ENGINEERING TECTONICS, P.A.
ENGINEERS • GEOLOGISTS • HYDROLOGISTS
P.O. Box I, Winston-Salem, NC 27108 (910) 724-6994

Monday, April 13, 1998

North Carolina Department of Environment, Health and Natural Resources
Solid Waste Division
PO Box 27687
Raleigh, North Carolina 27611-7687

Attention: Mr. Bill Myers

Subject: Groundwater Sampling Report
Old Avery County Landfill
Newland, North Carolina
Project No. 90-247

Mr. Myers:

On December 17, 1997 Engineering Tectonics, P.A. (ETPA) personnel mobilized to the Old Avery County Landfill in Newland, North Carolina to sample three (3) groundwater monitoring wells, MW-1, MW-2, and MW-3 and two (2) stream samples (Stream 1 and Stream 2). A copy of the report for this sampling event is attached.

If you have any questions concerning the above, please contact either myself or Dan Bowser at (336) 724-6994 extensions 119 and 107, respectively. Thank you.

Sincerely,

ENGINEERING TECTONICS, P.A.

Joanna Hanson
Staff Biologist

Enc.

Fac/Perm/Co ID #	Date	Doc ID#
86	4/14/98	DIN

Groundwater and Surface Water Sampling Report

Old Avery County Landfill
Newland, North Carolina

ETPA Project No: 90-247

Prepared for:

County of Avery
PO Box 640
Newland, North Carolina 28657

Monday, April 13, 1998

Engineering Tectonics, P.A.
Environmental Geotechnical and Drilling Services
1720 Vargrave Street
Winston-Salem, North Carolina 27107
(336) 724-6994

Groundwater Monitoring Well and Stream Sampling

On December 17, 1997, Engineering Tectonics, P.A. (ETPA) personnel mobilized to the Old Avery County Landfill to sample three (3) groundwater monitoring wells (MW-1 through MW-3) as well as two (2) stream samples (Stream 1 and Stream 2) per North Carolina Department of Environment and Natural Resources permit #06-02. Refer to Figure 1 for a site location map. Stream sample 1 was taken upstream of MW-3 from a branch of Brushy Creek immediately bordering the site. Stream 2 was taken downstream of the landfill from Brushy Creek. See Figure 2 for a site map of the landfill with sample locations.

Depth to water was measured in each monitoring well, and each well was developed prior to sampling with a new disposable Teflon bailer. A minimum of three volumes of water was purged from each well, and water samples collected according to EPA sampling protocols. The samples were packed on ice, and sent to an analytical laboratory using EPA approved chain of custody procedures. The samples were submitted for analysis using EPA method 8260, specific conductance, chloride, fluoride, nitrate, pH, TDS, sulfate, arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Standard Procedures for Groundwater Sampling are included in Appendix A.

Ground Water Static Levels

Static water levels were measured as 9.46, 6.10, and 5.50 feet for monitoring wells MW-1, MW-2, and MW-3, respectively.

Laboratory Results

Laboratory results for groundwater and stream samples are presented in Tables 1, 2, and 3 in the 'Tables' section of this report. Levels of benzene and cis-1,2-Dichloroethene in MW-1 were reported as 1.1 parts per billion (ppb) and 2.2 ppb, respectively. In MW-3, levels of benzene and cis-1,2-Dichloroethene

were reported as 1.2 ppb and 2.5 ppb, respectively. Copies of the laboratory results are included in Appendix B.

Limitations

This report has been prepared for the exclusive use of **Avery County** for specific application to the subject site. The report was prepared in accordance with generally accepted standards of practice for environmental services in this region of the United States. No other warranty, either expressed or implied, is made. This report is not to be reproduced, either in whole or in part, without written consent from ENGINEERING TECTONICS, P.A.

Our on-site observations pertain only to specific locations, at specific times, on specific dates. Our observations and conclusions do not reflect variations in unverified and/or subsurface conditions that may exist at or between sampling and/or observation locations, or at times other than those represented by our observations.

In providing this report, ENGINEERING TECTONICS, P.A. does not assume any responsibilities of the party, or parties, deemed legally responsible for the subject site. It is not the responsibility of ENGINEERING TECTONICS, P.A. to report our findings to any other person or persons, including conditions that may present a potential danger to public health, safety, or the environment, as may be required by law.

Certification

I certify this 14th day of April, 1998 this report was prepared by me or under my direct supervision.

by: Joanna Hanson
Joanna Hanson
Staff Biologist

reviewed by: Daniel Bowser
Daniel Bowser, P.G. #1610
Project Geologist

NORTH CAROLINA LICENSED SEAL 1610 GEOLOGIST DANIEL PATRICK BOWSER

Tables

Table 1

Groundwater Monitoring Well Laboratory Results

December 17, 1997

Analysis	MW-1	MW-2	MW-3	2L Standard
Specific Conductivity	233 umhos/cm	144 umhos/cm	255 umhos/cm	NA
Chloride	31.1	44.0	9.80	250
Fluoride	<0.1	<0.1	<0.1	2.0
Nitrate	0.20	.30	0.30	10.0
pH	5.79	5.80	6.05	6.5-8.5
TDS	80	<1	86	NA
Sulfate	<10	<10	<10	250
Arsenic	<0.010	<0.010	<0.010	0.05
Barium	.345	1.68	0.110	2.0
Cadmium	<0.001	0.002	<0.001	0.005
Chromium	<0.005	<0.005	<0.005	0.05
Lead	<.010	<.010	0.010	0.015
Mercury	0.0002	<0.0002	<0.0002	0.0011
Selenium	<0.010	<0.010	<0.010	0.05
Silver	<0.005	<0.005	<0.005	0.018

Results are presented in parts per million (ppm) unless specified
Results presented in Red are in violation of 2L standards
NA not applicable

Table 2

Stream Sampling Laboratory Results

December 17, 1997

Need to use SW standards

Analysis	Stream 1	Stream 2	2L Standard
Specific Conductivity	60 umhos/cm	38 umhos/cm	NA
Chloride	1.8	2.2	250
Fluoride	<0.1	<0.1	2.0
Nitrate	1.4	0.20	10.0
pH	6.54	6.55	6.5-8.5
TDS	39	4	NA
Sulfate	<10	<10	250
Arsenic	<0.010	<0.010	0.05
Barium	.014	0.019	2.0
Cadmium	<0.001	<0.001	0.005
Chromium	<0.005	<0.005	0.05
Lead	<.010	0.010	0.015
Mercury	0.0002	<0.0002	0.0011
Selenium	<0.010	<0.010	0.05
Silver	<0.005	<0.005	0.018

Results are presented in parts per million (ppm) unless specified
Results presented in Red are in violation of 2L standards
NA not applicable

Table 3

Volatile Organics
EPA Method 8260

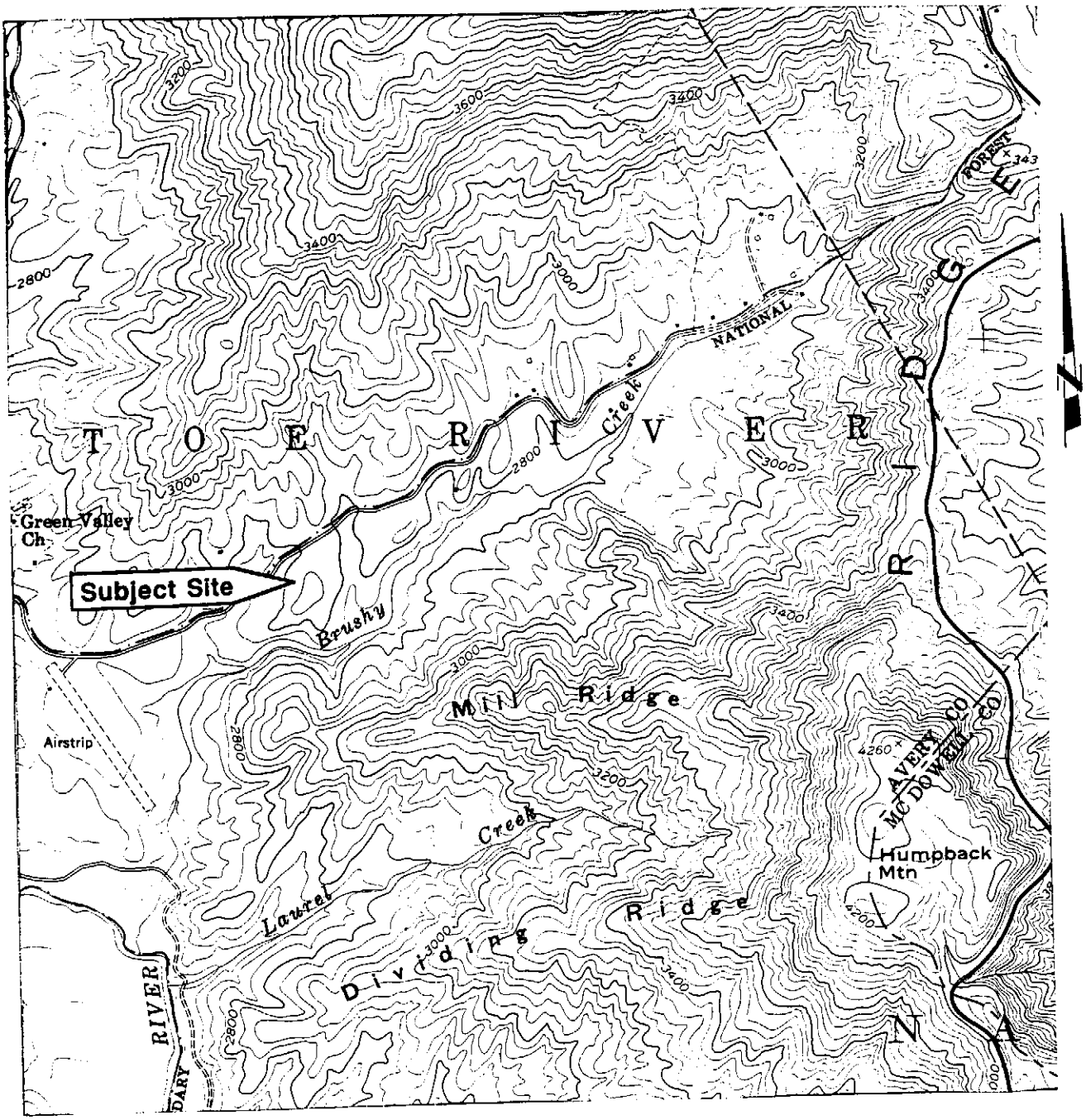
December 17, 1997

Compound	MW-1	MW-2	MW-3	Stream-1	Stream-2	2L Standard
Benzene	**1.1**	BDL	**1.2**	BDL	BDL	1 ppb
cis-1,2-Dichloroethene	**2.2**	BDL	**2.5**	BDL	BDL	

↳x ↳x not 2L violations

BDL = below detectable limit
Results in parts per billion (ppb)
Compounds that do not have an associated 2L Standard have a limit of zero.
Compounds not listed have a laboratory result of BDL for all samples.
Results presented in Red are in violation of 2L standards

Figures



Title: Site Location Map

Scale: 1"=2000'

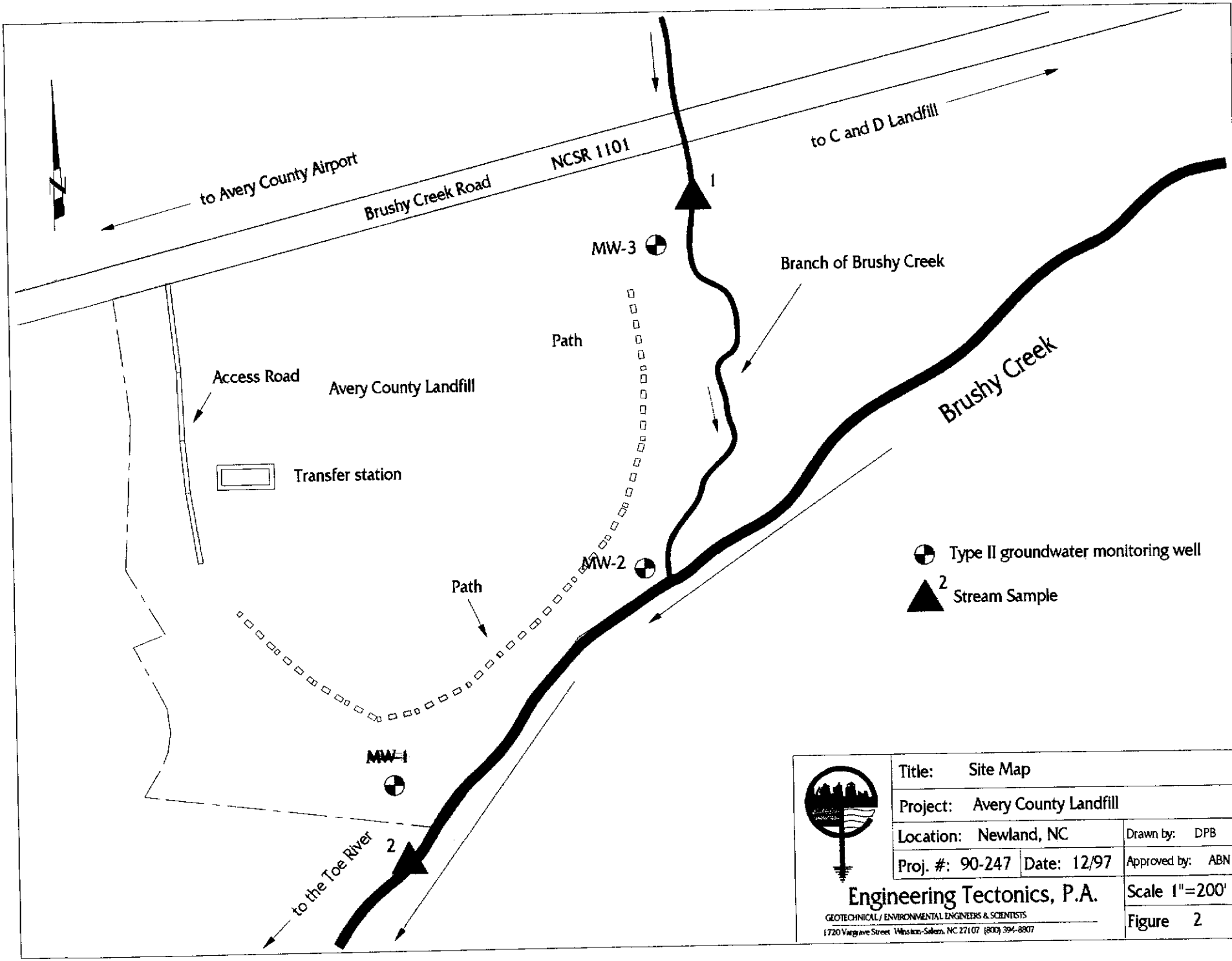
2000' 2000'

ENGINEERING TECTONICS, P.A.

GEOTECHNICAL / ENVIRONMENTAL ENGINEERS & SCIENTISTS

1720 Vargrave Street Winston-Salem, NC 27107 (800) 394-8807

Figure 1



Title: Site Map			
Project: Avery County Landfill			
Location: Newland, NC		Drawn by: DPB	
Proj. #: 90-247	Date: 12/97	Approved by: ABN	
Engineering Tectonics, P.A.		Scale 1"=200'	
GEOTECHNICAL / ENVIRONMENTAL ENGINEERS & SCIENTISTS		Figure 2	

1720 Vargrave Street Winston-Salem, NC 27107 (800) 394-8807

Appendix A

ENGINEERING TECTONICS, PA

Standard Procedures SP-7

Field Procedures For Collection of Ground Water Samples

Engineering Tectonics, P.A.
Environmental, Geotechnical, and Drilling Services
1720 Vargrave Street
Winston-Salem, North Carolina 27107
(336) 724-6994

CONTENTS

Field Procedures for the Collection of Groundwater Samples

1.0 PURPOSE

To establish a standard procedure for collection of ground water samples.

2.0 SCOPE

The following procedure describes the logistics, collection techniques and documentation requirements for collecting ground water samples.

3.0 RESPONSIBILITY

Project Manager, Project Hydrogeologist, and Field Sampling Technicians.

4.0 SUPPORTING PROCEDURES

SP-3 Cleaning of Glassware and Equipment for Field Sampling Programs.

SP-2 Chain-of-Custody Procedures.

SP-4 Soil and Water Sample Preservation Procedures

SP-8 Filtering of Water for Dissolved Metals Analysis.

5.0 REQUIRED FORMS

Chain-of-Custody forms.

6.0 PROCEDURE

6.1 Selection of Sampling Locations

Groundwater sampling locations in and around a contaminated site are typically existing domestic, production, and groundwater monitoring wells. The location of new groundwater sampling points will be based upon the review of existing site geohydrological data, the results of preliminary site surveys, and the initial estimates of the extent of contamination. The groundwater sampling locations will be chosen by the project geologist/engineer. If

possible, one upgradient and three downgradient samples from the uppermost aquifer will be taken.

6.2 Equipment List

1. Latex gloves and any other personal safety equipment specified in the Site Health and Safety Plan.
2. Sample containers. Number and kind will depend on the analytical requirements.
3. Device to measure water levels in wells to within 0.01 feet. Typically a fiberglass tape with a "plopper" or chalk, or an electronic water level indicator, is used.
4. Field notebook.
5. Sample bottle labels.
6. A large volume bailer or pump to evacuate the wells.
7. Teflon or PVC bailer with polypropylene or stainless steel cable or a peristaltic pump with Teflon tubing, as appropriate.
8. 50-foot length of garden hose (needed only when sampling from domestic, production and other wells where the sample will be obtained from the existing well pump).

6.3 Sample Collection

Prior to the evacuation of groundwater from any well, the depth to water shall be measured to the nearest 0.01 feet. A fiberglass or steel tape marked with chalk or an electric water sensing device (e.g., Slope Indicator Water Mark) shall be used for this purpose. The device must be decontaminated to avoid contamination of the well. The depth to water is typically measured from a reference point established on the top of the inner well casing is recorded in the field notebook along with the length of casing stick-up above the ground surface. If both an inner and outer casing are present, the one used as the measurement reference point shall be identified and the vertical distance between the two measured and recorded as well as the stick-up of the outer casing. The depth of the well bottom shall be sounded and the depth recorded to ascertain the well's integrity and any siltation problems.

To introduce fresh formation water into the well, a minimum of three well volumes must be evacuated from the well prior to sampling. If a well is evacuated dry prior to removing four well volumes, the evacuation is considered complete and the well is allowed to recharge to at least 75% of its original volume prior to sampling. Field parameters (i.e., pH, specific conductance and temperature) may be measured periodically during well evacuation to aid in determining water stabilization. Evacuation is accomplished by bailing with a large volume (1.5 liter) bailer, or by pumping. Whichever method is used, it must be assured that any materials (hose, bailer, tubing, pumps, rope, etc.) entering the well be clean. If the same device is being used to evacuate a number of wells, the device must be cleaned with detergent, water, acetone and deionized water between each well to prevent cross-contamination.

The sampling procedure for groundwater is as follows:

Prior to collecting any water samples, place a waterproof sample label on each clean container with the following information:

- Project Number
- Project Name
- Sample No.
- Date
- Analysis Required
- Preservative:
- Collection Time
- Initials of Collector

Fill in the information with a waterproof ink pen. This will prevent difficulty in filling out labels on a wet jar after it is filled.

Collect the groundwater sample using a clean bailer. Latex gloves shall be worn during this procedure. The temperature, pH, and conductivity of the evacuated water should be determined immediately after sample collection. These measurements should not be taken from any sample bottles being sent to the analytical laboratory for chemical analysis.

The vials for volatile organic analysis should always be filled with the initial bailer of water. When filling the 40 ml septum vials, care should be exercised to eliminate the formation of air bubbles. Slightly over-fill the vial, and screw on the cap. Then turn the vial upside down and tap lightly to check for air bubbles. Air bubbles of any size should not rise to the bottom of the vial. (Tiny bubbles can introduce significant error.) If air bubbles are present, empty the vial and repeat the procedure with a fresh bailer of water.

Fill all the remaining containers directly from the bailer, unless the well is to be sampled in duplicate. If a duplicate water sample is required, the water should be composited in a large clean container, prior to filling the sample bottles. Samples requiring volatile organic analysis should not be composited, however, an attempt should be made to fill all the vials with the initial bailer of water.

Avoid overflow of the bottles or jars already containing preservative (pre-preserved). All samples should be gently mixed after collection and checked for proper preservation with indicator paper (i.e. pH paper).

If dissolved metals analysis are required, an extra bottle (no preservative) will be filled and the metals container (pre-preserved with nitric acid) will remain empty. After the water sample is field filtered through a 0.45 micron membrane filter, transfer the water into the pre-preserved metals container. This will constitute a sample for dissolved metals analysis. See Engineering Tectonics, PA Technical Standard No. 8, "Filtering of Water Samples for Dissolved Metals Analysis".

If samples have not been pre-preserved, preserve them as soon as possible after collection and preparation.

Place all sample containers into a shipping container, cool with ice packs and complete the Chain-of-Custody form.

Detail in the field notebook the following:

- sample identification number
- location of the sample (on the sketch map)
- time and date of sampling
- personnel performing task depth to water table, reference mark, casing(s) stick-up, and vertical distance between inner and outer casing
- Amount evacuated from well and device used for evacuation
- Visual or sensory description of the sample (color, odor, turbidity, etc.)
- Weather conditions both present and previous to sampling
- Other pertinent observations
- Sign the entry

Make sure the well is secured after sampling.

If sampling devices are to be dedicated to a particular sample location, they will be placed in a plastic bag after their use and marked or tagged:
DEDICATED TO PROJECT NO.
SAMPLE LOCATION NO.

The tags should also indicate that the dedicated equipment needs cleaning before next use. Alternatively, the sampling devices can be left hanging in the well.

Field investigations requiring more than one sampling event should include the use of a Master Sample Logbook and a Field Notebook. At the end of each day all samples shall be recorded in the Master Logbook. Calibration of field instruments and field chemistry measurements such as pH shall be recorded in the Field Notebook.

Appendix B

Water Technology and Controls, Inc.
Environmental Laboratory
Laboratory Certification No. 165

Client: Engineering Tectonics
Contact: Ms. Joanna Hanson

Report Date: 1/9/98
Date Sample Rcvd: 12/18/97

WT&C Work Order # 12189708 Sample: MW-1 12/17/97

Parameters	Results
Arsenic, total	<0.010 mg/l
Barium, total	0.345 mg/l
Cadmium, total	<0.001 mg/l
Chromium, total	<0.005 mg/l
Lead, total	<0.010 mg/l
Mercury, total*	<0.0002 mg/l
Selenium, total	<0.010 mg/l
Silver, total	<0.005 mg/l
Chloride	31.1 mg/l
Fluoride	<0.1 mg/l
Nitrate Nitrogen	0.2 mg/l
Total Dissolved Solids	80 mg/l
Sulfate	<10 mg/l
Conductivity	233 umhos/cm
pH	5.79

I hereby certify that I have reviewed and approve these data.

Mike Vaughan

Maurice H. Vaughan, Jr.
Laboratory Supervisor

642 Tamco Road, Reidsville, North Carolina 27320
tel.(910)342-4748 fax.(910)342-1522

Water Technology and Controls, Inc.
Water Treatment Chemistries Environmental Laboratory
Reidsville, North Carolina 27320
(910) 342-4748

Client:	Engineering Tectonics	WT&C ID:	12189708
Project:	8260	Analysis:	12/29/97
Client Sample ID:	MW-1	Analyst:	KP
Sample Collection:	12/17/97 1130		

SW846-8260 VOLATILE ORGANICS

Parameter	Result
Benzene	**1.1 ug/L**
Bromobenzene	<1.0 ug/L
Bromochloromethane	<1.0 ug/L
Bromodichloromethane	<1.0 ug/L
Bromoform	<1.0 ug/L
Bromomethane	<5.0 ug/L
2-Butanone (MEK)	< 10 ug/L
n-Butylbenzene	<1.0 ug/L
sec-Butylbenzene	<1.0 ug/L
tert-Butylbenzene	<1.0 ug/L
Carbon Tetrachloride	<1.0 ug/L
Chlorobenzene	<1.0 ug/L
Chloroethane	<5.0 ug/L
Chloroform	<1.0 ug/L
Chloromethane	<5.0 ug/L
2-Chlorotoluene	<1.0 ug/L
4-Chlorotoluene	<1.0 ug/L
Dibromochloromethane	<1.0 ug/L
1,2-Dibromo-3-chloropropane	<1.0 ug/L
1,2-Dibromoethane (EDB)	<1.0 ug/L
Dibromomethane	<1.0 ug/L
Dichlorodifluoromethane	<5.0 ug/L
1,1-Dichloroethane	<1.0 ug/L
1,2-Dichloroethane	<1.0 ug/L
1,4-Dichlorobenzene	<1.0 ug/L
1,2-Dichlorobenzene	<1.0 ug/L
1,3-Dichlorobenzene	<1.0 ug/L
1,1-Dichloroethene	<1.0 ug/L
cis-1,2-Dichloroethene	**2.2 ug/L**
trans-1,2-Dichloroethene	<1.0 ug/L
1,2-Dichloropropane	<1.0 ug/L
1,3-Dichloropropane	<1.0 ug/L
2,2-Dichloropropane	<1.0 ug/L
1,1-Dichloropropene	<1.0 ug/L
1,2-Dichloropropene	<1.0 ug/L
cis-1,3-Dichloropropene	<1.0 ug/L
trans-1,3-Dichloropropene	<1.0 ug/L
Ethyl benzene	<1.0 ug/L
Hexachlorobutadiene	<1.0 ug/L
Isopropylbenzene	<1.0 ug/L
p-Isopropyltoluene	<1.0 ug/L
Methylene chloride	<1.0 ug/L
Naphthalene	<1.0 ug/L
n-Propylbenzene	<1.0 ug/L
Styrene	<1.0 ug/L
1,1,1,2-Tetrachloroethane	<1.0 ug/L
1,1,2,2-Tetrachloroethane	<1.0 ug/L
Tetrachloroethene	<1.0 ug/L
Toluene	<1.0 ug/L
1,1,1-Trichloroethane	<1.0 ug/L
1,1,2-Trichloroethane	<1.0 ug/L
Trichloroethene	<1.0 ug/L
1,2,3-Trichlorobenzene	<1.0 ug/L
1,2,4-Trichlorobenzene	<1.0 ug/L
1,2,3-Trichloropropane	<1.0 ug/L
Trichlorofluoromethane	<5.0 ug/L
1,2,4-Trimethylbenzene	<1.0 ug/L
1,3,5-Trimethylbenzene	<1.0 ug/L
Vinyl chloride	<5.0 ug/L
Xylenes (total)	<1.0 ug/L

I hereby certify that I have reviewed and approve this data.

Mike Vaughan

Maurice H. Vaughan, Jr.
Laboratory Supervisor

Water Technology and Controls, Inc.

Environmental Laboratory

Laboratory Certification No. 165

Client: Engineering Tectonics
Contact: Ms. Joanna Hanson

Report Date: 1/9/98
Date Sample Rcvd: 12/18/97

WT&C Work Order # 12189709

Sample: MW-2 12/17/97

Parameters	Results
Arsenic, total	<0.010 mg/l
Barium, total	1.68 mg/l
Cadmium, total	0.002 mg/l
Chromium, total	<0.005 mg/l
Lead, total	<0.010 mg/l
Mercury, total	<0.0002 mg/l
Selenium, total	<0.010 mg/l
Silver, total	<0.005 mg/l
Chloride	44.0 mg/l
Fluoride	<0.1 mg/l
Nitrate Nitrogen	0.3 mg/l
Total Dissolved Solids	<1 mg/l
Sulfate	<10 mg/l
Conductivity	144 umhos/cm
pH	5.80

I hereby certify that I have reviewed and approve these data.

Mike Vaughan

Maurice H. Vaughan, Jr.
Laboratory Supervisor

642 Tamco Road, Reidsville, North Carolina 27320
tel.(910)342-4748 fax.(910)342-1522

Water Technology and Controls, Inc.
Water Treatment Chemistries Environmental Laboratory
Reidsville, North Carolina 27320
(910) 342-4748

Client:	Engineering Tectonics	WT&C ID:	12189709
Project:	8260	Analysis:	12/29/97
Client Sample ID:	MW-2	Analyst:	KP
Sample Collection:	12/17/97 1130		

SW846-8260 VOLATILE ORGANICS

Parameter	Result	Parameter	Result
Benzene	<1.0 ug/L	cis-1,3-Dichloropropene	<1.0 ug/L
Bromobenzene	<1.0 ug/L	trans-1,3-Dichloropropene	<1.0 ug/L
Bromochloromethane	<1.0 ug/L	Ethyl benzene	<1.0 ug/L
Bromodichloromethane	<1.0 ug/L	Hexachlorobutadiene	<1.0 ug/L
Bromoform	<1.0 ug/L	Isopropylbenzene	<1.0 ug/L
Bromomethane	<5.0 ug/L	p-Isopropyltoluene	<1.0 ug/L
2-Butanone (MEK)	< 10 ug/L	Methylene chloride	<1.0 ug/L
n-Butylbenzene	<1.0 ug/L	Naphthalene	<1.0 ug/L
sec-Butylbenzene	<1.0 ug/L	n-Propylbenzene	<1.0 ug/L
tert-Butylbenzene	<1.0 ug/L	Styrene	<1.0 ug/L
Carbon Tetrachloride	<1.0 ug/L	1,1,1,2-Tetrachloroethane	<1.0 ug/L
Chlorobenzene	<1.0 ug/L	1,1,2,2-Tetrachloroethane	<1.0 ug/L
Chloroethane	<5.0 ug/L	Tetrachloroethene	<1.0 ug/L
Chloroform	<1.0 ug/L	Toluene	<1.0 ug/L
Chloromethane	<5.0 ug/L	1,1,1-Trichloroethane	<1.0 ug/L
2-Chlorotoluene	<1.0 ug/L	1,1,2-Trichloroethane	<1.0 ug/L
4-Chlorotoluene	<1.0 ug/L	Trichloroethene	<1.0 ug/L
Dibromochloromethane	<1.0 ug/L	1,2,3-Trichlorobenzene	<1.0 ug/L
1,2-Dibromo-3-chloropropane	<1.0 ug/L	1,2,4-Trichlorobenzene	<1.0 ug/L
1,2-Dibromoethane (EDB)	<1.0 ug/L	1,2,3-Trichloropropane	<1.0 ug/L
Dibromomethane	<1.0 ug/L	Trichlorofluoromethane	<5.0 ug/L
Dichlorodifluoromethane	<5.0 ug/L	1,2,4-Trimethylbenzene	<1.0 ug/L
1,1-Dichloroethane	<1.0 ug/L	1,3,5-Trimethylbenzene	<1.0 ug/L
1,2-Dichloroethane	<1.0 ug/L	Vinyl chloride	<5.0 ug/L
1,4-Dichlorobenzene	<1.0 ug/L	Xylenes (total)	<1.0 ug/L
1,2-Dichlorobenzene	<1.0 ug/L		
1,3-Dichlorobenzene	<1.0 ug/L		
1,1-Dichloroethene	<1.0 ug/L		
cis-1,2-Dichloroethene	<1.0 ug/L		
trans-1,2-Dichloroethene	<1.0 ug/L		
1,2-Dichloropropane	<1.0 ug/L		
1,3-Dichloropropane	<1.0 ug/L		
2,2-Dichloropropane	<1.0 ug/L		
1,1-Dichloropropene	<1.0 ug/L		
1,2-Dichloropropene	<1.0 ug/L		

I hereby certify that I have reviewed and approve this data.

Mike Vaughan

Maurice H. Vaughan, Jr.
Laboratory Supervisor

Water Technology and Controls, Inc.

Environmental Laboratory

Laboratory Certification No. 165

Client:	Engineering Tectonics	Report Date:	1/9/98
Contact:	Ms. Joanna Hanson	Date Sample Rcvd:	12/18/97

WT&C Work Order # 12189710 Sample: MW-3 12/17/97

Parameters	Results
Arsenic, total	<0.010 mg/l
Barium, total	0.110 mg/l
Cadmium, total	<0.001 mg/l
Chromium, total	<0.005 mg/l
Lead, total	<0.010 mg/l
Mercury, total	<0.0002 mg/l
Selenium, total	<0.010 mg/l
Silver, total	<0.005 mg/l
Chloride	9.8 mg/l
Fluoride	<0.1 mg/l
Nitrate Nitrogen	0.3 mg/l
Total Dissolved Solids	86 mg/l
Sulfate	<10 mg/l
Conductivity	255 umhos/cm
pH	6.05

I hereby certify that I have reviewed and approve these data.

Mike Vaughan

Maurice H. Vaughan, Jr.
Laboratory Supervisor

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tel.(910)342-4748 fax.(910)342-1522

Water Technology and Controls, Inc.
Water Treatment Chemistries Environmental Laboratory
Reidsville, North Carolina 27320
(910) 342-4748

Client:	Engineering Tectonics	WT&C ID:	12189710
Project:	8260	Analysis:	12/29/97
Client Sample ID:	MW-3	Analyst:	KP
Sample Collection:	12/17/97 1130		

SW846-8260 VOLATILE ORGANICS

Parameter	Result
Benzene	**1.2 ug/L**
Bromobenzene	<1.0 ug/L
Bromochloromethane	<1.0 ug/L
Bromodichloromethane	<1.0 ug/L
Bromoform	<1.0 ug/L
Bromomethane	<5.0 ug/L
2-Butanone (MEK)	< 10 ug/L
n-Butylbenzene	<1.0 ug/L
sec-Butylbenzene	<1.0 ug/L
tert-Butylbenzene	<1.0 ug/L
Carbon Tetrachloride	<1.0 ug/L
Chlorobenzene	<1.0 ug/L
Chloroethane	<5.0 ug/L
Chloroform	<1.0 ug/L
Chloromethane	<5.0 ug/L
2-Chlorotoluene	<1.0 ug/L
4-Chlorotoluene	<1.0 ug/L
Dibromochloromethane	<1.0 ug/L
1,2-Dibromo-3-chloropropane	<1.0 ug/L
1,2-Dibromoethane (EDB)	<1.0 ug/L
Dibromomethane	<1.0 ug/L
Dichlorodifluoromethane	<5.0 ug/L
1,1-Dichloroethane	<1.0 ug/L
1,2-Dichloroethane	<1.0 ug/L
1,4-Dichlorobenzene	<1.0 ug/L
1,2-Dichlorobenzene	<1.0 ug/L
1,3-Dichlorobenzene	<1.0 ug/L
1,1-Dichloroethene	<1.0 ug/L
cis-1,2-Dichloroethene	**2.5 ug/L**
trans-1,2-Dichloroethene	<1.0 ug/L
1,2-Dichloropropane	<1.0 ug/L
1,3-Dichloropropane	<1.0 ug/L
2,2-Dichloropropane	<1.0 ug/L
1,1-Dichloropropene	<1.0 ug/L
1,2-Dichloropropene	<1.0 ug/L
cis-1,3-Dichloropropene	<1.0 ug/L
trans-1,3-Dichloropropene	<1.0 ug/L
Ethyl benzene	<1.0 ug/L
Hexachlorobutadiene	<1.0 ug/L
Isopropylbenzene	<1.0 ug/L
p-Isopropyltoluene	<1.0 ug/L
Methylene chloride	<1.0 ug/L
Naphthalene	<1.0 ug/L
n-Propylbenzene	<1.0 ug/L
Styrene	<1.0 ug/L
1,1,1,2-Tetrachloroethane	<1.0 ug/L
1,1,2,2-Tetrachloroethane	<1.0 ug/L
Tetrachloroethene	<1.0 ug/L
Toluene	<1.0 ug/L
1,1,1-Trichloroethane	<1.0 ug/L
1,1,2-Trichloroethane	<1.0 ug/L
Trichloroethene	<1.0 ug/L
1,2,3-Trichlorobenzene	<1.0 ug/L
1,2,4-Trichlorobenzene	<1.0 ug/L
1,2,3-Trichloropropane	<1.0 ug/L
Trichlorofluoromethane	<5.0 ug/L
1,2,4-Trimethylbenzene	<1.0 ug/L
1,3,5-Trimethylbenzene	<1.0 ug/L
Vinyl chloride	<5.0 ug/L
Xylenes (total)	<1.0 ug/L

I hereby certify that I have reviewed and approve this data.

Mike Vaughan

Maurice H. Vaughan, Jr.
Laboratory Supervisor

Water Technology and Controls, Inc.

Environmental Laboratory

Laboratory Certification No. 165

Client: Engineering Tectonics
Contact: Ms. Joanna Hanson

Report Date: 1/9/98
Date Sample Rcvd: 12/18/97

WT&C Work Order # 12189711

Sample: Stream 1 12/17/97

Parameters	Results
Arsenic, total	<0.010 mg/l
Barium, total	0.014 mg/l
Cadmium, total	<0.001 mg/l
Chromium, total	<0.005 mg/l
Lead, total	<0.010 mg/l
Mercury, total	<0.0002 mg/l
Selenium, total	<0.010 mg/l
Silver, total	<0.005 mg/l
Chloride	1.8 mg/l
Fluoride	<0.1 mg/l
Nitrate Nitrogen	1.4 mg/l
Total Dissolved Solids	39 mg/l
Sulfate	<10 mg/l
Conductivity	60 umhos/cm
pH	6.54

I hereby certify that I have reviewed and approve these data.

Mike Vaughan

Maurice H. Vaughan, Jr.
Laboratory Supervisor

642 Tamco Road, Reidsville, North Carolina 27320
tel.(910)342-4748 fax.(910)342-1522

Water Technology and Controls, Inc.
Water Treatment Chemistries Environmental Laboratory
Reidsville, North Carolina 27320
(910) 342-4748

Client:	Engineering Tectonics	WT&C ID:	12189711
Project:	8260	Analysis:	12/29/97
Client Sample ID:	Stream 1	Analyst:	KP
Sample Collection:	12/17/97 1130		

SW846-8260 VOLATILE ORGANICS

Parameter	Result
Benzene	<1.0 ug/L
Bromobenzene	<1.0 ug/L
Bromochloromethane	<1.0 ug/L
Bromodichloromethane	<1.0 ug/L
Bromoform	<1.0 ug/L
Bromomethane	<5.0 ug/L
2-Butanone (MEK)	< 10 ug/L
n-Butylbenzene	<1.0 ug/L
sec-Butylbenzene	<1.0 ug/L
tert-Butylbenzene	<1.0 ug/L
Carbon Tetrachloride	<1.0 ug/L
Chlorobenzene	<1.0 ug/L
Chloroethane	<5.0 ug/L
Chloroform	<1.0 ug/L
Chloromethane	<5.0 ug/L
2-Chlorotoluene	<1.0 ug/L
4-Chlorotoluene	<1.0 ug/L
Dibromochloromethane	<1.0 ug/L
1,2-Dibromo-3-chloropropane	<1.0 ug/L
1,2-Dibromoethane (EDB)	<1.0 ug/L
Dibromomethane	<1.0 ug/L
Dichlorodifluoromethane	<5.0 ug/L
1,1-Dichloroethane	<1.0 ug/L
1,2-Dichloroethane	<1.0 ug/L
1,4-Dichlorobenzene	<1.0 ug/L
1,2-Dichlorobenzene	<1.0 ug/L
1,3-Dichlorobenzene	<1.0 ug/L
1,1-Dichloroethene	<1.0 ug/L
cis-1,2-Dichloroethene	<1.0 ug/L
trans-1,2-Dichloroethene	<1.0 ug/L
1,2-Dichloropropane	<1.0 ug/L
1,3-Dichloropropane	<1.0 ug/L
2,2-Dichloropropane	<1.0 ug/L
1,1-Dichloropropene	<1.0 ug/L
1,2-Dichloropropene	<1.0 ug/L
cis-1,3-Dichloropropene	<1.0 ug/L
trans-1,3-Dichloropropene	<1.0 ug/L
Ethyl benzene	<1.0 ug/L
Hexachlorobutadiene	<1.0 ug/L
Isopropylbenzene	<1.0 ug/L
p-Isopropyltoluene	<1.0 ug/L
Methylene chloride	<1.0 ug/L
Naphthalene	<1.0 ug/L
n-Propylbenzene	<1.0 ug/L
Styrene	<1.0 ug/L
1,1,1,2-Tetrachloroethane	<1.0 ug/L
1,1,2,2-Tetrachloroethane	<1.0 ug/L
Tetrachloroethene	<1.0 ug/L
Toluene	<1.0 ug/L
1,1,1-Trichloroethane	<1.0 ug/L
1,1,2-Trichloroethane	<1.0 ug/L
Trichloroethene	<1.0 ug/L
1,2,3-Trichlorobenzene	<1.0 ug/L
1,2,4-Trichlorobenzene	<1.0 ug/L
1,2,3-Trichloropropane	<1.0 ug/L
Trichlorofluoromethane	<5.0 ug/L
1,2,4-Trimethylbenzene	<1.0 ug/L
1,3,5-Trimethylbenzene	<1.0 ug/L
Vinyl chloride	<5.0 ug/L
Xylenes (total)	<1.0 ug/L

I hereby certify that I have reviewed and approve this data.

Mike Vaughan

Maurice H. Vaughan, Jr.
Laboratory Supervisor

Water Technology and Controls, Inc.

Environmental Laboratory

Laboratory Certification No. 165

Client: Engineering Tectonics
Contact: Ms. Joanna Hanson

Report Date: 1/9/98
Date Sample Rcvd: 12/18/97

WT&C Work Order # 12189712

Sample: Stream 2 12/17/97

Parameters	Results
Arsenic, total	<0.010 mg/l
Barium, total	0.019 mg/l
Cadmium, total	<0.001 mg/l
Chromium, total	<0.005 mg/l
Lead, total	<0.010 mg/l
Mercury, total	<0.0002 mg/l
Selenium, total	<0.010 mg/l
Silver, total	<0.005 mg/l
Chloride	2.2 mg/l
Fluoride	<0.1 mg/l
Nitrate Nitrogen	0.2 mg/l
Total Dissolved Solids	4 mg/l
Sulfate	<10 mg/l
Conductivity	38 umhos/cm
pH	6.55

I hereby certify that I have reviewed and approve these data.

Mike Vaughan

Maurice H. Vaughan, Jr.
Laboratory Supervisor

642 Tamco Road, Reidsville, North Carolina 27320
tel.(910)342-4748 fax.(910)342-1522

Water Technology and Controls, Inc.
Water Treatment Chemistries Environmental Laboratory
Reidsville, North Carolina 27320
(910) 342-4748

Client:	Engineering Tectonics	WT&C ID:	12189712
Project:	8260	Analysis:	12/29/97
Client Sample ID:	Stream 2	Analyst:	KP
Sample Collection:	12/17/97 1130		

SW846-8260 VOLATILE ORGANICS

Parameter	Result
Benzene	<1.0 ug/L
Bromobenzene	<1.0 ug/L
Bromochloromethane	<1.0 ug/L
Bromodichloromethane	<1.0 ug/L
Bromoform	<1.0 ug/L
Bromomethane	<5.0 ug/L
2-Butanone (MEK)	< 10 ug/L
n-Butylbenzene	<1.0 ug/L
sec-Butylbenzene	<1.0 ug/L
tert-Butylbenzene	<1.0 ug/L
Carbon Tetrachloride	<1.0 ug/L
Chlorobenzene	<1.0 ug/L
Chloroethane	<5.0 ug/L
Chloroform	<1.0 ug/L
Chloromethane	<5.0 ug/L
2-Chlorotoluene	<1.0 ug/L
4-Chlorotoluene	<1.0 ug/L
Dibromochloromethane	<1.0 ug/L
1,2-Dibromo-3-chloropropane	<1.0 ug/L
1,2-Dibromoethane (EDB)	<1.0 ug/L
Dibromomethane	<1.0 ug/L
Dichlorodifluoromethane	<5.0 ug/L
1,1-Dichloroethane	<1.0 ug/L
1,2-Dichloroethane	<1.0 ug/L
1,4-Dichlorobenzene	<1.0 ug/L
1,2-Dichlorobenzene	<1.0 ug/L
1,3-Dichlorobenzene	<1.0 ug/L
1,1-Dichloroethene	<1.0 ug/L
cis-1,2-Dichloroethene	<1.0 ug/L
trans-1,2-Dichloroethene	<1.0 ug/L
1,2-Dichloropropane	<1.0 ug/L
1,3-Dichloropropane	<1.0 ug/L
2,2-Dichloropropane	<1.0 ug/L
1,1-Dichloropropene	<1.0 ug/L
1,2-Dichloropropene	<1.0 ug/L
cis-1,3-Dichloropropene	<1.0 ug/L
trans-1,3-Dichloropropene	<1.0 ug/L
Ethyl benzene	<1.0 ug/L
Hexachlorobutadiene	<1.0 ug/L
Isopropylbenzene	<1.0 ug/L
p-Isopropyltoluene	<1.0 ug/L
Methylene chloride	<1.0 ug/L
Naphthalene	<1.0 ug/L
n-Propylbenzene	<1.0 ug/L
Styrene	<1.0 ug/L
1,1,1,2-Tetrachloroethane	<1.0 ug/L
1,1,2,2-Tetrachloroethane	<1.0 ug/L
Tetrachloroethene	<1.0 ug/L
Toluene	<1.0 ug/L
1,1,1-Trichloroethane	<1.0 ug/L
1,1,2-Trichloroethane	<1.0 ug/L
Trichloroethene	<1.0 ug/L
1,2,3-Trichlorobenzene	<1.0 ug/L
1,2,4-Trichlorobenzene	<1.0 ug/L
1,2,3-Trichloropropane	<1.0 ug/L
Trichlorofluoromethane	<5.0 ug/L
1,2,4-Trimethylbenzene	<1.0 ug/L
1,3,5-Trimethylbenzene	<1.0 ug/L
Vinyl chloride	<5.0 ug/L
Xylenes (total)	<1.0 ug/L

I hereby certify that I have reviewed and approve this data.

Mike Vaughan

Maurice H. Vaughan, Jr.
Laboratory Supervisor

WATER TECHNOLOGY AND CONTROLS, INC.
Water Treatment Chemistries & Environmental Laboratory
Reidsville, North Carolina 27320
(919) 342-4748

CHAIN OF CUSTODY RECORD

Customer: Engineering Tectonics Phone: (910) 724-6994 Ext. 119
Contact: Joanna Hanson Job: Avery County Landfill
Sampler (Signature): JoannaSHanson

TO BE FILLED IN ONLY AT LABORATORY

Sample Location	Sample Collection				Sample Type			Number of Containers Shipped	Test(s) Required	Preservation	
	Date 1	Time	Date 2	Time	Composite Auto	Composite Hand	Grab			Icing O.K.?	pH O.K.?
MW-1	12/17/97	1130 AM					X	4	8260, Conductance,	YD	YD
MW-2									ph, Chloride, Fluoride,		
MW-3									Nitrate, TDS, Sulfate,		
Stream 1									Arsenic, Barium, Cadmium,		
Stream 2									Chromium, Lead, Mercury,		
CMW-1									Selenium, Silver		
CMW-2											
CMW-3											

Relinquished by: (Signature) JoannaSHanson 12/18/97
Method of Shipment: WT&C
Date & Time: 12/18/97 0930

Received for WT&C by: [signature]
Date & Time: 12/19/97 0730

Received at lab by: [signature]
Date & Time: 12/18/97 1100 AM