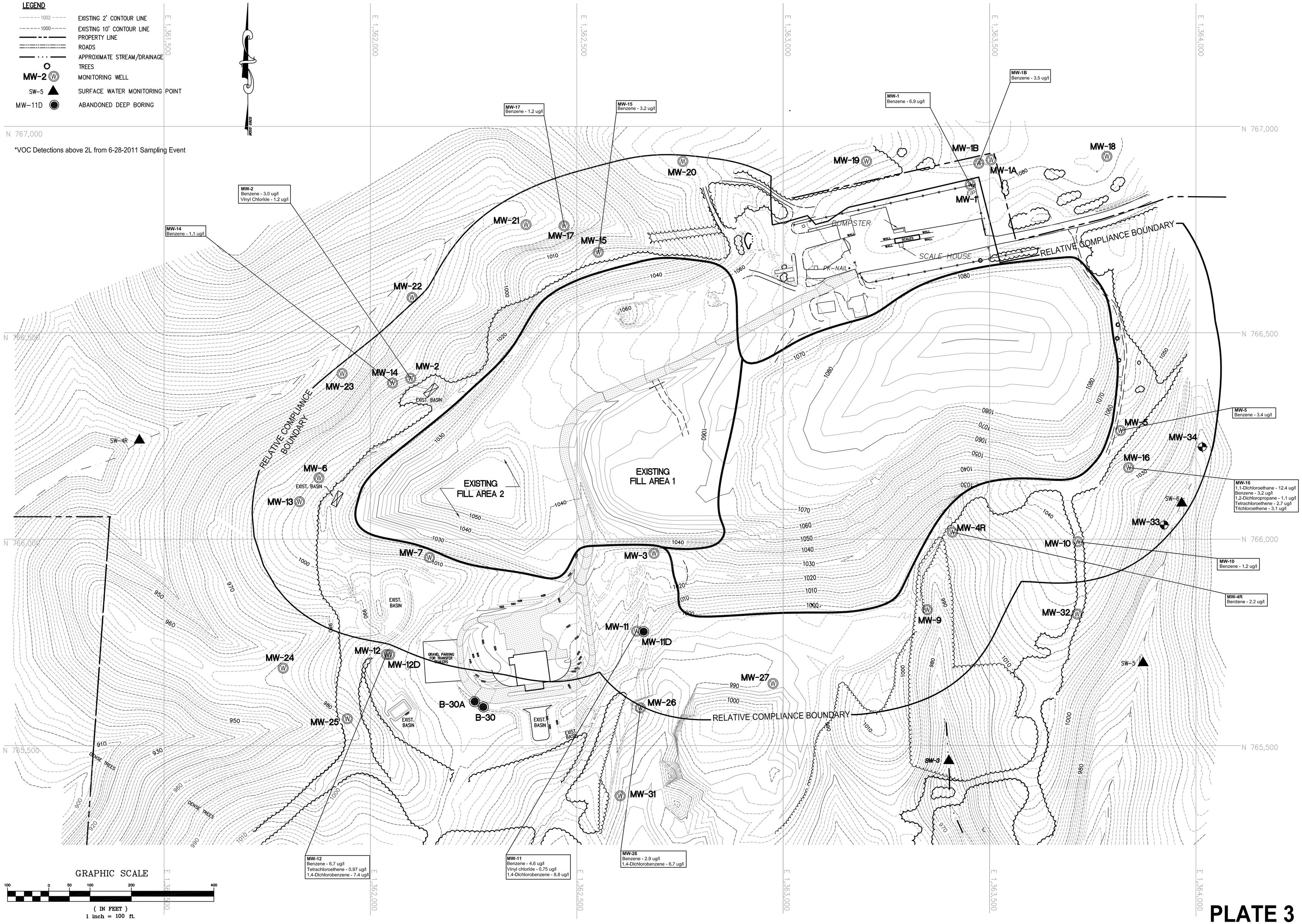

PLATE 3

Municipal Services Engineering Company, P.A.
LICENSE NUMBER: C-0281
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CONSTRUCTION AND DEMOLITION LANDFILL FACILITY
ALEXANDER COUNTY NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION

JUNE 2011 VOC CONTAMINANTS DETECTED ABOVE 2L STANDARD

SCALE:	1" = 100'
DATE:	9/15/2011
DRWN. BY:	K. MCVERRY
CHKD. BY:	M. GERMAN
PROJECT NUMBER	G11003.0
DRAWING NO.	PLATE 3
SHEET NO.	1 OF 1

Tables

Table 1
Sampling and Analysis Summary
June 28-July 1, 2011

		App. I		MNA													Field Parameters							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	Total Dissolved Solids (TDS)	pH	Turbidity	VOCs	1,2,4-Trichlorobenzene	Naphthalene	Total Metals	Dinoseb	Sulfide	Mercury	Tin
		Lab EPA 8260B	Lab EPA 6000/7000	AM23G	AM20GAX	AM20GAX	Field Hach Kit	Lab SM 2320B	EPA 300.0	Lab SM18 4500-S D	Lab SM 4500-Cl-E	SM 5310B	SM 5220D	SM5210B	Lab EPA 6010	Lab 353.2	Field Meter	Field Meter	Field Meter	Field Meter	Field Meter	Field Meter	Field Meter	Lab EPA 8260B	Lab EPA 8260B	Lab EPA 8260B	Lab EPA 6000/7000	Lab SW8151A	Lab SM18 4500-S D	Lab EPA 7470A	Lab EPA 6010C
MW-1		x	x														x	x	x	x	x	x	x							x	
MW-1A	Dry																														
MW-1B		x	x														x	x	x	x	x	x	x							x	
MW-2		x	x														x	x	x	x	x	x	x								
MW-4R		x	x														x	x	x	x	x	x	x								
MW-5		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	
MW-9		x	x														x	x	x	x	x	x	x		x						x
MW-10		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	
MW-12		x	x					x	x	x	x	x	x		x	x	x	x	x	x	x	x	x			x				x	
MW-12D		x	x					x	x	x	x	x	x		x	x	x	x	x	x	x	x	x					x		x	
MW-13		x	x														x	x	x	x	x	x	x								
MW-14		x	x														x	x	x	x	x	x	x								x
MW-15		x	x														x	x	x	x	x	x	x							x	x
MW-16		x	x					x	x	x	x	x	x		x	x	x	x	x	x	x	x	x							x	
MW-17		x	x														x	x	x	x	x	x	x							x	
MW-18		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							x	
MW-19		x	x														x	x	x	x	x	x	x								x
MW-20		x	x														x	x	x	x	x	x	x								
MW-21		x	x														x	x	x	x	x	x	x								
MW-22		x	x														x	x	x	x	x	x	x								
MW-23		x	x														x	x	x	x	x	x	x								
MW-24		x	x					x	x	x	x	x	x		x	x	x	x	x	x	x	x	x							x	
MW-25		x	x														x	x	x	x	x	x	x								
MW-26		x	x					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							x	
MW-27		x	x					x	x		x	x		x			x	x	x	x	x	x	x					x		x	
MW-31		x	x					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							x	
MW-32		x	x														x	x	x	x	x	x	x								
MW-33		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							x	
MW-34		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							x	
SW-3		x	x														x	x	x	x	x	x	x								
SW-4R		x	x														x	x	x	x	x	x	x								
SW-5		x	x														x	x	x	x	x	x	x								
SW-6		x	x														x	x	x	x	x	x	x								
EB																								x			x			x	
FB																								x			x				
TB																								x							

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

Table 2
Detections in Water Samples above SWSL, GWP, 2L or 2B (Appendix I)
June 28 -July 1, 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	1,4-Dichlorobenzene	7/1/11	4.3	ug/L	0.33	1	6				
MW-1	**Benzene**	**7/1/11**	**6.9**	**ug/L**	**0.25**	**1**	**1**			**5.9**	**LFG**
MW-1	**Cadmium, Total**	**7/1/11**	**2.7**	**ug/L**	**1**	**1**	**1.75**			**0.95**	**N**
MW-1	cis-1,2-Dichloroethene	7/1/11	10.4	ug/L	0.19	5	70				
MW-1	Cobalt, Total	7/1/11	25.9	ug/L	5	10			70		
MW-1	Copper, Total	7/1/11	11.8	ug/L	5	10	1000				
MW-1	Zinc, Total	7/1/11	31.7	ug/L	10	10	1050				
MW-1B	1,4-Dichlorobenzene	7/1/11	3.2	ug/L	0.33	1	6				
MW-1B	**Benzene**	**7/1/11**	**3.5**	**ug/L**	**0.25**	**1**	**1**			**2.5**	**LFG**
MW-1B	cis-1,2-Dichloroethene	7/1/11	7.4	ug/L	0.19	5	70				
MW-1B	Cobalt, Total	7/1/11	111	ug/L	5	10			70	41	
MW-1B	Zinc, Total	7/1/11	33.8	ug/L	10	10	1050				
MW-2	1,4-Dichlorobenzene	7/1/11	4.4	ug/L	0.33	1	6				
MW-2	Barium, Total	7/1/11	164	ug/L	5	100	700				
MW-2	**Benzene**	**7/1/11**	**3**	**ug/L**	**0.25**	**1**	**1**			**2**	**L &/or LFG**
MW-2	**Cadmium, Total**	**7/1/11**	**10**	**ug/L**	**1**	**1**	**1.75**			**8.25**	**N**
MW-2	cis-1,2-Dichloroethene	7/1/11	21.2	ug/L	0.19	5	70				
MW-2	Cobalt, Total	7/1/11	567	ug/L	5	10			70	497	
MW-2	Trichloroethene	7/1/11	1.2	ug/L	0.47	1	3				
MW-2	**Vinyl chloride**	**7/1/11**	**1.2**	**ug/L**	**0.62**	**1**	**0.03**			**1.17**	**L &/or LFG**
MW-2	Zinc, Total	7/1/11	80.6	ug/L	10	10	1050				
MW-4R	1,4-Dichlorobenzene	6/29/11	4.3	ug/L	0.33	1	6				
MW-4R	Barium, Total	6/29/11	116	ug/L	5	100	700				
MW-4R	**Benzene**	**6/29/11**	**2.2**	**ug/L**	**0.25**	**1**	**1**			**1.2**	**L &/or LFG**
MW-4R	**Cadmium, Total**	**6/29/11**	**2.5**	**ug/L**	**1**	**1**	**1.75**			**0.75**	**N**
MW-4R	cis-1,2-Dichloroethene	6/29/11	16.8	ug/L	0.19	5	70				
MW-4R	Cobalt, Total	6/29/11	142	ug/L	5	10			70	72	
MW-4R	Zinc, Total	6/29/11	25.7	ug/L	10	10	1050				

Sample ID	Parameter Name [1]	Sample Date	Result	Unit	MDL [2]	SWSL [3]	2L [4]	2B [5]	GWP [6]	Exceedance	Preliminary Cause [7]
MW-5	1,4-Dichlorobenzene	6/29/11	1.8	ug/L	0.33	1	6				
MW-5	**Benzene**	**6/29/11**	**3.4**	**ug/L**	**0.25**	**1**	**1**			**2.4**	**L &/or LFG**
MW-5	**Chromium, Total**	**6/29/11**	**12.8**	**ug/L**	**5**	**10**	**10**			**2.8**	**N**
MW-5	cis-1,2-Dichloroethene	6/29/11	11.8	ug/L	0.19	5	70				
MW-5	Toluene	6/29/11	1.1	ug/L	0.26	1	600				
MW-5	Vanadium, Total	6/29/11	9.2 j	ug/L	5	25			3.5	5.7	
MW-5	Zinc, Total	6/29/11	41	ug/L	10	10	1050				
MW-6	Cobalt, Total	6/29/11	20.9	ug/L	5	10			70		
MW-6	Zinc, Total	6/29/11	11.4	ug/L	10	10	1050				
MW-9	**Chromium, Total**	**6/29/11**	**13.5**	**ug/L**	**5**	**10**	**10**			**3.5**	**N**
MW-9	Zinc, Total	6/29/11	15.3	ug/L	10	10	1050				
MW-9	cis-1,2-Dichloroethene	6/29/11	12.5	ug/L	0.19	5	70				
MW-10	**Benzene**	**6/29/11**	**1.2**	**ug/L**	**0.25**	**1**	**1**			**0.2**	**L &/or LFG**
MW-11	Zinc, Total	6/30/11	198	ug/L	10	10	1050				
MW-11	**Chromium, Total**	**6/30/11**	**36.3**	**ug/L**	**5**	**10**	**10**			**26.3**	**N**
MW-11	Barium, Total	6/30/11	197	ug/L	5	100	700				
MW-11	Vanadium, Total	6/30/11	18.2 j	ug/L	5	25			3.5	14.7	
MW-11	Copper, Total	6/30/11	18.6	ug/L	5	10	1000				
MW-11	Cobalt, Total	6/30/11	127	ug/L	5	10			70	57	
MW-11	**Benzene**	**6/30/11**	**4.6**	**ug/L**	**0.25**	**1**	**1**			**3.6**	**L &/or LFG**
MW-11	**1,4-Dichlorobenzene**	**6/30/11**	**8.8**	**ug/L**	**0.33**	**1**	**6**			**2.8**	**L &/or LFG**
MW-11	cis-1,2-Dichloroethene	6/30/11	28.3	ug/L	0.19	5	70				
MW-11	**Vinyl chloride**	**6/30/11**	**0.75 J**	**ug/L**	**0.62**	**1**	**0.03**			**0.72**	**L &/or LFG**
MW-12	Barium, Total	6/29/11	102	ug/L	5	100	700				
MW-12	Cobalt, Total	6/29/11	33	ug/L	5	10			70		
MW-12	Zinc, Total	6/29/11	17.8	ug/L	10	10	1050				
MW-12	**Benzene**	6/29/11	**6.7**	**ug/L**	**0.25**	**1**	**1**			**5.7**	**L &/or LFG**
MW-12	**1,4-Dichlorobenzene**	6/29/11	**7.4**	**ug/L**	**0.33**	**1**	**6**			**1.4**	**L &/or LFG**
MW-12	cis-1,2-Dichloroethene	6/29/11	13.5	ug/L	0.19	5	70				
MW-12	Trichloroethene	6/29/11	2.4	ug/L	0.47	1	3				
MW-12	**Tetrachloroethene**	**6/29/11**	**0.97 J**	**ug/L**	**0.46**	**1**	**0.7**			**0.27**	**L &/or LFG**
MW-13	Zinc, Total	6/29/11	11.8	ug/L	10	10	1050				
MW-14	1,4-Dichlorobenzene	6/30/11	2.9	ug/L	0.33	1	6				
MW-14	**Benzene**	**6/30/11**	**1.1**	**ug/L**	**0.25**	**1**	**1**			**0.1**	**L &/or LFG**
MW-14	cis-1,2-Dichloroethene	6/30/11	13.8	ug/L	0.19	5	70				
MW-14	Cobalt, Total	6/30/11	214	ug/L	5	10			70	144	
MW-14	Zinc, Total	6/30/11	24.4	ug/L	10	10	1050				
MW-15	**Benzene**	**7/1/11**	**3.2**	**ug/L**	**0.25**	**1**	**1**			**2.2**	**L &/or LFG**
MW-15	cis-1,2-Dichloroethene	7/1/11	9.8	ug/L	0.19	5	70				
MW-15	Trichloroethene	7/1/11	1.1	ug/L	0.47	1	3				

Sample ID	Parameter Name [1]	Sample Date	Result	Unit	MDL [2]	SWSL [3]	2L [4]	2B [5]	GWP [6]	Exceedance	Preliminary Cause [7]
MW-16	**1,1-Dichloroethane**	**6/29/11**	**12.4**	**ug/L**	**0.32**	**5**	**6**			**6.4**	**L &/or LFG**
MW-16	**1,2-Dichloropropane**	**6/29/11**	**1.1**	**ug/L**	**0.27**	**1**	**0.6**			**0.5**	**L &/or LFG**
MW-16	1,4-Dichlorobenzene	6/29/11	2.2	ug/L	0.33	1	6				
MW-16	**Benzene**	**6/29/11**	**3.2**	**ug/L**	**0.25**	**1**	**1**			**2.2**	**L &/or LFG**
MW-16	cis-1,2-Dichloroethene	6/29/11	18.8	ug/L	0.19	5	70				
MW-16	Cobalt, Total	6/29/11	21.4	ug/L	5	10			70		
MW-16	Methylene Chloride	6/29/11	1	ug/L	0.97	1	4.6				
MW-16	**Tetrachloroethene**	**6/29/11**	**2.7**	**ug/L**	**0.46**	**1**	**0.7**			**2**	**L &/or LFG**
MW-16	**Trichloroethene**	**6/29/11**	**3.1**	**ug/L**	**0.47**	**1**	**3**			**0.1**	**L &/or LFG**
MW-16	Zinc, Total	6/29/11	20.2	ug/L	10	10	1050				
MW-17	**Benzene**	**6/30/11**	**1.2**	**ug/L**	**0.25**	**1**	**1**			**0.2**	**L &/or LFG**
MW-17	Cobalt, Total	6/30/11	31.7	ug/L	5	10			70		
MW-17	Zinc, Total	6/30/11	10.1	ug/L	10	10	1050				
MW-18	**Chromium, Total**	**6/28/11**	**11.3**	**ug/L**	**5**	**10**	**10**			**1.3**	**B, N**
MW-18	Cobalt, Total	6/28/11	24.2	ug/L	5	10			70		
MW-18	Copper, Total	6/28/11	28.8	ug/L	5	10	1000				
MW-18	Vanadium, Total	6/28/11	16.9 j	ug/L	5	25			3.5	13.4	
MW-18	Zinc, Total	6/28/11	25.4	ug/L	10	10	1050				
MW-21	Zinc, Total	6/30/11	12.6	ug/L	10	10	1050				
MW-22	Zinc, Total	6/30/11	12.2	ug/L	10	10	1050				
MW-23	Zinc, Total	6/30/11	10.1	ug/L	10	10	1050				
MW-24	1,4-Dichlorobenzene	6/29/11	1.8	ug/L	0.33	1	6				
MW-24	Barium, Total	6/29/11	136	ug/L	5	100	700				
MW-24	**Chromium, Total**	**6/29/11**	**13.6**	**ug/L**	**5**	**10**	**10**			**3.6**	**N**
MW-24	Cobalt, Total	6/29/11	39	ug/L	5	10			70		
MW-24	Vanadium, Total	6/29/11	8.8 j	ug/L	5	25			3.5	5.3	
MW-24	Zinc, Total	6/29/11	29.9	ug/L	10	10	1050				
MW-26	**Benzene**	**6/30/11**	**2.9**	**ug/L**	**0.25**	**1**	**1**			**1.9**	**L &/or LFG**
MW-26	cis-1,2-Dichloroethene	6/30/11	30.5	ug/L	0.19	5	70				
MW-26	**1,4-Dichlorobenzene**	**6/30/11**	**6.7**	**ug/L**	**0.33**	**1**	**6**			**0.7**	**L &/or LFG**
MW-27	cis-1,2-Dichloroethene	6/30/11	22.6	ug/L	0.19	5	70				
MW-31	Zinc, Total	6/29/11	12.3	ug/L	10	10	1050				
MW-33	Cobalt, Total	6/28/11	26.4	ug/L	5	10			70		
MW-33	Nickel, Total	6/28/11	5.4	ug/L	5	50	100				
MW-34	Cobalt, Total	6/28/11	21.4	ug/L	5	10			70		
MW-34	Vanadium, Total	6/28/11	9.5 j	ug/L	5	25			3.5	6	
MW-34	Zinc, Total	6/28/11	18.2	ug/L	10	10	1050				

Sample ID	Parameter Name [1]	Sample Date	Result	Unit	MDL [2]	SWSL [3]	2L [4]	2B [5]	GWP [6]	Exceedance	Preliminary Cause [7]
SW-5	Cobalt, Total	6/29/11	53.6	ug/L	5	10		270			

[1] Table contains Appendix I constituents detected at or above SWSL, GWP, 2L, or 2B

[2] MDL = Method Detection Limit

[3] SWSL = Solid Waste Section Reporting Limit

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

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

[6] GWP = Groundwater Protection Standard

[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

N = Natural from erosion of natural deposits

B = Background (hydraulically upgradient or upstream from landfill)

L = Leachate

LFG = Landfill Gas

BOLD = Concentration > 2L, or 2B Standard

Table 3
Detections in Water Samples above MDL (Appendix II Exclusive)
June 28-July 1, 2011

Sample ID	Parameter Name [1]	Sample Date	Result	Unit	MDL [2]	SWSL [3]	2L [4]	GWP [5]	Exceedance
MW-1B	Mercury	7/1/11	0.69 j	ug/L	0.1	0.2	1.05		
MW-6	Mercury	6/29/11	0.13 j	ug/L	0.1	0.2	1.05		
MW-10	Sulfide	6/29/11	113 j	ug/L	100	1000	NE	NE	
MW-11	1,2,4-Trichlorobenzene	6/30/11	0.68 j	ug/L	0.36	10	70		
MW-12	Naphthalene	6/29/11	2.5 j	ug/L	0.24	10	6		
MW-16	Mercury	6/29/11	0.12 j	ug/L	0.1	0.2	1.05		
MW-17	Mercury	6/30/11	0.2 j	ug/L	0.1	0.2	1.05		
MW-18	Mercury	6/28/11	0.16 j	ug/L	0.1	0.2	1.05		

[1] Table contains App II exclusive constituents detected over MDL
[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
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
June 28, 2011

Monitoring Well	Hydraulic Conductivity (cm/sec)	Effective Porosity (%)	Hydraulic Gradient (ft/ft)	Flow Rate (ft/yr)	Flow Direction	Depth to Groundwater (ft btoc)	Groundwater Potentiometric Elevation (ft amsl)	Screened Interval Lithology
MW-2	3.70E-06	28	0.56	8	N78W	25.46	979.02	UC
MW-12	n/a	28	0.04	n/a	S33W	52.65	954.70	UC
MW-16	8.72E-04	17	0.06	314	S10E	34.28	1003.28	UC
MW-17	n/a	17	0.39	n/a	N43W	18.82	972.34	UC
MW-21	3.77E-03	28	0.08	1149	N40W	30.41	959.59	UC
MW-22	6.04E-04	28	0.23	513	N56W	15.26	943.71	UC
MW-23	9.83E-04	28	0.31	1144	N40W	17.80	932.68	UC
MW-24	1.33E-02	28	0.06	2988	S39W	30.43	943.61	UC
MW-31	n/a	28	0.02	n/a	S54W	22.86	962.56	UC
MW-33	n/a	28	0.08	n/a	S30E	13.87	993.53	UC
MW-34	n/a	28	0.04	n/a	S18W	8.67	1005.93	UC
Minimum	3.70E-006	17	0.02	8	-	8.67	932.68	-
Average	3.26E-003	26	0.17	1019	-	24.59	968.27	-
Maximum	1.33E-002	28	0.56	2988	-	52.65	1005.93	-
MW-1	5.60E-05	10	0.13	76	S79W	36.26	1044.28	UC/UBR
MW-3	3.90E-06	10	0.15	6	S22W	25.78	998.95	UC/UBR
MW-4R	4.90E-04	10	0.05	231	S21W	16.31	996.33	UC/UBR
MW-5	6.40E-05	28	0.04	10	S09E	42.17	1009.09	UC/UBR
MW-14	n/a	10	0.12	n/a	N61W	39.15	958.29	UC/UBR
MW-15	n/a	10	0.09	n/a	N51W	24.60	998.84	UC/UBR
Minimum	3.90E-06	10	0.04	6	-	16.31	958.29	-
Average	1.53E-04	13	0.10	81	-	30.71	1000.96	-
Maximum	4.90E-04	28	0.15	231	-	42.17	1044.28	-
MW-1B	n/a	10	0.13	n/a	N02W	45.90	1036.66	UBR
MW-6	2.40E-05	10	0.32	78	S59W	26.27	979.39	UBR
MW-7	1.60E-06	10	0.25	4	S29W	41.83	967.41	UBR
MW-9	n/a	10	0.13	n/a	S21E	12.51	983.76	UBR
MW-11	n/a	10	0.25	n/a	S21W	41.58	970.38	UBR
MW-13	n/a	10	0.08	n/a	S62W	41.55	963.01	UBR
MW-19	1.92E-06	10	0.10	2	N81W	52.74	1018.74	UBR
MW-20	5.49E-05	10	0.11	63	N74W	40.03	1006.89	UBR
MW-25	5.41E-05	10	0.05	28	N75W	29.82	952.11	UBR
MW-26	1.16E-04	10	0.05	55	S32W	27.05	963.64	UBR
MW-27	2.83E-05	10	0.08	25	S00E	20.92	971.27	UBR
MW-32	n/a	10	0.08	n/a	S27E	31.79	993.47	UBR
Minimum	1.60E-06	10	0.05	2	-	12.51	952.11	-
Average	4.01E-05	10	0.14	36	-	34.33	983.89	-
Maximum	1.16E-04	10	0.32	78	-	52.74	1036.66	-
MW-10	n/a	10	0.05	n/a	n/a	37.88	1002.92	LBR
MW-12D	n/a	10	0.10	n/a	n/a	61.82	946.64	LBR
MW-18	1.19E-04	10	0.05	n/a	S52E	53.40	1030.93	LBR
Minimum	1.19E-04	10	0.05	-	-	37.88	946.64	-
Average	1.19E-04	10	0.07	-	-	51.03	993.50	-
Maximum	1.19E-04	10	0.10	-	-	61.82	1030.93	-

NOTE: Values for hydraulic conductivity obtained from GAI Consultants Sampling Report (April, 1995) & MESCO ACM Report (2008).

Average Linear Groundwater Velocities calculated only for UC & UBR wells with hydraulic conductivity values.

UC = Unconfined/saprolite; UBR = Upper Bedrock fracture system; LBR = Lower Bedrock fracture system.

Wells screened in LBR not utilized for flow directions/gradients.

Hydrologic Gradient taken from water elevations on June 28, 2011.

Flow rate (Q) is defined by the equation:

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

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

Table 5
Field Observations of Monitoring Locations
June 28-July 1, 2011

Sample Location	Viable Monitoring Location	Lack of Any Evidence of Tampering	Locked	Hinge/Hasp Operational	Tagged or Labeled	Concrete Surface Pad Effective	Degree of Visual Turbidity of Collected Sample	Comments
MW-1	Yes	Yes	Yes	Yes	Yes	Yes	Slight	
MW-1A	No	Yes	Yes	Yes	Yes	Yes	na	Dry
MW-1B	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-2	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-3	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-4R	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-5	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-6	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-7	Yes	Yes	Yes	Yes	Yes	Yes	na	Not sampled this event
MW-9	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-10	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-11	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-12	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-12D	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-13	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-14	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-15	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-16	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-17	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-18	Yes	Yes	Yes	Yes	Yes	Yes	Slight	
MW-19	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-20	Yes	Yes	Yes	Yes	Yes	Yes	Clear	Lock Replaced
MW-21	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-22	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-23	Yes	Yes	Yes	Yes	Yes	Yes	Slight	
MW-24	Yes	Yes	Yes	Yes	Yes	Yes	Clear	Lock Replaced
MW-25	Yes	Yes	Yes	Yes	Yes	Yes	Clear	Lock Replaced
MW-26	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-27	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-31	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-32	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-33	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
MW-34	Yes	Yes	Yes	Yes	Yes	Yes	Clear	
SW-3	Yes	-	-	-	-	-	Clear	
SW-4R	Yes	-	-	-	-	-	Clear	
SW-5	Yes	-	-	-	-	-	Clear	
SW-6	Yes	-	-	-	-	-	Clear	Premier sample. Location staked.

Any unusual field conditions, observations, or events:

None to note.

Table 6
Field Parameter Data Summary
June 28-July 1, 2011

Parameter	Water Depth*	Water Elevation	TOC Elevation	Temp.	ORP	DO	pH	Specific Conductance	TDS	Turbidity
Units	**ft (btoc)**	**ft (amsl)**	**ft (amsl)**	**C**	**mV**	**mg/L**	**SU**	**umhos/cm**	**mg/L**	**Visual or NTU**
MW-1	36.26	1044.28	1080.54	17.1	-35	0.5	6.36	449	225	Clear
MW-1B	45.90	1036.66	1082.56	16.2	546	0.3	4.93	80	39	Clear
MW-2	25.46	979.02	1004.48	14.6	13	0.6	5.89	490	247	Slight
MW-3	25.78	998.95	1024.73	16.4	-32	0.1	5.81	301	150	Clear
MW-4R	16.31	996.33	1012.64	16.0	-14	0.1	6.28	398	198	Clear
MW-5	42.17	1009.09	1051.26	16.5	-25	0.9	6.52	288	142	19.3
MW-6	31.40	979.39	1010.79	17.0	246	0.2	5.77	66	33	26.2
MW-7	41.83	967.41	1009.24	NR	NR	NR	NR	NR	NR	NR
MW-9	12.51	983.76	996.27	15.4	182	0.3	6.38	561	281	Clear
MW-10	37.88	1002.92	1040.80	15.9	-97	1.1	7.30	536	268	Clear
MW-11	41.58	970.38	1011.96	17.0	14	1.2	6.02	396	198	Clear
MW-12	52.65	954.70	1007.35	16.2	94	0.9	5.78	154	76	14.8
MW-12D	61.82	946.64	1008.46	17.0	-93	0.2	7.06	800	397	16.9
MW-13	41.55	963.01	1004.56	14.5	61	0.9	6.50	271	130	Clear
MW-14	39.15	958.29	997.44	14.5	178	1.0	5.49	630	314	Slight
MW-15	24.60	998.84	1023.44	14.7	-18	1.1	6.22	378	189	Clear
MW-16	34.28	1003.28	1037.56	16.1	545	0.8	5.73	92	46	10.3
MW-17	18.82	972.34	991.16	14.1	483	1.8	5.17	73	36	Clear
MW-18	53.40	1030.93	1084.33	16.9	-80	3.3	6.93	42	20	681
MW-19	52.74	1018.74	1071.48	15.3	261	2.1	6.40	80	39	Clear
MW-20	40.03	1006.89	1046.92	14.3	61	1.4	6.38	61	30	Clear
MW-21	30.41	959.59	990.00	14.1	365	3.1	5.67	60	30	Clear
MW-22	15.26	943.71	958.97	14.0	317	6.8	5.13	35	17	Slight
MW-23	17.80	932.68	950.48	13.2	391	6.9	5.22	95	47	Slight
MW-24	30.43	943.61	974.04	15.2	528	1.9	6.01	177	88	61.3
MW-25	29.82	952.11	981.93	14.6	309	0.6	6.03	101	49	31.2
MW-26	27.05	963.64	990.69	16.3	37	1.8	5.84	323	162	Clear
MW-27	20.92	971.27	992.19	15.9	-7	3.7	6.68	468	234	Clear
MW-31	22.86	962.56	985.42	15.4	527	1.1	5.36	110	55	16.3
MW-32	31.79	993.47	1025.26	15.5	233	1.0	6.90	93	46	Clear
MW-33	13.87	993.53	1007.40	14.4	192	5.1	5.43	59	29	101
MW-34	8.67	1005.93	1014.60	14.9	112	5.9	6.45	73	35	69.3
Minimum	8.67	932.68	950.48	13.2	-97	0.1	4.93	35	17	10.3
Average	32.03	982.62	1014.65	15.5	171	1.8	6.05	250	124	95.2
Maximum	61.82	1044.28	1084.33	17.1	546	6.9	7.30	800	397	681
SW-3	-	-	-	21.2	13	3.8	6.58	160	79	Clear
SW-4R	-	-	-	19.9	68	6.9	7.03	74	36	Clear
SW-5	-	-	-	20.8	-9	5.9	6.99	88	43	Clear
SW-6	-	-	-	20.9	6	5.6	7.01	78	36	Clear
Minimum	-	-	-	19.9	-9	3.8	6.58	74	36	Clear
Average	-	-	-	20.7	20	5.6	6.90	100	49	Clear
Maximum	-	-	-	21.2	68	6.9	7.03	160	79	Clear

* Depth to water recorded June 28, 2011

Appendix A
Corrective Action Summary

Corrective Action Summary

The Alexander County Closed Unlined Municipal Solid Waste Landfill (MSWLF) and Active Construction and Demolition (C&D) Landfill has progressed with Monitored Natural Attenuation (MNA) monitoring in accordance with the Corrective Action Plan (CAP) approved February 2009 and modified sampling schedule approved June 16, 2011. This is the fifth MNA sampling event, the first following the Corrective Action Evaluation Report (CAER) submitted March 2011. Sampling was conducted with traditional semi-annual sampling from June 28 to July 1, 2011.

Municipal Engineering Services Company, P.A. (MESCO) of Garner, North Carolina collected groundwater samples, to be tested for MNA parameters, from nine monitoring wells (MW-11, MW-12, MW-12D, MW-18, MW-24, MW-26, MW-31, MW-33 and MW-34), in accordance with the CAER review letter. Sampling was conducted per the methodology listed in the approved CAP Groundwater and Surface Water Sampling and Analysis Plan. **Plate 3,** depicts VOCs from the current sampling event above the 2L standard at each respective well. Benzene, 1,2-dichloropropane, 1,4-dichlorobenzene, tetrachloroethene, trichloroethene and vinyl were reported above their 2L standards.

Table 1 lists the wells with their specified MNA sampling parameter results. The Constituents of Concern (COCs) include both hydrocarbons and chlorinated solvents; therefore, biodegradation can occur on two fronts. **Table 2** shows the breakdown of chlorinated solvents through reductive chlorination during the first two sampling events. **Table 3** establishes the conditions present for existing dissolved hydrocarbons at plume locations. The MNA wells, on **Tables 2 and 3** are grouped by plume association, in order to simplify correlations between plates and tables. Biochlor was run for the MW-26 and MW-16 Areas of Concern (AOC). The parameters necessary for biochlor analysis were reported as non-detects for the MW-1 and MW-24 AOC.

In addition to MNA sampling, Alexander County instituted phytoremediation in the area corresponding to wells MW-7, MW-12 and MW-12D. On May 25, 2010, 200 hybrid popular cuttings were planted in and around the plume field. Transducers were set in wells MW-12 and MW-7 on August 12, 2010 to monitor daily water levels in the immediate area. Daily precipitation levels are recovered from the State Climate Office website. MESCO personnel retrieve transducer data for analysis quarterly. Select trees are being measured to monitor growth. **Table 4** provides a tree growth overview for the phytoremediation area. The majority of trees are flourishing and some have grown beyond our capacity to measure height. Tree photos taken in June are included as **Plate 4**.

Injection was proposed in the MW-26 area to supplement the natural MNA processes. On February 17, 2011 MESCO personnel conducted the injection of 19 gallons of 1.05x concentrated Bac-9 into injection well IW-1at a pressure of approximately 12 psi according to the procedure dictated by the manufacturer. The June sampling event is the first sampling event since the injection. Quarterly sampling reports for UIC will be prepared in accordance with Injection Permit WI0300160. The flow rate in the vicinity of MW-26 is approximately 55 feet per year; at this rate we should see injection impact in MW-26 approximately next June.

The adjacent property on the eastern side of the landfill has been purchased and Alexander County is currently working to extend the compliance boundary in this area. MW-33 and MW-34 were installed April 27, 2011, approximately 250 feet from the edge of waste to delineate plume extent. Once the compliance boundary for this AOC is updated VOC contamination above the 2L Standard will be delineated within 250 feet of waste.

Prior to the CAER, groundwater samples from MW-1 and MW-1B were analyzed for tritium and low-level tritium analysis; results indicated leachate was not the contamination cause. Three test methane wells (MEW-1, MEW-2 and MEW-3) have been installed as part of a test blower system. Several temporary monitoring locations will be instituted to collect comprehensive data. Due to constraints beyond Alexander Counties control the pilot test is planned for April/May 2012.

Electronic copies of quarterly injection reports will be sent to the Solid Waste Compliance Section for their reference. After three years the effectiveness of corrective action will be reviewed to determine if the contingency plan should be enacted.

Table 1: MNA Parameter Summary

Parameters	Method	MDL*	Units	MW-18	MW-33	MW-34
				06/28/11	06/28/11	06/28/11
VFA – Acetic Acid	AM23G	70	ug/L	32	37	32
VFA – Butyric Acid	AM23G	50	ug/L	<50	<50	94
VFA – Lactic Acid	AM23G	100	ug/L	170	50	78
VFA – Propionic Acid	AM23G	50	ug/L	<50	54	57
VFA – Pyruvic Acid	AM23G	150	ug/L	<150	<150	<150
Hydrogen	AM20GAX	0.6	nM	1	2.4	0.87
Methane	AM20GAX	0.015	ug/L	0.010	280	1.1
Ethene	AM20GAX	0.01	ug/L	0.0046	0.0027	0.0052
Ethane	AM20GAX	0.01	ug/L	0.0014	0.0039	0.0055
CO2-Dissolved	Field Hach Kit	5	mg/L	NS	90	60
Alkalinity	SM 2320B	5000	ug/L	<5000	11800	9700
Sulfate	EPA 300.0	1	ug/L	4720	5220	5880
Sulfide	SM 4500-S2D	100	ug/L	<100	<100	<100
Chloride	SM 4500-Cl-E	5000	ug/L	<5000	<5000	<5000
TOC	SM 5310B	1000	ug/L	<1000	3540	13300
COD	SM 5220D	25000	ug/L	<25000	<25000	<25000
BOD	SM 5210B	2000	ug/L	196000	<2000	<2000
Iron	EPA 6010	50	ug/L	20500	1630	6840
Nitrate	EPA 353.2	200	ug/L	<200	<200	<200
Temperature	Field Instrument	0	Degrees C	16.9	14.4	14.9
ORP	Field Instrument	-900	mV	-80	192	112
DO	Field Instrument	0	mg/L	3.3	5.1	5.9
pH	Field Instrument	0	Standard Units	6.93	5.43	6.45
Specific Conductance	Field Instrument	0	us/cm	42	59	73
Turbidity	Field Instrument	0	NTU	681	101	69.3

Notes:
VFA = Volatile Fatty Acids
MDL* = Lab Method Detection Limit or Lowest Field Measurement Possible
Constituents Below Quantitation Limit are shown as < MDL value
>100 = CO2 Concentration Exceeds Maximum capability of Method Used
NS = Not Sampled
Microseeps data (method AM23G & AM20GAX) reported to the Method Reporting Limit (MRL)

Table 1: MNA Parameter Summary

Parameters	Method	MDL*	Units	MW-5	MW-6	MW-11	MW-12	MW-12D	MW-16	MW-24	MW-26	MW-27
				06/29/11	06/29/11	06/30/11	06/29/11	06/29/11	06/29/11	06/29/11	06/30/11	06/30/11
Alkalinity	SM 2320B	5000	ug/L	199000	5000	239000	73700	385000	27800	43800	183000	265000
Sulfate	EPA 300.0	1	ug/L	4620	2890	2720	2560	1200	4980	3610	4020	25100
Sulfide	SM 4500-S2D	100	ug/L	<100	<100	<100	<100	<100	<100	<100	<100	<100
Chloride	SM 4500-Cl-E	5000	ug/L	5000	6090	22500	7420	58000*	5000	18000	14400	13200
TOC	SM 5310B	1000	ug/L	9190	5690	8800	16000	10600	9580	11300	10800	3610
COD	SM 5220D	25000	ug/L	<25000	<25000	30000	<25000	<25000	<25000	<25000	<25000	<25000
Iron	EPA 6010	50	ug/L	18100	212	45300	5100	5190	2740	4450	62.4	NS
Nitrate	EPA 353.2	200	ug/L	<200	806	<200	<200	<200	<200	<200	<200	<200
Temperature	Field Instrument	0	Degrees C	16.5	17.0	17.0	16.2	17.0	16.1	15.2	16.3	15.9
ORP	Field Instrument	-900	mV	-25	246	14	94	-93	545	528	37	-7
DO	Field Instrument	0	mg/L	0.9	0.2	1.2	0.9	0.2	0.8	1.9	1.8	3.7
pH	Field Instrument	0	Standard Units	6.52	5.77	6.02	5.78	7.06	5.73	6.01	5.84	6.68
Specific Conductance	Field Instrument	0	us/cm	288	66	396	154	800	92	177	323	468
Turbidity	Field Instrument	0	NTU	19.3	26.2	Clear	14.8	16.9	10.3	61.3	Clear	Clear

Notes:
NS= Not Sampled
MDL* = Lab Method Detection Limit or Lowest Field Measurement Possible
Constituents Below Quantitation Limit are shown as < MDL value
*Chloride analysis for MW-12D uses a dilution factor of 5 (MDL = 25,000)

Table 2: Reductive Dechlorination Assessment

Well	Tetrachloroethene (Perchloroethene – PCE)					Trichloroethene (TCE)					1,1-Dichloroethene (1,1-DCE)				
	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11
MW-3	BQL	BQL	BQL	BQL	NS	2.20	1.60	1.00	1.20	NS	BQL	BQL	BQL	1.60	NS
MW-11	0.49	0.52	BQL	0.40	BQL	0.87	0.72	0.75	0.45	0.48	BQL	BQL	BQL	1.10	BQL
MW-26	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.65	BQL
MW-27	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.78	BQL
MW-5	BQL	BQL	BQL	BQL	BQL	0.54	0.65	0.67	0.71	0.70	BQL	BQL	BQL	4.00	BQL
MW-16	2.10	2.90	2.80	2.40	2.70	2.50	3.50	3.50	3.00	3.10	BQL	BQL	BQL	11.00	BQL
MW-33	-	-	-	-	0.47	-	-	-	-	0.53	-	-	-	-	BQL
MW-34	-	-	-	-	BQL	-	-	-	-	BQL	-	-	-	-	BQL
MW-6	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-13	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-7	BQL	BQL	BQL	BQL	NS	0.48	0.90	0.54	0.82	NS	BQL	BQL	BQL	2.60	NS
MW-12	1.10	1.20	BQL	1.10	0.97	1.90	2.30	2.00	2.20	2.40	BQL	BQL	BQL	2.20	BQL
MW-12D	BQL	BQL	0.82	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.40	BQL
MW-24	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-25	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.67	BQL
MW-18	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL

Notes:
1. The selected chlorinated solvents consist of the target parent compound and several target daughter compounds.
2. Analytes were analyzed per EPA Test Method 8260. Detections are presented in micrograms per liter (µg/L).
3. BQL = Below Quantitation Limit
4. Red Text identifies an increase in concentration when compared to the prior event.
5. Green Text identifies a decrease in concentrations when compared to the prior event.

Table 2: Reductive Dechlorination Assessment

Well	cis-1,2-Dichlorethene (cis-1,2-DCE)					Vinyl Chloride (VC)					Ethene					Ethane				
	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11
MW-3	11.60	8.80	9.30	8.30	NS	1.30	0.83	1.10	0.64	NS	BQL	0.49	0.240	1.10	NS	BQL	0.048	0.046	0.64	NS
MW-11	32.50	32.30	24.60	29.00	28.30	0.94	0.85	0.91	0.48	0.75	BQL	0.018	0.042	0.042	NS	BQL	BQL	0.015	0.014	NS
MW-26	28.30	18.60	29.80	23.00	30.50	BQL	BQL	BQL	BQL	BQL	BQL	0.071	0.460	0.070	NS	BQL	0.022	0.100	0.022	NS
MW-27	19.00	20.20	24.60	28.00	22.60	BQL	BQL	BQL	BQL	BQL	BQL	0.16	0.210	0.046	NS	BQL	0.019	0.086	BQL	NS
MW-5	11.50	11.30	10.50	9.00	11.80	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	NS	BQL	BQL	0.008	BQL	NS
MW-16	17.20	16.30	18.00	17.00	18.80	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	NS	BQL	BQL	0.010	0.012	NS
MW-33	-	-	-	-	3.10	-	-	-	-	BQL	-	-	-	-	0.0027	-	-	-	-	0.0039
MW-34	-	-	-	-	BQL	-	-	-	-	BQL	-	-	-	-	0.0052	-	-	-	-	0.0055
MW-6	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.021	0.020	0.30	NS	BQL	0.002	0.002	0.016	NS
MW-13	0.45	0.41	BQL	0.44	0.26	BQL	BQL	BQL	BQL	BQL	BQL	0.021	0.022	0.30	NS	BQL	0.002	0.002	0.016	NS
MW-7	5.20	5.70	5.00	7.00	NS	BQL	BQL	BQL	BQL	NS	BQL	0.12	0.270	0.071	NS	BQL	0.018	0.022	0.019	NS
MW-12	12.50	13.60	11.90	13.00	13.50	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.010	BQL	NS	BQL	BQL	BQL	BQL	NS
MW-12D	0.77	0.68	0.36	0.62	0.70	BQL	BQL	BQL	BQL	BQL	BQL	0.11	0.078	0.038	NS	BQL	0.012	0.008	BQL	NS
MW-24	2.10	4.10	3.20	4.50	3.10	BQL	BQL	BQL	BQL	BQL	BQL	0.003	0.006	BQL	NS	BQL	BQL	0.014	BQL	NS
MW-25	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.005	BQL	NS	BQL	BQL	0.016	BQL	NS
MW-18	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.007	0.009	0.012	0.0046	BQL	BQL	0.002	BQL	0.0014

Table 3: Natural Attenuation Properties

	Oxygen (DO) (mg/l)					Nitrate (NO3)					Iron				
	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11
MW-3	0.3	0.2	0.2	0.1	0.1	211	BQL	BQL	BQL	NS	NS	42500	14400	17400	NS
MW-11	0.3	0.9	0.9	0.5	1.2	2060	BQL	BQL	BQL	BQL	36900	33700	32900	39900	45300
MW-26	1.2	0.9	1.0	0.4	1.8	BQL	BQL	BQL	BQL	BQL	11500	23800	25200	23400	62.4
MW-27	4.4	0.8	0.7	2.8	3.7	0.69	BQL	869	BQL	BQL	3720	4160	25.8	730	NS
MW-5	0.1	0.1	0.1	0.3	0.9	110	BQL	BQL	BQL	BQL	NS	35400	41500	43500	18100
MW-16	0.1	0.1	0.1	0.3	0.8	196.5	BQL	108	94	BQL	NS	6930	331	7040	2740
MW-33	-	-	-	-	5.1	-	-	-	-	BQL	-	-	-	-	1630
MW-34	-	-	-	-	5.9	-	-	-	-	BQL	-	-	-	-	6840
MW-6	3.4	0.6	0.7	0.7	0.2	1060	NS	471	BQL	806	703	168	32.6	309	212
MW-7	0.3	0.3	0.3	0.2	NS	127	BQL	BQL	BQL	NS	NS	26000	29000	36100	NS
MW-12	0.2	0.9	0.2	0.9	0.9	BQL	15	BQL	BQL	BQL	NS	1680	5930	4680	5100
MW-12D	0.1	0.1	0.2	0.1	0.2	100	BQL	BQL	BQL	BQL	NS	860	3040	2500	5190
MW-24	4.1	3.9	3.1	0.4	1.9	171	NS	133	BQL	BQL	576	108	2600	3390	4450
MW-25	0.9	1.0	1.1	0.5	0.6	548	NS	716	BQL	NS	777.0	233	167	260	NS
MW-18	3.9	3.8	3.7	3.6	3.3	BQL	NS	120	93	BQL	5460	1090	32100	22600	20500

Note:
1. The selected parameters consist of target properties to help identify the attenuation environment.
2. Analytes were analyzed in accordance with the appropriate method, listed on Table 1.
3. DO detections are presented in milligrams per liter (mg/L); others are presented in micrograms per liter (ug/L).
4. BQL = Below Quantitation Limit.
5. NS = Not Sampled.
6. Red Text identifies an increase in concentration when compared to the prior event.
7. Green Text identifies a decrease in concentrations when compared to the prior event.

Table 3: Natural Attenuation Properties

	Sulfate (SO4)					Methane				
	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11	Jun-09	Dec-09	Jul-10	Dec-10	Jun-11
MW-3	BQL	BQL	BQL	1900	NS	10000	8400	5600	6600	NS
MW-11	BQL	BQL	BQL	3600	2720	4260	4600	4100	3300	NS
MW-26	BQL	BQL	BQL	4700	4020	240	2100	480	700	NS
MW-27	16200	31600	13300	5900	25100	BQL	1.1	2.7	0.390	NS
MW-5	BQL	BQL	BQL	5200	4620	4100	3800	3100	7500	NS
MW-16	BQL	BQL	BQL	5700	4980	7490	5100	5100	7400	NS
MW-33	-	-	-	-	5220	-	-	-	-	280
MW-34	-	-	-	-	5880	-	-	-	-	1.1
MW-6	BQL	BQL	BQL	3300	2890	60.9	24	21	23	NS
MW-7	BQL	BQL	BQL	2600	NS	7900.0	7600	5100	4700	NS
MW-12	BQL	BQL	BQL	3100	2560	406.0	8600	5400	2900	NS
MW-12D	BQL	BQL	BQL	2100	1200	2820	1000	480	0.370	NS
MW-24	BQL	5340	5570	7100	3610	BQL	1.3	260	160	NS
MW-25	BQL	BQL	BQL	3300	NS	6.8	1.2	340	130	NS
MW-18	54900	8320	5550	5900	4720	BQL	0.1	0.044	BQL	0.01

Table 4: Tree Evaluation Summary

Tree Number	Height (in)	Middle Width (in)	Trunk Circumference (in)	Height (in)	Middle Width (in)	Trunk Circumference (in)	Height (in)	Middle Width (in)	Trunk Circumference (in)
	07/14/2010			12/17/2010			06/29/2011		
1	31	16	1.75	31	15	1.75	116	76	2
2	13	11	1.5	13	12	1.5	14	8	1.7
3	28	24	2	28	24	2	104	45	3.65
4	28	23	2	28	23	2	113	45	3.84
5	20	6	2	21	6	2	48	46	2
6	19	7	2.25	19	8	2.25	35	23	2.25
7	22	5	2	23	6	2	28	25	1.75
8	24	11	1.5	25	12	1.5	74	33	2.25
9	19	6	2	22	6	2	150	38	2.1
10	27	8	2.5	27	9	2.5	73	35	2.4

NOTE:
Bud-only cuttings planted (5/25/2010) with approximate 12-inch stick-up
Initial tree circumference approximately 1-inch

Photo date: 6-29-2011

PLATE 4

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Alexander County
MW-16 AOC
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	132.6	(ft/yr)
or			
Hydraulic Conductivity	K	4.7E-04	(cm/sec)
Hydraulic Gradient	i	0.06	(ft/ft)
Effective Porosity	n	0.22	(-)

2. DISPERSION

Alpha x*	20	(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)	4.29	(-)
TCE	130	(L/kg)	2.00	(-)
DCE	125	(L/kg)	1.97	(-)
VC	30	(L/kg)	1.23	(-)
ETH	0	(L/kg)	1.00	(-)
Common R (used in model)* =			**1.97**	

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*	200	(ft)
Modeled Area Length*	280	(ft)
Zone 1 Length*	280	(ft)
Zone 2 Length*	0	(ft)

L, W

Zone 2= L - Zone 1

6. SOURCE DATA

TYPE: Decaying Single Planar

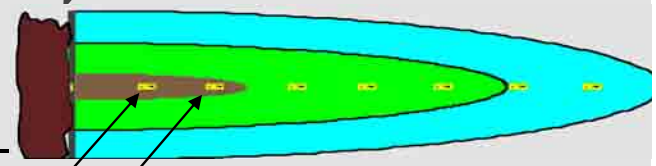
Source Options

Source Thickness in Sat. Zone* 12 (ft)

Y1
Width* (ft) 200

Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	0.01	0.1
TCE	0.01	0.1
DCE	0.00	0.1
VC	0.00	0.1
ETH	0.001	0.1

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	0.0027	0.0								
TCE Conc. (mg/L)	0.0007	0.0031	0.0								
DCE Conc. (mg/L)	0.0	0.0	0.0								
VC Conc. (mg/L)	0.0	0.0	0.0								
ETH Conc. (mg/L)			5.2E-06								
Distance from Source (ft)	25	75	225								
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

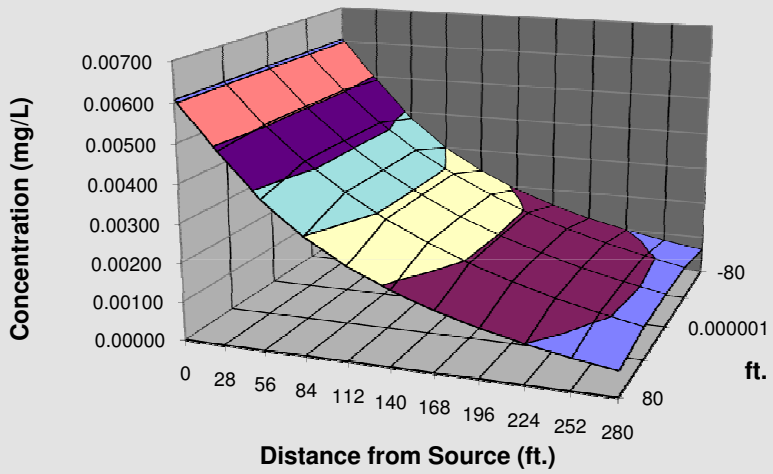
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	28	56	84	112	140	168	196	224	252	280
80	6.065E-03	4.888E-03	3.801E-03	2.992E-03	2.382E-03	1.911E-03	1.539E-03	1.241E-03	9.983E-04	7.990E-04	6.335E-04
40	6.065E-03	5.036E-03	4.180E-03	3.468E-03	2.872E-03	2.372E-03	1.953E-03	1.601E-03	1.305E-03	1.054E-03	8.419E-04
0	6.065E-03	5.036E-03	4.180E-03	3.470E-03	2.878E-03	2.385E-03	1.973E-03	1.627E-03	1.334E-03	1.084E-03	8.714E-04
-40	6.065E-03	5.036E-03	4.180E-03	3.468E-03	2.872E-03	2.372E-03	1.953E-03	1.601E-03	1.305E-03	1.054E-03	8.419E-04
-80	6.065E-03	4.888E-03	3.801E-03	2.992E-03	2.382E-03	1.911E-03	1.539E-03	1.241E-03	9.983E-04	7.990E-04	6.335E-04
MASS RATE (mg/day)	3.3E+1	2.7E+1	2.2E+1	1.8E+1	1.5E+1	1.2E+1	9.7E+0	7.9E+0	6.4E+0	5.2E+0	4.2E+0

Show No Degradation

Show Biotransformation

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



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	5.501E-02	(Kg)
- Plume Mass If Biotransformation/Production	2.167E-02	(Kg)
Mass Removed	3.334E-02	(Kg)

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

% Biotransformed = +60.6%

% Change in Mass Rate = 87.4 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	1.769E-01	MGal
Flow Rate of Water Through Source Area	1.435E-03	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

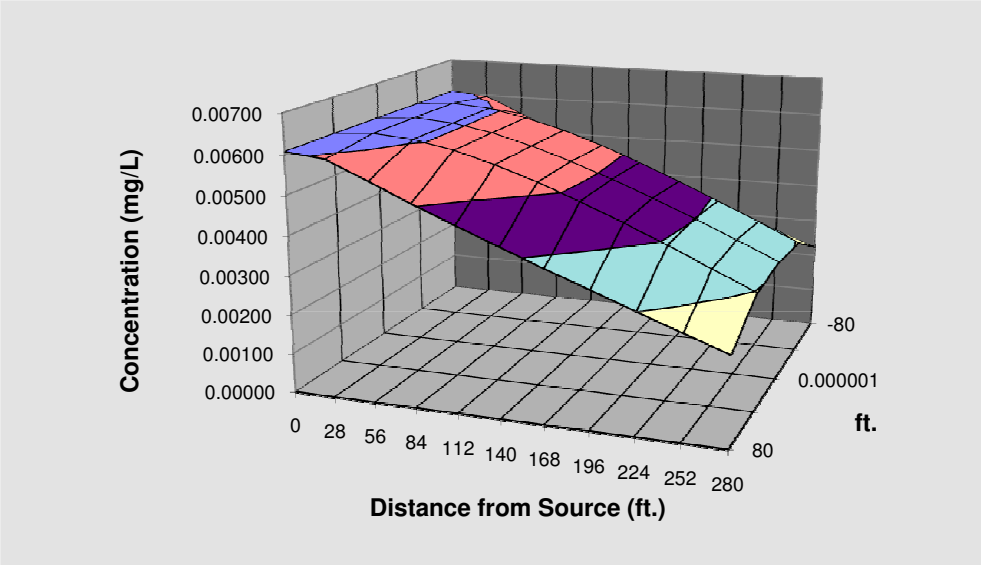
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	28	56	84	112	140	168	196	224	252	280
80	6.065E-03	5.958E-03	5.508E-03	5.057E-03	4.625E-03	4.208E-03	3.801E-03	3.401E-03	3.006E-03	2.617E-03	2.235E-03
40	6.065E-03	6.138E-03	6.057E-03	5.860E-03	5.575E-03	5.224E-03	4.824E-03	4.389E-03	3.929E-03	3.453E-03	2.970E-03
0	6.065E-03	6.138E-03	6.057E-03	5.864E-03	5.588E-03	5.253E-03	4.874E-03	4.459E-03	4.016E-03	3.551E-03	3.074E-03
-40	6.065E-03	6.138E-03	6.057E-03	5.860E-03	5.575E-03	5.224E-03	4.824E-03	4.389E-03	3.929E-03	3.453E-03	2.970E-03
-80	6.065E-03	5.958E-03	5.508E-03	5.057E-03	4.625E-03	4.208E-03	3.801E-03	3.401E-03	3.006E-03	2.617E-03	2.235E-03
MASS RATE (mg/day)	3.3E+1	3.3E+1	3.2E+1	3.0E+1	2.8E+1	2.6E+1	2.4E+1	2.2E+1	1.9E+1	1.7E+1	1.5E+1

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	5.501E-02	(Kg)
- Plume Mass If Biotransformation/Production	3.976E-02	(Kg)
Mass Removed	1.525E-02	(Kg)
% Biotransformed =	+27.7%	
% Change in Mass Rate =	55.5 %	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	5.750E-01	MGal
Flow Rate of Water Through Source Area	1.435E-03	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

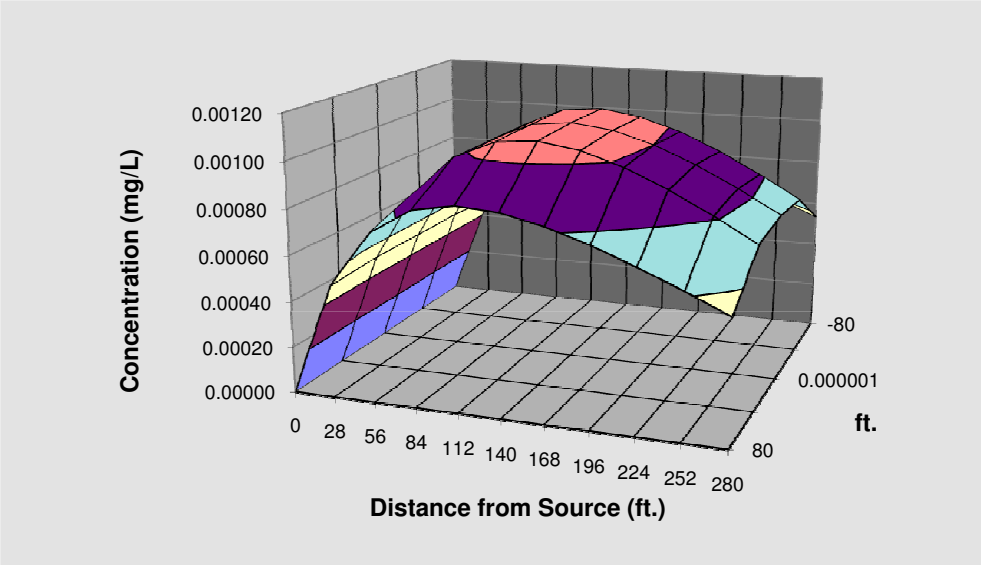
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	28	56	84	112	140	168	196	224	252	280
80	2.267E-10	4.884E-04	7.324E-04	8.405E-04	8.729E-04	8.604E-04	8.203E-04	7.624E-04	6.927E-04	6.155E-04	5.338E-04
40	2.267E-10	5.032E-04	8.054E-04	9.741E-04	1.052E-03	1.068E-03	1.041E-03	9.838E-04	9.053E-04	8.121E-04	7.095E-04
0	2.267E-10	5.032E-04	8.055E-04	9.746E-04	1.055E-03	1.074E-03	1.052E-03	9.995E-04	9.253E-04	8.353E-04	7.343E-04
-40	2.267E-10	5.032E-04	8.054E-04	9.741E-04	1.052E-03	1.068E-03	1.041E-03	9.838E-04	9.053E-04	8.121E-04	7.095E-04
-80	2.267E-10	4.884E-04	7.324E-04	8.405E-04	8.729E-04	8.604E-04	8.203E-04	7.624E-04	6.927E-04	6.155E-04	5.338E-04
MASS RATE (mg/day)	1.2E-6	2.7E+0	4.2E+0	5.0E+0	5.3E+0	5.4E+0	5.2E+0	4.9E+0	4.5E+0	4.0E+0	3.5E+0

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	0.000E+00	(Kg)
- Plume Mass If Biotransformation/Production	6.762E-03	(Kg)
Mass Removed	-6.762E-03	(Kg)
% Biotransformed =		
% Change in Mass Rate =	##########	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	1.435E-03	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

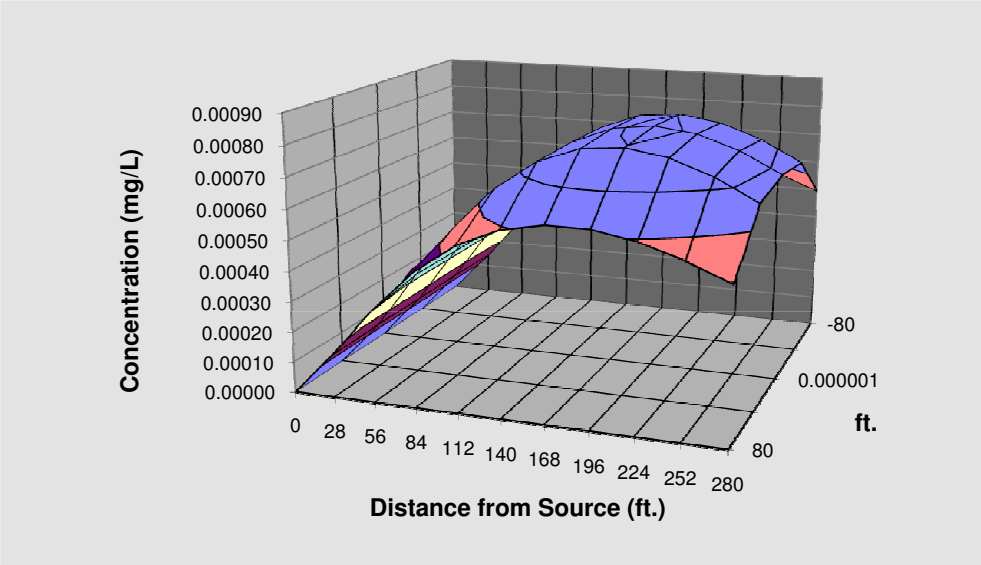
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	28	56	84	112	140	168	196	224	252	280
80	3.488E-11	1.419E-04	3.016E-04	4.354E-04	5.325E-04	5.928E-04	6.199E-04	6.189E-04	5.947E-04	5.521E-04	4.957E-04
40	3.488E-11	1.462E-04	3.317E-04	5.046E-04	6.420E-04	7.359E-04	7.868E-04	7.987E-04	7.772E-04	7.284E-04	6.588E-04
0	3.488E-11	1.462E-04	3.317E-04	5.049E-04	6.434E-04	7.400E-04	7.949E-04	8.114E-04	7.944E-04	7.493E-04	6.819E-04
-40	3.488E-11	1.462E-04	3.317E-04	5.046E-04	6.420E-04	7.359E-04	7.868E-04	7.987E-04	7.772E-04	7.284E-04	6.588E-04
-80	3.488E-11	1.419E-04	3.016E-04	4.354E-04	5.325E-04	5.928E-04	6.199E-04	6.189E-04	5.947E-04	5.521E-04	4.957E-04
MASS RATE (mg/day)	1.9E-7	7.8E-1	1.7E+0	2.6E+0	3.2E+0	3.7E+0	3.9E+0	4.0E+0	3.8E+0	3.6E+0	3.2E+0

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	0.000E+00	(Kg)
- Plume Mass If Biotransformation/Production	4.637E-03	(Kg)
Mass Removed	-4.637E-03	(Kg)
% Biotransformed =		
% Change in Mass Rate =	##########	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	1.435E-03	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

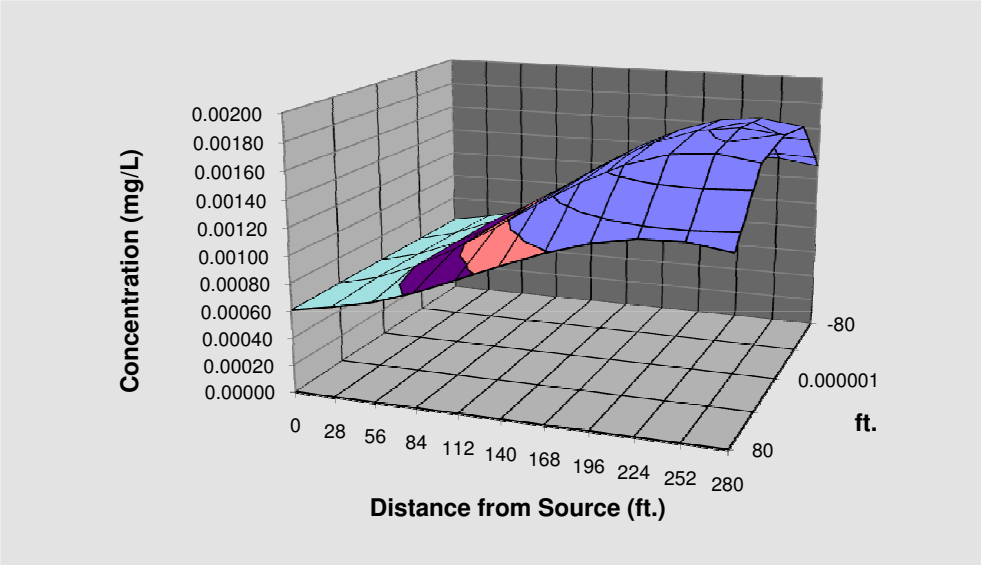
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	28	56	84	112	140	168	196	224	252	280
80	6.065E-04	6.600E-04	7.258E-04	8.249E-04	9.454E-04	1.072E-03	1.190E-03	1.283E-03	1.339E-03	1.348E-03	1.306E-03
40	6.065E-04	6.800E-04	7.982E-04	9.560E-04	1.140E-03	1.331E-03	1.510E-03	1.655E-03	1.750E-03	1.779E-03	1.736E-03
0	6.065E-04	6.800E-04	7.982E-04	9.565E-04	1.142E-03	1.338E-03	1.525E-03	1.682E-03	1.788E-03	1.830E-03	1.797E-03
-40	6.065E-04	6.800E-04	7.982E-04	9.560E-04	1.140E-03	1.331E-03	1.510E-03	1.655E-03	1.750E-03	1.779E-03	1.736E-03
-80	6.065E-04	6.600E-04	7.258E-04	8.249E-04	9.454E-04	1.072E-03	1.190E-03	1.283E-03	1.339E-03	1.348E-03	1.306E-03
MASS RATE (mg/day)	3.3E+0	3.6E+0	4.2E+0	4.9E+0	5.8E+0	6.7E+0	7.5E+0	8.2E+0	8.6E+0	8.8E+0	8.6E+0

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	5.501E-03	(Kg)
- Plume Mass If Biotransformation/Production	1.038E-02	(Kg)
Mass Removed	-4.881E-03	(Kg)

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

% Biotransformed = -88.7 %

% Change in Mass Rate = -159.9 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	1.435E-03	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

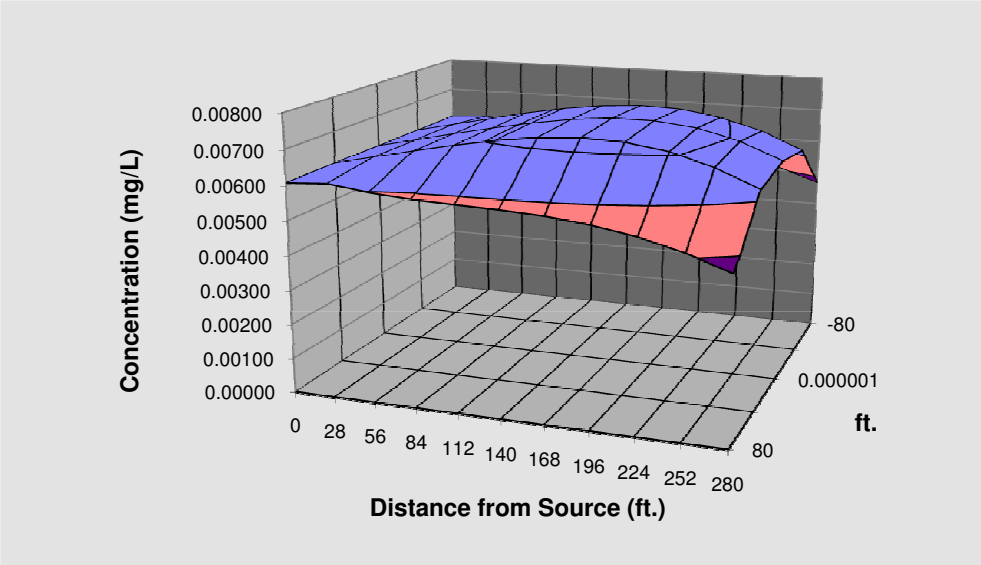
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	28	56	84	112	140	168	196	224	252	280
80	6.065E-03	6.139E-03	5.989E-03	5.899E-03	5.853E-03	5.814E-03	5.747E-03	5.622E-03	5.414E-03	5.105E-03	4.691E-03
40	6.065E-03	6.325E-03	6.586E-03	6.837E-03	7.056E-03	7.217E-03	7.294E-03	7.255E-03	7.076E-03	6.736E-03	6.234E-03
0	6.065E-03	6.325E-03	6.587E-03	6.841E-03	7.072E-03	7.258E-03	7.369E-03	7.371E-03	7.232E-03	6.929E-03	6.452E-03
-40	6.065E-03	6.325E-03	6.586E-03	6.837E-03	7.056E-03	7.217E-03	7.294E-03	7.255E-03	7.076E-03	6.736E-03	6.234E-03
-80	6.065E-03	6.139E-03	5.989E-03	5.899E-03	5.853E-03	5.814E-03	5.747E-03	5.622E-03	5.414E-03	5.105E-03	4.691E-03
MASS RATE (mg/day)	3.3E+1	3.4E+1	3.4E+1	3.5E+1	3.6E+1	3.6E+1	3.6E+1	3.6E+1	3.5E+1	3.3E+1	3.1E+1

Show No Degradation

Show Biotransformation

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



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	5.501E-02	(Kg)
- Plume Mass If Biotransformation/Production	2.167E-02	(Kg)
Mass Removed	3.334E-02	(Kg)
% Biotransformed =	**+60.6%**	
% Change in Mass Rate =	**6.7 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	1.435E-03	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# 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

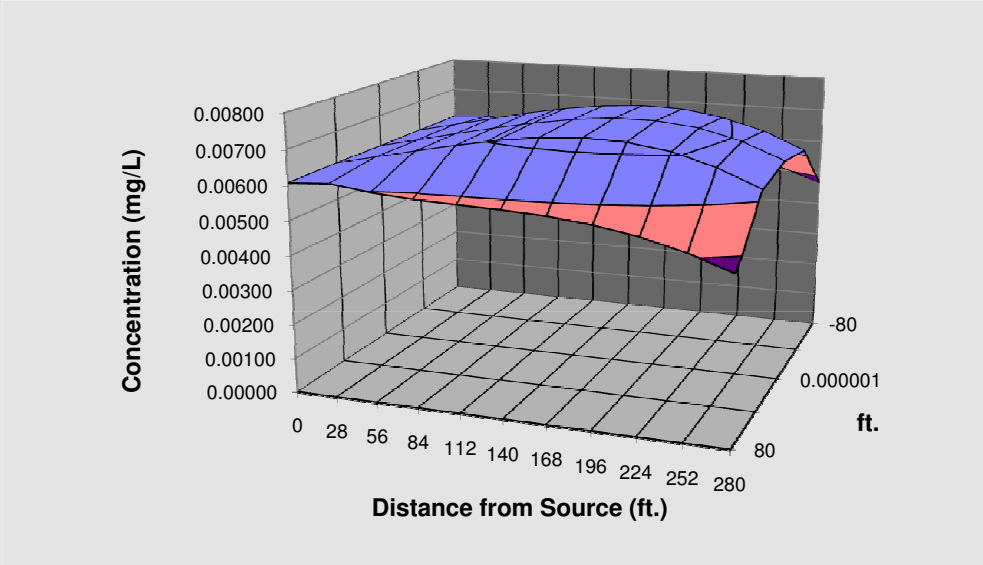
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	28	56	84	112	140	168	196	224	252	280
80	6.065E-03	6.139E-03	5.989E-03	5.899E-03	5.853E-03	5.814E-03	5.747E-03	5.622E-03	5.414E-03	5.105E-03	4.691E-03
40	6.065E-03	6.325E-03	6.586E-03	6.837E-03	7.056E-03	7.217E-03	7.294E-03	7.255E-03	7.076E-03	6.736E-03	6.234E-03
0	6.065E-03	6.325E-03	6.587E-03	6.841E-03	7.072E-03	7.258E-03	7.369E-03	7.371E-03	7.232E-03	6.929E-03	6.452E-03
-40	6.065E-03	6.325E-03	6.586E-03	6.837E-03	7.056E-03	7.217E-03	7.294E-03	7.255E-03	7.076E-03	6.736E-03	6.234E-03
-80	6.065E-03	6.139E-03	5.989E-03	5.899E-03	5.853E-03	5.814E-03	5.747E-03	5.622E-03	5.414E-03	5.105E-03	4.691E-03
MASS RATE (mg/day)	3.3E+1	3.4E+1	3.4E+1	3.5E+1	3.6E+1	3.6E+1	3.6E+1	3.6E+1	3.5E+1	3.3E+1	3.1E+1

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	5.501E-02	(Kg)
- Plume Mass If Biotransformation/Production	3.976E-02	(Kg)
Mass Removed	1.525E-02	(Kg)
% Biotransformed =	+27.7%	
% Change in Mass Rate =	6.7 %	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	1.435E-03	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# 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

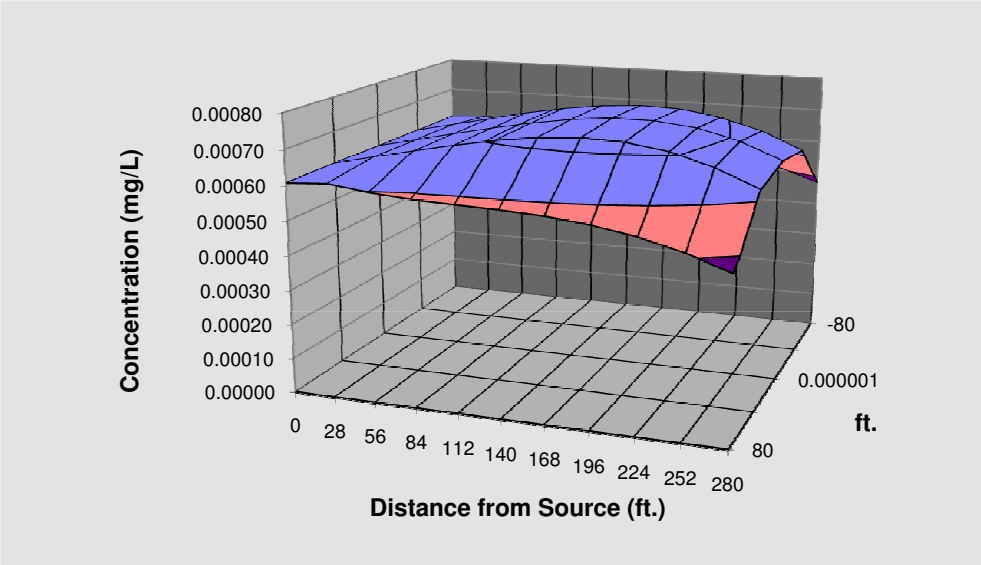
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	28	56	84	112	140	168	196	224	252	280
80	6.065E-04	6.139E-04	5.989E-04	5.899E-04	5.853E-04	5.814E-04	5.747E-04	5.622E-04	5.414E-04	5.105E-04	4.691E-04
40	6.065E-04	6.325E-04	6.586E-04	6.837E-04	7.056E-04	7.217E-04	7.294E-04	7.255E-04	7.076E-04	6.736E-04	6.234E-04
0	6.065E-04	6.325E-04	6.587E-04	6.841E-04	7.072E-04	7.258E-04	7.369E-04	7.371E-04	7.232E-04	6.929E-04	6.452E-04
-40	6.065E-04	6.325E-04	6.586E-04	6.837E-04	7.056E-04	7.217E-04	7.294E-04	7.255E-04	7.076E-04	6.736E-04	6.234E-04
-80	6.065E-04	6.139E-04	5.989E-04	5.899E-04	5.853E-04	5.814E-04	5.747E-04	5.622E-04	5.414E-04	5.105E-04	4.691E-04
MASS RATE (mg/day)	3.3E+0	3.4E+0	3.4E+0	3.5E+0	3.6E+0	3.6E+0	3.6E+0	3.6E+0	3.5E+0	3.3E+0	3.1E+0

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	5.501E-03	(Kg)
- Plume Mass If Biotransformation/Production	1.038E-02	(Kg)
Mass Removed	-4.881E-03	(Kg)
% Biotransformed =	**-88.7 %**	
% Change in Mass Rate =	**6.7 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	1.435E-03	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

Alexander County
MW-16 AOC
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	132.1	(ft/yr)
or			
Hydraulic Conductivity	K	4.7E-04	(cm/sec)
Hydraulic Gradient	i	0.06	(ft/ft)
Effective Porosity	n	0.22	(-)

2. DISPERSION

Alpha x*	20	(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)	8.24	(-)
TCE	130	(L/kg)	3.21	(-)
DCE	125	(L/kg)	3.13	(-)
VC	30	(L/kg)	1.50	(-)
ETH	0	(L/kg)	1.00	(-)
Common R (used in model)* =			**3.13**	

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*	200	(ft)
Modeled Area Length*	250	(ft)
Zone 1 Length*	250	(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* 10 (ft)

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

	Y1	
Width* (ft)	200	
Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	0.01	0.1
TCE	0.01	0.1
DCE	0.00	0.1
VC	0.00	0.1
ETH	0.001	0.1

View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	0.0	0.0027	0.0								
TCE Conc. (mg/L)	0.0007	0.0031	0.0								
DCE Conc. (mg/L)	0.0	0.0	0.0								
VC Conc. (mg/L)	0.0	0.0	0.0								
ETH Conc. (mg/L)			5.2E-06								
Distance from Source (ft)	25	75	225								
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

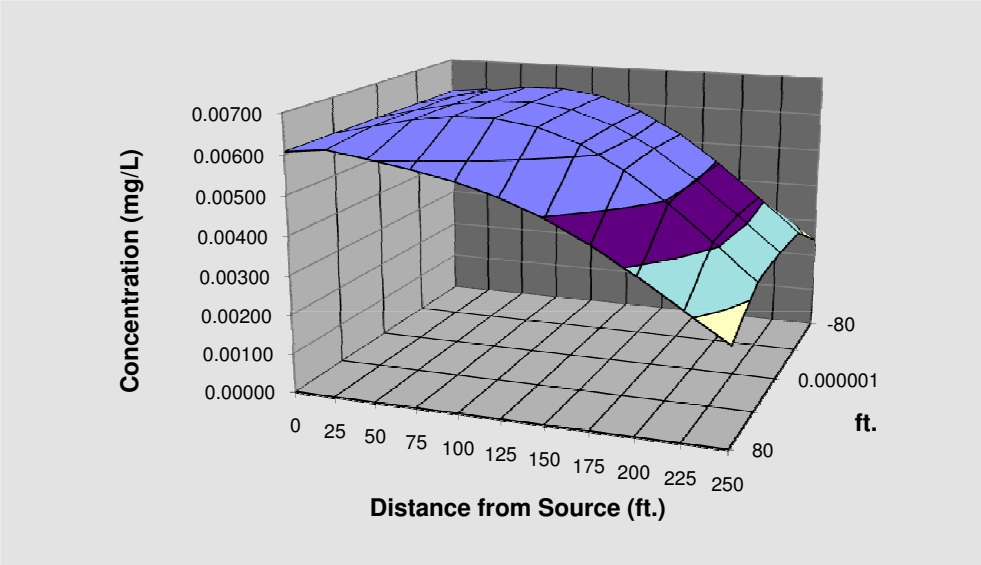
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	25	50	75	100	125	150	175	200	225	250
80	6.065E-03	6.182E-03	6.034E-03	5.867E-03	5.662E-03	5.374E-03	4.972E-03	4.449E-03	3.825E-03	3.141E-03	2.451E-03
40	6.065E-03	6.326E-03	6.549E-03	6.697E-03	6.721E-03	6.574E-03	6.226E-03	5.673E-03	4.946E-03	4.106E-03	3.232E-03
0	6.065E-03	6.326E-03	6.549E-03	6.699E-03	6.730E-03	6.598E-03	6.270E-03	5.739E-03	5.029E-03	4.198E-03	3.323E-03
-40	6.065E-03	6.326E-03	6.549E-03	6.697E-03	6.721E-03	6.574E-03	6.226E-03	5.673E-03	4.946E-03	4.106E-03	3.232E-03
-80	6.065E-03	6.182E-03	6.034E-03	5.867E-03	5.662E-03	5.374E-03	4.972E-03	4.449E-03	3.825E-03	3.141E-03	2.451E-03
MASS RATE (mg/day)	2.7E+1	2.8E+1	2.9E+1	2.9E+1	2.8E+1	2.7E+1	2.6E+1	2.3E+1	2.0E+1	1.7E+1	1.3E+1

Show No Degradation

Show Biotransformation

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



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	5.796E-02	(Kg)
- Plume Mass If Biotransformation/Production	5.508E-02	(Kg)
Mass Removed	2.879E-03	(Kg)
% Biotransformed =	+5.0%	
% Change in Mass Rate =	51.6 %	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	6.089E-01	MGal
Flow Rate of Water Through Source Area	1.191E-03	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

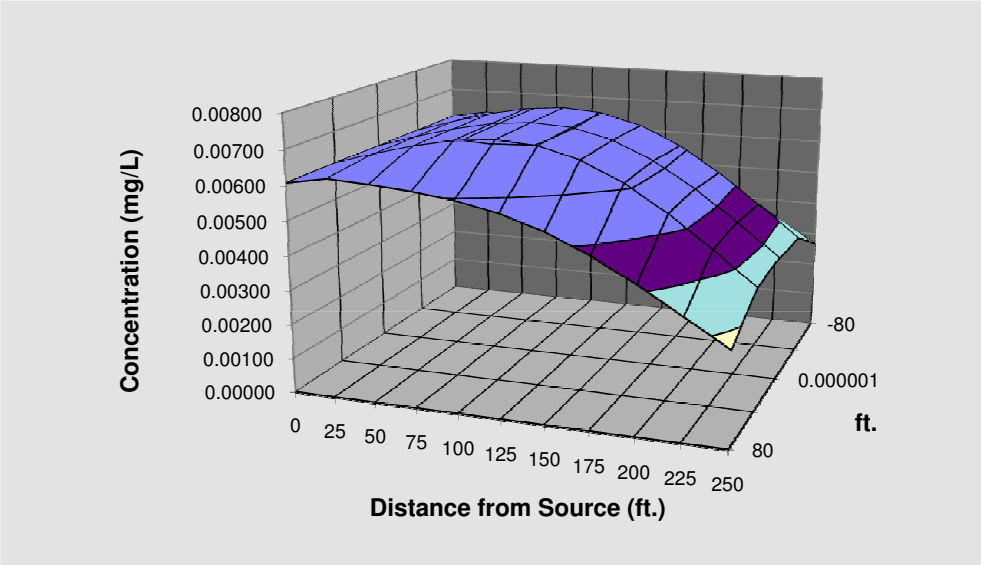
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	25	50	75	100	125	150	175	200	225	250
80	6.065E-03	6.273E-03	6.208E-03	6.112E-03	5.965E-03	5.716E-03	5.333E-03	4.806E-03	4.156E-03	3.429E-03	2.687E-03
40	6.065E-03	6.419E-03	6.738E-03	6.977E-03	7.080E-03	6.993E-03	6.678E-03	6.128E-03	5.374E-03	4.483E-03	3.543E-03
0	6.065E-03	6.419E-03	6.738E-03	6.978E-03	7.090E-03	7.019E-03	6.726E-03	6.199E-03	5.465E-03	4.584E-03	3.643E-03
-40	6.065E-03	6.419E-03	6.738E-03	6.977E-03	7.080E-03	6.993E-03	6.678E-03	6.128E-03	5.374E-03	4.483E-03	3.543E-03
-80	6.065E-03	6.273E-03	6.208E-03	6.112E-03	5.965E-03	5.716E-03	5.333E-03	4.806E-03	4.156E-03	3.429E-03	2.687E-03
MASS RATE (mg/day)	2.7E+1	2.9E+1	2.9E+1	3.0E+1	3.0E+1	2.9E+1	2.8E+1	2.5E+1	2.2E+1	1.8E+1	1.5E+1

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	5.796E-02	(Kg)
- Plume Mass If Biotransformation/Production	5.812E-02	(Kg)
Mass Removed	-1.585E-04	(Kg)
% Biotransformed =	-0.3 %	
% Change in Mass Rate =	46.9 %	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	6.747E-01	MGal
Flow Rate of Water Through Source Area	1.191E-03	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

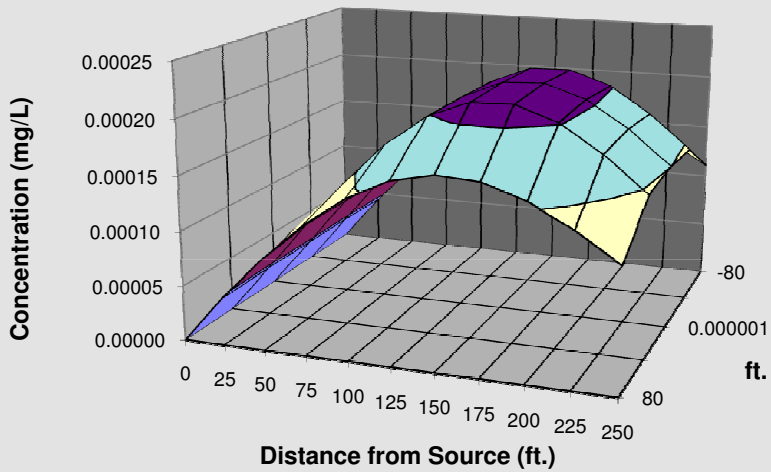
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	25	50	75	100	125	150	175	200	225	250
80	1.759E-11	4.380E-05	8.300E-05	1.167E-04	1.437E-04	1.622E-04	1.706E-04	1.682E-04	1.558E-04	1.355E-04	1.107E-04
40	1.759E-11	4.482E-05	9.008E-05	1.332E-04	1.706E-04	1.985E-04	2.137E-04	2.145E-04	2.015E-04	1.772E-04	1.460E-04
0	1.759E-11	4.482E-05	9.009E-05	1.332E-04	1.708E-04	1.992E-04	2.152E-04	2.170E-04	2.049E-04	1.812E-04	1.501E-04
-40	1.759E-11	4.482E-05	9.008E-05	1.332E-04	1.706E-04	1.985E-04	2.137E-04	2.145E-04	2.015E-04	1.772E-04	1.460E-04
-80	1.759E-11	4.380E-05	8.300E-05	1.167E-04	1.437E-04	1.622E-04	1.706E-04	1.682E-04	1.558E-04	1.355E-04	1.107E-04
MASS RATE (mg/day)	7.9E-8	2.0E-1	3.9E-1	5.7E-1	7.2E-1	8.3E-1	8.9E-1	8.9E-1	8.3E-1	7.3E-1	6.0E-1

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	0.000E+00	(Kg)
- Plume Mass If Biotransformation/Production	1.436E-03	(Kg)
Mass Removed	-1.436E-03	(Kg)

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

% Biotransformed =

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	1.191E-03	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

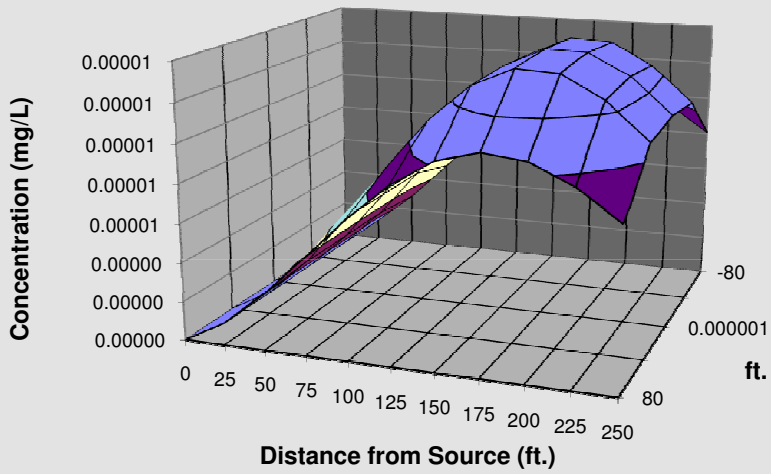
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	25	50	75	100	125	150	175	200	225	250
80	2.876E-13	1.130E-06	2.856E-06	4.914E-06	7.027E-06	8.884E-06	1.020E-05	1.077E-05	1.053E-05	9.567E-06	8.092E-06
40	2.876E-13	1.156E-06	3.100E-06	5.609E-06	8.341E-06	1.087E-05	1.277E-05	1.373E-05	1.362E-05	1.251E-05	1.067E-05
0	2.876E-13	1.156E-06	3.100E-06	5.611E-06	8.352E-06	1.091E-05	1.286E-05	1.389E-05	1.384E-05	1.279E-05	1.097E-05
-40	2.876E-13	1.156E-06	3.100E-06	5.609E-06	8.341E-06	1.087E-05	1.277E-05	1.373E-05	1.362E-05	1.251E-05	1.067E-05
-80	2.876E-13	1.130E-06	2.856E-06	4.914E-06	7.027E-06	8.884E-06	1.020E-05	1.077E-05	1.053E-05	9.567E-06	8.092E-06
MASS RATE (mg/day)	1.3E-9	5.2E-3	1.4E-2	2.4E-2	3.5E-2	4.5E-2	5.3E-2	5.7E-2	5.6E-2	5.1E-2	4.4E-2

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	0.000E+00	(Kg)
- Plume Mass If Biotransformation/Production	8.305E-05	(Kg)
Mass Removed	-8.305E-05	(Kg)

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

% Biotransformed =

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	1.191E-03	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

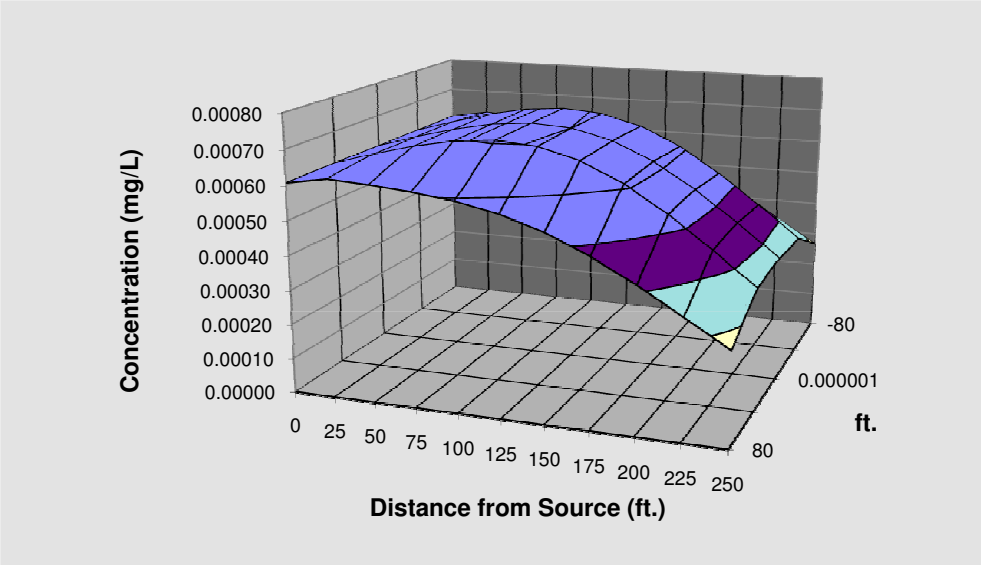
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	25	50	75	100	125	150	175	200	225	250
80	6.065E-04	6.267E-04	6.197E-04	6.099E-04	5.949E-04	5.700E-04	5.317E-04	4.791E-04	4.143E-04	3.418E-04	2.678E-04
40	6.065E-04	6.413E-04	6.726E-04	6.961E-04	7.061E-04	6.973E-04	6.657E-04	6.108E-04	5.357E-04	4.469E-04	3.532E-04
0	6.065E-04	6.413E-04	6.726E-04	6.963E-04	7.071E-04	6.998E-04	6.705E-04	6.180E-04	5.447E-04	4.569E-04	3.631E-04
-40	6.065E-04	6.413E-04	6.726E-04	6.961E-04	7.061E-04	6.973E-04	6.657E-04	6.108E-04	5.357E-04	4.469E-04	3.532E-04
-80	6.065E-04	6.267E-04	6.197E-04	6.099E-04	5.949E-04	5.700E-04	5.317E-04	4.791E-04	4.143E-04	3.418E-04	2.678E-04
MASS RATE (mg/day)	2.7E+0	2.9E+0	2.9E+0	3.0E+0	3.0E+0	2.9E+0	2.8E+0	2.5E+0	2.2E+0	1.8E+0	1.4E+0

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	5.796E-03	(Kg)
- Plume Mass If Biotransformation/Production	5.798E-03	(Kg)
Mass Removed	-1.779E-06	(Kg)
% Biotransformed =	**-0.0 %**	
% Change in Mass Rate =	**47.1 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	1.191E-03	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

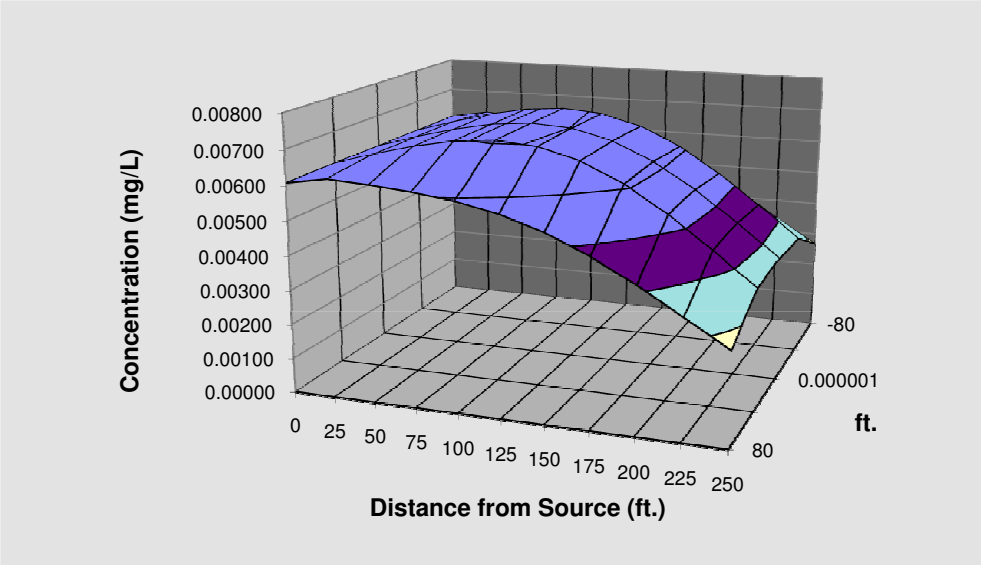
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓	Distance from Source (ft) 0	25	50	75	100	125	150	175	200	225	250
80	6.065E-03	6.267E-03	6.197E-03	6.098E-03	5.948E-03	5.698E-03	5.315E-03	4.789E-03	4.140E-03	3.416E-03	2.676E-03
40	6.065E-03	6.413E-03	6.726E-03	6.960E-03	7.060E-03	6.971E-03	6.655E-03	6.105E-03	5.354E-03	4.466E-03	3.529E-03
0	6.065E-03	6.413E-03	6.726E-03	6.962E-03	7.069E-03	6.996E-03	6.702E-03	6.177E-03	5.444E-03	4.566E-03	3.628E-03
-40	6.065E-03	6.413E-03	6.726E-03	6.960E-03	7.060E-03	6.971E-03	6.655E-03	6.105E-03	5.354E-03	4.466E-03	3.529E-03
-80	6.065E-03	6.267E-03	6.197E-03	6.098E-03	5.948E-03	5.698E-03	5.315E-03	4.789E-03	4.140E-03	3.416E-03	2.676E-03
MASS RATE (mg/day)	2.7E+1	2.9E+1	2.9E+1	3.0E+1	3.0E+1	2.9E+1	2.8E+1	2.5E+1	2.2E+1	1.8E+1	1.4E+1

Show No Degradation

Show Biotransformation

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



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	5.796E-02	(Kg)
- Plume Mass If Biotransformation/Production	5.508E-02	(Kg)
Mass Removed	2.879E-03	(Kg)
% Biotransformed =	+5.0%	
% Change in Mass Rate =	47.1 %	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	6.747E-01	MGal
Flow Rate of Water Through Source Area	1.191E-03	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

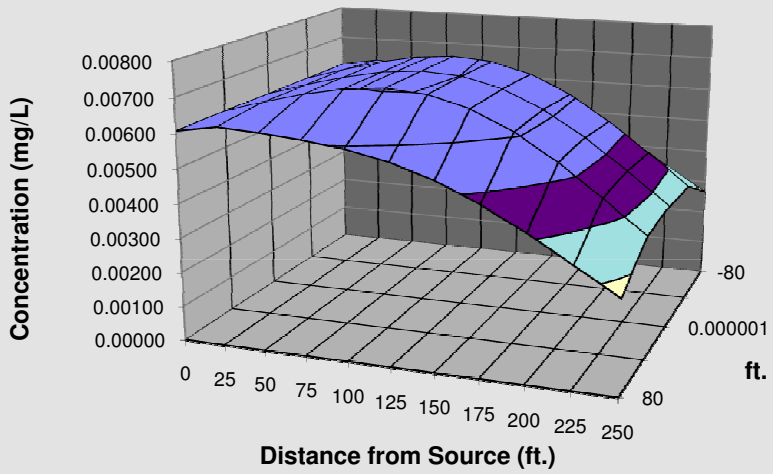
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	25	50	75	100	125	150	175	200	225	250
80	6.065E-03	6.267E-03	6.197E-03	6.098E-03	5.948E-03	5.698E-03	5.315E-03	4.789E-03	4.140E-03	3.416E-03	2.676E-03
40	6.065E-03	6.413E-03	6.726E-03	6.960E-03	7.060E-03	6.971E-03	6.655E-03	6.105E-03	5.354E-03	4.466E-03	3.529E-03
0	6.065E-03	6.413E-03	6.726E-03	6.962E-03	7.069E-03	6.996E-03	6.702E-03	6.177E-03	5.444E-03	4.566E-03	3.628E-03
-40	6.065E-03	6.413E-03	6.726E-03	6.960E-03	7.060E-03	6.971E-03	6.655E-03	6.105E-03	5.354E-03	4.466E-03	3.529E-03
-80	6.065E-03	6.267E-03	6.197E-03	6.098E-03	5.948E-03	5.698E-03	5.315E-03	4.789E-03	4.140E-03	3.416E-03	2.676E-03
MASS RATE (mg/day)	2.7E+1	2.9E+1	2.9E+1	3.0E+1	3.0E+1	2.9E+1	2.8E+1	2.5E+1	2.2E+1	1.8E+1	1.4E+1

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	5.796E-02	(Kg)
- Plume Mass If Biotransformation/Production	5.812E-02	(Kg)
Mass Removed	-1.585E-04	(Kg)
% Biotransformed =	-0.3 %	
% Change in Mass Rate =	47.1 %	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	6.747E-01	MGal
Flow Rate of Water Through Source Area	1.191E-03	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

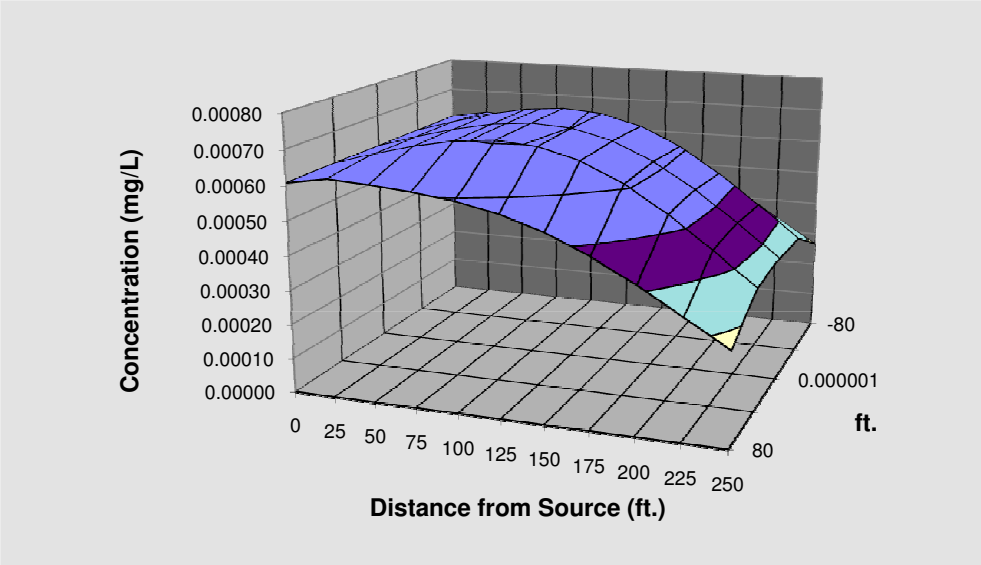
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	25	50	75	100	125	150	175	200	225	250
80	6.065E-04	6.267E-04	6.197E-04	6.098E-04	5.948E-04	5.698E-04	5.315E-04	4.789E-04	4.140E-04	3.416E-04	2.676E-04
40	6.065E-04	6.413E-04	6.726E-04	6.960E-04	7.060E-04	6.971E-04	6.655E-04	6.105E-04	5.354E-04	4.466E-04	3.529E-04
0	6.065E-04	6.413E-04	6.726E-04	6.962E-04	7.069E-04	6.996E-04	6.702E-04	6.177E-04	5.444E-04	4.566E-04	3.628E-04
-40	6.065E-04	6.413E-04	6.726E-04	6.960E-04	7.060E-04	6.971E-04	6.655E-04	6.105E-04	5.354E-04	4.466E-04	3.529E-04
-80	6.065E-04	6.267E-04	6.197E-04	6.098E-04	5.948E-04	5.698E-04	5.315E-04	4.789E-04	4.140E-04	3.416E-04	2.676E-04
MASS RATE (mg/day)	2.7E+0	2.9E+0	2.9E+0	3.0E+0	3.0E+0	2.9E+0	2.8E+0	2.5E+0	2.2E+0	1.8E+0	1.4E+0

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	5.796E-03	(Kg)
- Plume Mass If Biotransformation/Production	5.798E-03	(Kg)
Mass Removed	-1.779E-06	(Kg)
% Biotransformed =	-0.0 %	
% Change in Mass Rate =	47.1 %	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	1.191E-03	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

Alexander County
MW-26 AOC
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	82.8	(ft/yr)
or			
Hydraulic Conductivity	K	6.7E-05	(cm/sec)
Hydraulic Gradient	i	0.12	(ft/ft)
Effective Porosity	n	0.1	(-)

2. DISPERSION

Alpha x*	40	(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)	8.24	(-)
TCE	130	(L/kg)	3.21	(-)
DCE	125	(L/kg)	3.13	(-)
VC	30	(L/kg)	1.50	(-)
ETH	0	(L/kg)	1.00	(-)
Common R (used in model)* =			**3.13**	

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*	150	(ft)
Modeled Area Length*	400	(ft)
Zone 1 Length*	400	(ft)
Zone 2 Length*	0	(ft)

L, W

Zone 2= L - Zone 1

6. SOURCE DATA

TYPE: Decaying Single Planar

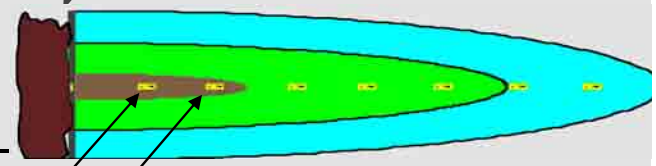
Source Options

Source Thickness in Sat. Zone* 15 (ft)

Y1
Width* (ft) 150

Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	0.00	0.1
TCE	0.01	0.1
DCE	0.001	0.1
VC	0.010	0.1
ETH	0	0.1

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	0.0	0.0	0.0							
TCE Conc. (mg/L)	0.0012	0.00045	0.0	0.0							
DCE Conc. (mg/L)	0.0	0.0	0.00065	0.0							
VC Conc. (mg/L)	0.00087	0.00075	0.0	0.0							
ETH Conc. (mg/L)	0.0	0.0	0.0	0.0							
Distance from Source (ft)	0	110	250	385							
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

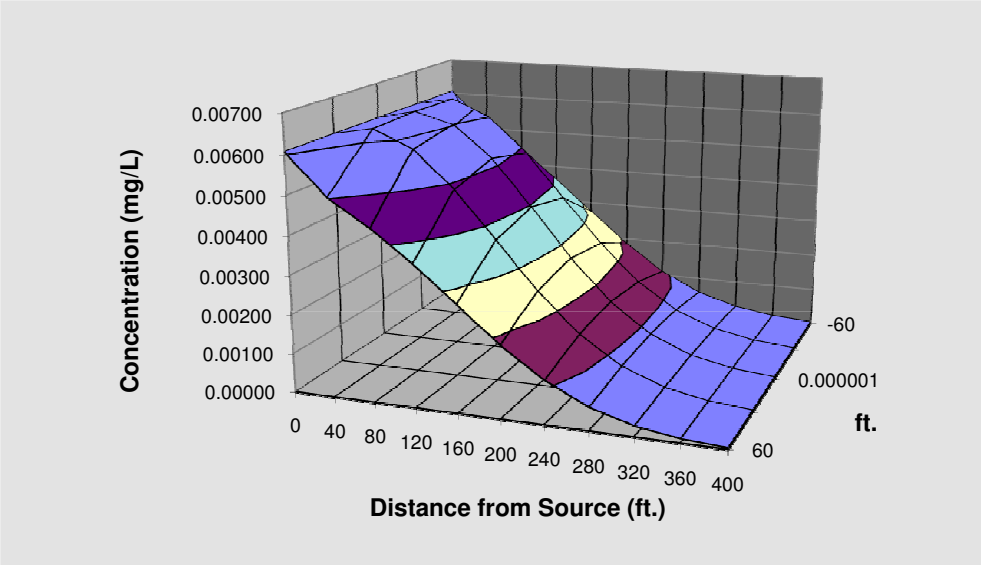
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-03	5.034E-03	4.370E-03	3.610E-03	2.725E-03	1.844E-03	1.106E-03	5.837E-04	2.697E-04	1.086E-04	3.807E-05
30	6.065E-03	6.262E-03	5.814E-03	4.877E-03	3.678E-03	2.470E-03	1.467E-03	7.655E-04	3.495E-04	1.392E-04	4.823E-05
0	6.065E-03	6.300E-03	6.023E-03	5.182E-03	3.965E-03	2.681E-03	1.595E-03	8.321E-04	3.793E-04	1.507E-04	5.206E-05
-30	6.065E-03	6.262E-03	5.814E-03	4.877E-03	3.678E-03	2.470E-03	1.467E-03	7.655E-04	3.495E-04	1.392E-04	4.823E-05
-60	6.065E-03	5.034E-03	4.370E-03	3.610E-03	2.725E-03	1.844E-03	1.106E-03	5.837E-04	2.697E-04	1.086E-04	3.807E-05
MASS RATE (mg/day)	8.8E+0	8.3E+0	7.6E+0	6.4E+0	4.8E+0	3.3E+0	1.9E+0	1.0E+0	4.7E-1	1.9E-1	6.5E-2

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	2.202E-02	(Kg)
- Plume Mass If Biotransformation/Production	2.124E-02	(Kg)
Mass Removed	7.790E-04	(Kg)

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

% Biotransformed = +3.5%

% Change in Mass Rate = 99.3 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	1.885E-01	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

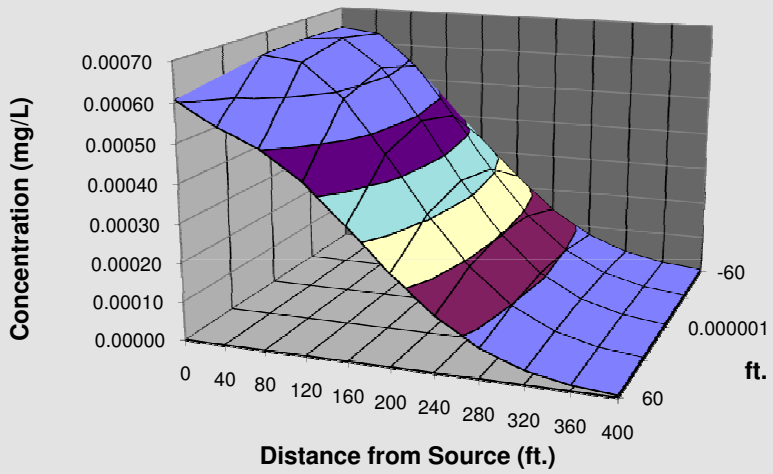
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-04	5.477E-04	5.037E-04	4.329E-04	3.359E-04	2.318E-04	1.411E-04	7.525E-05	3.504E-05	1.420E-05	5.001E-06
30	6.065E-04	6.813E-04	6.700E-04	5.848E-04	4.534E-04	3.107E-04	1.871E-04	9.868E-05	4.541E-05	1.820E-05	6.335E-06
0	6.065E-04	6.853E-04	6.942E-04	6.214E-04	4.888E-04	3.372E-04	2.035E-04	1.073E-04	4.928E-05	1.970E-05	6.838E-06
-30	6.065E-04	6.813E-04	6.700E-04	5.848E-04	4.534E-04	3.107E-04	1.871E-04	9.868E-05	4.541E-05	1.820E-05	6.335E-06
-60	6.065E-04	5.477E-04	5.037E-04	4.329E-04	3.359E-04	2.318E-04	1.411E-04	7.525E-05	3.504E-05	1.420E-05	5.001E-06
MASS RATE (mg/day)	8.8E-1	9.1E-1	8.8E-1	7.7E-1	6.0E-1	4.1E-1	2.5E-1	1.3E-1	6.1E-2	2.4E-2	8.5E-3

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	2.202E-03	(Kg)
- Plume Mass If Biotransformation/Production	2.465E-03	(Kg)
Mass Removed	-2.631E-04	(Kg)
% Biotransformed =	**-11.9 %**	
% Change in Mass Rate =	**99.0 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

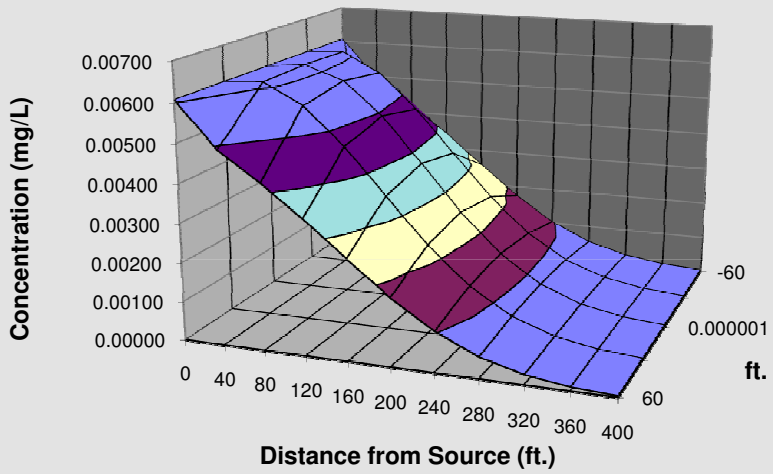
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-03	4.927E-03	4.208E-03	3.435E-03	2.570E-03	1.728E-03	1.032E-03	5.425E-04	2.499E-04	1.005E-04	3.515E-05
30	6.065E-03	6.128E-03	5.598E-03	4.640E-03	3.469E-03	2.315E-03	1.368E-03	7.114E-04	3.239E-04	1.287E-04	4.454E-05
0	6.065E-03	6.165E-03	5.800E-03	4.931E-03	3.739E-03	2.513E-03	1.488E-03	7.734E-04	3.515E-04	1.393E-04	4.807E-05
-30	6.065E-03	6.128E-03	5.598E-03	4.640E-03	3.469E-03	2.315E-03	1.368E-03	7.114E-04	3.239E-04	1.287E-04	4.454E-05
-60	6.065E-03	4.927E-03	4.208E-03	3.435E-03	2.570E-03	1.728E-03	1.032E-03	5.425E-04	2.499E-04	1.005E-04	3.515E-05
MASS RATE (mg/day)	8.8E+0	8.2E+0	7.3E+0	6.1E+0	4.6E+0	3.1E+0	1.8E+0	9.5E-1	4.3E-1	1.7E-1	6.0E-2

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	2.202E-02	*(Kg)*
- Plume Mass If Biotransformation/Production	2.041E-02	*(Kg)*
Mass Removed	1.611E-03	*(Kg)*

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

% Biotransformed = **+7.3%**

% Change in Mass Rate = **99.3 %** (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	1.481E-01	*MGal*
Flow Rate of Water Through Source Area	3.818E-04	*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

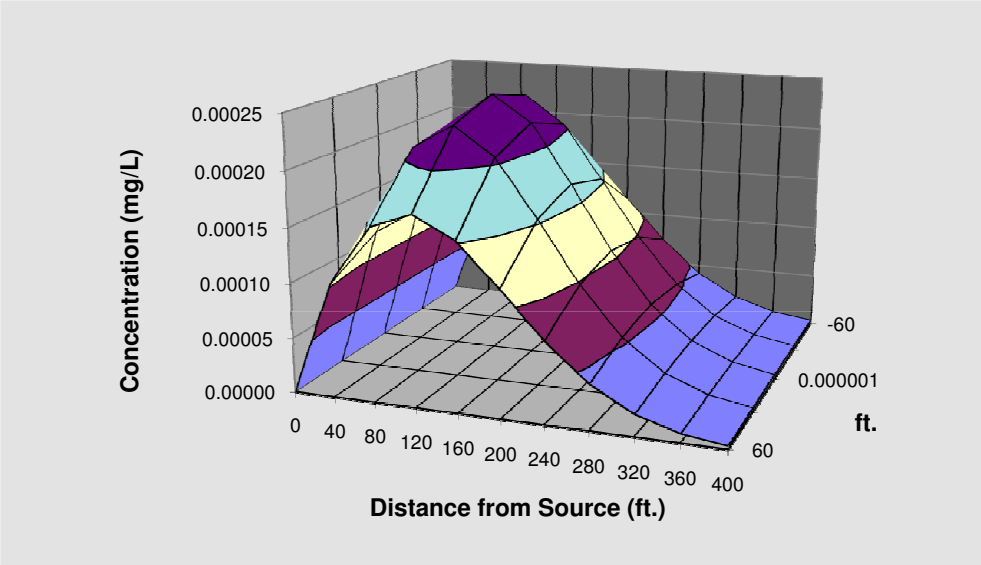
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	3.547E-11	1.035E-04	1.574E-04	1.714E-04	1.523E-04	1.145E-04	7.381E-05	4.100E-05	1.966E-05	8.146E-06	2.917E-06
30	3.547E-11	1.287E-04	2.094E-04	2.315E-04	2.055E-04	1.534E-04	9.790E-05	5.376E-05	2.548E-05	1.044E-05	3.695E-06
0	3.547E-11	1.295E-04	2.170E-04	2.460E-04	2.216E-04	1.665E-04	1.065E-04	5.844E-05	2.765E-05	1.130E-05	3.989E-06
-30	3.547E-11	1.287E-04	2.094E-04	2.315E-04	2.055E-04	1.534E-04	9.790E-05	5.376E-05	2.548E-05	1.044E-05	3.695E-06
-60	3.547E-11	1.035E-04	1.574E-04	1.714E-04	1.523E-04	1.145E-04	7.381E-05	4.100E-05	1.966E-05	8.146E-06	2.917E-06
MASS RATE (mg/day)	5.1E-8	1.7E-1	2.7E-1	3.0E-1	2.7E-1	2.0E-1	1.3E-1	7.2E-2	3.4E-2	1.4E-2	5.0E-3

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	0.000E+00	(Kg)
- Plume Mass If Biotransformation/Production	8.146E-04	(Kg)
Mass Removed	-8.146E-04	(Kg)

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

% Biotransformed =

% Change in Mass Rate = -9706310.7 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

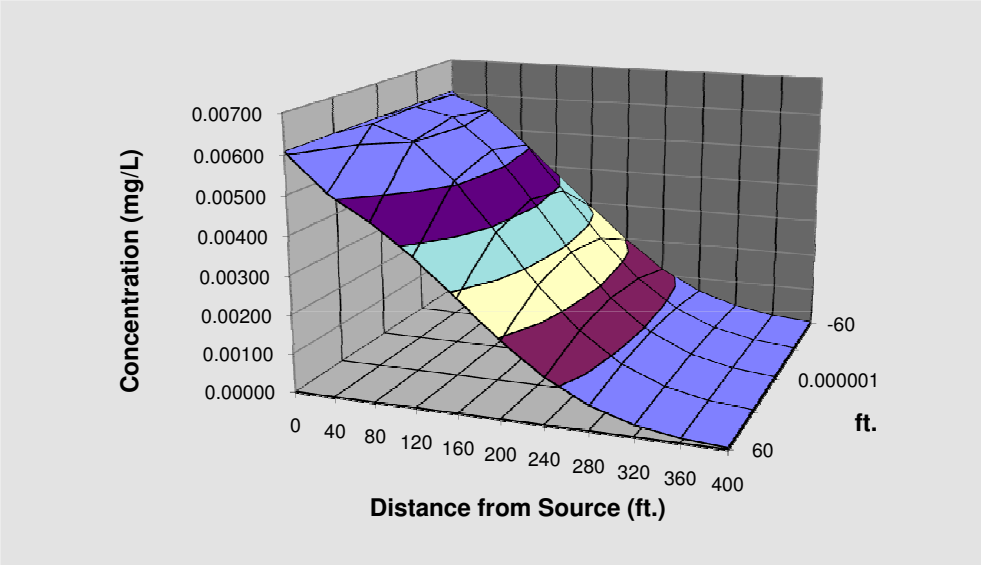
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-03	5.132E-03	4.520E-03	3.774E-03	2.870E-03	1.954E-03	1.177E-03	6.232E-04	2.886E-04	1.165E-04	4.089E-05
30	6.065E-03	6.384E-03	6.014E-03	5.098E-03	3.874E-03	2.618E-03	1.561E-03	8.173E-04	3.741E-04	1.493E-04	5.180E-05
0	6.065E-03	6.422E-03	6.230E-03	5.417E-03	4.177E-03	2.841E-03	1.698E-03	8.884E-04	4.059E-04	1.616E-04	5.592E-05
-30	6.065E-03	6.384E-03	6.014E-03	5.098E-03	3.874E-03	2.618E-03	1.561E-03	8.173E-04	3.741E-04	1.493E-04	5.180E-05
-60	6.065E-03	5.132E-03	4.520E-03	3.774E-03	2.870E-03	1.954E-03	1.177E-03	6.232E-04	2.886E-04	1.165E-04	4.089E-05
MASS RATE (mg/day)	8.8E+0	8.5E+0	7.9E+0	6.7E+0	5.1E+0	3.5E+0	2.1E+0	1.1E+0	5.0E-1	2.0E-1	7.0E-2

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	2.202E-02	(Kg)
- Plume Mass If Biotransformation/Production	2.124E-02	(Kg)
Mass Removed	7.790E-04	(Kg)
% Biotransformed =	**+3.5%**	
% Change in Mass Rate =	**99.2 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	2.154E-01	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

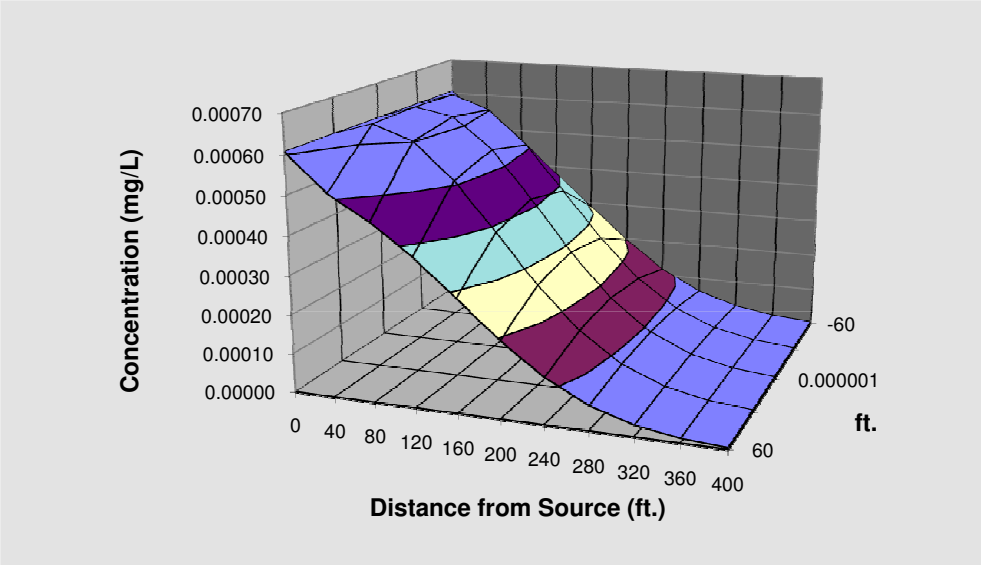
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-04	5.132E-04	4.520E-04	3.774E-04	2.870E-04	1.954E-04	1.177E-04	6.232E-05	2.886E-05	1.165E-05	4.089E-06
30	6.065E-04	6.384E-04	6.014E-04	5.098E-04	3.874E-04	2.618E-04	1.561E-04	8.173E-05	3.741E-05	1.493E-05	5.180E-06
0	6.065E-04	6.422E-04	6.230E-04	5.417E-04	4.177E-04	2.841E-04	1.698E-04	8.884E-05	4.059E-05	1.616E-05	5.592E-06
-30	6.065E-04	6.384E-04	6.014E-04	5.098E-04	3.874E-04	2.618E-04	1.561E-04	8.173E-05	3.741E-05	1.493E-05	5.180E-06
-60	6.065E-04	5.132E-04	4.520E-04	3.774E-04	2.870E-04	1.954E-04	1.177E-04	6.232E-05	2.886E-05	1.165E-05	4.089E-06
MASS RATE (mg/day)	8.8E-1	8.5E-1	7.9E-1	6.7E-1	5.1E-1	3.5E-1	2.1E-1	1.1E-1	5.0E-2	2.0E-2	7.0E-3

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.070 mg/L Displayed Model: No Degradation Displayed Compound: DCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	2.202E-03	(Kg)
- Plume Mass If Biotransformation/Production	2.465E-03	(Kg)
Mass Removed	-2.631E-04	(Kg)
% Biotransformed =	**-11.9 %**	
% Change in Mass Rate =	**99.2 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

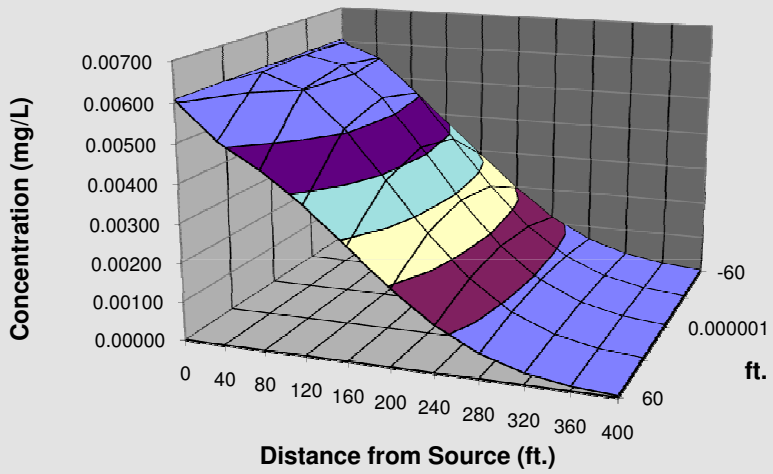
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-03	5.132E-03	4.520E-03	3.774E-03	2.870E-03	1.954E-03	1.177E-03	6.232E-04	2.886E-04	1.165E-04	4.089E-05
30	6.065E-03	6.384E-03	6.014E-03	5.098E-03	3.874E-03	2.618E-03	1.561E-03	8.173E-04	3.741E-04	1.493E-04	5.180E-05
0	6.065E-03	6.422E-03	6.230E-03	5.417E-03	4.177E-03	2.841E-03	1.698E-03	8.884E-04	4.059E-04	1.616E-04	5.592E-05
-30	6.065E-03	6.384E-03	6.014E-03	5.098E-03	3.874E-03	2.618E-03	1.561E-03	8.173E-04	3.741E-04	1.493E-04	5.180E-05
-60	6.065E-03	5.132E-03	4.520E-03	3.774E-03	2.870E-03	1.954E-03	1.177E-03	6.232E-04	2.886E-04	1.165E-04	4.089E-05
MASS RATE (mg/day)	8.8E+0	8.5E+0	7.9E+0	6.7E+0	5.1E+0	3.5E+0	2.1E+0	1.1E+0	5.0E-1	2.0E-1	7.0E-2

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	2.202E-02	(Kg)
- Plume Mass If Biotransformation/Production	2.041E-02	(Kg)
Mass Removed	1.611E-03	(Kg)
% Biotransformed =	**+7.3%**	
% Change in Mass Rate =	**99.2 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	2.154E-01	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Alexander County
MW-26 AOC
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	82.8	(ft/yr)
or			
Hydraulic Conductivity	K	6.7E-05	(cm/sec)
Hydraulic Gradient	i	0.12	(ft/ft)
Effective Porosity	n	0.1	(-)

2. DISPERSION

Alpha x*	40	(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)	8.24	(-)
TCE	130	(L/kg)	3.21	(-)
DCE	125	(L/kg)	3.13	(-)
VC	30	(L/kg)	1.50	(-)
ETH	0	(L/kg)	1.00	(-)
Common R (used in model)* =			**3.13**	

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*	150	(ft)
Modeled Area Length*	400	(ft)
Zone 1 Length*	400	(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* 15 (ft)

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

	Y1	
Width* (ft)	150	
Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	0.00	0.1
TCE	0.01	0.1
DCE	0.001	0.1
VC	0.010	0.1
ETH	0	0.1

View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	0.0	0.0	0.0	0.0							
TCE Conc. (mg/L)	0.0012	0.00045	0.0	0.0							
DCE Conc. (mg/L)	0.0	0.0	0.00065	0.0							
VC Conc. (mg/L)	0.00087	0.00075	0.0	0.0							
ETH Conc. (mg/L)	0.0	0.0	0.0	0.0							
Distance from Source (ft)	0	110	250	385							
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

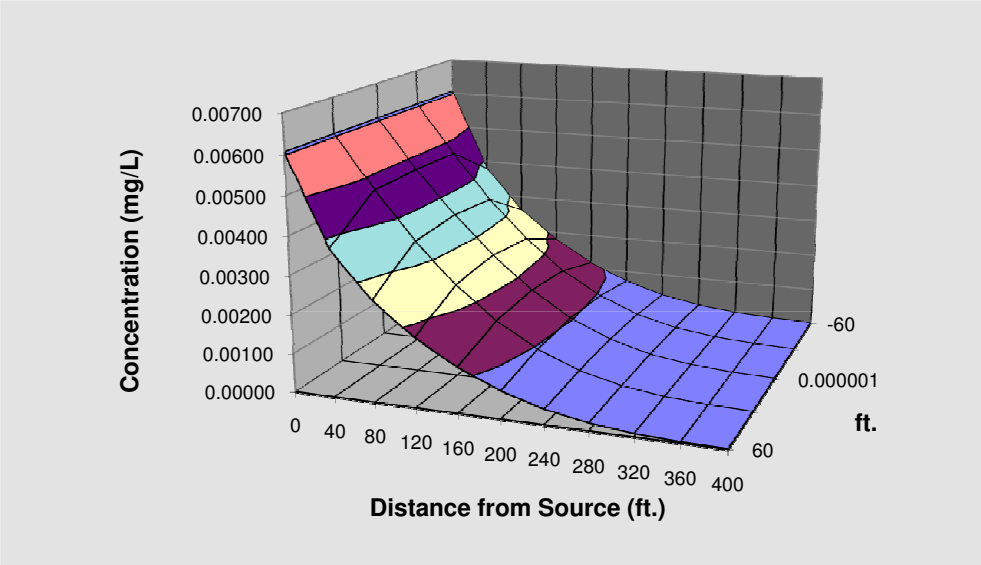
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-03	3.781E-03	2.596E-03	1.782E-03	1.167E-03	7.090E-04	3.922E-04	1.947E-04	8.581E-05	3.334E-05	1.136E-05
30	6.065E-03	4.703E-03	3.453E-03	2.407E-03	1.575E-03	9.501E-04	5.202E-04	2.553E-04	1.112E-04	4.271E-05	1.439E-05
0	6.065E-03	4.731E-03	3.577E-03	2.558E-03	1.698E-03	1.031E-03	5.658E-04	2.775E-04	1.207E-04	4.624E-05	1.553E-05
-30	6.065E-03	4.703E-03	3.453E-03	2.407E-03	1.575E-03	9.501E-04	5.202E-04	2.553E-04	1.112E-04	4.271E-05	1.439E-05
-60	6.065E-03	3.781E-03	2.596E-03	1.782E-03	1.167E-03	7.090E-04	3.922E-04	1.947E-04	8.581E-05	3.334E-05	1.136E-05
MASS RATE (mg/day)	8.8E+0	6.3E+0	4.5E+0	3.2E+0	2.1E+0	1.3E+0	6.9E-1	3.4E-1	1.5E-1	5.7E-2	1.9E-2

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	2.202E-02	(Kg)
- Plume Mass If Biotransformation/Production	1.263E-02	(Kg)
Mass Removed	9.390E-03	(Kg)

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

% Biotransformed = +42.6%

% Change in Mass Rate = 99.8 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	6.732E-02	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

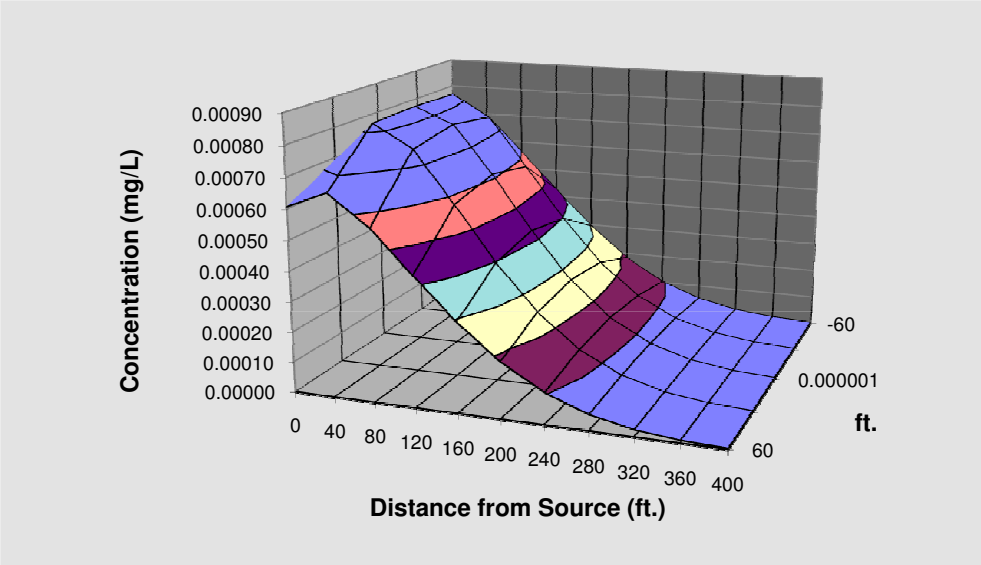
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-04	6.616E-04	5.620E-04	4.268E-04	2.945E-04	1.841E-04	1.035E-04	5.191E-05	2.302E-05	8.983E-06	3.068E-06
30	6.065E-04	8.230E-04	7.477E-04	5.766E-04	3.975E-04	2.468E-04	1.373E-04	6.807E-05	2.984E-05	1.151E-05	3.887E-06
0	6.065E-04	8.278E-04	7.746E-04	6.127E-04	4.285E-04	2.678E-04	1.494E-04	7.400E-05	3.238E-05	1.246E-05	4.196E-06
-30	6.065E-04	8.230E-04	7.477E-04	5.766E-04	3.975E-04	2.468E-04	1.373E-04	6.807E-05	2.984E-05	1.151E-05	3.887E-06
-60	6.065E-04	6.616E-04	5.620E-04	4.268E-04	2.945E-04	1.841E-04	1.035E-04	5.191E-05	2.302E-05	8.983E-06	3.068E-06
MASS RATE (mg/day)	8.8E-1	1.1E+0	9.8E-1	7.6E-1	5.2E-1	3.3E-1	1.8E-1	9.1E-2	4.0E-2	1.5E-2	5.2E-3

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	2.202E-03	(Kg)
- Plume Mass If Biotransformation/Production	2.455E-03	(Kg)
Mass Removed	-2.531E-04	(Kg)
% Biotransformed =	**-11.5 %**	
% Change in Mass Rate =	**99.4 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

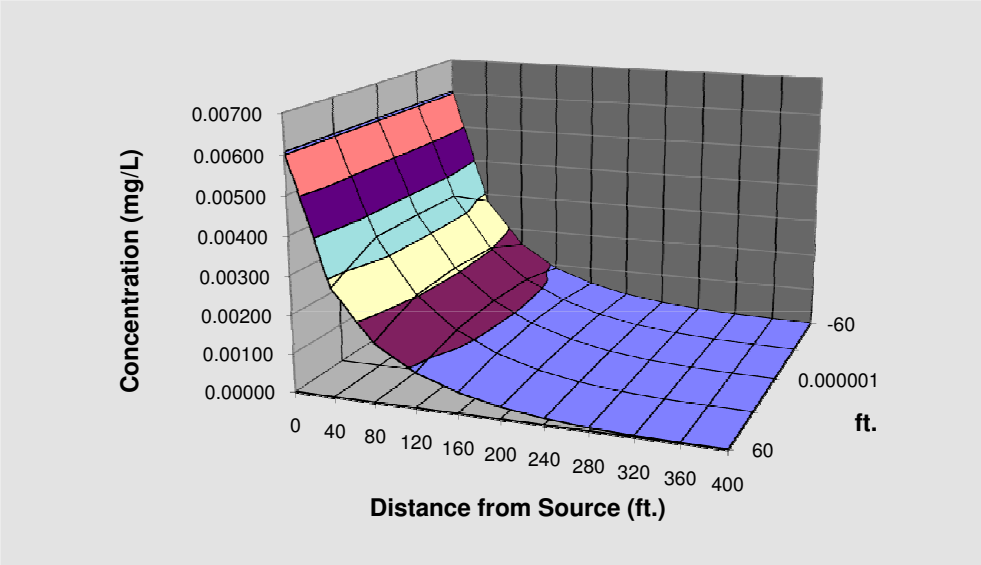
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-03	2.787E-03	1.526E-03	8.973E-04	5.311E-04	3.027E-04	1.608E-04	7.775E-05	3.369E-05	1.294E-05	4.371E-06
30	6.065E-03	3.467E-03	2.031E-03	1.212E-03	7.168E-04	4.056E-04	2.132E-04	1.020E-04	4.366E-05	1.658E-05	5.538E-06
0	6.065E-03	3.487E-03	2.104E-03	1.288E-03	7.728E-04	4.402E-04	2.319E-04	1.108E-04	4.738E-05	1.794E-05	5.978E-06
-30	6.065E-03	3.467E-03	2.031E-03	1.212E-03	7.168E-04	4.056E-04	2.132E-04	1.020E-04	4.366E-05	1.658E-05	5.538E-06
-60	6.065E-03	2.787E-03	1.526E-03	8.973E-04	5.311E-04	3.027E-04	1.608E-04	7.775E-05	3.369E-05	1.294E-05	4.371E-06
MASS RATE (mg/day)	8.8E+0	4.6E+0	2.7E+0	1.6E+0	9.4E-1	5.4E-1	2.8E-1	1.4E-1	5.8E-2	2.2E-2	7.5E-3

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	2.202E-02	(Kg)
- Plume Mass If Biotransformation/Production	8.399E-03	(Kg)
Mass Removed	1.362E-02	(Kg)
% Biotransformed =	**+61.9%**	
% Change in Mass Rate =	**99.9 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	6.732E-02	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

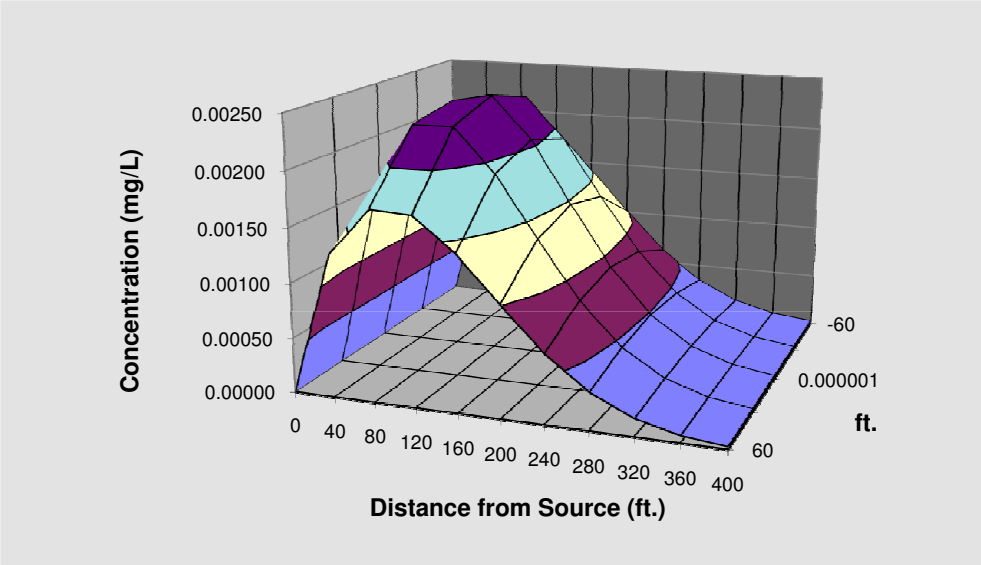
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	5.407E-10	1.300E-03	1.726E-03	1.705E-03	1.414E-03	1.012E-03	6.288E-04	3.399E-04	1.597E-04	6.513E-05	2.303E-05
30	5.407E-10	1.618E-03	2.296E-03	2.303E-03	1.909E-03	1.356E-03	8.341E-04	4.457E-04	2.070E-04	8.343E-05	2.918E-05
0	5.407E-10	1.627E-03	2.378E-03	2.447E-03	2.058E-03	1.471E-03	9.071E-04	4.846E-04	2.246E-04	9.031E-05	3.149E-05
-30	5.407E-10	1.618E-03	2.296E-03	2.303E-03	1.909E-03	1.356E-03	8.341E-04	4.457E-04	2.070E-04	8.343E-05	2.918E-05
-60	5.407E-10	1.300E-03	1.726E-03	1.705E-03	1.414E-03	1.012E-03	6.288E-04	3.399E-04	1.597E-04	6.513E-05	2.303E-05
MASS RATE (mg/day)	7.8E-7	2.2E+0	3.0E+0	3.0E+0	2.5E+0	1.8E+0	1.1E+0	5.9E-1	2.8E-1	1.1E-1	3.9E-2

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	0.000E+00	(Kg)
- Plume Mass If Biotransformation/Production	8.059E-03	(Kg)
Mass Removed	-8.059E-03	(Kg)

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

% Biotransformed =

% Change in Mass Rate = -5027203.3 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

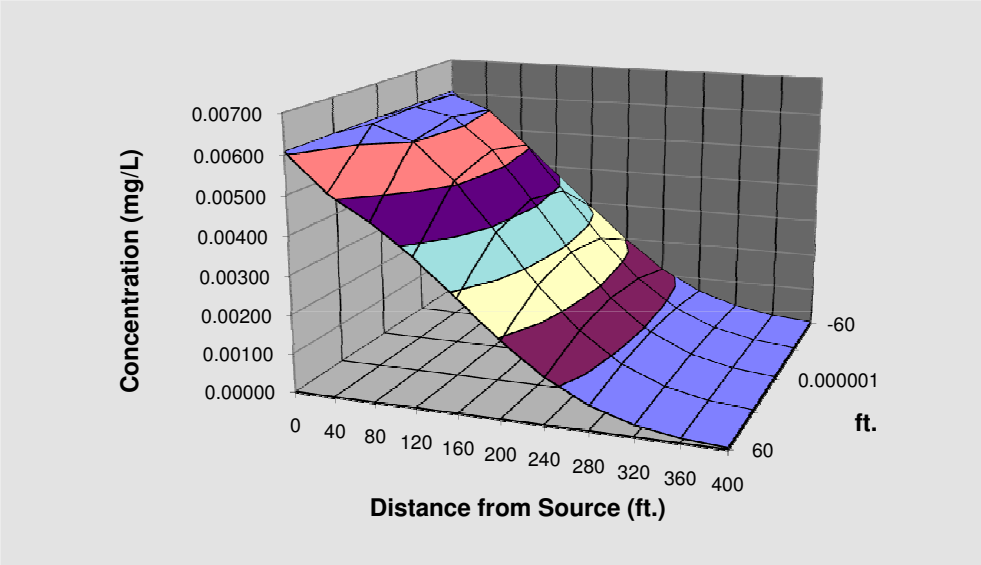
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-03	5.132E-03	4.520E-03	3.774E-03	2.870E-03	1.954E-03	1.177E-03	6.232E-04	2.886E-04	1.165E-04	4.089E-05
30	6.065E-03	6.384E-03	6.014E-03	5.098E-03	3.874E-03	2.618E-03	1.561E-03	8.173E-04	3.741E-04	1.493E-04	5.180E-05
0	6.065E-03	6.422E-03	6.230E-03	5.417E-03	4.177E-03	2.841E-03	1.698E-03	8.884E-04	4.059E-04	1.616E-04	5.592E-05
-30	6.065E-03	6.384E-03	6.014E-03	5.098E-03	3.874E-03	2.618E-03	1.561E-03	8.173E-04	3.741E-04	1.493E-04	5.180E-05
-60	6.065E-03	5.132E-03	4.520E-03	3.774E-03	2.870E-03	1.954E-03	1.177E-03	6.232E-04	2.886E-04	1.165E-04	4.089E-05
MASS RATE (mg/day)	8.8E+0	8.5E+0	7.9E+0	6.7E+0	5.1E+0	3.5E+0	2.1E+0	1.1E+0	5.0E-1	2.0E-1	7.0E-2

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	2.202E-02	(Kg)
- Plume Mass If Biotransformation/Production	1.263E-02	(Kg)
Mass Removed	9.390E-03	(Kg)
% Biotransformed =	**+42.6%**	
% Change in Mass Rate =	**99.2 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	2.154E-01	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

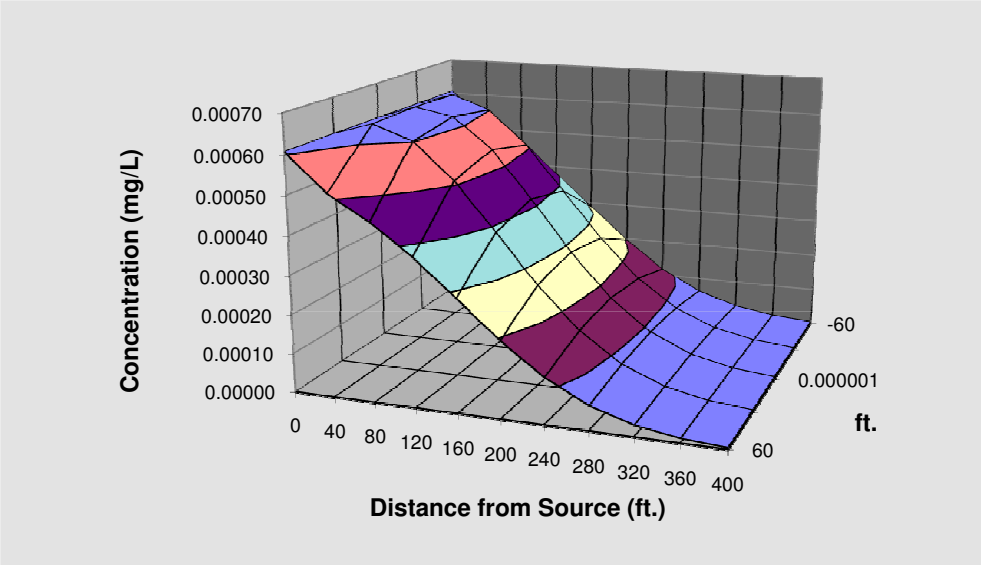
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-04	5.132E-04	4.520E-04	3.774E-04	2.870E-04	1.954E-04	1.177E-04	6.232E-05	2.886E-05	1.165E-05	4.089E-06
30	6.065E-04	6.384E-04	6.014E-04	5.098E-04	3.874E-04	2.618E-04	1.561E-04	8.173E-05	3.741E-05	1.493E-05	5.180E-06
0	6.065E-04	6.422E-04	6.230E-04	5.417E-04	4.177E-04	2.841E-04	1.698E-04	8.884E-05	4.059E-05	1.616E-05	5.592E-06
-30	6.065E-04	6.384E-04	6.014E-04	5.098E-04	3.874E-04	2.618E-04	1.561E-04	8.173E-05	3.741E-05	1.493E-05	5.180E-06
-60	6.065E-04	5.132E-04	4.520E-04	3.774E-04	2.870E-04	1.954E-04	1.177E-04	6.232E-05	2.886E-05	1.165E-05	4.089E-06
MASS RATE (mg/day)	8.8E-1	8.5E-1	7.9E-1	6.7E-1	5.1E-1	3.5E-1	2.1E-1	1.1E-1	5.0E-2	2.0E-2	7.0E-3

Show No Degradation

Show Biotransformation

Time: 5 yr Target Level: 0.070 mg/L Displayed Model: No Degradation Displayed Compound: DCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	2.202E-03	(Kg)
- Plume Mass If Biotransformation/Production	2.455E-03	(Kg)
Mass Removed	-2.531E-04	(Kg)
% Biotransformed =	**-11.5 %**	
% Change in Mass Rate =	**99.2 %**	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	0.000E+00	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

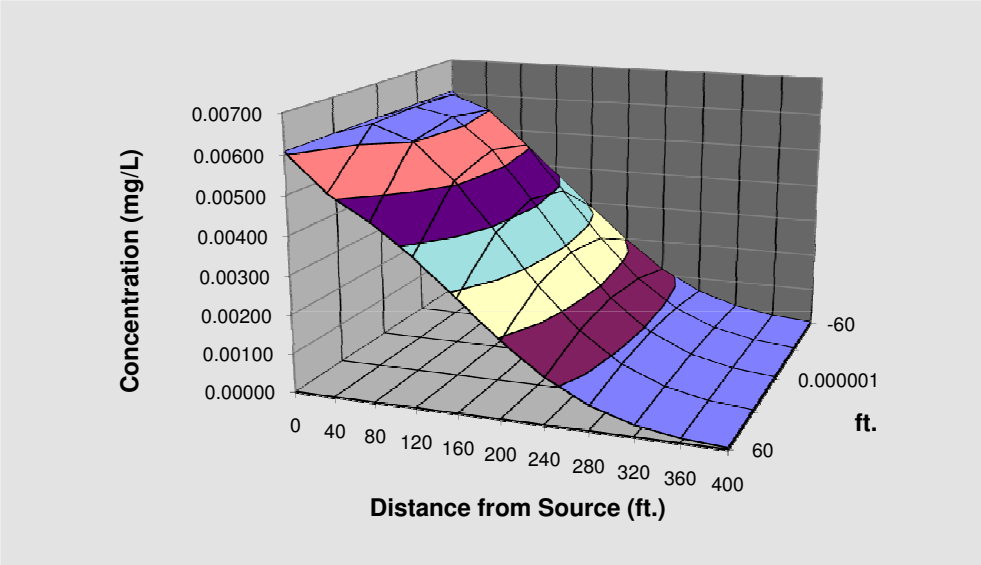
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft)	0	40	80	120	160	200	240	280	320	360	400
60	6.065E-03	5.132E-03	4.520E-03	3.774E-03	2.870E-03	1.954E-03	1.177E-03	6.232E-04	2.886E-04	1.165E-04	4.089E-05
30	6.065E-03	6.384E-03	6.014E-03	5.098E-03	3.874E-03	2.618E-03	1.561E-03	8.173E-04	3.741E-04	1.493E-04	5.180E-05
0	6.065E-03	6.422E-03	6.230E-03	5.417E-03	4.177E-03	2.841E-03	1.698E-03	8.884E-04	4.059E-04	1.616E-04	5.592E-05
-30	6.065E-03	6.384E-03	6.014E-03	5.098E-03	3.874E-03	2.618E-03	1.561E-03	8.173E-04	3.741E-04	1.493E-04	5.180E-05
-60	6.065E-03	5.132E-03	4.520E-03	3.774E-03	2.870E-03	1.954E-03	1.177E-03	6.232E-04	2.886E-04	1.165E-04	4.089E-05
MASS RATE (mg/day)	8.8E+0	8.5E+0	7.9E+0	6.7E+0	5.1E+0	3.5E+0	2.1E+0	1.1E+0	5.0E-1	2.0E-1	7.0E-2

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	2.202E-02	(Kg)
- Plume Mass If Biotransformation/Production	8.399E-03	(Kg)
Mass Removed	1.362E-02	(Kg)
% Biotransformed =	+61.9%	
% Change in Mass Rate =	99.2 %	(source to edge)

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

See acre-ft

Current Volume of Ground Water in Plume	2.154E-01	MGal
Flow Rate of Water Through Source Area	3.818E-04	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

Appendix B
Laboratory Analysis Reports
Chains of Custody

Pace Analytical Services, Inc.
205 East Meadow Road - Suite A
Eden, NC 27288
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Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

August 23, 2011

Mr. Jonathan Pfohl
Municipal Engineering Services
PO Box 97
Garner, NC 27529

RE: Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Dear Mr. Pfohl:
Enclosed are the analytical results for sample(s) received by the laboratory between June 30, 2011 and July 05, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards, where applicable, unless otherwise narrated in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

Report re-issued August 23, 2011 to include Appendix 1 VOCs for sample MW-11; per client request.

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

Sincerely,

Kevin Godwin

kevin.godwin@pacelabs.com
Project Manager

Enclosures

cc: Ms. Maggie German, Municipal Engineering Services

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CERTIFICATIONS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Arizona Certification #: AZ0735
Colorado Certification: FL NELAC Reciprocity
Connecticut Certification #: PH 0216
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: LA090012
Louisiana Environmental Certificate #: 05007
Maine Certification #: FL1264
Massachusetts Certification #: M-FL1264
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Montana Certification #: Cert 0074
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New Jersey Certification #: FL765
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
Pennsylvania Certification #: 68-547
Puerto Rico Certification #: FL01264
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
Virginia Certification #: 00432
Wyoming Certification: FL NELAC Reciprocity

Charlotte Certification IDs

9800 Kincey Ave. Ste 100, Huntersville, NC 28078
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Certification #: 99006001
South Carolina Drinking Water Cert. #: 99006003
Virginia Drinking Water Certification #: 00213
Connecticut Certification #: PH-0104
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Louisiana DHH Drinking Water # LA 100031
West Virginia Certification #: 357
Virginia/VELAP Certification #: 460144

Asheville Certification IDs

2225 Riverside Dr., Asheville, NC 28804
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
North Carolina Bioassay Certification #: 9
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia Certification #: 00072
West Virginia Certification #: 356
Virgina/VELAP Certification #: 460147

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SAMPLE SUMMARY

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Lab ID	Sample ID	Matrix	Date Collected	Date Received
9297319001	**MW-31**	Water	06/29/11 14:35	06/30/11 11:45
9297319002	**MW-11**	Water	06/30/11 17:30	07/01/11 14:10
9297319003	**MW-26**	Water	06/30/11 16:30	07/01/11 14:10
9297319004	**MW-27**	Water	06/30/11 15:35	07/01/11 14:10
9297319005	**MW-26**	Water	06/30/11 16:30	07/05/11 12:30
9297319006	**MW-27**	Water	06/30/11 15:35	07/05/11 12:30

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SAMPLE ANALYTE COUNT

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
9297319001	**MW-31**	EPA 6010	JMW, SHB	16	PASI-A
		EPA 7470	JMW	1	PASI-A
		EPA 8260	MCK	52	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 4500-S2D	AES	1	PASI-A
		SM 5210B	SDH	1	PASI-A
		EPA 300.0	EWS	1	PASI-A
		EPA 353.2	DMN	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
		SM 5220D	SDH	1	PASI-A
		SM 5310B	EWS	1	PASI-A
9297319002	**MW-11**	EPA 6010	SHB	16	PASI-A
		EPA 7470	JMW	1	PASI-A
		EPA 8260	MCK	55	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 4500-S2D	AES	1	PASI-A
		SM 5210B	SAJ	1	PASI-A
		EPA 300.0	EWS	1	PASI-A
		EPA 353.2	DMN	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
		SM 5220D	SDH	1	PASI-A
		SM 5310B	EWS	1	PASI-A
9297319003	**MW-26**	EPA 8260	MCK	52	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 4500-S2D	AES	1	PASI-A
		SM 5210B	SAJ	1	PASI-A
		EPA 300.0	EWS	1	PASI-A
		EPA 353.2	DMN	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
		SM 5220D	SDH	1	PASI-A
		SM 5310B	EWS	1	PASI-A
9297319004	**MW-27**	EPA 8151	LJM	2	PASI-O
		EPA 8260	MCK	52	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 5210B	SAJ	1	PASI-A
		EPA 300.0	EWS	1	PASI-A
		EPA 353.2	DMN	1	PASI-A

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SAMPLE ANALYTE COUNT

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 4500-Cl-E	JDA	1	PASI-A
		SM 5310B	EWS	1	PASI-A
9297319005	**MW-26**	EPA 6010	SHB	16	PASI-A
		EPA 7470	JMW	1	PASI-A
9297319006	**MW-27**	EPA 6010	SHB	15	PASI-A
		EPA 7470	JMW	1	PASI-A

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-31 **Lab ID: 9297319001** Collected: 06/29/11 14:35 Received: 06/30/11 11:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	07/09/11 12:15	07/13/11 18:59	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	07/09/11 12:15	07/14/11 15:32	7440-38-2	
Barium	**97.9J**	ug/L	100	5.0	1	07/09/11 12:15	07/13/11 18:59	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	07/09/11 12:15	07/13/11 18:59	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	07/09/11 12:15	07/13/11 18:59	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	07/09/11 12:15	07/13/11 18:59	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	07/09/11 12:15	07/13/11 18:59	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	07/09/11 12:15	07/13/11 18:59	7440-50-8	
Iron	**1790**	ug/L	300	50.0	1	07/09/11 12:15	07/13/11 18:59	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	07/09/11 12:15	07/13/11 18:59	7439-92-1	
Nickel	ND	ug/L	50.0	5.0	1	07/09/11 12:15	07/13/11 18:59	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	07/09/11 12:15	07/13/11 18:59	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	07/09/11 12:15	07/13/11 18:59	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	07/09/11 12:15	07/13/11 18:59	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	07/09/11 12:15	07/13/11 18:59	7440-62-2	
Zinc	**12.3**	ug/L	10.0	10.0	1	07/09/11 12:15	07/13/11 18:59	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	07/11/11 14:15	07/12/11 13:04	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		07/01/11 23:45	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		07/01/11 23:45	107-13-1	
Benzene	**0.30J**	ug/L	1.0	0.25	1		07/01/11 23:45	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		07/01/11 23:45	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/01/11 23:45	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		07/01/11 23:45	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		07/01/11 23:45	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		07/01/11 23:45	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		07/01/11 23:45	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		07/01/11 23:45	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		07/01/11 23:45	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		07/01/11 23:45	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		07/01/11 23:45	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		07/01/11 23:45	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		07/01/11 23:45	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		07/01/11 23:45	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		07/01/11 23:45	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		07/01/11 23:45	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		07/01/11 23:45	95-50-1	
1,4-Dichlorobenzene	**0.89J**	ug/L	1.0	0.33	1		07/01/11 23:45	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		07/01/11 23:45	110-57-6	
1,1-Dichloroethane	**0.66J**	ug/L	5.0	0.32	1		07/01/11 23:45	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		07/01/11 23:45	107-06-2	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		07/01/11 23:45	75-35-4	
cis-1,2-Dichloroethene	**3.0J**	ug/L	5.0	0.19	1		07/01/11 23:45	156-59-2	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-31 **Lab ID: 9297319001** Collected: 06/29/11 14:35 Received: 06/30/11 11:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		07/01/11 23:45	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		07/01/11 23:45	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.28	1		07/01/11 23:45	142-28-9	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		07/01/11 23:45	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		07/01/11 23:45	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		07/01/11 23:45	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		07/01/11 23:45	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		07/01/11 23:45	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		07/01/11 23:45	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		07/01/11 23:45	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		07/01/11 23:45	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		07/01/11 23:45	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		07/01/11 23:45	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		07/01/11 23:45	127-18-4	
Toluene	ND	ug/L	1.0	0.26	1		07/01/11 23:45	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		07/01/11 23:45	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		07/01/11 23:45	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		07/01/11 23:45	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		07/01/11 23:45	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		07/01/11 23:45	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		07/01/11 23:45	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		07/01/11 23:45	75-01-4	
Xylene (Total)	ND	ug/L	5.0	0.66	1		07/01/11 23:45	1330-20-7	
4-Bromofluorobenzene (S)	93	%	70-130		1		07/01/11 23:45	460-00-4	
Dibromofluoromethane (S)	113	%	70-130		1		07/01/11 23:45	1868-53-7	
1,2-Dichloroethane-d4 (S)	110	%	70-130		1		07/01/11 23:45	17060-07-0	
Toluene-d8 (S)	97	%	70-130		1		07/01/11 23:45	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**36600**	ug/L	5000	5000	1		07/12/11 14:00		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D								
Sulfide	ND	ug/L	1000	100	1		07/06/11 16:30	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	ug/L	2000	2000	1	07/01/11 11:44	07/06/11 09:07		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**1640J**	ug/L	250000		1		07/13/11 22:23	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	**474J**	ug/L	10000	200	1		06/30/11 21:58		
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	**10100**	ug/L	5000	5000	1		07/15/11 14:09	16887-00-6	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-31 **Lab ID: 9297319001** Collected: 06/29/11 14:35 Received: 06/30/11 11:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	ND	ug/L	25000	25000	1		07/18/11 13:57		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	**8850**	ug/L	1000	1000	1		07/01/11 20:31	7440-44-0	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-11 **Lab ID: 9297319002** Collected: 06/30/11 17:30 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	07/18/11 10:15	07/18/11 23:46	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/18/11 23:46	7440-38-2	
Barium	**197**	ug/L	100	5.0	1	07/18/11 10:15	07/18/11 23:46	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	07/18/11 10:15	07/18/11 23:46	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	07/18/11 10:15	07/18/11 23:46	7440-43-9	
Chromium	**36.3**	ug/L	10.0	5.0	1	07/18/11 10:15	07/18/11 23:46	7440-47-3	
Cobalt	**127**	ug/L	10.0	5.0	1	07/18/11 10:15	07/18/11 23:46	7440-48-4	
Copper	**18.6**	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 12:05	7440-50-8	
Iron	**45300**	ug/L	300	50.0	1	07/18/11 10:15	07/18/11 23:46	7439-89-6	
Lead	**8.0J**	ug/L	10.0	5.0	1	07/18/11 10:15	07/18/11 23:46	7439-92-1	
Nickel	**30.5J**	ug/L	50.0	5.0	1	07/18/11 10:15	07/18/11 23:46	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	07/18/11 10:15	07/19/11 12:05	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/18/11 23:46	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	07/18/11 10:15	07/19/11 12:05	7440-28-0	
Vanadium	**18.2J**	ug/L	25.0	5.0	1	07/18/11 10:15	07/18/11 23:46	7440-62-2	
Zinc	**198**	ug/L	10.0	10.0	1	07/18/11 10:15	07/18/11 23:46	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	07/12/11 15:05	07/13/11 13:41	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		07/07/11 18:16	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		07/07/11 18:16	107-13-1	
Benzene	**4.6**	ug/L	1.0	0.25	1		07/07/11 18:16	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		07/07/11 18:16	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/07/11 18:16	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		07/07/11 18:16	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		07/07/11 18:16	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		07/07/11 18:16	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		07/07/11 18:16	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		07/07/11 18:16	56-23-5	
Chlorobenzene	**2.2J**	ug/L	3.0	0.23	1		07/07/11 18:16	108-90-7	
Chloroethane	**1.5J**	ug/L	10.0	0.54	1		07/07/11 18:16	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		07/07/11 18:16	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		07/07/11 18:16	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		07/07/11 18:16	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		07/07/11 18:16	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		07/07/11 18:16	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		07/07/11 18:16	74-95-3	
1,2-Dichlorobenzene	**0.48J**	ug/L	5.0	0.30	1		07/07/11 18:16	95-50-1	
1,4-Dichlorobenzene	**8.8**	ug/L	1.0	0.33	1		07/07/11 18:16	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		07/07/11 18:16	110-57-6	
1,1-Dichloroethane	**1.3J**	ug/L	5.0	0.32	1		07/07/11 18:16	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		07/07/11 18:16	107-06-2	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		07/07/11 18:16	75-35-4	
cis-1,2-Dichloroethene	**28.3**	ug/L	5.0	0.19	1		07/07/11 18:16	156-59-2	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-11 **Lab ID: 9297319002** Collected: 06/30/11 17:30 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		07/07/11 18:16	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		07/07/11 18:16	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.28	1		07/07/11 18:16	142-28-9	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		07/07/11 18:16	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		07/07/11 18:16	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		07/07/11 18:16	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		07/07/11 18:16	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		07/07/11 18:16	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		07/07/11 18:16	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		07/07/11 18:16	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		07/07/11 18:16	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		07/07/11 18:16	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		07/07/11 18:16	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		07/07/11 18:16	127-18-4	
Toluene	ND	ug/L	1.0	0.26	1		07/07/11 18:16	108-88-3	
1,2,4-Trichlorobenzene	**0.68J**	ug/L	10.0	0.35	1		07/07/11 18:16	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		07/07/11 18:16	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		07/07/11 18:16	79-00-5	
Trichloroethene	**0.48J**	ug/L	1.0	0.47	1		07/07/11 18:16	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		07/07/11 18:16	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		07/07/11 18:16	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		07/07/11 18:16	108-05-4	
Vinyl chloride	**0.75J**	ug/L	1.0	0.62	1		07/07/11 18:16	75-01-4	
Xylene (Total)	ND	ug/L	5.0	0.66	1		07/07/11 18:16	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		07/07/11 18:16	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		07/07/11 18:16	95-47-6	
4-Bromofluorobenzene (S)	96	%	70-130		1		07/07/11 18:16	460-00-4	
Dibromofluoromethane (S)	118	%	70-130		1		07/07/11 18:16	1868-53-7	
1,2-Dichloroethane-d4 (S)	114	%	70-130		1		07/07/11 18:16	17060-07-0	
Toluene-d8 (S)	100	%	70-130		1		07/07/11 18:16	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**239000**	ug/L	5000	5000	1		07/14/11 13:50		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D								
Sulfide	ND	ug/L	1000	100	1		07/06/11 16:30	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	ug/L	2000	2000	1	07/02/11 11:30	07/07/11 11:36		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**2720J**	ug/L	250000		1		07/14/11 05:11	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	ND	ug/L	10000	200	1		07/01/11 21:13		

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-11 **Lab ID: 9297319002** Collected: 06/30/11 17:30 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	**22500**	ug/L	5000	5000	1		07/15/11 14:15	16887-00-6	
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	**30000**	ug/L	25000	25000	1		07/18/11 13:57		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	**8800**	ug/L	1000	1000	1		07/20/11 12:59	7440-44-0	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-26 **Lab ID: 9297319003** Collected: 06/30/11 16:30 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	**2.5J**	ug/L	100	2.2	1		07/07/11 18:42	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		07/07/11 18:42	107-13-1	
Benzene	**2.9**	ug/L	1.0	0.25	1		07/07/11 18:42	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		07/07/11 18:42	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/07/11 18:42	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		07/07/11 18:42	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		07/07/11 18:42	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		07/07/11 18:42	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		07/07/11 18:42	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		07/07/11 18:42	56-23-5	
Chlorobenzene	**1.8J**	ug/L	3.0	0.23	1		07/07/11 18:42	108-90-7	
Chloroethane	**1.1J**	ug/L	10.0	0.54	1		07/07/11 18:42	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		07/07/11 18:42	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		07/07/11 18:42	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		07/07/11 18:42	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		07/07/11 18:42	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		07/07/11 18:42	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		07/07/11 18:42	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		07/07/11 18:42	95-50-1	
1,4-Dichlorobenzene	**6.7**	ug/L	1.0	0.33	1		07/07/11 18:42	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		07/07/11 18:42	110-57-6	
1,1-Dichloroethane	**1.0J**	ug/L	5.0	0.32	1		07/07/11 18:42	75-34-3	
1,2-Dichloroethane	**0.19J**	ug/L	1.0	0.12	1		07/07/11 18:42	107-06-2	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		07/07/11 18:42	75-35-4	
cis-1,2-Dichloroethene	**30.5**	ug/L	5.0	0.19	1		07/07/11 18:42	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		07/07/11 18:42	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		07/07/11 18:42	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.28	1		07/07/11 18:42	142-28-9	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		07/07/11 18:42	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		07/07/11 18:42	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		07/07/11 18:42	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		07/07/11 18:42	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		07/07/11 18:42	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		07/07/11 18:42	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		07/07/11 18:42	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		07/07/11 18:42	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		07/07/11 18:42	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		07/07/11 18:42	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		07/07/11 18:42	127-18-4	
Toluene	ND	ug/L	1.0	0.26	1		07/07/11 18:42	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		07/07/11 18:42	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		07/07/11 18:42	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		07/07/11 18:42	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		07/07/11 18:42	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		07/07/11 18:42	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		07/07/11 18:42	108-05-4	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-26 **Lab ID: 9297319003** Collected: 06/30/11 16:30 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Vinyl chloride	ND	ug/L	1.0	0.62	1		07/07/11 18:42	75-01-4	
Xylene (Total)	ND	ug/L	5.0	0.66	1		07/07/11 18:42	1330-20-7	
4-Bromofluorobenzene (S)	96	%	70-130		1		07/07/11 18:42	460-00-4	
Dibromofluoromethane (S)	119	%	70-130		1		07/07/11 18:42	1868-53-7	
1,2-Dichloroethane-d4 (S)	116	%	70-130		1		07/07/11 18:42	17060-07-0	
Toluene-d8 (S)	99	%	70-130		1		07/07/11 18:42	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**183000**	ug/L	5000	5000	1		07/14/11 13:50		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D								
Sulfide	ND	ug/L	1000	100	1		07/06/11 16:30	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	ug/L	2000	2000	1	07/02/11 11:30	07/07/11 11:36		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**4020J**	ug/L	250000		1		07/14/11 05:24	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	ND	ug/L	10000	200	1		07/01/11 21:11		
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	**14400**	ug/L	5000	5000	1		07/15/11 14:15	16887-00-6	
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	ND	ug/L	25000	25000	1		07/18/11 13:57		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	**10800**	ug/L	1000	1000	1		07/19/11 22:58	7440-44-0	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-27 **Lab ID: 9297319004** Collected: 06/30/11 15:35 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8151 Chlorinated Herbicides	Analytical Method: EPA 8151								
Dinoseb	ND	ug/L	1.0	0.057	1	07/06/11 13:30	07/07/11 09:36	88-85-7	
2,4-DCPA (S)	88	%	65.5-125.7		1	07/06/11 13:30	07/07/11 09:36	19719-28-9	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	**3.1J**	ug/L	100	2.2	1		07/07/11 19:07	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		07/07/11 19:07	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		07/07/11 19:07	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		07/07/11 19:07	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/07/11 19:07	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		07/07/11 19:07	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		07/07/11 19:07	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		07/07/11 19:07	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		07/07/11 19:07	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		07/07/11 19:07	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		07/07/11 19:07	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		07/07/11 19:07	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		07/07/11 19:07	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		07/07/11 19:07	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		07/07/11 19:07	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		07/07/11 19:07	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		07/07/11 19:07	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		07/07/11 19:07	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		07/07/11 19:07	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		07/07/11 19:07	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		07/07/11 19:07	110-57-6	
1,1-Dichloroethane	**0.76J**	ug/L	5.0	0.32	1		07/07/11 19:07	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		07/07/11 19:07	107-06-2	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		07/07/11 19:07	75-35-4	
cis-1,2-Dichloroethene	**22.6**	ug/L	5.0	0.19	1		07/07/11 19:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		07/07/11 19:07	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		07/07/11 19:07	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.28	1		07/07/11 19:07	142-28-9	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		07/07/11 19:07	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		07/07/11 19:07	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		07/07/11 19:07	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		07/07/11 19:07	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		07/07/11 19:07	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		07/07/11 19:07	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		07/07/11 19:07	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		07/07/11 19:07	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		07/07/11 19:07	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		07/07/11 19:07	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		07/07/11 19:07	127-18-4	
Toluene	ND	ug/L	1.0	0.26	1		07/07/11 19:07	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		07/07/11 19:07	71-55-6	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-27 **Lab ID: 9297319004** Collected: 06/30/11 15:35 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		07/07/11 19:07	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		07/07/11 19:07	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		07/07/11 19:07	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		07/07/11 19:07	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		07/07/11 19:07	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		07/07/11 19:07	75-01-4	
Xylene (Total)	ND	ug/L	5.0	0.66	1		07/07/11 19:07	1330-20-7	
4-Bromofluorobenzene (S)	97	%	70-130		1		07/07/11 19:07	460-00-4	
Dibromofluoromethane (S)	120	%	70-130		1		07/07/11 19:07	1868-53-7	
1,2-Dichloroethane-d4 (S)	115	%	70-130		1		07/07/11 19:07	17060-07-0	
Toluene-d8 (S)	99	%	70-130		1		07/07/11 19:07	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**265000**	ug/L	5000	5000	1		07/14/11 13:50		
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	ug/L	2000	2000	1	07/02/11 11:30	07/07/11 11:36		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**25100J**	ug/L	250000		1		07/14/11 05:38	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	ND	ug/L	10000	200	1		07/01/11 21:07		
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	**13200**	ug/L	5000	5000	1		07/15/11 14:16	16887-00-6	
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	**3610**	ug/L	1000	1000	1		07/20/11 09:14	7440-44-0	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-26 **Lab ID: 9297319005** Collected: 06/30/11 16:30 Received: 07/05/11 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Antimony	ND	ug/L	6.0	5.0	1	07/18/11 10:15	07/19/11 00:07	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 00:07	7440-38-2	
Barium	**8.4J**	ug/L	100	5.0	1	07/18/11 10:15	07/19/11 00:07	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	07/18/11 10:15	07/19/11 00:07	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	07/18/11 10:15	07/19/11 00:07	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 00:07	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 00:07	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 12:09	7440-50-8	
Iron	**62.4J**	ug/L	300	50.0	1	07/18/11 10:15	07/19/11 00:07	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 00:07	7439-92-1	
Nickel	ND	ug/L	50.0	5.0	1	07/18/11 10:15	07/19/11 00:07	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	07/18/11 10:15	07/19/11 12:09	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 00:07	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	07/18/11 10:15	07/19/11 12:09	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	07/18/11 10:15	07/19/11 00:07	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	07/18/11 10:15	07/19/11 00:07	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	07/12/11 15:05	07/13/11 13:52	7439-97-6	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

Sample: MW-27 **Lab ID: 9297319006** Collected: 06/30/11 15:35 Received: 07/05/11 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Antimony	ND	ug/L	6.0	5.0	1	07/18/11 10:15	07/19/11 00:14	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 00:14	7440-38-2	
Barium	**12.3J**	ug/L	100	5.0	1	07/18/11 10:15	07/19/11 00:14	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	07/18/11 10:15	07/19/11 00:14	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	07/18/11 10:15	07/19/11 00:14	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 00:14	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 00:14	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 12:12	7440-50-8	
Lead	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 00:14	7439-92-1	
Nickel	ND	ug/L	50.0	5.0	1	07/18/11 10:15	07/19/11 00:14	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	07/18/11 10:15	07/19/11 12:12	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	07/18/11 10:15	07/19/11 00:14	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	07/18/11 10:15	07/19/11 12:12	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	07/18/11 10:15	07/19/11 00:14	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	07/18/11 10:15	07/19/11 00:14	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	07/12/11 15:05	07/13/11 13:55	7439-97-6	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: GCSV/5095
QC Batch Method: EPA 8151
Analysis Method: EPA 8151
Analysis Description: 8151A GCS Herbicides
Associated Lab Samples: 9297319004

METHOD BLANK: 220073
Matrix: Water
Associated Lab Samples: 9297319004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dinoseb	ug/L	ND	1.0	07/07/11 07:13	
2,4-DCPA (S)	%	92	65.5-125.7	07/07/11 07:13	

LABORATORY CONTROL SAMPLE: 220074

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Dinoseb	ug/L	1.2	0.97J	80	44-111.8	
2,4-DCPA (S)	%			94	65.5-125.7	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 220202 220203

Parameter	Units	9297234018 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Dinoseb	ug/L	ND	2.4	2.4	2.0	1.8J	85	77	44-111.8	10	40	
2,4-DCPA (S)	%						96	86	65.5-125			

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: MPRP/8693
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET NC Groundwater
Associated Lab Samples: 9297319001

METHOD BLANK: 631113
Matrix: Water
Associated Lab Samples: 9297319001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	6.0	07/13/11 18:53	
Arsenic	ug/L	ND	10.0	07/13/11 18:53	
Barium	ug/L	ND	100	07/13/11 18:53	
Beryllium	ug/L	ND	1.0	07/13/11 18:53	
Cadmium	ug/L	ND	1.0	07/13/11 18:53	
Chromium	ug/L	ND	10.0	07/13/11 18:53	
Cobalt	ug/L	ND	10.0	07/13/11 18:53	
Copper	ug/L	ND	10.0	07/13/11 18:53	
Iron	ug/L	ND	300	07/13/11 18:53	
Lead	ug/L	ND	10.0	07/13/11 18:53	
Nickel	ug/L	ND	50.0	07/13/11 18:53	
Selenium	ug/L	ND	10.0	07/13/11 18:53	
Silver	ug/L	ND	10.0	07/13/11 18:53	
Thallium	ug/L	ND	5.5	07/13/11 18:53	
Vanadium	ug/L	ND	25.0	07/13/11 18:53	
Zinc	ug/L	ND	10.0	07/13/11 18:53	

LABORATORY CONTROL SAMPLE: 631114

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	506	101	80-120	
Arsenic	ug/L	500	506	101	80-120	
Barium	ug/L	500	515	103	80-120	
Beryllium	ug/L	500	515	103	80-120	
Cadmium	ug/L	500	508	102	80-120	
Chromium	ug/L	500	511	102	80-120	
Cobalt	ug/L	500	514	103	80-120	
Copper	ug/L	500	514	103	80-120	
Iron	ug/L	5000	5080	102	80-120	
Lead	ug/L	500	515	103	80-120	
Nickel	ug/L	500	513	103	80-120	
Selenium	ug/L	500	507	101	80-120	
Silver	ug/L	250	254	102	80-120	
Thallium	ug/L	500	509	102	80-120	
Vanadium	ug/L	500	507	101	80-120	
Zinc	ug/L	500	521	104	80-120	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

MATRIX SPIKE SAMPLE: 631115

Parameter	Units	9297319001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	ND	500	493	99	75-125	
Arsenic	ug/L	ND	500	501	99	75-125	
Barium	ug/L	97.9J	500	602	101	75-125	
Beryllium	ug/L	ND	500	506	101	75-125	
Cadmium	ug/L	ND	500	498	100	75-125	
Chromium	ug/L	ND	500	508	101	75-125	
Cobalt	ug/L	ND	500	503	100	75-125	
Copper	ug/L	ND	500	503	101	75-125	
Iron	ug/L	1790	5000	6830	101	75-125	
Lead	ug/L	ND	500	503	100	75-125	
Nickel	ug/L	ND	500	505	100	75-125	
Selenium	ug/L	ND	500	502	100	75-125	
Silver	ug/L	ND	250	249	100	75-125	
Thallium	ug/L	ND	500	492	98	75-125	
Vanadium	ug/L	ND	500	504	100	75-125	
Zinc	ug/L	12.3	500	519	101	75-125	

SAMPLE DUPLICATE: 631116

Parameter	Units	9297234005 Result	Dup Result	RPD	Max RPD	Qualifiers
Antimony	ug/L	ND	ND		25	
Arsenic	ug/L	ND	ND		25	
Barium	ug/L	30.7J	30.2J	1	25	
Beryllium	ug/L	ND	ND		25	
Cadmium	ug/L	ND	ND		25	
Chromium	ug/L	ND	ND		25	
Cobalt	ug/L	ND	ND		25	
Copper	ug/L	ND	ND		25	
Iron	ug/L	5720	5680	1	25	
Lead	ug/L	ND	ND		25	
Nickel	ug/L	ND	ND		25	
Selenium	ug/L	ND	ND		25	
Silver	ug/L	ND	ND		25	
Thallium	ug/L	ND	ND		25	
Vanadium	ug/L	ND	ND		25	
Zinc	ug/L	ND	ND		25	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: MPRP/8751 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET NC Groundwater
Associated Lab Samples: 9297319002, 9297319005, 9297319006

METHOD BLANK: 635078 | Matrix: Water
Associated Lab Samples: 9297319002, 9297319005, 9297319006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	6.0	07/18/11 23:39	
Arsenic	ug/L	ND	10.0	07/18/11 23:39	
Barium	ug/L	ND	100	07/18/11 23:39	
Beryllium	ug/L	ND	1.0	07/18/11 23:39	
Cadmium	ug/L	ND	1.0	07/18/11 23:39	
Chromium	ug/L	ND	10.0	07/18/11 23:39	
Cobalt	ug/L	ND	10.0	07/18/11 23:39	
Copper	ug/L	ND	10.0	07/18/11 23:39	
Iron	ug/L	ND	300	07/18/11 23:39	
Lead	ug/L	ND	10.0	07/18/11 23:39	
Nickel	ug/L	ND	50.0	07/18/11 23:39	
Selenium	ug/L	ND	10.0	07/18/11 23:39	
Silver	ug/L	ND	10.0	07/18/11 23:39	
Thallium	ug/L	ND	5.5	07/18/11 23:39	
Vanadium	ug/L	ND	25.0	07/18/11 23:39	
Zinc	ug/L	ND	10.0	07/18/11 23:39	

LABORATORY CONTROL SAMPLE: 635079

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	443	89	80-120	
Arsenic	ug/L	500	446	89	80-120	
Barium	ug/L	500	453	91	80-120	
Beryllium	ug/L	500	457	91	80-120	
Cadmium	ug/L	500	461	92	80-120	
Chromium	ug/L	500	469	94	80-120	
Cobalt	ug/L	500	460	92	80-120	
Copper	ug/L	500	444	89	80-120	
Iron	ug/L	5000	4620	92	80-120	
Lead	ug/L	500	456	91	80-120	
Nickel	ug/L	500	464	93	80-120	
Selenium	ug/L	500	435	87	80-120	
Silver	ug/L	250	235	94	80-120	
Thallium	ug/L	500	435	87	80-120	
Vanadium	ug/L	500	452	90	80-120	
Zinc	ug/L	500	463	93	80-120	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

MATRIX SPIKE SAMPLE: 635080

Parameter	Units	9297319002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	ND	500	446	89	75-125	
Arsenic	ug/L	ND	500	459	91	75-125	
Barium	ug/L	197	500	653	91	75-125	
Beryllium	ug/L	ND	500	469	94	75-125	
Cadmium	ug/L	ND	500	465	93	75-125	
Chromium	ug/L	36.3	500	512	95	75-125	
Cobalt	ug/L	127	500	583	91	75-125	
Copper	ug/L	18.6	500	479	92	75-125	
Iron	ug/L	45300	5000	49600	87	75-125	
Lead	ug/L	8.0J	500	463	91	75-125	
Nickel	ug/L	30.5J	500	494	93	75-125	
Selenium	ug/L	ND	500	451	89	75-125	
Silver	ug/L	ND	250	239	96	75-125	
Thallium	ug/L	ND	500	435	86	75-125	
Vanadium	ug/L	18.2J	500	483	93	75-125	
Zinc	ug/L	198	500	677	96	75-125	

SAMPLE DUPLICATE: 635081

Parameter	Units	9297319005 Result	Dup Result	RPD	Max RPD	Qualifiers
Antimony	ug/L	ND	ND		25	
Arsenic	ug/L	ND	ND		25	
Barium	ug/L	8.4J	8.3J	1	25	
Beryllium	ug/L	ND	ND		25	
Cadmium	ug/L	ND	ND		25	
Chromium	ug/L	ND	ND		25	
Cobalt	ug/L	ND	ND		25	
Copper	ug/L	ND	ND		25	
Iron	ug/L	62.4J	ND		25	
Lead	ug/L	ND	ND		25	
Nickel	ug/L	ND	ND		25	
Selenium	ug/L	ND	ND		25	
Silver	ug/L	ND	ND		25	
Thallium	ug/L	ND	ND		25	
Vanadium	ug/L	ND	ND		25	
Zinc	ug/L	ND	ND		25	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: MERP/3604
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury
Associated Lab Samples: 9297319001

METHOD BLANK: 632070
Matrix: Water
Associated Lab Samples: 9297319001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	07/12/11 13:41	

LABORATORY CONTROL SAMPLE: 632071

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.4	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 632072 632073

Parameter	Units	9297084001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	1.7	1.7	69	70	75-125	1	25	M0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 632074 632075

Parameter	Units	9297084002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	1.6	2.1	63	85	75-125	30	25	M0,R1

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: MERP/3605 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 9297319002, 9297319005, 9297319006

METHOD BLANK: 632262 Matrix: Water
Associated Lab Samples: 9297319002, 9297319005, 9297319006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	07/13/11 12:46	

LABORATORY CONTROL SAMPLE: 632263

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.3	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 632264 632265

Parameter	Units	9297391006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.2	2.3	86	91	75-125	5	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 632266 632267

Parameter	Units	9297391007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.3	2.6	94	104	75-125	10	25	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: MSV/15871
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV Low Level Landfill
Associated Lab Samples: 9297319001

METHOD BLANK: 628900
Matrix: Water
Associated Lab Samples: 9297319001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	5.0	07/01/11 15:15	
1,1,1-Trichloroethane	ug/L	ND	1.0	07/01/11 15:15	
1,1,2,2-Tetrachloroethane	ug/L	ND	3.0	07/01/11 15:15	
1,1,2-Trichloroethane	ug/L	ND	1.0	07/01/11 15:15	
1,1-Dichloroethane	ug/L	ND	5.0	07/01/11 15:15	
1,1-Dichloroethene	ug/L	ND	5.0	07/01/11 15:15	
1,2,3-Trichloropropane	ug/L	ND	1.0	07/01/11 15:15	
1,2-Dibromo-3-chloropropane	ug/L	ND	13.0	07/01/11 15:15	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	07/01/11 15:15	
1,2-Dichlorobenzene	ug/L	ND	5.0	07/01/11 15:15	
1,2-Dichloroethane	ug/L	ND	1.0	07/01/11 15:15	
1,2-Dichloropropane	ug/L	ND	1.0	07/01/11 15:15	
1,3-Dichloropropane	ug/L	ND	1.0	07/01/11 15:15	
1,4-Dichlorobenzene	ug/L	ND	1.0	07/01/11 15:15	
2-Butanone (MEK)	ug/L	ND	100	07/01/11 15:15	
2-Hexanone	ug/L	ND	50.0	07/01/11 15:15	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	07/01/11 15:15	
Acetone	ug/L	ND	100	07/01/11 15:15	
Acrylonitrile	ug/L	ND	200	07/01/11 15:15	
Benzene	ug/L	ND	1.0	07/01/11 15:15	
Bromochloromethane	ug/L	ND	3.0	07/01/11 15:15	
Bromodichloromethane	ug/L	ND	1.0	07/01/11 15:15	
Bromoform	ug/L	ND	3.0	07/01/11 15:15	
Bromomethane	ug/L	ND	10.0	07/01/11 15:15	
Carbon disulfide	ug/L	ND	100	07/01/11 15:15	
Carbon tetrachloride	ug/L	ND	1.0	07/01/11 15:15	
Chlorobenzene	ug/L	0.23J	3.0	07/01/11 15:15	
Chloroethane	ug/L	ND	10.0	07/01/11 15:15	
Chloroform	ug/L	ND	5.0	07/01/11 15:15	
Chloromethane	ug/L	ND	1.0	07/01/11 15:15	
cis-1,2-Dichloroethene	ug/L	ND	5.0	07/01/11 15:15	
cis-1,3-Dichloropropene	ug/L	ND	1.0	07/01/11 15:15	
Dibromochloromethane	ug/L	ND	3.0	07/01/11 15:15	
Dibromomethane	ug/L	ND	10.0	07/01/11 15:15	
Ethylbenzene	ug/L	ND	1.0	07/01/11 15:15	
Iodomethane	ug/L	ND	10.0	07/01/11 15:15	
Methylene Chloride	ug/L	ND	1.0	07/01/11 15:15	
Styrene	ug/L	ND	1.0	07/01/11 15:15	
Tetrachloroethene	ug/L	ND	1.0	07/01/11 15:15	
Toluene	ug/L	ND	1.0	07/01/11 15:15	
trans-1,2-Dichloroethene	ug/L	ND	5.0	07/01/11 15:15	
trans-1,3-Dichloropropene	ug/L	ND	1.0	07/01/11 15:15	
trans-1,4-Dichloro-2-butene	ug/L	ND	100	07/01/11 15:15	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

METHOD BLANK: 628900 Matrix: Water

Associated Lab Samples: 9297319001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Trichloroethene	ug/L	ND	1.0	07/01/11 15:15	
Trichlorofluoromethane	ug/L	ND	1.0	07/01/11 15:15	
Vinyl acetate	ug/L	ND	50.0	07/01/11 15:15	
Vinyl chloride	ug/L	ND	1.0	07/01/11 15:15	
Xylene (Total)	ug/L	ND	5.0	07/01/11 15:15	
1,2-Dichloroethane-d4 (S)	%	102	70-130	07/01/11 15:15	
4-Bromofluorobenzene (S)	%	93	70-130	07/01/11 15:15	
Dibromofluoromethane (S)	%	106	70-130	07/01/11 15:15	
Toluene-d8 (S)	%	99	70-130	07/01/11 15:15	

LABORATORY CONTROL SAMPLE: 628901

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	50	47.8	96	70-130	
1,1,1-Trichloroethane	ug/L	50	45.0	90	70-130	
1,1,2,2-Tetrachloroethane	ug/L	50	50.5	101	70-130	
1,1,2-Trichloroethane	ug/L	50	50.1	100	70-130	
1,1-Dichloroethane	ug/L	50	49.1	98	70-130	
1,1-Dichloroethene	ug/L	50	46.8	94	70-132	
1,2,3-Trichloropropane	ug/L	50	48.4	97	70-130	
1,2-Dibromo-3-chloropropane	ug/L	50	49.9	100	70-130	
1,2-Dibromoethane (EDB)	ug/L	50	48.5	97	70-130	
1,2-Dichlorobenzene	ug/L	50	50.3	101	70-130	
1,2-Dichloroethane	ug/L	50	46.0	92	70-130	
1,2-Dichloropropane	ug/L	50	49.6	99	70-130	
1,3-Dichloropropane	ug/L	50	49.4	99	70-130	
1,4-Dichlorobenzene	ug/L	50	47.4	95	70-130	
2-Butanone (MEK)	ug/L	100	101	101	70-145	
2-Hexanone	ug/L	100	96.5	96	70-144	
4-Methyl-2-pentanone (MIBK)	ug/L	100	93.5J	93	70-140	
Acetone	ug/L	100	97.3J	97	50-175	
Acrylonitrile	ug/L	250	286	115	70-143	
Benzene	ug/L	50	46.1	92	70-130	
Bromochloromethane	ug/L	50	46.5	93	70-130	
Bromodichloromethane	ug/L	50	45.0	90	70-130	
Bromoform	ug/L	50	50.1	100	70-130	
Bromomethane	ug/L	50	48.9	98	54-130	
Carbon disulfide	ug/L	50	53.8J	108	70-131	
Carbon tetrachloride	ug/L	50	43.5	87	70-132	
Chlorobenzene	ug/L	50	48.9	98	70-130	
Chloroethane	ug/L	50	53.9	108	64-134	
Chloroform	ug/L	50	47.8	96	70-130	
Chloromethane	ug/L	50	43.6	87	64-130	
cis-1,2-Dichloroethene	ug/L	50	47.1	94	70-131	
cis-1,3-Dichloropropene	ug/L	50	52.3	105	70-130	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

LABORATORY CONTROL SAMPLE: 628901

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Dibromochloromethane	ug/L	50	45.7	91	70-130	
Dibromomethane	ug/L	50	47.5	95	70-131	
Ethylbenzene	ug/L	50	48.2	96	70-130	
Iodomethane	ug/L	100	117	117	49-180	
Methylene Chloride	ug/L	50	49.1	98	63-130	
Styrene	ug/L	50	52.6	105	70-130	
Tetrachloroethene	ug/L	50	46.7	93	70-130	
Toluene	ug/L	50	46.6	93	70-130	
trans-1,2-Dichloroethene	ug/L	50	47.6	95	70-130	
trans-1,3-Dichloropropene	ug/L	50	50.5	101	70-132	
trans-1,4-Dichloro-2-butene	ug/L	50	57.3J	115	70-141	
Trichloroethene	ug/L	50	48.8	98	70-130	
Trichlorofluoromethane	ug/L	50	45.5	91	62-133	
Vinyl acetate	ug/L	100	108	108	66-157	
Vinyl chloride	ug/L	50	53.0	106	69-130	
Xylene (Total)	ug/L	150	150	100	70-130	
1,2-Dichloroethane-d4 (S)	%			93	70-130	
4-Bromofluorobenzene (S)	%			98	70-130	
Dibromofluoromethane (S)	%			99	70-130	
Toluene-d8 (S)	%			101	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 628902 628903

Parameter	Units	9297234017 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethene	ug/L	ND	50	50	46.8	51.2	94	102	70-166	9	30	
Benzene	ug/L	6.7	50	50	57.6	60.7	102	108	70-148	5	30	
Chlorobenzene	ug/L	2.3J	50	50	51.7	56.5	99	108	70-146	9	30	
Toluene	ug/L	ND	50	50	49.7	53.2	99	106	70-155	7	30	
Trichloroethene	ug/L	2.4	50	50	50.5	53.5	96	102	69-151	6	30	
1,2-Dichloroethane-d4 (S)	%						97	99	70-130			
4-Bromofluorobenzene (S)	%						92	94	70-130			
Dibromofluoromethane (S)	%						104	106	70-130			
Toluene-d8 (S)	%						96	96	70-130			

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: MSV/15933 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV Low Level Landfill
Associated Lab Samples: 9297319002, 9297319003, 9297319004

METHOD BLANK: 630602 Matrix: Water
Associated Lab Samples: 9297319002, 9297319003, 9297319004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	5.0	07/07/11 11:02	
1,1,1-Trichloroethane	ug/L	ND	1.0	07/07/11 11:02	
1,1,2,2-Tetrachloroethane	ug/L	ND	3.0	07/07/11 11:02	
1,1,2-Trichloroethane	ug/L	ND	1.0	07/07/11 11:02	
1,1-Dichloroethane	ug/L	ND	5.0	07/07/11 11:02	
1,1-Dichloroethene	ug/L	ND	5.0	07/07/11 11:02	
1,2,3-Trichloropropane	ug/L	ND	1.0	07/07/11 11:02	
1,2,4-Trichlorobenzene	ug/L	ND	10.0	07/07/11 11:02	
1,2-Dibromo-3-chloropropane	ug/L	ND	13.0	07/07/11 11:02	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	07/07/11 11:02	
1,2-Dichlorobenzene	ug/L	ND	5.0	07/07/11 11:02	
1,2-Dichloroethane	ug/L	ND	1.0	07/07/11 11:02	
1,2-Dichloropropane	ug/L	ND	1.0	07/07/11 11:02	
1,3-Dichloropropane	ug/L	ND	1.0	07/07/11 11:02	
1,4-Dichlorobenzene	ug/L	ND	1.0	07/07/11 11:02	
2-Butanone (MEK)	ug/L	ND	100	07/07/11 11:02	
2-Hexanone	ug/L	ND	50.0	07/07/11 11:02	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	07/07/11 11:02	
Acetone	ug/L	2.9J	100	07/07/11 11:02	
Acrylonitrile	ug/L	ND	200	07/07/11 11:02	
Benzene	ug/L	ND	1.0	07/07/11 11:02	
Bromochloromethane	ug/L	ND	3.0	07/07/11 11:02	
Bromodichloromethane	ug/L	ND	1.0	07/07/11 11:02	
Bromoform	ug/L	ND	3.0	07/07/11 11:02	
Bromomethane	ug/L	ND	10.0	07/07/11 11:02	
Carbon disulfide	ug/L	ND	100	07/07/11 11:02	
Carbon tetrachloride	ug/L	ND	1.0	07/07/11 11:02	
Chlorobenzene	ug/L	ND	3.0	07/07/11 11:02	
Chloroethane	ug/L	ND	10.0	07/07/11 11:02	
Chloroform	ug/L	0.14J	5.0	07/07/11 11:02	
Chloromethane	ug/L	ND	1.0	07/07/11 11:02	
cis-1,2-Dichloroethene	ug/L	ND	5.0	07/07/11 11:02	
cis-1,3-Dichloropropene	ug/L	ND	1.0	07/07/11 11:02	
Dibromochloromethane	ug/L	ND	3.0	07/07/11 11:02	
Dibromomethane	ug/L	ND	10.0	07/07/11 11:02	
Ethylbenzene	ug/L	ND	1.0	07/07/11 11:02	
Iodomethane	ug/L	ND	10.0	07/07/11 11:02	
m&p-Xylene	ug/L	ND	2.0	07/07/11 11:02	
Methylene Chloride	ug/L	ND	1.0	07/07/11 11:02	
o-Xylene	ug/L	ND	1.0	07/07/11 11:02	
Styrene	ug/L	ND	1.0	07/07/11 11:02	
Tetrachloroethene	ug/L	ND	1.0	07/07/11 11:02	
Toluene	ug/L	ND	1.0	07/07/11 11:02	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

METHOD BLANK: 630602 Matrix: Water

Associated Lab Samples: 9297319002, 9297319003, 9297319004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
trans-1,2-Dichloroethene	ug/L	ND	5.0	07/07/11 11:02	
trans-1,3-Dichloropropene	ug/L	ND	1.0	07/07/11 11:02	
trans-1,4-Dichloro-2-butene	ug/L	ND	100	07/07/11 11:02	
Trichloroethene	ug/L	ND	1.0	07/07/11 11:02	
Trichlorofluoromethane	ug/L	ND	1.0	07/07/11 11:02	
Vinyl acetate	ug/L	ND	50.0	07/07/11 11:02	
Vinyl chloride	ug/L	ND	1.0	07/07/11 11:02	
Xylene (Total)	ug/L	ND	5.0	07/07/11 11:02	
1,2-Dichloroethane-d4 (S)	%	113	70-130	07/07/11 11:02	
4-Bromofluorobenzene (S)	%	94	70-130	07/07/11 11:02	
Dibromofluoromethane (S)	%	118	70-130	07/07/11 11:02	
Toluene-d8 (S)	%	97	70-130	07/07/11 11:02	

LABORATORY CONTROL SAMPLE: 630603

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	50	50.9	102	70-130	
1,1,1-Trichloroethane	ug/L	50	51.0	102	70-130	
1,1,2,2-Tetrachloroethane	ug/L	50	32.1	64	70-130	L0
1,1,2-Trichloroethane	ug/L	50	50.8	102	70-130	
1,1-Dichloroethane	ug/L	50	51.4	103	70-130	
1,1-Dichloroethene	ug/L	50	49.5	99	70-132	
1,2,3-Trichloropropane	ug/L	50	48.0	96	70-130	
1,2,4-Trichlorobenzene	ug/L	50	51.6	103	70-134	
1,2-Dibromo-3-chloropropane	ug/L	50	46.6	93	70-130	
1,2-Dibromoethane (EDB)	ug/L	50	48.9	98	70-130	
1,2-Dichlorobenzene	ug/L	50	50.8	102	70-130	
1,2-Dichloroethane	ug/L	50	51.2	102	70-130	
1,2-Dichloropropane	ug/L	50	48.9	98	70-130	
1,3-Dichloropropane	ug/L	50	50.2	100	70-130	
1,4-Dichlorobenzene	ug/L	50	48.5	97	70-130	
2-Butanone (MEK)	ug/L	100	94.8J	95	70-145	
2-Hexanone	ug/L	100	92.2	92	70-144	
4-Methyl-2-pentanone (MIBK)	ug/L	100	90.9J	91	70-140	
Acetone	ug/L	100	99.2J	99	50-175	
Acrylonitrile	ug/L	250	268	107	70-143	
Benzene	ug/L	50	46.5	93	70-130	
Bromochloromethane	ug/L	50	50.3	101	70-130	
Bromodichloromethane	ug/L	50	49.8	100	70-130	
Bromoform	ug/L	50	49.5	99	70-130	
Bromomethane	ug/L	50	63.5	127	54-130	
Carbon disulfide	ug/L	50	53.7J	107	70-131	
Carbon tetrachloride	ug/L	50	49.5	99	70-132	
Chlorobenzene	ug/L	50	49.6	99	70-130	
Chloroethane	ug/L	50	53.9	108	64-134	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

LABORATORY CONTROL SAMPLE: 630603

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloroform	ug/L	50	52.2	104	70-130	
Chloromethane	ug/L	50	43.3	87	64-130	
cis-1,2-Dichloroethene	ug/L	50	50.2	100	70-131	
cis-1,3-Dichloropropene	ug/L	50	56.5	113	70-130	
Dibromochloromethane	ug/L	50	47.5	95	70-130	
Dibromomethane	ug/L	50	49.0	98	70-131	
Ethylbenzene	ug/L	50	50.1	100	70-130	
Iodomethane	ug/L	100	121	121	49-180	
m&p-Xylene	ug/L	100	105	105	70-130	
Methylene Chloride	ug/L	50	50.6	101	63-130	
o-Xylene	ug/L	50	55.7	111	70-130	
Styrene	ug/L	50	55.1	110	70-130	
Tetrachloroethene	ug/L	50	47.7	95	70-130	
Toluene	ug/L	50	48.3	97	70-130	
trans-1,2-Dichloroethene	ug/L	50	49.5	99	70-130	
trans-1,3-Dichloropropene	ug/L	50	54.2	108	70-132	
trans-1,4-Dichloro-2-butene	ug/L	50	50.8J	102	70-141	
Trichloroethene	ug/L	50	59.0	118	70-130	
Trichlorofluoromethane	ug/L	50	50.6	101	62-133	
Vinyl acetate	ug/L	100	105	105	66-157	
Vinyl chloride	ug/L	50	48.8	98	69-130	
Xylene (Total)	ug/L	150	161	107	70-130	
1,2-Dichloroethane-d4 (S)	%			101	70-130	
4-Bromofluorobenzene (S)	%			99	70-130	
Dibromofluoromethane (S)	%			104	70-130	
Toluene-d8 (S)	%			101	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 630604 630605

Parameter	Units	9297234026 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethene	ug/L	ND	50	50	48.3	53.1	97	106	70-166	9	30	
Benzene	ug/L	ND	50	50	43.6	48.8	87	98	70-148	11	30	
Chlorobenzene	ug/L	ND	50	50	44.1	49.4	88	99	70-146	11	30	
Toluene	ug/L	ND	50	50	44.5	49.3	89	99	70-155	10	30	
Trichloroethene	ug/L	ND	50	50	42.2	46.8	84	93	69-151	10	30	
1,2-Dichloroethane-d4 (S)	%						116	113	70-130			
4-Bromofluorobenzene (S)	%						93	94	70-130			
Dibromofluoromethane (S)	%						118	115	70-130			
Toluene-d8 (S)	%						94	95	70-130			

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WET/17103
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Associated Lab Samples: 9297319001

METHOD BLANK: 632237
Matrix: Water
Associated Lab Samples: 9297319001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	ug/L	ND	5000	07/12/11 14:00	

LABORATORY CONTROL SAMPLE: 632238

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	ug/L	50000	51200	102	90-110	

SAMPLE DUPLICATE: 632239

Parameter	Units	9297589001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	ug/L	30.2 mg/L	29100	4	20	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WET/17121 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 9297319002, 9297319003, 9297319004

METHOD BLANK: 632752 Matrix: Water
Associated Lab Samples: 9297319002, 9297319003, 9297319004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	ug/L	ND	5000	07/14/11 13:50	

LABORATORY CONTROL SAMPLE: 632753

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	ug/L	50000	50800	102	90-110	

SAMPLE DUPLICATE: 632754

Parameter	Units	9297234007 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	ug/L	43800	41700	5	20	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WET/17048 Analysis Method: SM 4500-S2D
QC Batch Method: SM 4500-S2D Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 9297319001, 9297319002, 9297319003

METHOD BLANK: 630316 Matrix: Water
Associated Lab Samples: 9297319001, 9297319002, 9297319003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide	ug/L	ND	1000	07/06/11 16:30	

LABORATORY CONTROL SAMPLE: 630317

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	ug/L	500	509J	102	90-110	

MATRIX SPIKE SAMPLE: 630318

Parameter	Units	9297185002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide	ug/L	ND	500	ND	6	75-125	M0

SAMPLE DUPLICATE: 630319

Parameter	Units	9297185002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide	ug/L	ND	ND		20	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WET/16998 | Analysis Method: SM 5210B
QC Batch Method: SM 5210B | Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 9297319001

METHOD BLANK: 628803 | Matrix: Water
Associated Lab Samples: 9297319001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	ug/L	ND	2000	07/06/11 09:07	

LABORATORY CONTROL SAMPLE: 628804

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	ug/L	198000	193000	97	84-115	

SAMPLE DUPLICATE: 628805

Parameter	Units	9297319001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	ug/L	ND	ND		20	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WET/17021 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 9297319002, 9297319003, 9297319004

METHOD BLANK: 629470 Matrix: Water
Associated Lab Samples: 9297319002, 9297319003, 9297319004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
BOD, 5 day	ug/L	ND	2000	07/07/11 11:36	

LABORATORY CONTROL SAMPLE: 629471

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	ug/L	198000	200000	101	84-115	

SAMPLE DUPLICATE: 629472

Parameter	Units	9297153005 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	ug/L	13.7 mg/L	12200	12	20	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WETA/10085
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 9297319001

METHOD BLANK: 632799
Matrix: Water
Associated Lab Samples: 9297319001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	ug/L	ND	250000	07/13/11 17:52	

LABORATORY CONTROL SAMPLE: 632800

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	20000	19500J	97	90-110	

MATRIX SPIKE SAMPLE: 632801

Parameter	Units	9297093002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	8.8 mg/L	20000	28300J	97	90-110	

MATRIX SPIKE SAMPLE: 632803

Parameter	Units	9297093003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	10.8 mg/L	20000	30000J	96	90-110	

SAMPLE DUPLICATE: 632802

Parameter	Units	9297093002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	ug/L	8.8 mg/L	8870J	1	20	

SAMPLE DUPLICATE: 632804

Parameter	Units	9297093003 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	ug/L	10.8 mg/L	10700J	0	20	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WETA/10086 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 9297319002, 9297319003, 9297319004

METHOD BLANK: 632809 Matrix: Water
Associated Lab Samples: 9297319002, 9297319003, 9297319004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	ug/L	ND	250000	07/14/11 01:06	

LABORATORY CONTROL SAMPLE: 632810

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	20000	19000J	95	90-110	

MATRIX SPIKE SAMPLE: 632811

Parameter	Units	9297410001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	ND	20000	20000J	89	90-110	M1

MATRIX SPIKE SAMPLE: 632813

Parameter	Units	9297410002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	45.6 mg/L	20000	61200J	78	90-110	M1

SAMPLE DUPLICATE: 632812

Parameter	Units	9297410001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	ug/L	ND	ND		20	

SAMPLE DUPLICATE: 632814

Parameter	Units	9297410002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	ug/L	45.6 mg/L	46100J	1	20	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WETA/10021
QC Batch Method: EPA 353.2
Analysis Method: EPA 353.2
Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Associated Lab Samples: 9297319001

METHOD BLANK: 628790
Matrix: Water
Associated Lab Samples: 9297319001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Nitrate	ug/L	ND	10000	06/30/11 21:38	

LABORATORY CONTROL SAMPLE: 628791

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	ug/L	5000	5080J	102	90-110	

MATRIX SPIKE SAMPLE: 628792

Parameter	Units	9297183001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	ug/L	2.6 mg/L	5000	7870J	105	90-110	

MATRIX SPIKE SAMPLE: 628794

Parameter	Units	9297212001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	ug/L	7.0 mg/L	5000	12800J	115	90-110	M1

SAMPLE DUPLICATE: 628793

Parameter	Units	9297183001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Nitrate	ug/L	2.6 mg/L	2640J	0	20	

SAMPLE DUPLICATE: 628795

Parameter	Units	9297212001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Nitrate	ug/L	7.0 mg/L	7050J	0	20	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WETA/10033 | Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 | Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Associated Lab Samples: 9297319002, 9297319003, 9297319004

METHOD BLANK: 629444 | Matrix: Water
Associated Lab Samples: 9297319002, 9297319003, 9297319004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Nitrate	ug/L	ND	10000	07/01/11 21:03	

LABORATORY CONTROL SAMPLE: 629445

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	ug/L	5000	4930J	99	90-110	

MATRIX SPIKE SAMPLE: 629446

Parameter	Units	9297319004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	ug/L	ND	5000	4990J	98	90-110	

SAMPLE DUPLICATE: 629447

Parameter	Units	9297319004 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Nitrate	ug/L	ND	ND		20	

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Eden, NC 27288
(336)623-8921

Pace Analytical Services, Inc.
2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WETA/10107 Analysis Method: SM 4500-Cl-E
QC Batch Method: SM 4500-Cl-E Analysis Description: 4500 Chloride
Associated Lab Samples: 9297319001, 9297319002, 9297319003, 9297319004

METHOD BLANK: 634467 Matrix: Water
Associated Lab Samples: 9297319001, 9297319002, 9297319003, 9297319004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	ug/L	ND	5000	07/15/11 13:59	

LABORATORY CONTROL SAMPLE: 634468

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	ug/L	20000	20200	101	90-110	

MATRIX SPIKE SAMPLE: 634469

Parameter	Units	9297593002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	ug/L	55.7 mg/L	5000000	3810000	75	75-125	M0

SAMPLE DUPLICATE: 634470

Parameter	Units	9297594001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	ug/L	6440 mg/L	6600000	3	20	

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Huntersville, NC 28078
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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WETA/10113 Analysis Method: SM 5220D
QC Batch Method: SM 5220D Analysis Description: 5220D COD
Associated Lab Samples: 9297319001, 9297319002, 9297319003

METHOD BLANK: 634928 Matrix: Water
Associated Lab Samples: 9297319001, 9297319002, 9297319003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chemical Oxygen Demand	ug/L	ND	25000	07/18/11 13:57	

LABORATORY CONTROL SAMPLE: 634929

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	ug/L	750000	728000	97	90-110	

MATRIX SPIKE SAMPLE: 634930

Parameter	Units	9297305002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	ug/L	719 mg/L	750000	1450000	98	75-125	

MATRIX SPIKE SAMPLE: 634932

Parameter	Units	9297319001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	ug/L	ND	750000	733000	98	75-125	

SAMPLE DUPLICATE: 634931

Parameter	Units	9297305002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	ug/L	719 mg/L	782000	8	20	

SAMPLE DUPLICATE: 634933

Parameter	Units	9297319001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	ug/L	ND	ND		20	

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(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WETA/10028
QC Batch Method: SM 5310B
Analysis Method: SM 5310B
Analysis Description: 5310B TOC
Associated Lab Samples: 9297319001

METHOD BLANK: 628908
Matrix: Water
Associated Lab Samples: 9297319001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	ug/L	ND	1000	07/01/11 16:30	

LABORATORY CONTROL SAMPLE: 628909

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	ug/L	25000	24500	98	90-110	

MATRIX SPIKE SAMPLE: 628912

Parameter	Units	9297084014 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	ug/L	8.4 mg/L	25000	27300	76	75-125	

MATRIX SPIKE SAMPLE: 628913

Parameter	Units	9297084001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	ug/L	14.0 mg/L	25000	29100	60	75-125	M1

SAMPLE DUPLICATE: 628910

Parameter	Units	9297385001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	ug/L	2.6 mg/L	2610	1	20	

SAMPLE DUPLICATE: 628911

Parameter	Units	9297385002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	ug/L	21.5 mg/L	21400	0	20	

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Asheville, NC 28804
(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

QC Batch: WETA/10087 Analysis Method: SM 5310B
QC Batch Method: SM 5310B Analysis Description: 5310B TOC
Associated Lab Samples: 9297319002, 9297319003, 9297319004

METHOD BLANK: 632815 Matrix: Water
Associated Lab Samples: 9297319002, 9297319003, 9297319004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Organic Carbon	ug/L	ND	1000	07/19/11 21:17	

LABORATORY CONTROL SAMPLE: 632816

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	ug/L	25000	24600	98	90-110	

MATRIX SPIKE SAMPLE: 632817

Parameter	Units	9297645001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	ug/L	3.6 mg/L	25000	26700	92	75-125	

MATRIX SPIKE SAMPLE: 632819

Parameter	Units	9297319002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	ug/L	8800	25000	32300	94	75-125	

SAMPLE DUPLICATE: 632818

Parameter	Units	9297450001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	ug/L	13400	13400	0	20	

SAMPLE DUPLICATE: 632820

Parameter	Units	9297319003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	ug/L	10800	10700	1	20	

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QUALIFIERS

Project: ALEXANDER MSWLF - SWS +UIC
Pace Project No.: 9297319

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-A	Pace Analytical Services - Asheville
PASI-C	Pace Analytical Services - Charlotte
PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Partial submittal other samples to follow later for 1 Report

Page: 1 of 1

1477375

Section A Required Client Information:

Company: Municipal Engineering Services
Address: PO Box 97
Garner NC 27529
Email To: jpfohl@mesco.com
Phone: (919)772-5393 Fax: (919)772-1176
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: jpfohl@mesco.com
Copy To: mgerman@mesco.com
Purchase Order No.:
Project Name: Alexander MSWLF-SWS & UIC
Project Number:

Section C Invoice Information:

Attention:
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Kevin Galvin
Pace Profile #: 2103-3

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER

Site Location STATE: NC

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	COLLECTED Composite Start TIME	COLLECTED Composite End/Grab DATE	COLLECTED Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	VOCs-App I	Metals-App I	Alkalinity	Sulfate // Sulfide	TOC / COD	Nitrate	Chloride	Iron	BOD	~~VOCs-App II~~	~~Herbicides~~	Mercury	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-31	WT	G			6/29/11	2:35											✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	N	0997319 001
2																															
3																															
4																															
5																															
6																															
7																															
8																															
9																															
10																															
11																															
12																															

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	MESCO	6/30/11	7:05	Pace	6/30/11	705				
		6/30/11	1145	Pace	6/30/11	1145	2.8	Y	n	Y

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Joseph Pfohl

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY): 6/29/11

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Sample Condition Upon Receipt

Pace Analytical

Client Name: Municipal Project # 9297319

Where Received: ☑ Huntersville ☐ Asheville ☐ Eden

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other_____

Optional
Proj. Due Date:
Proj. Name:

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other_____

Thermometer Used: IR Gun : T1102 **Type of Ice:** (Wet) Blue None ☑ Samples on ice, cooling process has begun

Temp Correction Factor: Add / Subtract 0 °C

Corrected Cooler Temp.: 2.8 C **Biological Tissue is Frozen:** Yes No

Date and Initials of person examining contents: JMM 6-30-11

Temp should be above freezing to 6°C

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☑Yes ☐No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix:_____	☐Yes ☑No ☐N/A	12. no time or date on any sample labels
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☐N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☐Yes ☐No	Initial when completed
Samples checked for dechlorination:	☑Yes ☐No ☐N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	15.
Trip Blank Present:	☐Yes ☐No ☑N/A	16.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):_____		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

SCURF Review: L/L **Date:** 6/30/11 **SRF Review:** L/L **Date:** 6/30/11

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Last submittal for this Report. combine w/ 1477375 submitted previously

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1474395

Section A Required Client Information:

Company: Municipal Engineering Services
Address: PO Box 97
Garner NC 27529
Email To: jpfahl@mesco.com
Phone: (919)772-5393 Fax: (919)772-1176
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: jpfahl@mesco.com
Copy To: mgeiman@mescoeng.com
Purchase Order No.:
Project Name: Alexander MSWLF SWS & VIC
Project Number:

Section C Invoice Information:

Attention: See A
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Kevin Godwin
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER

Site Location STATE: NC

Section D Required Client Information

Matrix Codes (see valid codes to left) — MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): N

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start Date	Composite Start Time	Composite End/Grab Date	Composite End/Grab Time	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: VOCs-App I	Metals-App I	Alkalinity / Chloride	Sulfate // Nitrate	Sulfide	TOC	Iron	BOD	1,2,4-Trichlorobenzene	Dinoseb	Mercury	COD	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 9297319
1	MW-11	WT	G			6/30/11	17:30												✓	✓	✓	✓	✓	✓	✓		✓	✓	N	92973190 02
2	MW-26	↓	↓			↓	16:30											✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		003
3	MW-27	↓	↓			↓	15:35											✓	✓	✓	✓	.	✓		✓	✓	✓	✓			004
4																															
5																															
6																															
7																															
8																															
9																															
10																															
11																															
12																															

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	/MESCO	6/30/11	1:20		7/1/11	1320				
	Pace	7/1/11 7/01/11	1410		7/01/11	1410	2.1	Y	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Jaqueline Pack
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 6/30/11

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Sample Condition Upon Receipt

Pace Analytical

Client Name: Municipal Project # 997319

Where Received: ☒ Huntersville ☐ Asheville ☐ Eden

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☒ Pace Other_____

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Optional
Proj. Due Date:
Proj. Name:

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other_____

Thermometer Used: IR Gun : T1102 **Type of Ice:** (Wet) Blue None ☒ Samples on ice, cooling process has begun

Temp Correction Factor: Add / Subtract 0 °C

Corrected Cooler Temp.: 2.1 C **Biological Tissue is Frozen:** Yes (No)

Temp should be above freezing to 6°C

Date and Initials of person examining contents: JEA 07/01/11

Comments:

Chain of Custody Present:	☑Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☑Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☑Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A	5.
Short Hold Time Analysis (<72hr):	☑Yes	☐No	☐N/A	6.
Rush Turn Around Time Requested:	☐Yes	☑No	☐N/A	7.
Sufficient Volume:	~~☐Yes~~	☑No	☐N/A	8. Did not Receive Metal Bottle
Correct Containers Used:	☑Yes	☐No	☐N/A	9. For MW-26 or MW-27
-Pace Containers Used:	☑Yes	☐No	☐N/A	
Containers Intact:	☑Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: WS	☑Yes	☑No	☐N/A	12. No Date or Times on samples BOT is on COC
All containers needing preservation have been checked.	☑Yes	☐No	☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes	☐No	☐N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☐Yes	☐No		Initial when completed
Samples checked for dechlorination:	☑Yes	☐No	☐N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes	☑No	☐N/A	15.
Trip Blank Present:	☐Yes	☐No	☑N/A	16.
Trip Blank Custody Seals Present	☐Yes	☐No	☑N/A	
Pace Trip Blank Lot # (if purchased):				

Field Data Required? Y / N

Client Notification/ Resolution:

Person Contacted: Jonathan Hahn Date/Time: 7/1/11

Comments/ Resolution: PM informed of missing samples. KG

SCURF Review: JG **Date:** 7/1/11 **SRF Review:** RCS **Date:** 7/1/11

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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Page: 1 of 1

1474368

Section A Required Client Information:

Company: Municipal Engineering Serv.
Address: PO Box 97
Garner NC 27529
Email To: jpfuhle@mesco.com
Phone: (919) 772-5393 Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: jpfuhle@mesco.com
Copy To: mgoinas@mesco.com
Purchase Order No.:
Project Name: Alexander MSWLF & UIC
Project Number:

Section C Invoice Information:

Attention:
Company Name:
Address:
Pace Quote Reference: Kevin Godwin
Pace Project Manager:
Pace Profile #: 2103-3

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER

Site Location STATE: NC

Section D Required Client Information

Matrix Codes MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	COLLECTED Composite Start TIME	COLLECTED Composite End/Grab DATE	COLLECTED Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N)	Metals - APII	Mercury	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-26	WT	G			6/30/11	16:30					1							✓	✓	✓	N	9297319 005
2	MW-27	"	"			6/30/11	15:35					1							✓	✓			006
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	MESCO	7/3/11	8:45	PACE	7/5/11	8:45				
	Pace	7/5/11	1230	Pace	7/5/11	1230	24	Y	n	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 7/3/11

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Sample Condition Upon Receipt

Pace Analytical

Client Name: Municipal Eng. Project # 9297319

Where Received: ☑ Huntersville ☐ Asheville ☐ Eden

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other_____

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Optional
Proj. Due Date:
Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other_____

Thermometer Used: IR Gun : T1102 **Type of Ice:** (Wet) Blue None ☑ Samples on ice, cooling process has begun

Temp Correction Factor: Add / Subtract 0 °C

Corrected Cooler Temp.: 2.4 C **Biological Tissue is Frozen:** Yes No

Date and Initials of person examining contents: JMM 7-5-11

Temp should be above freezing to 6°C

Comments:

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix:_____	☐Yes ☑No ☐N/A	12. no time or date on any sample labels.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☐Yes ☐No	Initial when completed
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	15.
Trip Blank Present:	☐Yes ☐No ☑N/A	16.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):_____		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

SCURF Review: JL Date: 7/5/11 **SRF Review:** JL Date: 7/5/11

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
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9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

July 18, 2011

Mr. Jonathan Pfohl
Municipal Engineering Services
PO Box 97
Garner, NC 27529

RE: Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

Dear Mr. Pfohl:
Enclosed are the analytical results for sample(s) received by the laboratory on July 01, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards, where applicable, unless otherwise narrated in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

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

Sincerely,

Kevin Godwin

kevin.godwin@pacelabs.com
Project Manager

Enclosures

cc: Ms. Maggie German, Municipal Engineering Services

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CERTIFICATIONS

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

Charlotte Certification IDs

9800 Kincey Ave. Ste 100, Huntersville, NC 28078
Louisiana/LELAP Certification #: 04034
New Jersey Certification #: NC012
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
Pennsylvania Certification #: 68-00784
South Carolina Certification #: 99006001
South Carolina Drinking Water Cert. #: 99006003
Virginia Drinking Water Certification #: 00213
Connecticut Certification #: PH-0104
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Louisiana DHH Drinking Water # LA 100031
West Virginia Certification #: 357
Virginia/VELAP Certification #: 460144

Asheville Certification IDs

2225 Riverside Dr., Asheville, NC 28804
Connecticut Certification #: PH-0106
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
New Jersey Certification #: NC011
North Carolina Bioassay Certification #: 9
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
Pennsylvania Certification #: 68-03578
South Carolina Bioassay Certification #: 99030002
South Carolina Certification #: 99030001
Virginia Certification #: 00072
West Virginia Certification #: 356
Virgina/VELAP Certification #: 460147

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SAMPLE SUMMARY

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

Lab ID	Sample ID	Matrix	Date Collected	Date Received
9297447001	**EB**	Water	06/30/11 00:00	07/01/11 14:10
9297447002	**FB**	Water	06/30/11 00:00	07/01/11 14:10
9297447003	**TB**	Water	06/30/11 00:00	07/01/11 14:10

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SAMPLE ANALYTE COUNT

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
9297447001	**EB**	EPA 6010	JMW	16	PASI-A
		EPA 7470	JMW	1	PASI-A
		EPA 8260	MCK	68	PASI-C
9297447002	**FB**	EPA 6010	JMW	16	PASI-A
		EPA 7470	JMW	1	PASI-A
		EPA 8260	MCK	68	PASI-C
9297447003	**TB**	EPA 8260	MCK	68	PASI-C

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

Sample: EB **Lab ID: 9297447001** Collected: 06/30/11 00:00 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	07/09/11 14:30	07/13/11 21:31	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:31	7440-38-2	
Barium	ND	ug/L	100	5.0	1	07/09/11 14:30	07/13/11 21:31	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	07/09/11 14:30	07/13/11 21:31	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	07/09/11 14:30	07/13/11 21:31	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:31	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:31	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:31	7440-50-8	
Lead	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:31	7439-92-1	
Nickel	ND	ug/L	50.0	5.0	1	07/09/11 14:30	07/13/11 21:31	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	07/09/11 14:30	07/13/11 21:31	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:31	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	07/09/11 14:30	07/13/11 21:31	7440-28-0	
Tin	ND	ug/L	100	5.0	1	07/09/11 14:30	07/13/11 21:31	7440-31-5	
Vanadium	ND	ug/L	25.0	5.0	1	07/09/11 14:30	07/13/11 21:31	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	07/09/11 14:30	07/13/11 21:31	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	07/12/11 15:05	07/13/11 13:36	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	**3.0J**	ug/L	100	2.2	1		07/07/11 19:32	67-64-1	
Acetonitrile	ND	ug/L	55.0	2.2	1		07/07/11 19:32	75-05-8	
Acrolein	ND	ug/L	53.0	1.6	1		07/07/11 19:32	107-02-8	
Acrylonitrile	ND	ug/L	200	1.9	1		07/07/11 19:32	107-13-1	
Allyl chloride	ND	ug/L	10.0	1.5	1		07/07/11 19:32	107-05-1	
Benzene	ND	ug/L	1.0	0.25	1		07/07/11 19:32	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		07/07/11 19:32	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/07/11 19:32	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		07/07/11 19:32	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		07/07/11 19:32	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		07/07/11 19:32	78-93-3	
Carbon disulfide	**4.7J**	ug/L	100	1.2	1		07/07/11 19:32	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		07/07/11 19:32	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		07/07/11 19:32	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		07/07/11 19:32	75-00-3	
Chloroform	**0.50J**	ug/L	5.0	0.14	1		07/07/11 19:32	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		07/07/11 19:32	74-87-3	
Chloroprene	ND	ug/L	20.0	0.27	1		07/07/11 19:32	126-99-8	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		07/07/11 19:32	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		07/07/11 19:32	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		07/07/11 19:32	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		07/07/11 19:32	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		07/07/11 19:32	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	5.0	0.24	1		07/07/11 19:32	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		07/07/11 19:32	106-46-7	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

Sample: EB **Lab ID: 9297447001** Collected: 06/30/11 00:00 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		07/07/11 19:32	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		07/07/11 19:32	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		07/07/11 19:32	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		07/07/11 19:32	107-06-2	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		07/07/11 19:32	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		07/07/11 19:32	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		07/07/11 19:32	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		07/07/11 19:32	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.28	1		07/07/11 19:32	142-28-9	
2,2-Dichloropropane	ND	ug/L	15.0	0.13	1		07/07/11 19:32	594-20-7	
1,1-Dichloropropene	ND	ug/L	5.0	0.49	1		07/07/11 19:32	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		07/07/11 19:32	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		07/07/11 19:32	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		07/07/11 19:32	100-41-4	
Ethyl methacrylate	ND	ug/L	10.0	0.20	1		07/07/11 19:32	97-63-2	
Hexachloro-1,3-butadiene	ND	ug/L	10.0	0.71	1		07/07/11 19:32	87-68-3	
2-Hexanone	ND	ug/L	50.0	0.46	1		07/07/11 19:32	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		07/07/11 19:32	74-88-4	
Isobutanol	ND	ug/L	100	35.0	1		07/07/11 19:32	78-83-1	
Methacrylonitrile	ND	ug/L	100	0.93	1		07/07/11 19:32	126-98-7	
Methylene Chloride	ND	ug/L	1.0	0.97	1		07/07/11 19:32	75-09-2	
Methyl methacrylate	ND	ug/L	30.0	2.0	1		07/07/11 19:32	80-62-6	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		07/07/11 19:32	108-10-1	
Naphthalene	ND	ug/L	10.0	0.24	1		07/07/11 19:32	91-20-3	
Propionitrile	ND	ug/L	150	3.6	1		07/07/11 19:32	107-12-0	
Styrene	ND	ug/L	1.0	0.26	1		07/07/11 19:32	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		07/07/11 19:32	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		07/07/11 19:32	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		07/07/11 19:32	127-18-4	
Toluene	ND	ug/L	1.0	0.26	1		07/07/11 19:32	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/L	10.0	0.35	1		07/07/11 19:32	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		07/07/11 19:32	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		07/07/11 19:32	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		07/07/11 19:32	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		07/07/11 19:32	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		07/07/11 19:32	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		07/07/11 19:32	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		07/07/11 19:32	75-01-4	
Xylene (Total)	ND	ug/L	5.0	0.66	1		07/07/11 19:32	1330-20-7	
4-Bromofluorobenzene (S)	95	%	70-130		1		07/07/11 19:32	460-00-4	
Dibromofluoromethane (S)	119	%	70-130		1		07/07/11 19:32	1868-53-7	
1,2-Dichloroethane-d4 (S)	116	%	70-130		1		07/07/11 19:32	17060-07-0	
Toluene-d8 (S)	99	%	70-130		1		07/07/11 19:32	2037-26-5	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

Sample: FB **Lab ID: 9297447002** Collected: 06/30/11 00:00 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	07/09/11 14:30	07/13/11 21:37	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:37	7440-38-2	
Barium	ND	ug/L	100	5.0	1	07/09/11 14:30	07/13/11 21:37	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	07/09/11 14:30	07/13/11 21:37	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	07/09/11 14:30	07/13/11 21:37	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:37	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:37	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:37	7440-50-8	
Lead	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:37	7439-92-1	
Nickel	ND	ug/L	50.0	5.0	1	07/09/11 14:30	07/13/11 21:37	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	07/09/11 14:30	07/13/11 21:37	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	07/09/11 14:30	07/13/11 21:37	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	07/09/11 14:30	07/13/11 21:37	7440-28-0	
Tin	ND	ug/L	100	5.0	1	07/09/11 14:30	07/13/11 21:37	7440-31-5	
Vanadium	ND	ug/L	25.0	5.0	1	07/09/11 14:30	07/13/11 21:37	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	07/09/11 14:30	07/13/11 21:37	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	07/12/11 15:05	07/13/11 13:39	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		07/08/11 04:00	67-64-1	
Acetonitrile	ND	ug/L	55.0	2.2	1		07/08/11 04:00	75-05-8	
Acrolein	ND	ug/L	53.0	1.6	1		07/08/11 04:00	107-02-8	
Acrylonitrile	ND	ug/L	200	1.9	1		07/08/11 04:00	107-13-1	
Allyl chloride	ND	ug/L	10.0	1.5	1		07/08/11 04:00	107-05-1	
Benzene	ND	ug/L	1.0	0.25	1		07/08/11 04:00	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		07/08/11 04:00	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/08/11 04:00	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		07/08/11 04:00	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		07/08/11 04:00	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		07/08/11 04:00	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		07/08/11 04:00	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		07/08/11 04:00	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		07/08/11 04:00	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		07/08/11 04:00	75-00-3	
Chloroform	**0.47J**	ug/L	5.0	0.14	1		07/08/11 04:00	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		07/08/11 04:00	74-87-3	
Chloroprene	ND	ug/L	20.0	0.27	1		07/08/11 04:00	126-99-8	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		07/08/11 04:00	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		07/08/11 04:00	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		07/08/11 04:00	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		07/08/11 04:00	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		07/08/11 04:00	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	5.0	0.24	1		07/08/11 04:00	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		07/08/11 04:00	106-46-7	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

Sample: FB **Lab ID: 9297447002** Collected: 06/30/11 00:00 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		07/08/11 04:00	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		07/08/11 04:00	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		07/08/11 04:00	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		07/08/11 04:00	107-06-2	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		07/08/11 04:00	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		07/08/11 04:00	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		07/08/11 04:00	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		07/08/11 04:00	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.28	1		07/08/11 04:00	142-28-9	
2,2-Dichloropropane	ND	ug/L	15.0	0.13	1		07/08/11 04:00	594-20-7	
1,1-Dichloropropene	ND	ug/L	5.0	0.49	1		07/08/11 04:00	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		07/08/11 04:00	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		07/08/11 04:00	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		07/08/11 04:00	100-41-4	
Ethyl methacrylate	ND	ug/L	10.0	0.20	1		07/08/11 04:00	97-63-2	
Hexachloro-1,3-butadiene	ND	ug/L	10.0	0.71	1		07/08/11 04:00	87-68-3	
2-Hexanone	ND	ug/L	50.0	0.46	1		07/08/11 04:00	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		07/08/11 04:00	74-88-4	
Isobutanol	ND	ug/L	100	35.0	1		07/08/11 04:00	78-83-1	
Methacrylonitrile	ND	ug/L	100	0.93	1		07/08/11 04:00	126-98-7	
Methylene Chloride	ND	ug/L	1.0	0.97	1		07/08/11 04:00	75-09-2	
Methyl methacrylate	ND	ug/L	30.0	2.0	1		07/08/11 04:00	80-62-6	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		07/08/11 04:00	108-10-1	
Naphthalene	ND	ug/L	10.0	0.24	1		07/08/11 04:00	91-20-3	
Propionitrile	ND	ug/L	150	3.6	1		07/08/11 04:00	107-12-0	
Styrene	ND	ug/L	1.0	0.26	1		07/08/11 04:00	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		07/08/11 04:00	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		07/08/11 04:00	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		07/08/11 04:00	127-18-4	
Toluene	ND	ug/L	1.0	0.26	1		07/08/11 04:00	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/L	10.0	0.35	1		07/08/11 04:00	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		07/08/11 04:00	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		07/08/11 04:00	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		07/08/11 04:00	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		07/08/11 04:00	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		07/08/11 04:00	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		07/08/11 04:00	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		07/08/11 04:00	75-01-4	
Xylene (Total)	ND	ug/L	5.0	0.66	1		07/08/11 04:00	1330-20-7	
4-Bromofluorobenzene (S)	98	%	70-130		1		07/08/11 04:00	460-00-4	
Dibromofluoromethane (S)	103	%	70-130		1		07/08/11 04:00	1868-53-7	
1,2-Dichloroethane-d4 (S)	103	%	70-130		1		07/08/11 04:00	17060-07-0	
Toluene-d8 (S)	98	%	70-130		1		07/08/11 04:00	2037-26-5	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

Sample: TB **Lab ID: 9297447003** Collected: 06/30/11 00:00 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	**4.7J**	ug/L	100	2.2	1		07/08/11 04:24	67-64-1	
Acetonitrile	ND	ug/L	55.0	2.2	1		07/08/11 04:24	75-05-8	
Acrolein	ND	ug/L	53.0	1.6	1		07/08/11 04:24	107-02-8	
Acrylonitrile	ND	ug/L	200	1.9	1		07/08/11 04:24	107-13-1	
Allyl chloride	ND	ug/L	10.0	1.5	1		07/08/11 04:24	107-05-1	
Benzene	ND	ug/L	1.0	0.25	1		07/08/11 04:24	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		07/08/11 04:24	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/08/11 04:24	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		07/08/11 04:24	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		07/08/11 04:24	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		07/08/11 04:24	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		07/08/11 04:24	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		07/08/11 04:24	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		07/08/11 04:24	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		07/08/11 04:24	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		07/08/11 04:24	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		07/08/11 04:24	74-87-3	
Chloroprene	ND	ug/L	20.0	0.27	1		07/08/11 04:24	126-99-8	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		07/08/11 04:24	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		07/08/11 04:24	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		07/08/11 04:24	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		07/08/11 04:24	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		07/08/11 04:24	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	5.0	0.24	1		07/08/11 04:24	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		07/08/11 04:24	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		07/08/11 04:24	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		07/08/11 04:24	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		07/08/11 04:24	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		07/08/11 04:24	107-06-2	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		07/08/11 04:24	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		07/08/11 04:24	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		07/08/11 04:24	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		07/08/11 04:24	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.28	1		07/08/11 04:24	142-28-9	
2,2-Dichloropropane	ND	ug/L	15.0	0.13	1		07/08/11 04:24	594-20-7	
1,1-Dichloropropene	ND	ug/L	5.0	0.49	1		07/08/11 04:24	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		07/08/11 04:24	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		07/08/11 04:24	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		07/08/11 04:24	100-41-4	
Ethyl methacrylate	ND	ug/L	10.0	0.20	1		07/08/11 04:24	97-63-2	
Hexachloro-1,3-butadiene	ND	ug/L	10.0	0.71	1		07/08/11 04:24	87-68-3	
2-Hexanone	ND	ug/L	50.0	0.46	1		07/08/11 04:24	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		07/08/11 04:24	74-88-4	
Isobutanol	ND	ug/L	100	35.0	1		07/08/11 04:24	78-83-1	
Methacrylonitrile	ND	ug/L	100	0.93	1		07/08/11 04:24	126-98-7	
Methylene Chloride	ND	ug/L	1.0	0.97	1		07/08/11 04:24	75-09-2	

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ANALYTICAL RESULTS

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

Sample: TB **Lab ID: 9297447003** Collected: 06/30/11 00:00 Received: 07/01/11 14:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Methyl methacrylate	ND	ug/L	30.0	2.0	1		07/08/11 04:24	80-62-6	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		07/08/11 04:24	108-10-1	
Naphthalene	ND	ug/L	10.0	0.24	1		07/08/11 04:24	91-20-3	
Propionitrile	ND	ug/L	150	3.6	1		07/08/11 04:24	107-12-0	
Styrene	ND	ug/L	1.0	0.26	1		07/08/11 04:24	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		07/08/11 04:24	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		07/08/11 04:24	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		07/08/11 04:24	127-18-4	
Toluene	ND	ug/L	1.0	0.26	1		07/08/11 04:24	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/L	10.0	0.35	1		07/08/11 04:24	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		07/08/11 04:24	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		07/08/11 04:24	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		07/08/11 04:24	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		07/08/11 04:24	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		07/08/11 04:24	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		07/08/11 04:24	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		07/08/11 04:24	75-01-4	
Xylene (Total)	ND	ug/L	5.0	0.66	1		07/08/11 04:24	1330-20-7	
4-Bromofluorobenzene (S)	96	%	70-130		1		07/08/11 04:24	460-00-4	
Dibromofluoromethane (S)	103	%	70-130		1		07/08/11 04:24	1868-53-7	
1,2-Dichloroethane-d4 (S)	102	%	70-130		1		07/08/11 04:24	17060-07-0	
Toluene-d8 (S)	102	%	70-130		1		07/08/11 04:24	2037-26-5	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

QC Batch: MPRP/8694
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET NC Groundwater
Associated Lab Samples: 9297447001, 9297447002

METHOD BLANK: 631117
Matrix: Water
Associated Lab Samples: 9297447001, 9297447002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	6.0	07/13/11 20:19	
Arsenic	ug/L	ND	10.0	07/13/11 20:19	
Barium	ug/L	ND	100	07/13/11 20:19	
Beryllium	ug/L	ND	1.0	07/13/11 20:19	
Cadmium	ug/L	ND	1.0	07/13/11 20:19	
Chromium	ug/L	ND	10.0	07/13/11 20:19	
Cobalt	ug/L	ND	10.0	07/13/11 20:19	
Copper	ug/L	ND	10.0	07/13/11 20:19	
Lead	ug/L	ND	10.0	07/13/11 20:19	
Nickel	ug/L	ND	50.0	07/13/11 20:19	
Selenium	ug/L	ND	10.0	07/13/11 20:19	
Silver	ug/L	ND	10.0	07/13/11 20:19	
Thallium	ug/L	ND	5.5	07/13/11 20:19	
Tin	ug/L	ND	100	07/13/11 20:19	
Vanadium	ug/L	ND	25.0	07/13/11 20:19	
Zinc	ug/L	ND	10.0	07/13/11 20:19	

LABORATORY CONTROL SAMPLE: 631118

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	499	100	80-120	
Arsenic	ug/L	500	501	100	80-120	
Barium	ug/L	500	508	102	80-120	
Beryllium	ug/L	500	504	101	80-120	
Cadmium	ug/L	500	498	100	80-120	
Chromium	ug/L	500	498	100	80-120	
Cobalt	ug/L	500	504	101	80-120	
Copper	ug/L	500	504	101	80-120	
Lead	ug/L	500	504	101	80-120	
Nickel	ug/L	500	502	100	80-120	
Selenium	ug/L	500	503	101	80-120	
Silver	ug/L	250	248	99	80-120	
Thallium	ug/L	500	496	99	80-120	
Tin	ug/L	500	510	102	80-120	
Vanadium	ug/L	500	496	99	80-120	
Zinc	ug/L	500	519	104	80-120	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 631119 631120

Parameter	Units	9297382003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	ND	500	500	506	494	101	99	75-125	2	25	
Arsenic	ug/L	ND	500	500	516	502	103	100	75-125	3	25	
Barium	ug/L	41.2J	500	500	555	541	103	100	75-125	3	25	
Beryllium	ug/L	ND	500	500	514	501	103	100	75-125	3	25	
Cadmium	ug/L	ND	500	500	506	493	101	99	75-125	3	25	
Chromium	ug/L	ND	500	500	502	492	100	98	75-125	2	25	
Cobalt	ug/L	ND	500	500	500	487	100	97	75-125	3	25	
Copper	ug/L	ND	500	500	506	494	101	99	75-125	2	25	
Lead	ug/L	ND	500	500	497	487	99	97	75-125	2	25	
Nickel	ug/L	ND	500	500	497	485	99	97	75-125	2	25	
Selenium	ug/L	ND	500	500	513	499	103	100	75-125	3	25	
Silver	ug/L	ND	250	250	253	246	101	98	75-125	3	25	
Thallium	ug/L	ND	500	500	486	474	97	95	75-125	2	25	
Tin	ug/L	ND	500	500	513	501	103	100	75-125	2	25	
Vanadium	ug/L	ND	500	500	508	496	101	99	75-125	2	25	
Zinc	ug/L	ND	500	500	520	512	103	101	75-125	2	25	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

QC Batch: MERP/3605 | Analysis Method: EPA 7470
QC Batch Method: EPA 7470 | Analysis Description: 7470 Mercury
Associated Lab Samples: 9297447001, 9297447002

METHOD BLANK: 632262 | Matrix: Water
Associated Lab Samples: 9297447001, 9297447002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	07/13/11 12:46	

LABORATORY CONTROL SAMPLE: 632263

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.3	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 632264 632265

Parameter	Units	9297391006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.2	2.3	86	91	75-125	5	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 632266 632267

Parameter	Units	9297391007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.3	2.6	94	104	75-125	10	25	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

QC Batch: MSV/15933
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV Low Level Landfill
Associated Lab Samples: 9297447001

METHOD BLANK: 630602
Matrix: Water
Associated Lab Samples: 9297447001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	5.0	07/07/11 11:02	
1,1,1-Trichloroethane	ug/L	ND	1.0	07/07/11 11:02	
1,1,2,2-Tetrachloroethane	ug/L	ND	3.0	07/07/11 11:02	
1,1,2-Trichloroethane	ug/L	ND	1.0	07/07/11 11:02	
1,1-Dichloroethane	ug/L	ND	5.0	07/07/11 11:02	
1,1-Dichloroethene	ug/L	ND	5.0	07/07/11 11:02	
1,1-Dichloropropene	ug/L	ND	5.0	07/07/11 11:02	
1,2,3-Trichloropropane	ug/L	ND	1.0	07/07/11 11:02	
1,2,4-Trichlorobenzene	ug/L	ND	10.0	07/07/11 11:02	
1,2-Dibromo-3-chloropropane	ug/L	ND	13.0	07/07/11 11:02	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	07/07/11 11:02	
1,2-Dichlorobenzene	ug/L	ND	5.0	07/07/11 11:02	
1,2-Dichloroethane	ug/L	ND	1.0	07/07/11 11:02	
1,2-Dichloropropane	ug/L	ND	1.0	07/07/11 11:02	
1,3-Dichlorobenzene	ug/L	ND	5.0	07/07/11 11:02	
1,3-Dichloropropane	ug/L	ND	1.0	07/07/11 11:02	
1,4-Dichlorobenzene	ug/L	ND	1.0	07/07/11 11:02	
2,2-Dichloropropane	ug/L	ND	15.0	07/07/11 11:02	
2-Butanone (MEK)	ug/L	ND	100	07/07/11 11:02	
2-Hexanone	ug/L	ND	50.0	07/07/11 11:02	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	07/07/11 11:02	
Acetone	ug/L	2.9J	100	07/07/11 11:02	
Acetonitrile	ug/L	ND	55.0	07/07/11 11:02	
Acrolein	ug/L	19.9J	53.0	07/07/11 11:02	B-
Acrylonitrile	ug/L	ND	200	07/07/11 11:02	
Allyl chloride	ug/L	ND	10.0	07/07/11 11:02	
Benzene	ug/L	ND	1.0	07/07/11 11:02	
Bromochloromethane	ug/L	ND	3.0	07/07/11 11:02	
Bromodichloromethane	ug/L	ND	1.0	07/07/11 11:02	
Bromoform	ug/L	ND	3.0	07/07/11 11:02	
Bromomethane	ug/L	ND	10.0	07/07/11 11:02	
Carbon disulfide	ug/L	ND	100	07/07/11 11:02	
Carbon tetrachloride	ug/L	ND	1.0	07/07/11 11:02	
Chlorobenzene	ug/L	ND	3.0	07/07/11 11:02	
Chloroethane	ug/L	ND	10.0	07/07/11 11:02	
Chloroform	ug/L	0.14J	5.0	07/07/11 11:02	
Chloromethane	ug/L	ND	1.0	07/07/11 11:02	
Chloroprene	ug/L	ND	20.0	07/07/11 11:02	
cis-1,2-Dichloroethene	ug/L	ND	5.0	07/07/11 11:02	
cis-1,3-Dichloropropene	ug/L	ND	1.0	07/07/11 11:02	
Dibromochloromethane	ug/L	ND	3.0	07/07/11 11:02	
Dibromomethane	ug/L	ND	10.0	07/07/11 11:02	
Dichlorodifluoromethane	ug/L	ND	5.0	07/07/11 11:02	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

METHOD BLANK: 630602 Matrix: Water

Associated Lab Samples: 9297447001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethyl methacrylate	ug/L	ND	10.0	07/07/11 11:02	
Ethylbenzene	ug/L	ND	1.0	07/07/11 11:02	
Hexachloro-1,3-butadiene	ug/L	ND	10.0	07/07/11 11:02	
Iodomethane	ug/L	ND	10.0	07/07/11 11:02	
Isobutanol	ug/L	ND	100	07/07/11 11:02	
Methacrylonitrile	ug/L	ND	100	07/07/11 11:02	
Methyl methacrylate	ug/L	ND	30.0	07/07/11 11:02	
Methylene Chloride	ug/L	ND	1.0	07/07/11 11:02	
Naphthalene	ug/L	ND	10.0	07/07/11 11:02	
Propionitrile	ug/L	ND	150	07/07/11 11:02	
Styrene	ug/L	ND	1.0	07/07/11 11:02	
Tetrachloroethene	ug/L	ND	1.0	07/07/11 11:02	
Toluene	ug/L	ND	1.0	07/07/11 11:02	
trans-1,2-Dichloroethene	ug/L	ND	5.0	07/07/11 11:02	
trans-1,3-Dichloropropene	ug/L	ND	1.0	07/07/11 11:02	
trans-1,4-Dichloro-2-butene	ug/L	ND	100	07/07/11 11:02	
Trichloroethene	ug/L	ND	1.0	07/07/11 11:02	
Trichlorofluoromethane	ug/L	ND	1.0	07/07/11 11:02	
Vinyl acetate	ug/L	ND	50.0	07/07/11 11:02	
Vinyl chloride	ug/L	ND	1.0	07/07/11 11:02	
Xylene (Total)	ug/L	ND	5.0	07/07/11 11:02	
1,2-Dichloroethane-d4 (S)	%	113	70-130	07/07/11 11:02	
4-Bromofluorobenzene (S)	%	94	70-130	07/07/11 11:02	
Dibromofluoromethane (S)	%	118	70-130	07/07/11 11:02	
Toluene-d8 (S)	%	97	70-130	07/07/11 11:02	

LABORATORY CONTROL SAMPLE: 630603

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	50	50.9	102	70-130	
1,1,1-Trichloroethane	ug/L	50	51.0	102	70-130	
1,1,2,2-Tetrachloroethane	ug/L	50	32.1	64	70-130	L0
1,1,2-Trichloroethane	ug/L	50	50.8	102	70-130	
1,1-Dichloroethane	ug/L	50	51.4	103	70-130	
1,1-Dichloroethene	ug/L	50	49.5	99	70-132	
1,1-Dichloropropene	ug/L	50	47.2	94	70-130	
1,2,3-Trichloropropane	ug/L	50	48.0	96	70-130	
1,2,4-Trichlorobenzene	ug/L	50	51.6	103	70-134	
1,2-Dibromo-3-chloropropane	ug/L	50	46.6	93	70-130	
1,2-Dibromoethane (EDB)	ug/L	50	48.9	98	70-130	
1,2-Dichlorobenzene	ug/L	50	50.8	102	70-130	
1,2-Dichloroethane	ug/L	50	51.2	102	70-130	
1,2-Dichloropropane	ug/L	50	48.9	98	70-130	
1,3-Dichlorobenzene	ug/L	50	50.6	101	70-130	
1,3-Dichloropropane	ug/L	50	50.2	100	70-130	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

LABORATORY CONTROL SAMPLE: 630603

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dichlorobenzene	ug/L	50	48.5	97	70-130	
2,2-Dichloropropane	ug/L	50	55.7	111	58-145	
2-Butanone (MEK)	ug/L	100	94.8J	95	70-145	
2-Hexanone	ug/L	100	92.2	92	70-144	
4-Methyl-2-pentanone (MIBK)	ug/L	100	90.9J	91	70-140	
Acetone	ug/L	100	99.2J	99	50-175	
Acetonitrile	ug/L	500	585	117	70-130	
Acrolein	ug/L	250	230	92	70-130	
Acrylonitrile	ug/L	250	268	107	70-143	
Allyl chloride	ug/L	50	55.3	111	70-130	
Benzene	ug/L	50	46.5	93	70-130	
Bromochloromethane	ug/L	50	50.3	101	70-130	
Bromodichloromethane	ug/L	50	49.8	100	70-130	
Bromoform	ug/L	50	49.5	99	70-130	
Bromomethane	ug/L	50	63.5	127	54-130	
Carbon disulfide	ug/L	50	53.7J	107	70-131	
Carbon tetrachloride	ug/L	50	49.5	99	70-132	
Chlorobenzene	ug/L	50	49.6	99	70-130	
Chloroethane	ug/L	50	53.9	108	64-134	
Chloroform	ug/L	50	52.2	104	70-130	
Chloromethane	ug/L	50	43.3	87	64-130	
Chloroprene	ug/L	50	50.6	101	70-130	
cis-1,2-Dichloroethene	ug/L	50	50.2	100	70-131	
cis-1,3-Dichloropropene	ug/L	50	56.5	113	70-130	
Dibromochloromethane	ug/L	50	47.5	95	70-130	
Dibromomethane	ug/L	50	49.0	98	70-131	
Dichlorodifluoromethane	ug/L	50	38.2	76	56-130	
Ethyl methacrylate	ug/L	50	48.3	97	70-130	
Ethylbenzene	ug/L	50	50.1	100	70-130	
Hexachloro-1,3-butadiene	ug/L	50	46.8	94	70-130	
Iodomethane	ug/L	100	121	121	49-180	
Isobutanol	ug/L	1000	960	96	70-130	
Methacrylonitrile	ug/L	500	511	102	70-130	
Methyl methacrylate	ug/L	50	44.8	90	70-130	
Methylene Chloride	ug/L	50	50.6	101	63-130	
Naphthalene	ug/L	50	48.0	96	70-138	
Propionitrile	ug/L	500	506	101	70-130	
Styrene	ug/L	50	55.1	110	70-130	
Tetrachloroethene	ug/L	50	47.7	95	70-130	
Toluene	ug/L	50	48.3	97	70-130	
trans-1,2-Dichloroethene	ug/L	50	49.5	99	70-130	
trans-1,3-Dichloropropene	ug/L	50	54.2	108	70-132	
trans-1,4-Dichloro-2-butene	ug/L	50	50.8J	102	70-141	
Trichloroethene	ug/L	50	59.0	118	70-130	
Trichlorofluoromethane	ug/L	50	50.6	101	62-133	
Vinyl acetate	ug/L	100	105	105	66-157	
Vinyl chloride	ug/L	50	48.8	98	69-130	
Xylene (Total)	ug/L	150	161	107	70-130	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

LABORATORY CONTROL SAMPLE: 630603

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichloroethane-d4 (S)	%			101	70-130	
4-Bromofluorobenzene (S)	%			99	70-130	
Dibromofluoromethane (S)	%			104	70-130	
Toluene-d8 (S)	%			101	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 630604 630605

Parameter	Units	9297234026 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethene	ug/L	ND	50	50	48.3	53.1	97	106	70-166	9	30	
Benzene	ug/L	ND	50	50	43.6	48.8	87	98	70-148	11	30	
Chlorobenzene	ug/L	ND	50	50	44.1	49.4	88	99	70-146	11	30	
Toluene	ug/L	ND	50	50	44.5	49.3	89	99	70-155	10	30	
Trichloroethene	ug/L	ND	50	50	42.2	46.8	84	93	69-151	10	30	
1,2-Dichloroethane-d4 (S)	%						116	113	70-130			
4-Bromofluorobenzene (S)	%						93	94	70-130			
Dibromofluoromethane (S)	%						118	115	70-130			
Toluene-d8 (S)	%						94	95	70-130			

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

QC Batch: MSV/15934
Analysis Method: EPA 8260
QC Batch Method: EPA 8260
Analysis Description: 8260 MSV Low Level Landfill
Associated Lab Samples: 9297447002, 9297447003

METHOD BLANK: 630616
Matrix: Water
Associated Lab Samples: 9297447002, 9297447003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	5.0	07/07/11 23:07	
1,1,1-Trichloroethane	ug/L	ND	1.0	07/07/11 23:07	
1,1,2,2-Tetrachloroethane	ug/L	ND	3.0	07/07/11 23:07	
1,1,2-Trichloroethane	ug/L	ND	1.0	07/07/11 23:07	
1,1-Dichloroethane	ug/L	ND	5.0	07/07/11 23:07	
1,1-Dichloroethene	ug/L	ND	5.0	07/07/11 23:07	
1,1-Dichloropropene	ug/L	ND	5.0	07/07/11 23:07	
1,2,3-Trichloropropane	ug/L	ND	1.0	07/07/11 23:07	
1,2,4-Trichlorobenzene	ug/L	ND	10.0	07/07/11 23:07	
1,2-Dibromo-3-chloropropane	ug/L	ND	13.0	07/07/11 23:07	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	07/07/11 23:07	
1,2-Dichlorobenzene	ug/L	ND	5.0	07/07/11 23:07	
1,2-Dichloroethane	ug/L	ND	1.0	07/07/11 23:07	
1,2-Dichloropropane	ug/L	ND	1.0	07/07/11 23:07	
1,3-Dichlorobenzene	ug/L	ND	5.0	07/07/11 23:07	
1,3-Dichloropropane	ug/L	ND	1.0	07/07/11 23:07	
1,4-Dichlorobenzene	ug/L	ND	1.0	07/07/11 23:07	
2,2-Dichloropropane	ug/L	ND	15.0	07/07/11 23:07	
2-Butanone (MEK)	ug/L	ND	100	07/07/11 23:07	
2-Hexanone	ug/L	ND	50.0	07/07/11 23:07	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	07/07/11 23:07	
Acetone	ug/L	ND	100	07/07/11 23:07	
Acetonitrile	ug/L	ND	55.0	07/07/11 23:07	
Acrolein	ug/L	ND	53.0	07/07/11 23:07	
Acrylonitrile	ug/L	ND	200	07/07/11 23:07	
Allyl chloride	ug/L	ND	10.0	07/07/11 23:07	
Benzene	ug/L	ND	1.0	07/07/11 23:07	
Bromochloromethane	ug/L	ND	3.0	07/07/11 23:07	
Bromodichloromethane	ug/L	ND	1.0	07/07/11 23:07	
Bromoform	ug/L	ND	3.0	07/07/11 23:07	
Bromomethane	ug/L	ND	10.0	07/07/11 23:07	
Carbon disulfide	ug/L	ND	100	07/07/11 23:07	
Carbon tetrachloride	ug/L	ND	1.0	07/07/11 23:07	
Chlorobenzene	ug/L	ND	3.0	07/07/11 23:07	
Chloroethane	ug/L	ND	10.0	07/07/11 23:07	
Chloroform	ug/L	ND	5.0	07/07/11 23:07	
Chloromethane	ug/L	ND	1.0	07/07/11 23:07	
Chloroprene	ug/L	ND	20.0	07/07/11 23:07	
cis-1,2-Dichloroethene	ug/L	ND	5.0	07/07/11 23:07	
cis-1,3-Dichloropropene	ug/L	ND	1.0	07/07/11 23:07	
Dibromochloromethane	ug/L	ND	3.0	07/07/11 23:07	
Dibromomethane	ug/L	ND	10.0	07/07/11 23:07	
Dichlorodifluoromethane	ug/L	ND	5.0	07/07/11 23:07	

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QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

METHOD BLANK: 630616 Matrix: Water

Associated Lab Samples: 9297447002, 9297447003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethyl methacrylate	ug/L	ND	10.0	07/07/11 23:07	
Ethylbenzene	ug/L	ND	1.0	07/07/11 23:07	
Hexachloro-1,3-butadiene	ug/L	ND	10.0	07/07/11 23:07	
Iodomethane	ug/L	ND	10.0	07/07/11 23:07	
Isobutanol	ug/L	ND	100	07/07/11 23:07	
Methacrylonitrile	ug/L	ND	100	07/07/11 23:07	
Methyl methacrylate	ug/L	ND	30.0	07/07/11 23:07	
Methylene Chloride	ug/L	ND	1.0	07/07/11 23:07	
Naphthalene	ug/L	0.38J	10.0	07/07/11 23:07	
Propionitrile	ug/L	ND	150	07/07/11 23:07	
Styrene	ug/L	ND	1.0	07/07/11 23:07	
Tetrachloroethene	ug/L	ND	1.0	07/07/11 23:07	
Toluene	ug/L	ND	1.0	07/07/11 23:07	
trans-1,2-Dichloroethene	ug/L	ND	5.0	07/07/11 23:07	
trans-1,3-Dichloropropene	ug/L	ND	1.0	07/07/11 23:07	
trans-1,4-Dichloro-2-butene	ug/L	ND	100	07/07/11 23:07	
Trichloroethene	ug/L	ND	1.0	07/07/11 23:07	
Trichlorofluoromethane	ug/L	ND	1.0	07/07/11 23:07	
Vinyl acetate	ug/L	ND	50.0	07/07/11 23:07	
Vinyl chloride	ug/L	ND	1.0	07/07/11 23:07	
Xylene (Total)	ug/L	ND	5.0	07/07/11 23:07	
1,2-Dichloroethane-d4 (S)	%	103	70-130	07/07/11 23:07	
4-Bromofluorobenzene (S)	%	98	70-130	07/07/11 23:07	
Dibromofluoromethane (S)	%	103	70-130	07/07/11 23:07	
Toluene-d8 (S)	%	98	70-130	07/07/11 23:07	

LABORATORY CONTROL SAMPLE: 630617

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	50	52.5	105	70-130	
1,1,1-Trichloroethane	ug/L	50	50.5	101	70-130	
1,1,2,2-Tetrachloroethane	ug/L	50	51.1	102	70-130	
1,1,2-Trichloroethane	ug/L	50	53.3	107	70-130	
1,1-Dichloroethane	ug/L	50	43.7	87	70-130	
1,1-Dichloroethene	ug/L	50	44.3	89	70-132	
1,1-Dichloropropene	ug/L	50	47.9	96	70-130	
1,2,3-Trichloropropane	ug/L	50	49.1	98	70-130	
1,2,4-Trichlorobenzene	ug/L	50	49.8	100	70-134	
1,2-Dibromo-3-chloropropane	ug/L	50	49.6	99	70-130	
1,2-Dibromoethane (EDB)	ug/L	50	51.8	104	70-130	
1,2-Dichlorobenzene	ug/L	50	50.9	102	70-130	
1,2-Dichloroethane	ug/L	50	50.2	100	70-130	
1,2-Dichloropropane	ug/L	50	49.5	99	70-130	
1,3-Dichlorobenzene	ug/L	50	49.4	99	70-130	
1,3-Dichloropropane	ug/L	50	49.2	98	70-130	

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(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

LABORATORY CONTROL SAMPLE: 630617

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dichlorobenzene	ug/L	50	49.2	98	70-130	
2,2-Dichloropropane	ug/L	50	41.2	82	58-145	
2-Butanone (MEK)	ug/L	100	90.2J	90	70-145	
2-Hexanone	ug/L	100	97.1	97	70-144	
4-Methyl-2-pentanone (MIBK)	ug/L	100	97.3J	97	70-140	
Acetone	ug/L	100	88.8J	89	50-175	
Acetonitrile	ug/L	500	513	103	70-130	
Acrolein	ug/L	250	227	91	70-130	
Acrylonitrile	ug/L	250	208	83	70-143	
Allyl chloride	ug/L	50	50.7	101	70-130	
Benzene	ug/L	50	46.6	93	70-130	
Bromochloromethane	ug/L	50	48.7	97	70-130	
Bromodichloromethane	ug/L	50	53.6	107	70-130	
Bromoform	ug/L	50	52.2	104	70-130	
Bromomethane	ug/L	50	32.6	65	54-130	
Carbon disulfide	ug/L	50	47.7J	95	70-131	
Carbon tetrachloride	ug/L	50	51.8	104	70-132	
Chlorobenzene	ug/L	50	51.1	102	70-130	
Chloroethane	ug/L	50	39.0	78	64-134	
Chloroform	ug/L	50	52.7	105	70-130	
Chloromethane	ug/L	50	46.2	92	64-130	
Chloroprene	ug/L	50	43.5	87	70-130	
cis-1,2-Dichloroethene	ug/L	50	45.2	90	70-131	
cis-1,3-Dichloropropene	ug/L	50	49.0	98	70-130	
Dibromochloromethane	ug/L	50	50.6	101	70-130	
Dibromomethane	ug/L	50	51.4	103	70-131	
Dichlorodifluoromethane	ug/L	50	37.6	75	56-130	
Ethyl methacrylate	ug/L	50	48.3	97	70-130	
Ethylbenzene	ug/L	50	48.3	97	70-130	
Hexachloro-1,3-butadiene	ug/L	50	49.4	99	70-130	
Iodomethane	ug/L	100	67.8	68	49-180	
Isobutanol	ug/L	1000	1210	121	70-130	
Methacrylonitrile	ug/L	500	486	97	70-130	
Methyl methacrylate	ug/L	50	50.5	101	70-130	
Methylene Chloride	ug/L	50	43.8	88	63-130	
Naphthalene	ug/L	50	53.2	106	70-138	
Propionitrile	ug/L	500	592	118	70-130	
Styrene	ug/L	50	51.0	102	70-130	
Tetrachloroethene	ug/L	50	49.2	98	70-130	
Toluene	ug/L	50	46.2	92	70-130	
trans-1,2-Dichloroethene	ug/L	50	44.8	90	70-130	
trans-1,3-Dichloropropene	ug/L	50	50.4	101	70-132	
trans-1,4-Dichloro-2-butene	ug/L	50	51.1J	102	70-141	
Trichloroethene	ug/L	50	52.1	104	70-130	
Trichlorofluoromethane	ug/L	50	47.3	95	62-133	
Vinyl acetate	ug/L	100	113	113	66-157	
Vinyl chloride	ug/L	50	47.7	95	69-130	
Xylene (Total)	ug/L	150	148	99	70-130	

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Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

LABORATORY CONTROL SAMPLE: 630617

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichloroethane-d4 (S)	%			89	70-130	
4-Bromofluorobenzene (S)	%			101	70-130	
Dibromofluoromethane (S)	%			100	70-130	
Toluene-d8 (S)	%			99	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 630618 630619

Parameter	Units	9297382003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethene	ug/L	ND	50	50	52.4	56.0	105	112	70-166	7	30	
Benzene	ug/L	0.45J	50	50	54.8	60.1	109	119	70-148	9	30	
Chlorobenzene	ug/L	0.37J	50	50	54.6	60.2	109	120	70-146	10	30	
Toluene	ug/L	ND	50	50	52.5	57.1	105	114	70-155	9	30	
Trichloroethene	ug/L	ND	50	50	57.6	62.2	114	123	69-151	8	30	
1,2-Dichloroethane-d4 (S)	%						103	102	70-130			
4-Bromofluorobenzene (S)	%						96	111	70-130			
Dibromofluoromethane (S)	%						103	104	70-130			
Toluene-d8 (S)	%						95	96	70-130			

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QUALIFIERS

Project: ALEXANDER MSWLF - BLANKS
Pace Project No.: 9297447

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-A	Pace Analytical Services - Asheville
PASI-C	Pace Analytical Services - Charlotte

ANALYTE QUALIFIERS

B-	Analyte detected in method blank but was not detected in the associated samples.
L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

only C-O-C for this Report

Section A Required Client Information:

Company: Municipal Engineering Services
Address: PO Box 97
Gainer NC 27529
Email To: jpfahl@mesco.com
Phone: (919) 772-5393 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: jpfahl@mesco.com
Copy To: Mgerman@mesco.com
Purchase Order No.:
Project Name: Alexander MSWLF - Blanks
Project Number:

Section C Invoice Information:

Attention: See A
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Kevin Godwin
Pace Profile #: 2103-C

Page: 1 of 1

1476752

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☑ OTHER

Site Location STATE: NC

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT

Requested Analysis Filtered (Y/N): N

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start Date	Composite Start Time	Composite End/Grab Date	Composite End/Grab Time	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test App II VOCs	App II Metals	Mercury	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	EB	WT	G			6/30/11			4			1	3					✓	✓	✓	N	001
2	FB	↓	↓			↓			4			1	3					✓	✓	✓	↓	002
3	TB	↓	↓			↓			2				2					✓			↓	003
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Pace Provided DI H_2O	MESCO	7/1/11	1:20	Pace	7/1/11	1320				
Geotech Disposable weighted Bailer	Pace	7/1/11	1410	Pace	7/1/11	1410	4.6	4	N	4
Samples										
DI water poured through suburban exhaust.										

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Jonathan Pfahl

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY): 6/30/11

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Sample Condition Upon Receipt

Pace Analytical

Client Name: Mun Project # 9297447

Where Received: ☑ Huntersville ☐ Asheville ☐ Eden

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other_____

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Optional
Proj. Due Date:
Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other_____

Thermometer Used: IR Gun : T1102 **Type of Ice:** Wet Blue None ☑ Samples on ice, cooling process has begun

Temp Correction Factor: Add / Subtract 0 °C

Corrected Cooler Temp.: 4.6 C **Biological Tissue is Frozen:** Yes No

Date and Initials of person examining contents: TMG 11

Temp should be above freezing to 6°C

				Comments:
Chain of Custody Present:	☑Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☑Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☑Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes	☑No	☐N/A	6.
Rush Turn Around Time Requested:	☐Yes	☑No	☐N/A	7.
Sufficient Volume:	☑Yes	☐No	☐N/A	8.
Correct Containers Used:	☑Yes	☐No	☐N/A	9.
-Pace Containers Used:	☑Yes	☐No	☐N/A	
Containers Intact:	☑Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☑N/A	11.
Sample Labels match COC:	☑Yes	☐No	☐N/A	12. NO time/date on bottles
-Includes date/time/ID/Analysis Matrix:_____				
All containers needing preservation have been checked.	☑Yes	☐No	☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes	☐No	☐N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☐Yes	☐No		Initial when completed
Samples checked for dechlorination:	☐Yes	☐No	☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☑N/A	15.
Trip Blank Present:	☐Yes	☐No	☑N/A	16.
Trip Blank Custody Seals Present	☐Yes	☐No	☑N/A	
Pace Trip Blank Lot # (if purchased):_____				

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

SCURF Review: JG **Date:** 7/1/11 **SRF Review:** JG **Date:** 7/1/11

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Appendix C
Field Sampling Parameter Data Sheet(s)

Sampling Data Sheet

Municipal Services Engineering Company — Garner, NC — Boone, NC

Samplers: J. Pfohl Page 2 of 3

Project: Alexander Co Closed MSWLF & Active C&D LF

Monitoring Point	Sample Date	Sample Time	Sampling Parameters: Depth to Water (BTOP) Static	Lab Parameters to be analyzed for	Volume Purged (Gal)	Sample Type	Goes Dry During Purge	Total Depth Measured as expected	Total Depth Expected	Water Quality Parameters (Stabalized): CO2 (mg/l)	DO (mg/L)	ORP	pH	Temp. ©	Specific Cond. (us/cm	TDS (mg/L)	Turbidity	CH4 Gas Vapors (ppm)	Sample Day BTOP ▽
MW-1	7/31/11	11:15	36.26 6/28/11	AM 2	1	DB	Y	Y	40	NR	0.5	-35	6.36	17.1	449	225	c	NR	36.31
MW-1A	NS	—	Dry >47.34	AM C		-	-	Y	48.5	NR							-	NR	
MW-1B	7/31/11	9:40	45.90	AM 14	8	P-DB	N	Y	61	NR	0.3	576	4.93	16.2	80	39	c	NR	45.88
MW-2	7/31/11	10:30	26.46	AM 7	4	DB	Y	Y	30	NR	0.6	13	5.89	14.6	490	247	ST	NR	25.50
MW-4R	6/29/11	1800	16.31	AM 4	5	DB	N	Y	21.5	NR	0.1	-14	6.28	16.0	398	198	c	NR	16.33
MW-5	6/29/11	7:00	42.17	MNA 8	5	P&DB	Y	Y	49.1	NR	0.9	-25	6.52	16.5	288	142	c 19.3	But saw NR vapors	42.16
MW-6	6/29/11	3:30	31.40	MNA C	6	P&DB	Y	Y	42	NR	0.2	246	5.77	17.0	66	33	c 26.2	NR	31.43
MW-9	6/29/11	6:30	12.51	AM 13	8	P&DB	Y	Y	31.5	NR	0.3	182	6.38	15.4	561	281	c	NR	12.55
MW-10	6/29/11	5:40	37.88	AM C	3.5	P&DB	Y	Y	91	NR	1.1	-97	7.30	15.9	536	268	c	NR	37.89
MW-12	6/29/11	5:00	52.65	MNA 6	7	P&DB	N	Y	66.5	NR	0.9	94	5.78	16.2	154	76	c 14.8	NR	52.70
MW-12D	6/29/11	4:30	61.82	MNA C	21	P&DB	Y	Y	102.5	NR	0.2	-93	7.06	17.0	800	397	c 16.9	NR	61.90
MW-13	6/29/11	3:00	41.55	MNA C	11	P&DB	N	Y	60.5	NR	0.9	61	6.50	14.5	271	130	c	NR	41.63
MW-14	6/30/11	12:30	39.15	AM 11	2	DB	Y	N	40.5	NR	1.0	158	5.49	14.5	630	314	ST	NR	39.19
MW-15	7/31/11	9100	24.60	AM 12	6	P&DB	Y	Y	35	NR	1.1	-18	6.22	14.7	378	189	c	NR	24.62
MW-16	6/29/11	7:40PM	34.28	MNA 3	8	P&DB	N	Y	40.25	NR	0.8	545	5.73	16.1	92	46	c 10.3	NR	34.31
MW-17	6/30/11	10:50	18.82 6/30/11 18.84	AM C	3	DB	Y	Y	22.3	NR	1.8	483	5.17	14.1	73	36	c	NR	18.84
MW-18	6/28/11	1:10	53.40	MNA C	2	P&D	Y	Y	56.7	NR	3.3	-80	6.93	16.9	42	20	ST 6.21	NR	
MW-7	NS		41.83																

Comments

SS B=Stainless Steel Baler, D B=Disposable Baler, P=Low flow Pump, PD=Purged Dry

VT=Very Turbid, MT=Moderately Turbid, ST=Slightly Turbid, C=Clear

NR=No Reading Attempted, NS=No Sample Obtained

MW-17 (18.82)

Sampling Data Sheet

Municipal Services Engineering Company
Garner, NC Boone, NC

Project: Alexander Co Closed MSWLF & Active C&D LF

Samplers: J. Pfohl Page 1 of 3

Monitoring Point	Sample Date	Sample Time	Sampling Parameters: Depth to Water (BTOP) Static	Lab Parameters to be analyzed for	Volume Purged (Gal)	Sample Type	Goes Dry During Purge	Total Depth Measured as expected	Total Depth Expected	Water Quality Parameters (stabalized): CO2 (mg/l)	DO (mg/L)	ORP	pH	Temp. ©	Specific Cond. (us/cm	TDS (mg/L)	Turbidity	CH4 Gas Vapors (ppm)	
MW-19	6/29/11	10:00	52.74	AM C	6	DB	Y	Y	63.92	NR	2.1	261	6.40	15.3	80	39	c	NR	50.76
MW-20	6/29/11	10:40	40.03	AM C	14	P&DB	Y	Y	63.55	NR	1.4	61	6.38	14.3	61	30	c	NR	40.21
MW-21	6/30/11	11:35	30.41	AM C	6	P&DB	N	Y	41.05	NR	3.1	365	5.67	14.1	60	30	c	NR	30.47
MW-22	6/30/11	2:45	15.26	AM 16	4	P&DB	Y Bailed	Y	18.12	NR	6.2	217	5.19	14.0	35	17	ST	NR	15.31
MW-23	6/30/11	10:00	17.20	AM C	5	P&DB	N	Y	21.54	NR	6.9	391	5.22	13.2	95	47	c	NR	17.86
MW-24	6/29/11	12:15	30.43	MNA C	4	P&DB	N	Y Lock Replaced	35.35	NR	1.9	528	6.01	15.2	177	88	ST 61.3	NR	30.43
MW-25	6/29/11	11:30	29.82	AM C	6	P&DB	Y	Y Lock Replaced	44.48	NR	0.6	309	6.03	14.6	101	49	< 31.2	NR	29.82
~~MW-31~~			~~32.56~~	MNA C					~~32.56~~										
MW-32	6/28/11	2:05	31.79	AM C	6	P&DB	Y	Y	42.7	NR	1.0	233	6.90	15.5	93	46	c	NR	
MW-33	6/28/11	3:05	13.87	MNA C	10	P&DB	N	Y	21.38	90	5.1	192	8.43	14.4	59	29	c 101	NR	
MW-34	6/28/11	4:30	8.67	MNA C	12	P&DB	Y	Y	21.19	60	5.9	112	6.45	14.9	73	35	c 69.3	NR	
SW-3	6/30/11	1:45	-	DM C	-	Dip	-	-	-	NR	3.8	13	6.58	21.2	160	79	c	NR	
SW-4R	6/30/11	2:00	-	DM C	-	Dip	-	-	-	NR	6.9	68	7.03	19.9	74	36	c	NR	
SW-5	6/29/11	5:20	-	DM C	-	Dip	-	-	-	NR	5.9	-9	6.99	20.8	88	43	c	NR	
SW-6	6/28/11	7:55PM	-	DM C	-	Dip	-	-	-	NR	5.6	6	7.01	20.9	78	36	c	NR	

Comments

SS B=Stainless Steel Baler, D B=Disposable Baler, P=Low flow Pump, PD=Purged Dry

VT=Very Turbid, MT=Moderately Turbid, ST=Slightly Turbid, C=Clear

NR=No Reading Attempted, NS=No Sample Obtained

Sampling Data Sheet

Municipal Services Engineering Company
Garner, NC Boone, NC

Project: Alexander Co Closed MSWLF & Active C&D LF

Samplers: J. Pfohl Page 3 of 3

Monitoring Point	Sample Date	Sample Time	Sampling Parameters: Depth to Water (BTOP) Static	Lab Parameters to be analyzed for	Volume Purged (Gal)	Sample Type	Goes Dry During Purge	Total Depth Measured as expected	Total Depth Expected	Water Quality Parameters: CO2 (mg/l)	DO (mg/L)	ORP	pH	Temp. ©	Specific Cond. (us/cm	TDS (mg/L)	Turbidity	CH4 Gas Vapors (ppm)
MW-11	6/30/11	5:30	~~6/28/11~~ 41.58 ~~6/28/11~~ 41.75	MNA 2	10	P&DB	Y	Y	56	NR	1.2?	14	6.02	17.0	396	198	c	NR
MW-26	6/30/11	4:30	~~6/28/11~~ 37.05 ~~6/28/11~~ 37.35	MNA 5	18	P&DB	N	Y	49.8	NR	1.8?	37	5.84	16.3	323	162	c	
MW-27	6/30/11	3:35	~~22~~ 20.92	MNA 10	13	P&DB	Y	Y	49.82	NR	3.7	-7	6.68	15.9	468	234	c	
MW-31	6/29/11	2:35	22.86	MNA C	13	P&DB	N	Y	32.56	NR	7.1	527	5.36	15.4	110	55	c	16.3
											Lots of metal flocculation							

C

Comments

SS B=Stainless Steel Baler, D B=Disposable Baler, P=Low flow Pump, PD=Purged Dry

VT=Very Turbid, MT=Moderately Turbid, ST=Slightly Turbid, C=Clear

NR=No Reading Attempted, NS=No Sample Obtained