Carmen Johnson
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95-02

THE WATAUGA COUNTY LANDFILL
PERMIT NO. 95-02
ASSESSMENT PLAN
ACTIVITY REPORT
APPENDICES

Prepared for
Watauga County
Board of Commissioners

Prepared by
Draper Aden Associates

July 29, 1994

DAA Job No. 6520-14

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TABLE OF CONTENTS

List of Appendices

APPENDIX I	Assessment Monitoring Well Boring and Completion Logs
APPENDIX II	TCLP Analysis of Drill Cuttings
APPENDIX III	HASP Air Sampling Analytical Results and Field Notes
APPENDIX IV	Aquifer Flow Testing Result Calculations
APPENDIX V	Potable Well Sampling Program Analytical Results
APPENDIX VI	Standard Groundwater Monitoring Field Collection Forms
APPENDIX VII	Landfill Groundwater Organic Analysis Summary Table and Data Evaluation

APPENDIX 1

Assessment Monitoring Well Boring and Completion Logs

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LOG OF: MW-8 (1 of 1)

Project Number: 6520-14	
Client: WATAUGA COUNTY	Drilling Company: GROUNDWATER PROTECT.
Project: WATAUGA COUNTY LANDFILL	Driller: SPEEDSTAR 300
Location: WATAUGA COUNTY, NORTH CAROLINA	Boring Method: 6" AIR ROTARY HAMMER
North: 10047.6 East: 10867.8	Logged by: JEFFREY SMITH
Total Depth 63.0' Elev GS: 3237.0 Reference: ASSESSMENT WELLS	Completion Date: January 6, 1994

Samp ID	Blow Counts	N Value	Depth Scale	SOIL DESCRIPTION (USC)	Stratum Elev	PID (ppm)	WELL LOG	H2O	REMARKS
			2, 4, 6, 8, 10, 12, 14, 16	Brown clayey SILT, Dry with low to medium plasticity.	3220.0				
			18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64	Layered cataclastic Gneiss, consisting of interlayered biotite-hornblende Gneiss, biotite-hornblende-plagioclase Schist and Gneiss, epidote-biotite-plagioclase Schist and Gneiss, and granitic Gneiss, frequent moist seams occuring within Schist.	3174.0			3188.0 3186.0 3184.0 3174.0	Slighty moist seams occuring within schist Water production observed after addition of new drill rod. Approx. elev. of base of adjacent fill.

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LOG OF: MW-9
(1 of 1)

			Project Number: 6520-14
Client: WATAUGA COUNTY			*Drilling Company:* GROUNDWATER PROTECT.
Project: WATAUGA COUNTY LANDFILL			*Driller:* SPEEDSTAR 300
Location: WATAUGA COUNTY, NORTH CAROLINA			*Boring Method:* 6" AIR ROTARY HAMMER
North: 8508.5	*East:* 11132.9		*Logged by:* JEFFREY SMITH
Total Depth 84.0'	*Elev GS:* 3356.3	*Reference:* ASSESSMENT WELLS	*Completion Date:* January 6, 1994

Samp ID	*Blow Counts*	*N Value*	*Depth Scale*	*SOIL DESCRIPTION (USC)*	*Stratum Elev*	*PID (ppm)*	*WELL LOG*	*H2O*	*REMARKS*
			2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36	*Brown SILT with trace Clay Dry to slightly moist with low plasticity. hammering suggests saprolitic Schist*	3319.3				
			38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84	*Layered cataclastic Gneiss, consisting primarily of granitic Gneiss, interlayered with biotite-hornblende Gneiss, biotite-hornblende-plagioclase Schist and Gneiss, and epidote-biotite-plagioclase Schist and Gneiss.* *Significant fracture/shear zone* *Significant brown Schist layer moist to wet*	3272.3			3286.3 3284.3 3282.3 3272.3	*water produced*

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LOG OF: MW-10
(1 of 1)

Client: WATAUGA COUNTY	Project Number: 6520-14
	Drilling Company: BEDFORD ENV. WELL
Project: WATAUGA COUNTY LANDFILL	Driller: INGERSOL RAND T4W
Location: WATAUGA COUNTY, NORTH CAROLINA	Boring Method: 10" & 6" AIR ROTARY
North: 10112.9 East: 11356.7	Logged by: JEFFREY SMITH
Total Depth 68.0' Elev GS: 3202.0 Reference: ASSESSMENT WELLS	Completion Date: February 10, 1994

Samp ID	Blow Counts	N Value	Depth Scale	SOIL DESCRIPTION (USC)	Stratum Elev	PID (ppm)	WELL LOG	H2O	REMARKS
			2, 4, 6	Boulder (approx. 2-6 in dia.) fill, composed primarily of layered cataclastic Gniess	3196.0				
			8, 10, 12	Primarily CLAY fill	3189.0			▼	water produced
			14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40	Gneiss boulders and CLAY fill	3161.0				
			42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68	Black AMPHIBOLITE Significant fractures Significant fractures	3134.0			3148 3146 3144 3134	installed 6" steel casing to 41.00 ft. groundwater produced 0 0 0 groundwater produced 0
			70, 72, 74						

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LOG OF: MW-11
(1 of 1)

Project Number: 6520-14

Client: WATAUGA COUNTY	*Drilling Company:* GROUNDWATER PROTECT.
Project: WATAUGA COUNTY LANDFILL	*Driller:* SPEEDSTAR 300
Location: WATAUGA COUNTY, NORTH CAROLINA	*Boring Method:* 8.25" HSA & 6" A.R.
North: 10513.5 *East:* 9780.7	*Logged by:* JEFFREY SMITH
Total Depth 23.0' *Elev GS:* 3157.0 *Reference:* ASSESSMENT WELLS	*Completion Date:* January 12, 1994

Samp ID	Blow Counts	N Value	Depth Scale	SOIL DESCRIPTION (USC)	Stratum Elev	PID (ppm)	WELL LOG	H2O	REMARKS
			2						
			4						
				Red-brown silty Clay, Wet.					
			6						
			8	*gradually increasing saprolitic Schist characteristics.*				3148.0	
			10					3146.0	
			12					3144.0	
			14						
			16						
			18		3138.0				*groundwater produced above bedrock.*
			20	*Brown, biotite-hornblende-plagioclase Schist.*	3137.0				*changed from 8.25" HSA to 6" hammer.*
				Grey granitic Gneiss					
			22		3134.0			3134.0	
			24						

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LOG OF: MW-12
(1 of 1)

Project Number: 6520-14	
Client: WATAUGA COUNTY	Drilling Company: GROUNDWATER PROTECT.
Project: WATAUGA COUNTY LANDFILL	Driller: SPEEDSTAR 300
Location: WATAUGA COUNTY, NORTH CAROLINA	Boring Method: 8" & 6" AIR ROTARY
North: 10518.7 East: 9774.0	Logged by: JEFFREY SMITH
Total Depth 70.0' Elev GS: 3156.0 Reference: ASSESSMENT WELLS	Completion Date: January 11, 1994

Samp ID	Blow Counts	N Value	Depth Scale	SOIL DESCRIPTION (USC)	Stratum Elev	PID (ppm)	WELL LOG	H2O	REMARKS
			2, 4, 6, 8, 10, 12, 14, 16, 18	Red-brown silty Clay grading into saprolitic Schist	3138.0				
			20, 22	Brown, biotite-hornblende-plagioclase Schist	3133.0				groundwater produced set temp. 6" PVC casing at 21 ft.
			24, 26, 28, 30, 32, 34	Gray, granitic Gneiss, few fractures	3122.0				little groundwater produced
			36, 38, 40, 42	Brown, biotite-hornblende-plagioclase Schist.	3114.0				silty groundwater produced
			44, 46, 48, 50, 52, 54, 56, 58	Predominantly gray, granitic Gneiss interlayered with minor biotite-hornblende Gneiss and biotite-hornblende-plagioclase Schist and Gneiss. few fractures	3098.0			3103 3101 3099	little groundwater produced 0 0 0
			60, 62, 64, 66, 68, 70	same with frequent fractures	3086.0			3089 3086	significant, CLEAR groundwater produced 0 0

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LOG OF: MW-13
(1 of 1)

Project Number: 6520-14

Client: WATAUGA COUNTY	*Drilling Company:* GROUNDWATER PROTECT.
Project: WATAUGA COUNTY LANDFILL	*Driller:* SPEEDSTAR 300
Location: WATAUGA COUNTY, NORTH CAROLINA	*Boring Method:* 8.25" ID HSA
North: 11403.3 *East:* 9553.6	*Logged by:* JEFFREY SMITH
Total Depth 29.0' *Elev GS:* 3116.5 *Reference:* ASSESSMENT WELLS	*Completion Date:* January 14, 1994

Samp ID	Blow Counts	N Value	Depth Scale	SOIL DESCRIPTION (USC)	Stratum Elev	PID (ppm)	WELL LOG	H2O	REMARKS
			2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30	*Red-orange-brown silty CLAY moist*	3110.5				
				Yellow-orange-brown silty CLAY	3107.5				
				Brown SILT/CLAY				3101.5	
								3099.5	
				wet to saturated				3097	*groundwater produced*
					3087.5			3087.5	

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LOG OF: MW-14
(1 of 1)

Client: WATAUGA COUNTY		*Project Number:* 6520-14	*Drilling Company:* BEDFORD ENV. WELL
Project: WATAUGA COUNTY LANDFILL			*Driller:* INGERSOL RAND T4W
Location: WATAUGA COUNTY, NORTH CAROLINA			*Boring Method:* 10" AIR ROTARY TRI.
North: 11219.4	*East:* 11044.6		*Logged by:* JEFFREY SMITH
Total Depth 69.0'	*Elev GS:* 3117.4	*Reference:* ASSESSMENT WELLS	*Completion Date:* January 16, 1994

Samp ID	Blow Counts	N Value	Depth Scale	SOIL DESCRIPTION (USC)	Stratum Elev	PID (ppm)	WELL LOG	H2O	REMARKS
			2, 4, 6	*Brown CLAY/SILT with minor stream boulders composed primarily of black Amphibolite and hornblende Gneiss*	3110.4				
			8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70	*Saprolitic, gray-brown, biotite-muscovite Schist and Gneiss*					*groundwater produced*
								3062.4	
								3060.4	
								3058.4	*2-5 gal/min groundwater production*
				Black amphibolite bedrock encountered	3048.4			3048.4	

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LOG OF: MW-15
(1 of 1)

Project Number: 6520-14

Client: WATAUGA COUNTY	*Drilling Company:* BEDFORD ENV. WELL
Project: WATAUGA COUNTY LANDFILL	*Driller:* INGERSOL RAND T4W
Location: WATAUGA COUNTY, NORTH CAROLINA	*Boring Method:* 10" & 6" AIR ROTARY
North: 11212.3 *East:* 11052.7	*Logged by:* JEFFREY SMITH
Total Depth 176.0' *Elev GS:* 3118.3 *Reference:* ASSESSMENT WELLS	*Completion Date:* January 16, 1994

Samp ID	Blow Counts	N Value	Depth Scale	SOIL DESCRIPTION (USC)	Stratum Elev	PID (ppm)	WELL LOG	H2O	REMARKS
			2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70	*Brown SILT/CLAY with stream cobbles and boulders composed primarily of black Amphibolite and epidote-hornblende-plagioclase Gneiss.*	3107.3			▼	*groundwater produced.*
			72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176	*Saprolitic, gray-brown, biotite-muscovite Schist and Gneiss.*	3047.3				*set 6" steel casing at 81.0 ft.*
				Black AMPHIBOLITE.					
				Significant fracture zone Feldspar and Quartz-rich vein	2958.3			2957.3	*significant, clear groundwater production*
				Significant fracture zone Feldspar and quartz-rich veins.	2946.3			2955.3 2952.8	*significant, clear groundwater production from 160 to 172 ft.*
					2942.3			2942.3	

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LOG OF: MW-16
(1 of 1)

Project Number: 6520-14

Client: WATAUGA COUNTY	*Drilling Company:* BEDFORD ENV. WELL
Project: WATAUGA COUNTY LANDFILL	*Driller:* INGERSOL RAND T4W
Location: WATAUGA COUNTY, NORTH CAROLINA	*Boring Method:* 6" AIR ROTARY HAMMER
North: 10722.8 *East:* 11195.2	*Logged by:* JEFFREY SMITH
Total Depth 24.0' *Elev GS:* 3140.5 *Reference:* ASSESSMENT WELLS	*Completion Date:* January 14, 1994

Samp ID	Blow Counts	N Value	Depth Scale	SOIL DESCRIPTION (USC)	Stratum Elev	PID (ppm)	WELL LOG	H2O	REMARKS
			2						
			4						
			6	*Brown CLAY with minor Silt, moist to wet with moderate plasticity.*					
			8						
			10					3130.5	
			12					3128.5	
			14					3126.5	*groundwater produced*
			16						
			18						
			20						
			22						
			24		3116.5			3116.5	

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LOG OF: MW-17
(1 of 1)

Project Number: 6520-14

Client: WATAUGA COUNTY	*Drilling Company:* GROUNDWATER PROTECT.
Project: WATAUGA COUNTY LANDFILL	*Driller:* SPEEDSTAR 300
Location: WATAUGA COUNTY, NORTH CAROLINA	*Boring Method:* 8.25" HSA & 6" A.R.
North: 10305.0 *East:* 10054.9	*Logged by:* JEFFREY SMITH
Total Depth 93.0' *Elev GS:* 3181.0 *Reference:* ASSESSMENT WELLS	*Completion Date:* January 12, 1994

Samp ID	Blow Counts	N Value	Depth Scale	SOIL DESCRIPTION (USC)	Stratum Elev	PID (ppm)	WELL LOG	H2O	REMARKS
			2, 4, 6, 8	*Orange-brown silty CLAY*	3173.0				
			10, 12, 14, 16	*Brown CLAY/SILT*	3165.0			▼	
			18, 20	*Brown clayey SILT grading to gray-brown clayey SILT grading to gray SILT*	3161.0				*NO groundwater produced above bedrock. changed from 8.25" HSA to 6" hammer.*
			22, 24, 26, 28, 30, 32	*Gray-green-brown, epidote-biotite-plagioclase Schist and Gneiss*	3148.0				
			34, 36	*Brown, biotite-hornblende-plagioclase Schist.*	3144.0				
			38, 40, 42	*Gray-green, epidote-biotite-plagioclase Schist and Gneiss.*	3141.0				
			44, 46	*Primarily gray Granitic Gneiss, with significant water producing fractures.*	3134.0				*significant groundwater produced from 42 to 45 ft.*
			48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94	*Black AMPHIBOLITE.* *minor fractures.*	3088.0			3106.0 3104.0 3102.0 3092.0 3088.0	*minor fractures from 87 to 89 ft.*

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LOG OF: MW-18
(1 of 1)

		Project Number: 6520-14	
Client: WATAUGA COUNTY		*Drilling Company:* GROUNDWATER PROTECT.	
Project: WATAUGA COUNTY LANDFILL		*Driller:* SPEEDSTAR 300	
Location: WATAUGA COUNTY, NORTH CAROLINA		*Boring Method:* 8.25" HSA & 6" A.R.	
North: 11393.9	*East:* 9561.5	*Logged by:* JEFFREY SMITH	
Total Depth 70.0' *Elev GS:* 3117.0	*Reference:* ASSESSMENT WELLS	*Completion Date:* January 13, 1994	

Samp ID	Blow Counts	N Value	Depth Scale	SOIL DESCRIPTION (USC)	Stratum Elev	PID (ppm)	WELL LOG	H2O	REMARKS
			2, 4, 6, 8	*Orange-brown silty CLAY*	3109.0				
			10, 12, 14	*Brown CLAY/SILT*	3103.0				
			16, 18, 20	*Gray-brown silty CLAY*	3097.0				
			22, 24, 26		3090.0				
			28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54	*Layered cataclastic Gneiss, consisting primarily of granitic Gneiss, interlayered with biotite-hornblende Gneiss, biotite-hornblende-plagioclase Schist and Gneiss, and epidote-biotite-plagioclase Schist and Gneiss.*	3060.0			3062 0	*changed from 8.25" HSA to 6" hammer.*
			56, 58, 60, 62, 64, 66, 68, 70, 72	*Black AMPHIBOLITE significant fracture zone*	3047.0			3060 0 3058 0 3048 0 3047 0	*significant fracture zone from 60 to 70 ft.*

APPENDIX II

TCLP Analysis of Drill Cuttings

ANALYTICAL RESULTS

FOR

WATAUGA COUNTY LANDFILL
PROJECT NUMBER: 6520-14

April 19, 1994
Revised May 17, 1994

Compiled For:

Draper Aden Associates
Blacksburg, Virginia

Compiled By:

Central Virginia Laboratories & Consultants, Inc.
3109 Odd Fellows Road
Lynchburg, Virginia 24501
(804) 847-2852

CVLC Page 1
Draper Aden Associates
April 19, 1994
Revised May 17, 1994

SAMPLE IDENTIFICATION: *CVLC #94-03136* *CUSTOMER:* MW - 8

SAMPLE COLLECTION: 03/24/94 0830 hours to 0840 hours
SAMPLE RELINQUISHED: 03/25/94 1130 hours
SAMPLE RECEIVED: 03/28/94 0800 hours
SAMPLE LOCATION: MW-8 Soil Stockpile

SW-846 Method 1311 Toxicity Characteristic Leachate Procedure (TCLP)

Sample Weight 85.37 grams
Extraction Solution #1

METALS

CONTAMINANT	*CONCENTRATION(mg/l)*	*REGULATORY LEVEL(mg/l)*[1]
Arsenic	<0.1	5.0
Barium	1.8	100
Cadmium	<0.005	1.0
Chromium	<0.05	5.0
Lead	<0.1	5.0
Mercury	<0.02	0.2
Selenium	<0.1	1.0
Silver	<0.010	5.0

[1]40 CFR 261 Established Limit

CVLC Page 2
Draper Aden Associates
April 19, 1994
Revised May 17, 1994

SAMPLE IDENTIFICATION: *CVLC #94-03136* *CUSTOMER:* MW - 8

SW-846 Method 1311 Toxicity Characteristic Leachate Procedure (TCLP)

Sample Weight 10.41 grams
Extraction Solution #1

SW-846 METHOD 8010 & 8020 VOLATILE ORGANIC COMPOUNDS

CONTAMINANT	*CONCENTRATION(mg/l)*	*REGULATORY LEVEL(mg/l)*[1]
Benzene	<0.010	0.5
Carbon Tetrachloride	<0.010	0.5
Chlorobenzene	<0.010	100.0
Chloroform	0.038	6.0
1,4-Dichlorobenzene	<0.010	7.5
1,2-Dichloroethane	<0.010	0.5
1,1-Dichloroethylene	0.033	0.7
Methyl Ethyl Ketone	<0.100	200.0
Tetrachloroethylene	<0.010	0.7
Trichloroethylene	0.025	0.5
Vinyl Chloride	<0.010[2]	0.2

SW-846 Method 1311 Toxicity Characteristic Leachate Procedure (TCLP)

Sample Weight 85.37 grams
Extraction Solution #1

SW-846 METHOD 8270 PESTICIDES

CONTAMINANT	*CONCENTRATION(mg/l)*	*REGULATORY LEVEL(mg/l)*[1]
Chlordane	<0.015	0.03
Endrin	<0.010	0.02
Heptachlor (& OH)	<0.007	0.008
Lindane	<0.200	0.4
Methoxychlor	<5.0	10.0
Toxaphene	<0.100	0.5

[1]40 CFR 261 Established Limit

[2]Please note revision.

CVLC Page 3
Draper Aden Associates
April 19, 1994
Revised May 17, 1994

SAMPLE IDENTIFICATION: *CVLC #94-03136* *CUSTOMER:* MW - 8

SW-846 Method 1311 Toxicity Characteristic Leachate Procedure (TCLP)

Sample Weight 85.37 grams
Extraction Solution #1

SW-846 METHOD 8270 SEMI-VOLATILE ORGANIC COMPOUNDS

CONTAMINANT	*CONCENTRATION(mg/l)*	*REGULATORY LEVEL(mg/l)*[1]
o-Cresol	<100	200.0
m-Cresol	<100	200.0
p-Cresol	<100	200.0
Cresol	<100	200.0
2,4-Dinitrotoluene	<0.100	0.13
Hexachlorobenzene	<0.070	0.13
Hexachlorobutadiene	<0.100	0.5
Hexachloroethane	<0.100	3.0
Nitrobenzene	<0.50	2.0
Pentachlorophenol	<50.0	100.0
Pyridine	<1.0	5.0
2,4,5-Trichlorophenol	<200	400.0
2,4,6-Trichlorophenol	<1.0	2.0

SW-846 Method 1311 Toxicity Characteristic Leachate Procedure (TCLP)

Sample Weight 85.37 grams
Extraction Solution #1

SW-846 METHOD 8150 HERBICIDES

CONTAMINANT	*CONCENTRATION(mg/l)*	*REGULATORY LEVEL(mg/l)*[1]
2,4-D	<5.0	10.0
2,4,5-TP (Silvex)	<0.50	1.0

[1]40 CFR 261 Established Limit

APPENDIX III

HASP Air Sampling Analytical Results and Field Notes

ETS Analytical Services, Inc.

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JAN 0 - 094

January 21, 1994

Mr. Justin Babendreier
Draper Aden Associates
2206 South main Street
Blacksburg, Va. 24060

RE: Watuga Co. Landfill

Dear Mr. Babendreier:

Enclosed are the volatile organic results for the above referenced project. Samples were received in Tedlar bags in the laboratory on January 20, 1994. All bags were intact.

The samples were analyzed using the instrument conditions outlined in USEPA Method 8240. Aliquots of the air samples from Tedlar bags were withdrawn using a 100ml gas-tight syringe. The sample was quickly injected into the sampler of the purge and trap device during the purge cycle. Analysis was then conducted as for water samples according to Method 8240.

It should be noted that methylene chloride and the two Tentatively Identified Compounds detected in these analyses are common laboratory solvents. Methylene chloride and hexane concentrations were approximately the same in the laboratory blank; however, 1,1,2-trichloro-1,2,2-trifluoro-ethane was not detected in the laboratory blank.

Also note that the Tentatively Identified Compounds are semi-quantitative. This means that the compounds identified are compounds not used in the calibration of the instrument and therefore, a quantitated result can not be obtained.

If you should any questions concerning these results, please feel free to contact either myself or Rich Whitney. Thank you for allowing ETSAS to provide our services.

Sincerely,

Chris A. Southworth

Chris A. Southworth,
Project Manager

1401 Municipal Road, NW - Roanoke, Virginia 24012-1309 - Telephone: 703-265-0004 - FAX: 703-563-4866

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Draper Aden Associates
2206 South Main Street
Blacksburg, Va 24060
ATTN: Mr. Justin Babendreir

Re: Laboratory Analysis
ETSAS Client No. 6973
Watuga Co. Landfill

REPORT DATE/NUMBER: January 21, 1994 / 80

ANALYSIS FOR: Volatile Organic Compounds

METHOD OF ANALYSIS: SW 846 Method 8240, Modified

SAMPLE ANALYSIS DATA

Lab ID: 152398 Client ID: MW-8 SHALLOW#1 Matrix: AIR
Other ID: 6520-14 Collected by: J. SMITH
Collection Date: 01/19/94 Time: 1420 Received at ETSAS: 01/20/94
VOLATILE ORGANIC COMPOUNDS BY GC/MS:

Benzene ——— < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

Bromodichloromethane ——— < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

Carbon Tetrachloride ——— < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

Chloroethane ——— < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

Chloroform ——— < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

cis-1,2-Dichloroethene ——— < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

1,4-Dichlorobenzene ——— < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

REPORT CONTINUED ON NEXT PAGE

1401 Municipal Road, NW - Roanoke, Virginia 24012-1309 - Telephone: 703-265-0004 - FAX: 703-563-4866

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SAMPLE ANALYSIS DATA

Lab ID: 152398 (continued)

Dichlorodiflouromethane — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

1,1-Dichloroethane — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

1,2-Dichloroethane — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

1,1-Dichloroethylene — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

1,2-Dichloropropane — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

2,2-Dichloropropene — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

1,1-Dichloropropene — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

Methylene chloride — 0.52 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

Tetrachloroethene — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

Trans-1,3-Dichloropropene — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

1,1,1-Trichloroethane — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

Trichloroethylene — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

Vinyl chloride — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

Xylenes — < 0.10 ug/l
└>Analysis Date: 01/20/94 by: MC
└>Method: GC/MS; Det Limit= 0.10 ug/l

REPORT CONTINUED ON NEXT PAGE

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SAMPLE ANALYSIS DATA

Lab ID: 152399 Client ID: MW-8 DEEP#1 Matrix: AIR
Other ID: 6520-14 Collected by: J. SMITH
Collection Date: 01/19/94 Time: 1420 Received at ETSAS: 01/20/94

Benzene		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
Bromodichloromethane		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
Carbon Tetrachloride		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
Chloroethane		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
Chloroform		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
cis-1,2-Dichloroethene		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
1,4-Dichlorobenzene		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
Dichlorodiflouromethane		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
1,1-Dichloroethane		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
1,2-Dichloroethane		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
1,1-Dichloroethylene		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
1,2-Dichloropropane		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		
2,2-Dichloropropene		< 0.10 ug/l
↳Analysis Date: 01/20/94	by: MC	
↳Method: GC/MS; Det Limit= 0.10 ug/l		

REPORT CONTINUED ON NEXT PAGE

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SAMPLE ANALYSIS DATA

Lab ID: 152399 (continued)

1,1-Dichloropropene — < 0.10 ug/l
- Analysis Date: 01/20/94 by: MC
- Method: GC/MS; Det Limit= 0.10 ug/l

Methylene chloride — 0.35 ug/l
- Analysis Date: 01/20/94 by: MC
- Method: GC/MS; Det Limit= 0.10 ug/l

Tetrachloroethene — < 0.10 ug/l
- Analysis Date: 01/20/94 by: MC
- Method: GC/MS; Det Limit= 0.10 ug/l

Trans-1,3-Dichloropropene — < 0.10 ug/l
- Analysis Date: 01/20/94 by: MC
- Method: GC/MS; Det Limit= 0.10 ug/l

1,1,1-Trichloroethane — < 0.10 ug/l
- Analysis Date: 01/20/94 by: MC
- Method: GC/MS; Det Limit= 0.10 ug/l

Trichloroethylene — < 0.10 ug/l
- Analysis Date: 01/20/94 by: MC
- Method: GC/MS; Det Limit= 0.10 ug/l

Vinyl chloride — < 0.10 ug/l
- Analysis Date: 01/20/94 by: MC
- Method: GC/MS; Det Limit= 0.10 ug/l

Xylenes — < 0.10 ug/l
- Analysis Date: 01/20/94 by: MC
- Method: GC/MS; Det Limit= 0.10 ug/l

NOTE: Tentatively Identified Compounds: 1,1,2-trichloro-1,2,2-triflouroethane and Hexane were found present in both samples. Please see attached letter.

If we may be of further assistance, please contact us at any time.

Sincerely,
ETS ANALYTICAL SERVICES, INC.

Chris Southworth

Chris Southworth, Project Manager

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Draper Aden Associates
CONSULTING ENGINEERS
2206 South Main Street
Blacksburg, Virginia 24060

CHAIN OF CUSTODY RECORD

Date: Jan 20 1994

Customer Name: DRAPER ADEN ASSOCIATES

Address: 2206 South Main
Blacksburg VA 24060

Person to Contact: John Bloodgood Telephone: (703) 552 0444

Billing Address: Same as above

Sample Collection Information

Sampling Site: Watauga County Landfill

Project #: 0520-04 Sampler: Jeff Smith

Date of Sample Shipment: Jan 20 1994 How Shipped: DAA Pickup

SAMPLE LOG AND ANALYSES REQUEST

Turnaround Requirements
- ____ Regular
- ✓ Rush
- ✓ FAX Results

Analysis Requested: Organic Scan #3

Sample ID	Containers # and Type	Date	Time	Matrix	Grab / Comp.						Organic Scan #3	Remarks
MW-3 Shallow #1	1 Tedlar Bag	1/19/94	2:40p	AIR	GRAB						✓	
MW-3 Deep #1	1 Tedlar Bag	1/19/94	2:40p	AIR	GRAB						✓	
MW-3 Shallow #2	1 Tedlar Bag	1/19/94	3:40p	AIR	GRAB							Extra
MW-3 Deep #2	1 Tedlar Bag	1/19/94	4:00p	AIR	GRAB							Extra

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	1/20/94 [illegible]				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Condition on Arrival:

Comments: [illegible]

Possible Interfering Compounds: [illegible]

Requested by: Jeffrey Smith

Per. J. Smith: Bill Watauga Co Landfill
Box 1003 West King St
Boone, NC 28607-1025

152398-401

Roche Analytics Laboratory
a division of Roche Biomedical Laboratories, Inc.

P.O. BOX 25249
RICHMOND, VA. 23260

ANALYSIS REPORT

ANALYTICS NO: 013-0105
ACCOUNT NO: 45609520
DATE: January 28, 1994

Bob Wilson
Draper, Aden Associates
2206 South Main Street
Blacksburg, VA 24060

SAMPLE TYPE: 4 Charcoal Tubes

DATE RECEIVED: 01/13/94

REMARKS:
µg = micrograms, ppm = parts per million
ND = Not Detected, L = Liters
NIOSH Method #1015 For 1,1 Dichloroethylene = VDC
NIOSH Method #1022 For Trichloroethylene = TCE
NIOSH Method #1501 For Benzene
NIOSH Method #1003 For Perchloroethylene = PERC
NIOSH Method #1003 For Carbon Tetrachloride = CCL_4
NIOSH Method #1003 For 1,1 Dichloroethane = 11DCLE
NIOSH Method #1003 For Chloroform = $CHCL_3$
NIOSH Method #1003 For 1,1,1-Trichloroethane = MCFM
Amended Report Original Date: 01/25/94

Sample #	Analytics #	Volume(L)	Analyte	µg Found Front	Back	Total	Results, ppm
BLANK	0135310105-001	--	PERC	< 20	ND	< 20	--
			$CHCL_3$	< 20	ND	< 20	--
			CCL_4	< 20	ND	< 20	--
			MCFM	< 20	ND	< 20	--
			11DCLE	< 20	ND	< 20	--
			TCE	< 20	ND	< 20	--
			VDC	< 10	ND	< 10	--
			Benzene	< 2.0	ND	< 2.0	--
Lou/well #9	-002	8.9	PERC	< 20	ND	< 20	< 0.4
			$CHCL_3$	< 20	ND	< 20	< 0.5
			CCL_4	< 20	ND	< 20	< 0.4
			MCFM	< 20	ND	< 20	< 0.5
			11DCLE	< 20	ND	< 20	< 0.6
			TCE	< 20	ND	< 20	< 0.5
			VDC	< 10	ND	< 10	< 0.29
			Benzene	< 2.0	ND	< 2.0	< 0.08
Gordon/well #10	-003	11.8	PERC	< 20	ND	< 20	< 0.3
			$CHCL_3$	< 20	ND	< 20	< 0.4
			CCL_4	< 20	ND	< 20	< 0.3
			MCFM	< 20	ND	< 20	< 0.4
			11DCLE	< 20	ND	< 20	< 0.5
			TCE	< 20	ND	< 20	< 0.4
			VDC	< 10	ND	< 10	< 0.22
			Benzene	< 2.0	ND	< 2.0	< 0.06

Roche Analytics Laboratory
a division of Roche Biomedical Laboratories, Inc.
P.O. BOX 25249
RICHMOND, VA. 23260

ANALYSIS REPORT

ANALYTICS NO: 013-0105
ACCOUNT NO: 45609520
DATE: January 28, 1994

Bob Wilson
Draper, Aden Associates
2206 South Main Street
Blacksburg, VA 24060

SAMPLE TYPE: 4 Charcoal Tubes

DATE RECEIVED: 01/13/94

REMARKS:
µg = micrograms, ppm = parts per million
ND = Not Detected, L = Liters
NIOSH Method #1015 For 1,1 Dichloroethylene = VDC
NIOSH Method #1022 For Trichloroethylene = TCE
NIOSH Method #1501 For Benzene
NIOSH Method #1003 For Perchloroethylene = PERC
NIOSH Method #1003 For Carbon Tetrachloride = CCL_4
NIOSH Method #1003 For 1,1 Dichloroethane = 11DCLE
NIOSH Method #1003 For Chloroform = $CHCL_3$
NIOSH Method #1003 For 1,1,1-Trichloroethane = MCFM

Sample #	Analytics #	Volume(L)	Analyte	µg Found Front	µg Found Back	µg Found Total	Results, ppm
Rick/well #12	-004	10.4	PERC	< 20	ND	< 20	< 0.3
			$CHCL_3$	< 20	ND	< 20	< 0.4
			CCL_4	< 20	ND	< 20	< 0.4
			MCFM	< 20	ND	< 20	< 0.4
			11DCLE	< 20	ND	< 20	< 0.5
			TCE	< 20	ND	< 20	< 0.4
			VDC	< 10	ND	< 10	< 0.25
			Benzene	< 2.0	ND	< 2.0	< 0.07

NOTE: A less than (<) notation in front of the number for all analyses indicates that either no analyte was detected or was below the level of accurate quantitation by our method. In either case the final concentration found is well below the concentration regulated by OSHA.

James A. Calpin, CIH
Laboratory Director

T:013105

LABORATORY TEST REQUEST

ACCOUNT NAME AND ADDRESS:

DRAPER, ADEN ASSOCIATES

2206 SOUTH MAIN STREET
BLACKSBURG VA 24060
ACCOUNT NUMBER 703-552-0444
45609520-6 85 VAY

Roche Analytics Laborator
ROCHE
a division of Roche Biomedical Laboratories, Inc.
8040 VILLA PARK DRIVE SUITE 250
RICHMOND, VIRGINIA 23228
(804) 264-7100
TOLL FREE (800) 888-8061

DATE SHIPPED	# OF SAMPLES	SAMPLE TYPE/MEDIA	PROJECT NAME OR NUMBER
01/12/94		Personal/charcoal	Watauga

PURCHASE ORDER NO.	CONTACT	TELEPHONE NUMBER
	Frank V. Quarato	412-543-2655

PRIORITY ANALYSIS ☐ EXTRA CHARGE

☐ 1 DAY
☐ 2 DAY
☑ STANDARD

SPECIAL INSTRUCTIONS AND/OR UNUSUAL CONDITIONS:
Samples may contain moisture due to the nature of the samples.

FOR LABORATORY USE ONLY	SAMPLE # OR SAMPLE AREA	SAMPLE DATE	SAMPLE * VOLUME/LITERS	ANALYSIS REQUESTED-PLEASE USE SEPARATE LABORATORY TEST REQUEST FOR EACH SAMPLE TYPE
	Blank	01/06/94	"0 Min" 2L/40 min	All samples to be Tested
	Lou/well #9	01/06/94	"44.5 min" 2L/40 min	for: Trichloroethylene
	Gordon/well #10	01/10/94	"52 Min." 2L/40 min.	1,1,1 Trichloroethane
	Rick/well #12	01/11/94	"52 Min." 2L/40 min.	Tetrachloroethylene
				1,1-Dichloroethylene
				1,1-Dichloroethane
				Chloroform
				Benzene
				Carbon Tetrachloride

INV# M11521
#710

* FOR PASSIVE MONITORS: EXPOSURE TIME IN MINUTES IS REQUIRED.

CLIENT COPY

Roche Analytics Laboratory
a division of Roche Biomedical Laboratories, Inc.
P.O. BOX 25249
RICHMOND, VA. 23260

ANALYSIS REPORT

ANALYTICS NO: 021-0093
ACCOUNT NO: 45609520
DATE: January 28, 1994

Frank V Quanto
Draper, Aden Associates
2206 South Main Street
Blacksburg, VA 24060

SAMPLE TYPE: 3 Charcoal Tubes

DATE RECEIVED: 01/21/94

REMARKS: µg = micrograms, ppm = parts per million
ND = Not Detected, L = Liters, Project Name: Watauga
NIOSH Method #1015 for 1,1 Dichloroethylene = VDC
NIOSH Method #1003 for Perchloroethylene = PERC
NIOSH Method #1003 for Carbon Tetrachloride = CCL_4
NIOSH Method #1003 for 1,1 Dichloroethane = 11DCLE
NIOSH Method #1003 for Chloroform = $CHCL_3$
NIOSH Method #1003 for 1,1,1-Trichloroethane = MCFM
NIOSH Method #1022 for Trichloroethylene = TCE
NIOSH Method #1501 for Benzene

Sample #	Analytics #	Volume(L)	Analyte	µg Found Front	Back	Total	Results, ppm
BLANK	0215310093-001	--	PERC	< 20	ND	< 20	--
			$CHCL_3$	< 20	ND	< 20	--
			CCL_4	< 20	ND	< 20	--
			MCFM	< 20	ND	< 20	--
			11DCLE	< 20	ND	< 20	--
			TCE	< 20	ND	< 20	--
			VDC	< 10	ND	< 10	--
			Benzene	< 2.0	ND	< 2.0	--
Frank "3:02"	-002	11.4	PERC	< 20	ND	< 20	< 0.3
			$CHCL_3$	< 20	ND	< 20	< 0.4
			CCL_4	< 20	ND	< 20	< 0.3
			MCFM	< 20	ND	< 20	< 0.4
			11DCLE	< 20	ND	< 20	< 0.5
			TCE	< 20	ND	< 20	< 0.4
			VDC	< 10	ND	< 10	< 0.23
			Benzene	< 2.0	ND	< 2.0	< 0.06
Frank "12:25"	-003	8.6	PERC	< 20	ND	< 20	< 0.4
			$CHCL_3$	< 20	ND	< 20	< 0.5
			CCL_4	< 20	ND	< 20	< 0.4
			MCFM	< 20	ND	< 20	< 0.5
			11DCLE	< 20	ND	< 20	< 0.6
			TCE	< 20	ND	< 20	< 0.5
			VDC	< 10	ND	< 10	< 0.30
			Benzene	< 2.0	ND	< 2.0	< 0.08

James A. Calpin, CIH
Laboratory Director

F:ah060292\02193

ACCREDITED BY THE AMERICAN INDUSTRIAL HYGIENE ASSOCIATION

LABORATORY TEST REQUEST

ACCOUNT NAME AND ADDRESS:

DRAPER, ADEN ASSOCIATES

2206 SOUTH MAIN STREET
BLACKSBURG VA 24060
ACCOUNT NUMBER 703-552-0444
45609520-6 85 VAY

Roche Analytics Laboratory
ROCHE
a division of Roche Biomedical Laboratories, Inc.
8040 VILLA PARK DRIVE SUITE 250
RICHMOND, VIRGINIA 23228
(804) 264-7100
TOLL FREE (800) 888-8061

DATE SHIPPED	# OF SAMPLES	SAMPLE TYPE/MEDIA	PROJECT NAME OR NUMBER
01/12/94		Personal/charcoal	Watauga
PURCHASE ORDER NO.		CONTACT: Frank V. Quarato	TELEPHONE NUMBER: 412-543-2655

PRIORITY ANALYSIS ☐ EXTRA CHARGE
☐ 1 DAY
☐ 2 DAY
☑ STANDARD

SPECIAL INSTRUCTIONS AND/OR UNUSUAL CONDITIONS:
Samples may contain Moisture due to weather and Nature of Drilling.

FOR LABORATORY USE ONLY	SAMPLE # OR SAMPLE AREA	SAMPLE DATE	SAMPLE * VOLUME/LITERS	ANALYSIS REQUESTED-PLEASE USE SEPARATE LABORATORY TEST REQUEST FOR EACH SAMPLE TYPE
	Blank	01/12/94	"0 min" .2L/40min	All Samples to be Tested
	Frank "3:02"	01/12/94	"57 min" .2L/40min	for Trichloroethylene
	Frank "12:25"	01/13/94	"43 min" .2L/40min	1,1,1 Trichorethane
				Tetra chloro thylene
				1,1-Dichloro Ethylene
				1,1-Dichloroethane
				Chloroform
				Benzene
				Carbon Tetrachloride

~~Invoice~~ ~~M 11521~~ ~~$110~~ ~~$105.43~~
~~#~~ M12013

* FOR PASSIVE MONITORS: EXPOSURE TIME IN MINUTES IS REQUIRED.

CLIENT COPY

Roche Analytics Laboratory

a division of Roche Biomedical Laboratories, Inc.

P.O. BOX 25249
RICHMOND, VA. 23260

ANALYSIS REPORT

ANALYTICS NO: 054-0043
ACCOUNT NO: 45609520
DATE: March 4, 1994

Bob Wilson
Draper, Aden Associates
2206 South Main Street
Blacksburg, VA 24060

SAMPLE TYPE: 4 Charcoal Tubes

DATE RECEIVED: 02/23/94

REMARKS:
µg = micrograms, ppm = parts per million
ND = Not Detected, L = Liters, Project Name: 652014 Watauga
NIOSH Method #1003 for Carbon Tetrachloride = CCl_4
NIOSH Method #1003 for Perchloroethylene = PCE
NIOSH Method #1003 for 1,1-Dichloroethane = 1,1-DCE
NIOSH Method #1003 for Chloroform = $CHCl_3$
NIOSH Method #1003 for 1,1,1-Trichloroethane = MCFM
NIOSH Method #1501 for Benzene
NIOSH Method #1022 for Trichloroethylene = TCE
NIOSH Method #1015 for Vinylidene Chloride = VDC

Sample #	Analytics #	Volume(L)	Analyte	µg Found Front	Back	Total	Results, ppm
MW10 JES	0545310043-001	3.71	CCl_4	< 20	ND	< 20	< 0.9
			PCE	< 20	ND	< 20	< 0.8
			1,1-DCE	< 20	ND	< 20	< 1.4
			$CHCl_3$	< 20	ND	< 20	< 1.2
			MCFM	< 20	ND	< 20	< 1.0
			Benzene	< 2.0	ND	< 2.0	< 0.17
			TCE	< 20	ND	< 20	< 1.1
			VDC	< 5.0	ND	< 5.0	< 0.34
MW14 JES	-002	1.67	CCl_4	< 20	ND	< 20	< 2.0
			PCE	< 20	ND	< 20	< 1.8
			1,1-DCE	< 20	ND	< 20	< 3.0
			$CHCl_3$	< 20	ND	< 20	< 2.5
			MCFM	< 20	ND	< 20	< 2.2
			Benzene	< 2.0	ND	< 2.0	< 0.38
			TCE	< 20	ND	< 20	< 2.3
			VDC	< 5.0	ND	< 5.0	< 0.76
W15 TD	-003	3.62	CCl_4	< 20	ND	< 20	< 0.9
			PCE	< 20	ND	< 20	< 0.9
			1,1-DCE	< 20	ND	< 20	< 1.4
			$CHCl_3$	< 20	ND	< 20	< 1.2
			MCFM	< 20	ND	< 20	< 1.0
			Benzene	< 2.0	ND	< 2.0	< 0.17
			TCE	< 20	ND	< 20	< 1.1
			VDC	< 5.0	ND	< 5.0	< 0.35

AES

Roche Analytics Laboratory
a division of Roche Biomedical Laboratories, Inc.
P.O. BOX 25249
RICHMOND, VA. 23260

ANALYSIS REPORT

ANALYTICS NO: 054-0043
ACCOUNT NO: 45609520
DATE: March 4, 1994

Bob Wilson
Draper, Aden Associates
2206 South Main Street
Blacksburg, VA 24060

SAMPLE TYPE: 4 Charcoal Tubes

DATE RECEIVED: 02/23/94

REMARKS:
µg = micrograms, ppm = parts per million
ND = Not Detected, L = Liters, Project Name: 652014 Watauga
NIOSH Method #1003 for Carbon Tetrachloride = CCl_4
NIOSH Method #1003 for Perchloroethylene = PCE
NIOSH Method #1003 for 1,1-Dichloroethane = 1,1-DCE
NIOSH Method #1003 for Chloroform = $CHCl_3$
NIOSH Method #1003 for 1,1,1-Trichloroethane = MCFM
NIOSH Method #1501 for Benzene
NIOSH Method #1022 for Trichloroethylene = TCE
NIOSH Method #1015 for Vinylidene Chloride = VDC

Sample #	Analytics #	Volume(L)	Analyte	µg Found Front	µg Found Back	µg Found Total	Results, ppm
BLANK	-004	--	CCl_4	< 20	ND	< 20	--
			PCE	< 20	ND	< 20	--
			1,1-DCE	< 20	ND	< 20	--
			$CHCl_3$	< 20	ND	< 20	--
			MCFM	< 20	ND	< 20	--
			Benzene	< 2.0	ND	< 2.0	--
			TCE	< 20	ND	< 20	--
			VDC	< 5.0	ND	< 5.0	--

Sue E Saltin, CIH for
James A. Calpin, CIH
Laboratory Director

:ah060292\05443

LABORATORY TEST REQUEST

ACCOUNT NAME AND ADDRESS:

DRAPER. ADEN ASSOCIATES

2206 SOUTH MAIN STREET
BLACKSBURG VA 24060
ACCOUNT NUMBER 703-552-0444
45609520-6 85 VAY

Roche Analytics Laboratory
ROCHE
a division of Roche Biomedical Laboratories, Inc.
8040 VILLA PARK DRIVE SUITE 250
RICHMOND, VIRGINIA 23228
(804) 264-7100
TOLL FREE (800) 888-8061

DATE SHIPPED	# OF SAMPLES	SAMPLE TYPE/MEDIA	PROJECT NAME OR NUMBER
2/21/94	1 (E-tube)	CT	652014 Watauga

PURCHASE ORDER NO.	CONTACT	TELEPHONE NUMBER
	Bob Wilson	703 552 0444

PRIORITY ANALYSIS ☐ EXTRA CHARGE
☐ 1 DAY
☐ 2 DAY
☑ STANDARD

SPECIAL INSTRUCTIONS AND/OR UNUSUAL CONDITIONS:
NOTE LIST OF REQUESTED ANALYSIS

FOR LABORATORY USE ONLY	SAMPLE # OR SAMPLE AREA	SAMPLE DATE	SAMPLE * VOLUME/LITERS	ANALYSIS REQUESTED-PLEASE USE SEPARATE LABORATORY TEST REQUEST FOR EACH SAMPLE TYPE
	MW10 JES	2/10/94	3.71 Hrs	1,1 Dichloroethylene VDC #1015
	MW14 JES	2/16/94	1.67	Trichloroethylene #1022
	MW15 T.D	2/15/94	3.62	Benzene #1501
	BLANK	2/21/94	20 litres	Tetrachloroethylene #1003
				Carbon Tet (CCl4) #1003
				1,1 Dichloroethane (1DCLE) #1003
				Chloroform (CHCl3) #1003
Released		1130 hrs		1,1,1 Trichloroethane (MCFA) #1003
RDS 2/21		verified		Vinyl Chloride (VC) #1007
Shipped				

* FOR PASSIVE MONITORS: EXPOSURE TIME IN MINUTES IS REQUIRED.

CLIENT COPY

#8 well 01/05/94

wind direction:
Temperature:
Humidity:
weather conditions:

Monitoring Duration:

Personal SAMPles TAKEN: Personal Sample was Not Taken due To Rig Mishap. AN Employee First Aid was Recorded when a Sub-contractor To Draper Aden was struck By A Falling Drill section. This Entire Incident CAN Be Found ON Report With Draper Aden. See Justin Babendrier's Report. work was stopped and a Full safet Meeting will Be given To minimize on site Injuries.

F.V.Q.

Monitor well
#8
01/06/94

				1st
10:00		O_2	calibrated at	19.8%
		LEL	calibrated @	0%
		PID	Background	.3 - .2 PPM
10:20		O_2	[illegible]	
		LEL		
		PID		
				1st
10:20	Bit Drop	O_2	AT Hole (12 inch)	12.8%
		LEL	AT Hole (12 inch)	0%
		PID	AT Hole (12 inch)	1.0 → .8
10:20	[illegible]	O_2	Breathing ZONE	19.8%
		LEL	breathing ZONE	0%
con't	Bit [illegible]	PID	Breathing ZONE	.3 - .2 PPM
10:30	Blow Hole	O_2	AT Hole (24 inch)	19.8%
		LEL	AT Hole (24")	0%
		PID	AT Hole (24")	.8 - .6 PPM
10:30	Blow Hole	O_2	Breathing ZONE	
		LEL	Breathing ZONE	
		PID	Breathing ZONE	

F.V.Q.

Monitoring well #8 01/06/94

wind direction:
Temperature:
Humidity:
weather Conditions:

Monitoring Duration:

Personal Samples Taken:

Personal samples not taken work on Hole was over Quickly. Sample will be drawn Today on Hole #9

Monitoring well #9 01/06/94

3:15	O_2	19.8	%
	LEL	0	%
	PID	.7-.6	"background"
continuous Air Monitoring 3:25	O_2	19.8	%
	LEL	0	%
	PID	.7-.6	PPM

Note: @ 3:25 To 3:40 The drillers started To Hit water And Moist soils. The PID Had A reaction To The Pt. of 11ppm And fell Down Quickly. Note → Ground Temperature is About 54° And Ambient Air is AT 36° Today. WARM Air From The Drill and Moisture From The soils Coupled with The operational capabilites of The PID IN Temperatures Below The 40°F Range MAKE The Justifications For INterferance.

Monitoring well #9

wind direction
Temperature
Humidity

weather conditions:

See Boone weather Station Data IN Field File

Monitoring Duration:

Personal samples TAKEN

A Personal sample was Drawn Today and was Not capped Immediately. The sample was wet ~~and~~ Not only Due To Moistare IN The Hole But Bad HANDLING OF The sample by the safety Personnel.

Sample duration: start 2:56 49.51 (MIN)
Individual sampled: Lou Milka "Heller"
Job Title: Drillers Helper
Position when sampled: (Drillers Helper AT Hole)
Flow Rate: Before 200.1 after 200.1

Monitoring Well #10 01/07/94 (Friday)

10:00	O_2 "Calabration"	20.9 %	Background
	LEL "Calabration"	0. %	Background
	PID "Calabration"	PPM	
	Personal sample flow Rate		
	Before: 200.1 CC		
	After:		
	O_2	%	
	LEL	%	
	PID	PPM	
	Personal		

NO DRILLING

01/10/94 "Mon" well #10

8:05 O_2 - Calibrated — 21.0% Background
LEL - Calibrated — 0% Background
PID - Calibrated — 0.5 ppm back ground.
Personal Sample Flow Rate
Before: 203.6 L/min.
After:

9:35 Safety Meeting

10:31 Dressed Out

11:09 Arrived on-site

Weather Conditions:

Wind Direction:

Temp.
Humidity
see Boone weather
Data IN Field File

11:47 Couldn't break ground w/ Auger. Went immediately to Air Rotary change over.

01/10/94 "Mon" well #10

12:00 Placed Sampling Pump on Gordon

12:09 Hoisted Gordon to a fresh air rotary Auger

12:14 Went into Level C

12:20 started personal sampling

12:25 PID .4-.9 Background upwind of site

12:28 Drill rig broke ground

12:30 (All readings in breathing zone.) Hole #10

12:30 PID = .7
O_2 = 21
LEL > 0

12:39 PID = 1.1
O_2 = 21
LEL = 0

01/10/94 "MON" well # 10

12:42 PID = 2.8
O_2 = 21
LEL = 0

12:44 PID = 1.9 → 2.8
O_2 = 21
LEL = 0

12:48 PID = 1.0
O_2 = 21
LEL = 0

12:51 PID = .7
O_2 = 21
LEL = 0

12:53 Soil sample taken

1:00 PID = .4
O_2 = 21
LEL = 0

1:02 PID = .5
O_2 = 21
LEL = 0

01/10/94 "MON" well #10

1:04 PID = .5
O_2 = 21
LEL = 0

1:09 OD connected auger sections

1:18 Stop Personal Sample
59 min.

1:20 Sealed Charcoal sampling tube

1:20 Begin drilling again to try and get into bed rock

1:26 PID = .5
O_2 = 21
LEL = 0

1:32 PID = .5
O_2 = 21
LEL = 0

01/10/94 "MON" well #10

1:37 Started air rotary drilling again

1:38 PID = .5
O2 = 21
LEL = 0

1:52 started steam Decon.

2:02 Finished Decon

2:13 Left ~~Bore Hole for~~ Decon for secondary decon.

2:19 Started Secondary Decon.

2:38 Finish Secondary Decon

2:40 Cleaned Resp. Protection, Hand Tools & Monitoring Equipment

3:07 Broke for lunch

3:28 Bagged Monitoring Equipment

3:39 Suited Back up in CPC & Loaded Truck

AH

01/10/94 "MON" well #10

4:02 Headed back down to drill site

4:10 Taped CPC & put detegger solution in masks

4:29 PID - Calibrated Background 0.0 ppm

4:52 Drill Rig Brake Guard Again

4:53 PID = 0.0 ppm
O2 = 21
LEL = 0

4:55 PID = 0.0
O2 = 21
LEL = 0

4:59 PID = 0.0
O2 = 21
LEL = 0

5:02 PID = 0.0
O2 = 21
LEL = 0

AH

"MON" well #10 01/10/94

5:10 Switching from Air Rotary to Auger

5:30 Began Rotary Drilling

5:31 PID=0.0
O_2=21
LEL=0

5:38 Brought up time on Auger

5:59 Stop Auger Drilling at 13' will pick up here tomorrow

6:01 Started Decon.

6:10 Left drill site for secondary decon

6:17 Began Secondary Decon of All equipment

6:46 Went back down to site to break down hammer

"MON" well #10 01/10/94

7:47 Left drill site for secondary decon.

7:52 Loaded up monitoring equipment

8:02 Left site for Hotel

1/11/94 "Tue" well #12

7:21 Arrived on-site

7:24 Put defogger solution in APR

7:40 O_2 Calibrated 20.9% Background
LEL Calibrated 0% Background
PID Calibrated 0.0 Background
Personal Sample Flow Rate
Before: 204.6 cc
After:

7:47 O_2 Re Calibrated 21.1% Background

7:50 Safety Tailgate Meeting
- Decon w/ Rig Hose

8:10 Dressed out in CPC

8:20 Bagged O_2/LEL Meter

8:43 Bagged PID

8:50 Tape Rest of Crew

9:20 Left for Site

AN

Weather Conditions:
Temp.
Humidity
Wind

01/11/94 "Tue" well #12

9:30 Set up Monitoring & Recording Station

9:52 Monitored well head to determine if they can light a torch

9:52 O_2 = 21.1%
LEL = 0
PID = 0.0

10:04 Lit Torch to try and loosen threads

10:05 O_2 = 21.1%
LEL = 0
PID = 0.0

10:08 O_2 = ~~0~~ 21.1%
LEL = 0
PID = 0.0

10:11 O_2 = 21.1%
LEL = 0

AN

01/11/94 THE well # 10

10:14 O_2 = 21.1%
LEL = 0

10:16 O_2 = 21.1%
LEL = 0

10:17 Attempted to break the seam, couldn't get kink out of chain

10:20 Lit torch to try to get kink out of chain

10:21 O_2 = 21.1%
LEL = 0

10:23 Attached Hydraling wrench to try and break auger again - couldn't break

10:27 Began pulling augers

AN

01/11/94 THE well # 10

11:32 Donned Level C

11:37 O_2 = 21.1%
LEL = 0
PID = 0.0

11:42 Began Air Rotary Drilling

11:43 O_2 = 21.1%
LEL = 0
PID = 0.0

11:47 Sent Ricky up derrick on Safety Board

11:48 O_2 = 21.1%
LEL = 0
PID = 0.0

11:52 O_2 = 21.1%
LEL = 0
PID = 0.0

11:54 O_2 = 21.1%
LEL = 0 PID = 0.0

AN

01/11/94
TUE well # 10

11:57 O_2 = 21.1%
LEL = 0
PID = 0.0

12:04 Clean personnel downgraded from Level C to Level D

12:11 Upgraded personnel back into Level C

12:15 O_2 = 21.1%
LEL = 0
PID = 0.0

12:20 Deconed Driller, Helpers & site Safety person, so they could downgrade to Level D

12:23 Check Decon solution (in tub) for pH
pH = 7

12:25 Everyone downgraded to Level D

12:30 Decided to abandon bore hole & move rig up.

AAP

"TUE" 01/11/94
well # 10

12:38 Lowered Mast and moved rig forward approximately 30 feet.

1:06 Dressed back out in Level C to begin drilling Hole # 10b

1:09 O_2 = 21.1%
LEL = 0
PID = 0.0

1:11 Began Air Rotary Drilling

1:13 O_2 = 21.1%
LEL = 0
PID = 0.0

1:21 Abandoning well 10b, hit rock that is pushing auger away from rig

1:30 Lowered mast & started decon

1:48 Left site for secondary decon

AAP

01/11/94

"TUE" well # 12

2:13 Broke for Lunch

2:49 Returned from Lunch

2:56 Packed up Personal Samples for shipment.

3:06 Donned CPC

3:16 Left for drilling site

3:18 Arrived on site

3:21 Prepared personal sampling pump for Rich

3:25 The following statement was written by Mark Combs:

3:26 "I, Mark Combs, visited a site at the Boone Nissan where drilling will take place with a representative of Blue Ridge Electric Membership Corp. He assured me no power lines were buried in the vicinity.

Mark Combs 11 January 1994

01/11/94

"TUE" well # 12

3:39 O_2 = 21.1%, LEL = 0, PID = 0.0 } while hand digging

3:46 Donned Level C

3:48 Put personal sampling pump on Rich

3:54 Started personal sampling pump

3:56 O_2 = 21.1%, LEL = 0, PID = 0.0

4:00 Started Air Rotary Drilling

4:02 O_2 = 21.1%, LEL = 0, PID = 0.0

4:05 O_2 = 21.1%, LEL = 0, PID = 0.0

01/11/94
"TUE" well #12

4:07 O_2 = 21.1%
LEL = 0
PID = 0.0

4:11 O_2 = 21.1%
LEL = 0
PID = 0.0

4:13 Began adding second auger

4:16 O_2 = 21.1%
LEL = 0
PID = 0.0

4:20 Shut rig down for conference

4:23 Disconnected second auger
4:30 Took off personal sample p/s
4:35 Connected 2 pieces of casing in hole

4:39 Pushed casing in hole

4:40 Sealed up personal sample

01/11/94
"TUE" well #12

4:52 Connected 6" Air Rotary Hammer to drill inside casing

5:08 Attached personal sampling tube to Rich. & started pump.

5:19 Attached first section of auger

5:21 PID - Dead Battery Past 8 Hr. Span

5:23 O_2 = 21.1%
LEL = 0%

5:24 Hit water w/ auger

5:25 O_2 = 21.1%
LEL = 0%

5:26 Attached 2nd piece of auger

5:31 O_2 = 21.1%
LEL = 0%

01/11/94

"TUE" well #12

5:35 Added 3rd piece of Auger

5:35 O_2 = 21.1%
LEL = 0%

5:42 O_2 = 21.1%
LEL = 0%

5:46 O_2 = 21.1%
LEL = 0%

5:47 Decided to go 50 min. w/ personal sample since ~10 min. of down time when sample tube was placed on Helper.

5:49 O_2 = 21.1%
LEL = 0%
Began to snow lightly

5:58 O_2 = 21.1%
LEL = 0%
Removed personal sample tube

6:00 Capped personal sample

01/11/94

"TUE" well #12

6:15 Began installing PVC well casing

6:35 Began filling w/ Bentonite

6:55 Decided to crush bentonite pellets for grout

7:33 Brought over wooden 2x6 frame to drill rig

7:36 Removed outer PVC casing

7:49 Broke hoe mixing ~~cement~~ grout

7:59 Finish Grouting

8:05 Loaded up Hammer

8:13 Began decaning pulled casings

8:14 Dropped the mast

8:17 Began personal Decon.

01/11/94

"TUE" well #12

8:22 Left site for secondary decon.

8:27 Unloaded Truck

8:31 Dofted CPC

8:39 Gathered up equipment to be charged up overnight

8:45 Left site for Hotel

8:57 Unloaded Truck

9:09 Put meters on charge

"wed" well # 11
1/12/94
well #12"

7:41 Arrived on site, drillers were already decoming rig at secondary decon

7:43 Put meters back on charge to try an obtain a charge long enough for a 12-14 hour day.

7:47 Called Justin at home & office wasn't able to get ahold of him.

8:32 O_2 = Calibrated 20.8% Background
LEL = Calibrated 0% Background
PID =
Personal Sample Flow Rate
Before: 206.8 L/cc
After:

8:32 Prep. of Personal Samples For Roche Analytical

10:00 Decision made to start in Level D

10:19 Arrived on site in Level D

* NOTE: JOE GISPAINSKI WAS APPOINTED SSHS BY JUSTIN BABENDREIER

wed 1/12/94 well #12

Weather Conditions

Temp.
Humidity

Wind

10:25 Put CO Passive tube on Rick (will leave on for 8 hrs #434)

10:27 Started Drilling

10:29 O_2 = 21.1%
LEL = 0%

10:33 O_2 = 21.1%
LEL = 0%

10:38 Start Pen Samp. Pump (Frank)

10:39 O_2 = 21.1%
LEL = 0%
PID = 0.0 ppm

10:44 O_2 = 21.1%
LEL = 0%
PID = 0.0 ppm

wed 1/12/94 well #12

10:53 O_2 = 21.1%
LEL = 0%
PID = 0.0 ppm

10:55 Went from rotary drill to hammer bit (hit SHIS)

11:07 O_2 = 21.1%
LEL = 0%
PID = 0.0%

11:12 Began Air Rotary Drilling

11:13 O_2 = 21.1%
LEL = 0
PID = 0.0 ppm

11:15 What was thought to be SHIS was bedrock, the decision was made to put the well in at this depth.

11:23 Started Casing Well

Wed 1/12/94 well #1

11:30 O_2 = 21.1%
LEL = 0%
PID = 0.0ppm

11:39 O_2 = 21.1%
LEL = 0%
PID = 0.0ppm

11:40 Began Pulling Augers

12:00 O_2 = 21.1%
LEL = 0%
PID = 0.0PPM

12:04 Cancelled Personal sample Due to No Readings of significance. Sample Not collected.

12:06 Shut Down PID to save Battery on Machine. Not Fully charged due to Late workday 01/11/94.

12:24 Put PID & Gillian Pump back on charge for afternoon session

Wed 1/12/94 well #1

12:38 Started Decomming Rig and Augers

12:45 Broke for Lunch

1:05 Dressed out in Level D

1:20 Observed construction of access road for next drill site.

1:25 Dump 1st load of Gravel

1:38 Bulldozer stopped and is awaiting 2nd load of gravel.

1:46 2nd load of gravel arrived

1:47 Hooked dump truck up to bulldozer to pull up hill

1:55 Dumped second load of gravel

1:58 Bulldozer smoothed out gravel

2:00 Drill Rig attempted to back up hill - made it half way

wed 1/12/94 well #17

2:02 Hooked bulldozer up to drill rig and pulled to next drilling site

2:15 Took batteries of charger for PID & Gillian Pump.

2:20 O_2 = Calibrated 21.1% background
LEL = Calibrated 0% background
PID = Calibrated 0.5 ppm background
Personal Sample Pump
Flow Rate
Before: 203 L/cc
After:

2:30 Ready to monitor, all equipment calibrated and bagged

2:43 Started drilling well #17

2:48 O_2 = 21.1%
LEL 0
PID = .5 - .6 ppm

3:02 Start Personal Sample Pump "Frank"

wed 1/12/94 well #17

3:02 PID Jumped to 1.9 then .5

3:06 PID Background fluctuation between .5 - .7 ppm

3:07 Added ~~4th~~ piece of auger

3:10 PID 1.5 ppm inside auger
O_2 = 20.9%
LEL = 0%

3:15 Switched from hollow stem auger to air rotary hammer

3:25 Stove broke for a quick lunch

3:39 Put 6" hammer in hollow stem auger

3:43 Lowered hammer & first section of auger into hole

3:48 Started Air Rotary Drilling

3:49 O_2 = 21.1% PID = 1.9 ppm
LEL = 0%

wed 1/12/94 well #17

3:50 O_2 = 21.1%
LEL = 0%
PID = 2.8 ppm

3:51 O_2 = 21.1%
LEL = 0%
PID = 1.0 ppm

3:52 O_2 = 21.1%
LEL = 0%
PID = 2.0 ppm
} inside ~~[illegible]~~ rod

3:55 Stepped back into clean area and PID was fluctuation between 0.8 & 1.1 ppm

3:56 Holding at 1 ppm at hole (PID)

3:57 O_2 = 21.1%
LEL = 0%
PID = .5 ppm.

3:59 Took personal sampling pump off front pump

wed 1/12/94 well #17

died at 58 min. (low Battery from 12-14 hr. day use)

4:00 Decided to pull Benzene Tube for possible ionization of vapors

4:04 Pumped Benzene tube for 2 minutes w/no color change

4:06 Decided to pull TCE Tube

4:07 No color change on TCE Tube

4:07 Decided to pull Chlorine Tube

4:10 No color change on Chlorine Tube

4:11 Decide to pull Toluene Tube

4:12 No color change on Toluene Tube
* would have turned Brown to indicate toluene or a diffuse yellow to indicate Benzene

wed 1/12/94 well #17

4:12 O_2 = 21.1%
LEL = 0%
PID = spiked to 9.5 ppm

4:13 Decided to pull a Hydrocarbon Tube

4:15 No color change on Hydrocarbon Tube

4:15 O_2 = 21.1%
LEL = 0%
PID = 1.4 ppm in Breathing Zone
= 1.9 at hole

4:24 O_2 = 21.1%
LEL = 0%
PID = 1.0 ppm

4:28 O_2 = 21.1%
LEL = 0%
PID = 1.0 ppm in Breathing Zone
= 5.6 at hole

wed 1/12/94 well #17

4:30 Note a good cross breeze across the back of the drill rig, which is dispersing the vapors as the pressurized air brings it up.

4:37 O_2 = 21.1%
LEL = 0%
PID = 0.8 ppm in Breathing zone
1.9 - 2.6 ppm at upwind location

4:40 Note very slippery conditions because of the continuous flow of water up the auger

wed 1/12/94 well #17

9:41 Monitored up wind location
O_2 = 21.1%
LEL = 0%
PID = .8 ppm in Breathing zone
.6 ppm at ground level

4:45 O_2 = 21.1%
LEL = 0%
PID = 3.5 ppm at hole

5:02 O_2 = 21.1%
LEL = 0%
PID = 1.8 ppm in breathing zone

5:06 O_2 = 21.1%
LEL = 0%
PID = 1.3 ppm in Breathing Zone

5:09 Started pulling Rods

5:26 Started to install PVC well casing.

5:47 Started grouting hole

wed 1/12/94 well #17

6:00 Lighting strung "good lighting"

6:07 "Sounded well for sand level"

6:25 Took CO Tube off end of Rig
No noted color change

6:41 Continued observing Driller, Helper & Support people for signs of Cold Exposure (Temp. dropped significantly since afternoon)

6:52 Returned Monitoring equipment to truck

7:08 Went back to secondary decon to decontaminate

7:24 Returned to drill location

7:32 Started pulling augers

7:51 Finished pulling augers

8:09 Returned to building to gather equipment

Wed 1/12/94 well #17

8:14 Unloaded equipment for decon from truck

8:32 Left site for hotel

8:45 Unloaded truck

9:04 Put meters on charge

Thursday 1/13/94 well #18

7:46 Arrived at site

7:48 Put all monitoring equipment back on-charge

7:53 We were informed by Jeff that there would be no drilling today since the ground did not freeze last night, therefore making the drill sites inaccessible. We were also informed that we were to monitor the headspace of well #8.

7:58 HST & Q Environmental planning meeting

8:28 Made phone calls for Vinyl Chloride & 2 stage Benzene Tubes. Will be delivered to site by 10:00 AM on 1/14/94.

10:13 Given the go ahead to drill

1/13/94 well #18

10:31 Left for site

10:45 Built Road w/drillers

10:55 Back Rig on Hole

11:20 set up Mast-N-Auger

11:25 Calibrated PID
PID .6ppM
O_2 20.9 %
LEL 0 %
Colorimetric Tubes Ready
Personal sample gear Prepared

11:37 Augering AT Hole PID was Turned off "Accidently with Log Book New Bit ground 1.4ppM. "will recalibrate AT First Break in drill Action.

11:43 All Readings Background.
O_2 20.9%
LEL 0%
PID 1.3ppM
* JOE Left For more Personal Sample Tubes

1/13/94 well #18

11:57 All Readings Background
O_2 20.9%
LEL 0.0%
PID 1.4ppM

12:01 New section of Auger ATTached/Replaced And Readings IN Auger Are Background,
O_2 20.8 %
LEL 0 %
PID 1.3ppM

12:25 Placed personal sample on FVQ.

12:28 O_2 = 20.9% ← Background
LEL = 0% ← Background
PID > .8ppm Background

12:31 PID = 1.1ppm when hit hit water

12:35 O_2 = 20.9%
LEL = 0%
PID = 1.1 ppm

12:37 O_2 = 20.9
LEL = 0%
PID > .5 ppm

1/13/94 WELL #18

12:38 O_2 = 20.9%
LEL = 0%
PID = 2.2 ppm at hole
= 1.0 in Breathing Zone

12:39 Decided to Pull Benzene Tube

12:43 Add another rod

12:47 No color change on Benzene Tube

12:48 Broke open wind indicator tube wind was blowing from ~~East to West~~ South East to Northwest

12:52 O_2 = 20.9%
LEL = 0%
PID = 1.0 ppm in B.Z.

NOTE: BZ = Breathing Zone

12:54 O_2 = 20.9%
LEL = 0
PID = 1.9 ppm - BZ

1/13/94 WELL #18

12:56 O_2 = 20.9%
LEL = 0%
PID = 3.0 ppm at hole
.9 ppm in BZ

1:06 O_2 = 20.9%
LEL = 0%
PID = 1.1 ppm at hole

1:08 O_2 = 20.9%
LEL = 0%
PID = 1.0 in BZ
2.4 at hole

FVQ. personal sample at 43 min. will Go To collect when well installed

1:09 PID = 15 ppm at Ground "inch" (climbed to 22 ppm w/in 2 minutes

1:11 PID = BZ 1.0 then climbed To Ground to 9.1 ppm over another 2 min. period

1:17 Decided to set well

1:20 Went thru personal decon (Joe & Frank)

1/13/94 Well #18

1:25 Cleaned monitoring equipment

1:54 Left site of building

2:02 Left bldg. for monitoring well #8 location

2:04 Arrived at well #8 to monitor headspace (opened well)

O_2 = 20.9%
LEL = 0%
PID = Leveled out at 20.7 ppm at well head (Background of .3 ppm)

Detector Tubes pulled down well approximately 10 feet

Toluene = No color change
TCE = No color change
BENZENE = No color change

2:27 Closed well and packed up equipment

1/13/94 Well #18

2:30 Left monitoring well #8 for secondary decon.

2:33 Arrived at secondary decon and decanned Joe / Frank / Floor Mats from truck and outside of truck

2:51 Finished decon.

2:52 Doffed Level D PPE

2:59 Bob Wilson called for Frank

3:30 Left bldg. for site

3:45 Observed site for safety and health hazards, cold exposure, etc.

4:30 Left site for secondary decon & to make phone call to Justin, he requested I stay for remainder of project as SSHS.

5:14 Left site for hotel, put meters on charge

01/14/94 "Friday" WELL #13

7:45 am Calabration

O_2 20.7% Calibrated Background
LEL 0% Calibrated Background
PID 2.1 ppm Background

8:11 Arrived on site

8:12 Dressed up in level D

8:21 Set up decon area

8:29 Bagged monitoring equipment

8:35 Started drilling

8:40 O_2 = 20.7%
LEL 0%
PID 3.4 ppm

8:56 PID Background 3.3 ppm

9:07 O_2 = 20.7%
LEL = 0%
PID = 3.8 ppm

1/14/94 "Friday" WELL #13

9:10 O_2 = 20.7%
LEL = 0%
PID = 5.2 ppm oil hole in auger

Weather

Temp
Humidity
Wind

* Snow lightly falling

9:18 O_2 = 20.7%
LEL = 0%
PID = 1.8 ppm in BZ

9:23 Start Lon for another section of auger

9:37 Jeff & Frank left for facility

9:38 Started Drilling Auger B

9:13 Left site for Hotel (had to check out)

WELL #13 1/14/94 "Friday"

10:24 Arrived at hotel, parked clothes & truck

10:57 Checked out of hotel

11:08 Checked in at Holiday Inn NOT

11:52 Left for Lunch

1:10 Arrived back on site, drill rig wasn't pulled out yet. Tow truck didn't show up

1:30 Tow truck showed up to pull out drill rig

2:00 Left drill site for building.

2:12 Was informed by Jeff that we would not be drilling this afternoon.

2:15 Fixed Hard Hat

WELL #13 1/14/94 "Friday"

2:25 Made phone calls / Unloaded Truck

3:43 Left bldg to sample well #8 for Vinyl Chloride ~~& Pull the~~

3:48 No color change on Vinyl Chloride Tube

3:56 Left site for County Courthouse

4:15 Arrived at county courthouse to get print-out of Muellens HASP - 30 ft

4:29 Stopped at hardware store to get replacement support straps for hardhat - Didn't have it

4:35 Stopped at office supply store for print out of Millers HASP

5:40 Put monitoring equipment on charge

NO DRILLING

1/15/94 ~~"Friday"~~ Saturday

7:57 Arrived on site

8:02 Unloaded truck

8:05 Awaiting the word if we are going to drill or shut the project down.

Weather Conditions:

Temp.
Humidity
Wind Chill -
Wind - Gusting 30-50 mph

9:15 Seperated equipment

9:55 Given word to go home.

NO DRILLING

1/15/94 ~~Friday~~ Saturday

7:57 Arrived on site

8:02 Unloaded truck

8:05 Awaiting the word if we are going to drill or shut the project down.

Weather Conditions:

Temp.
Humidity
Windchill -
Wind - Gusting 30-50mph

9:15 Seperated equipment

9:55 Given word to go home.

2·2·94 MW 18

Clear sunny (20's)

calibration -
PID - span calibrated
LEL Exotox 55 - factory
O_2 personal sampler - 0.0478 Lpm
Glenn Cobb

Background
PID 1.5 ppm
LEL/O_2 1% LEL 20.2% O_2

10:45 arrive on site, drillers here for 10 minutes
Decon begins

- calibrate instruments
- Arrange PPE room
- Decon equip. assembly
- Check field file on new crew members

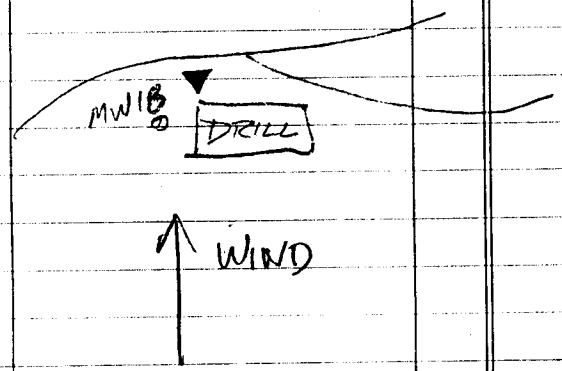
1:00 morning tail gate meeting
1:15 mob to location
2:00 located on MW18
☆ personal sampler placed on Glenn Cobb driller helper

MW 16 (cont.)

2:30 Drilling begins

Used drilling - 1 person

Rick Ranson - Geron 3:46 Rear Cleaned



2:50 LEL 0% ≈ 15 ft BGL
PID 1.5 ppm

3:10 LEL 0 ≈ 30 ft BGL
PID 1.0 ppm

3:25 LEL 0
PID 0.9 ≈ 50 ft

3:40 LEL 0
PID 0.9

3:45 Drilling halted by problems retrieving drill string to hole - binding in bore.

4:10 Drilling resumes.

4:17 P.I.D. 0.8 ppm
LEL 0 %

4:55 Continued drill problems hole collapsing causing drill rod to bind

5:30 drilling resumes

5:40 P.I.D. 0.8 ppm
LEL 0 %

5:50 Drilling ends at 100 ft. steel binding in bore -

Return 2.10.94

[MW10]

1:30 moved rig on location
pulled by LF D8

Calibration

Microtip PID

span gas - 103 ppm isobutylene
zero air - ambient site air
background 0.0 ppm

Exotox 55 LEL/O2

background 0.0 - 1.0%

Conditions
freezing rain, foggy, 32°
muddy

Personal Sampler -
-- serial charcoal tubes
- Jeff Smith

2:00 H&S meeting

2:10 Begin drilling

2:23 0.0 ppm on PID
rapid flucts from
0.0 - 6.0 then
probably vapor - fog -
not enough flow to
pull dragen tube

2:25 Start Resp. Sampler on JES
LEL - 0.0

2:30 PID 7.8 Dragen (VC) - ∅
LEL 0.0

2:40 PID 9.6 Dragen (B...) ∅
LEL 0.0

3:1 PID 1.6 (Stopped Drilling)
0.0

3:10 PID 10.3 Dragen Carbon Tet. ∅
LEL 0.0

3:30 PID 4.7 Dragen Chloroform ∅
LEL 0.0

3:45 PID 4.2
0.0

4:00 P.I.D. 4.1
LEL 0.0

4:15 Stopped drilling

9:00 pm SKC personal sample pumps calibrated by bubble chamber
0.048 liter/minute

2.11.94
MW10 (continued)

7:30 arrive on site

Severe icing delayed start of work

9:30 Began grouting MW10 outcasing

Heavy rain.

10:00 Returned [illegible] to get instruments and return to site

10:30 return to site, poor access, got stuck, arrived at MW10 drilling had already begun

Heavy rain.

Started instruments [illegible] readings of 10.5. Short wire to 15.5 ppm on PID

LEL 0.0
O_2 20.8

11:00 Drilling terminated drill tools removed, well built

MW16 2/14/94

4:45 Set-up @ site after moving to decon at Baling Facility, prepare to work

Calibration
PID span gas & Zero gas
Digiflam 2000 autocalibrated and zeroed
Personal Sampler
2 serial tubes - JES

Background.
PID 1.8 ppm
LEL 0.0%
O_2 20.8%

4:50 Safety meeting
air monitoring matrix
& instrumentation

4:55 Begin drilling
PID 1.8
LEL 0.0
O_2 20.8

5:02 Drilling ends
5:05 Well Construction begins
PID 0.0 ppm
LEL 0.0 %
O_2 [illegible]

5:12 Well Construction Ends

MW-15
2.15.94

8:30 Set up on location

Personal Sampler on T. Davidson on at 8:36

Instrument Calibration
PID zero & span
LEL - autocalib. [illegible]
O_2 20.4

Background
PID 0.0 ppm
LEL 0.0 %
O_2 20.4 %
LEL & O_2 show zero error

8:40 Drilling begins
PID 0.0
LEL 0.0
O_2 20.4

8:55 PID 0.0
LEL 0.0
O_2 20.4

9:10 PID 0.0
LEL 0.0
O_2 20.4

[illegible] PID 0.0
LEL 0.0
O_2 20.6

9:40 Same

9:[illegible] PID 0.0
LEL 0.0
O_2 20.6

10:00 Withdraw drill tools and begin placing steel casing.

LEL @ top of casing 0.0%

10:30 4 sections (80 ft) casing welded and placed.

10:45 PID 0.0 ppm
LEL 0.0%
O_2 20.8

Re-autocalibrated the Digiflame. LEL now in calibration and good, O_2 is still out.

11:00 PID 0.0 ppm
LEL 0.5%
O_2 20.8

11:20 Stop drilling, remove tools

MW15 —

Background PID shows 15.5 ppm at ground level, upwind, in the parking lot. 0 ppm in the breathing zone

Same situation at well head.

11:45. Break to begin grouting.
remove personal air sampler from T.D.
196 mins total time

4:00 End grouting
Beginning drilling @ 81 ft

4:24 on PS (Ty Davidson)
PID 0.0 ppm
O_2 20.8%
LEL 0.0 %

4:40 PID 0.0 ppm
O_2 20.8 %
LEL 0.0 %

4:50 switch on personal sampler (100 ft drop)

4:55 PID 0.0 ppm
LEL 0.0 %
O_2 20.8 %

5:10 PID 0.0 ppm
LEL 0.0 %
O_2 20.8 %

5:25 PID 0.0 ppm
LEL 0.0 %
O_2 20.8 %

5:40 PID 0.0 ppm
LEL 0.0 %
O_2 20.8 %

5:55 Drilling ends, drill tools removed (175 feet deep)

6:07 shut down remove PS
77 minutes

TO
MW 14 2/16/94

9:35 Calibration
P.I.D. calibr, span / zeroed
LEL autozeroed out
P.S. - JES
O_2 autozeroed out

Background
PID 0.0
LEL/O2

9:45 PID 0.0

10:00 PID 0.0

10:15 PID 0.0
Water @ 40 ft
10:18 turn on PS (JES)
LEL/O2 0.0%
10:30 Drilling ends
- tools removed
- shut down / well construction
10:48 Switch off PS JES
end well const.
35 min run time

APPENDIX IV

Aquifer Flow Testing Result Calculations

Draper Aden Associates
CONSULTING ENGINEERS
BLACKSBURG - RICHMOND, VIRGINIA
NASHVILLE, TENNESSEE

Subject MW-8 (RECOVERY) Sheet No. ___ of ___

Job No. ___

By ___ Date ___

MW-8

SWL =

PURGE RATE = 0.0334 cuft/min

DURATION = 45 min

START: 4:06

STOP: 4:51

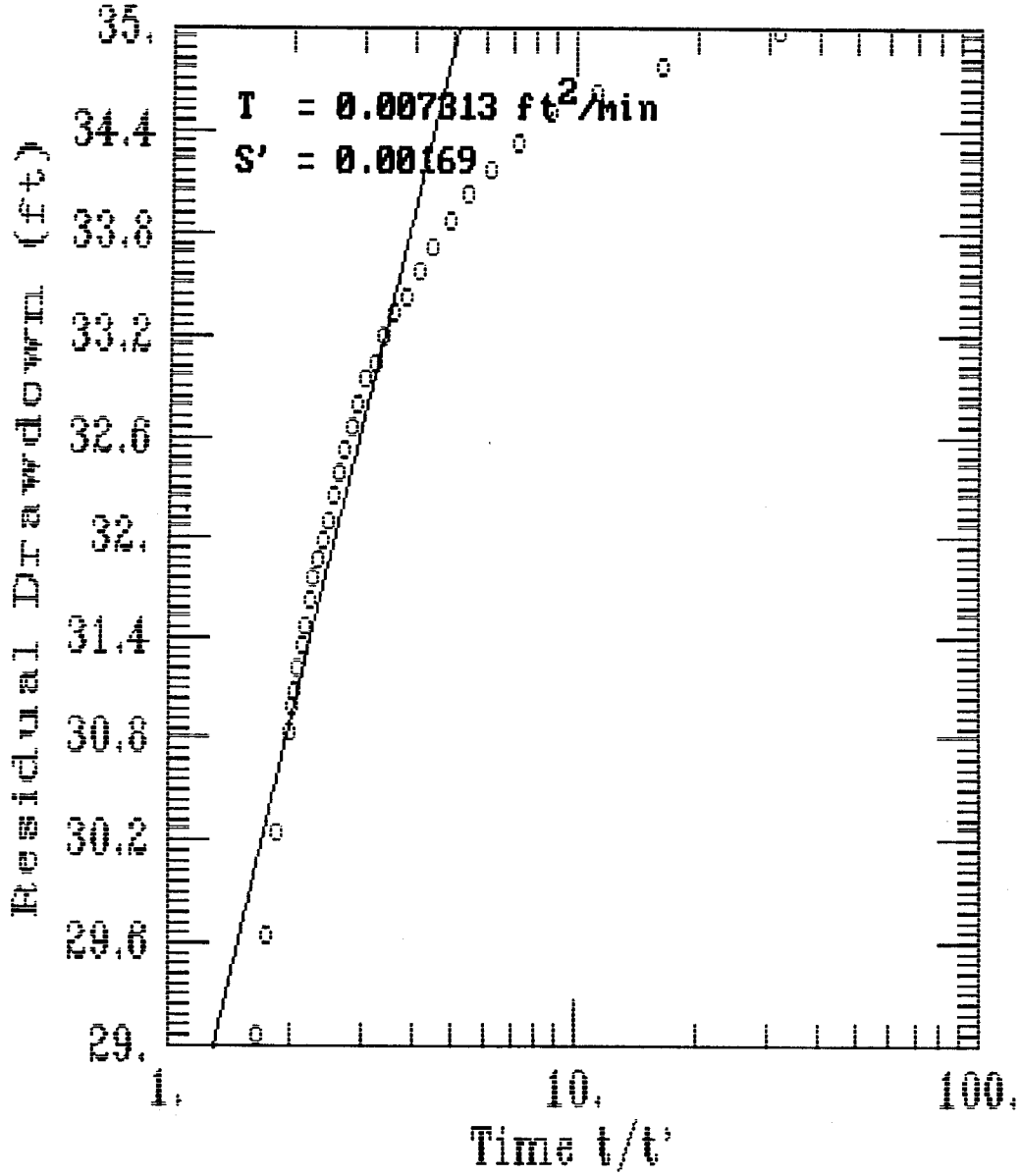
LW = 83.88'

rw = 0.25'

LE = 12.0'

TIME	D TO H_2O	ΔH
1.0 min	51.45'	34.97'
2.0	51.25	34.77
3.0	51.10	34.62
4.0	50.97	34.49
5.0	50.80	34.32
6.0	50.65	34.17
7.0	50.51	34.03
8.0	50.36	33.88
9.0	50.20	33.72
10.0	50.06	33.58
11.0	49.91	33.43
12.0	49.82	33.34
13.0	49.67	33.19
14.0	49.52	33.04
15.0	49.43	32.95
16.0	49.28	32.80
17.0	49.14	32.66
18.0	49.00	32.52
19.0	48.87	32.39
20.0	48.74	32.26
21.0	48.58	32.10
22.0	48.47	31.99
23.0	48.35	31.87
24.0	48.23	31.75
25.0	48.09	31.61
26.0	47.95	31.47
27.0	47.83	31.35
28.0	47.71	31.22
29.0	47.57	31.09
30.0	47.47	30.99
31.0	47.32	30.84
36.0	46.72	30.24
41.0	46.13	29.65
46.0	45.53	29.05

WATUAGA ASSESSMENT RECOVERY TEST * MW-8



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NASHVILLE, TENNESSEE

Subject MW-9 (RECOVERY) Sheet No. ___ of ___

Job No. ___

By ___ Date ___

MW-9
SWL = 59.95'

PURGE RATE = 0.0334 cuft/min

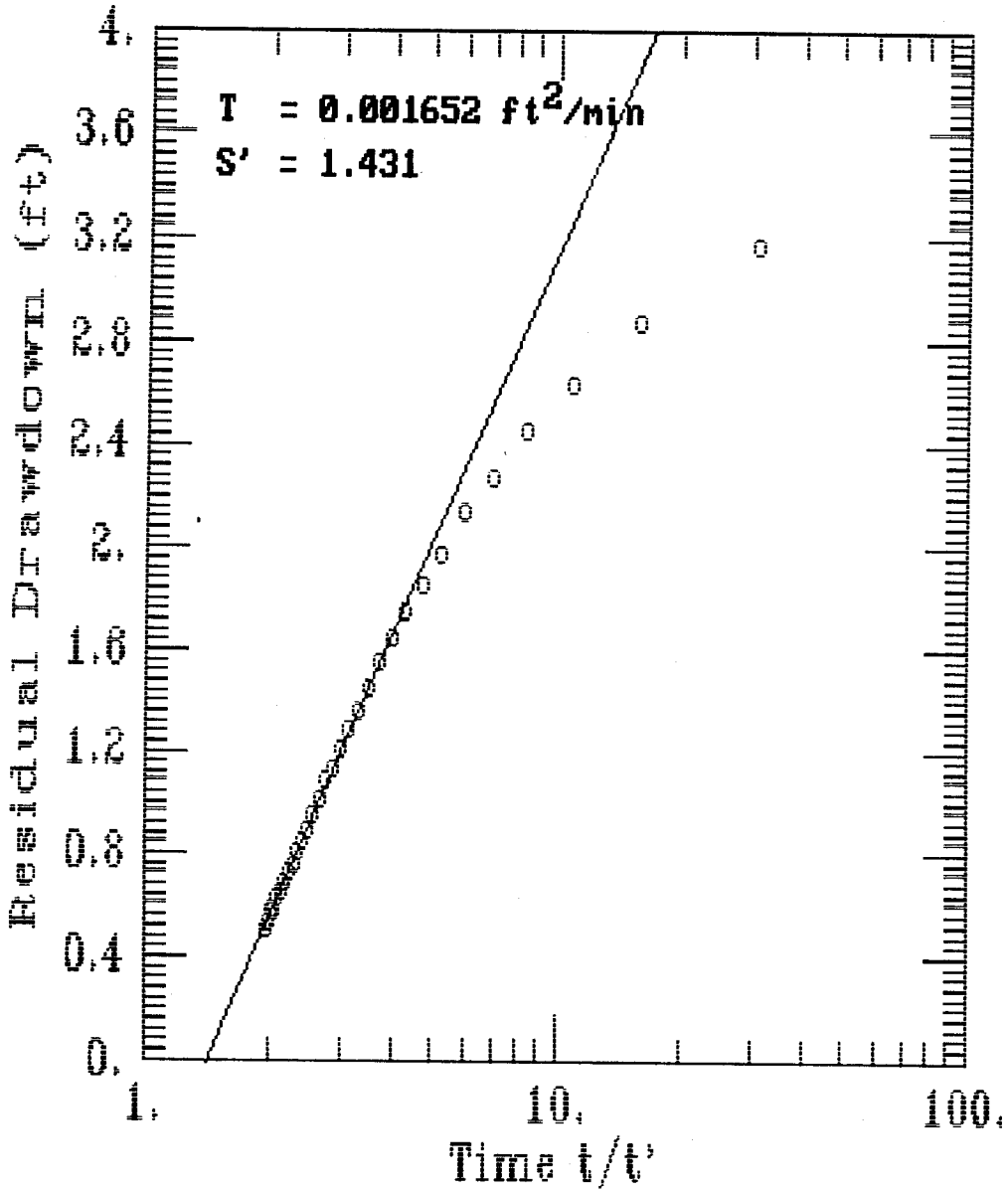
DURATION = 30 min

START: 9:40 AM
STOP: 10:10 AM

LW = 27.37'
TW = 0.25'
LE = 12.0'

TIME	D TO H_2O	ΔH
1.0 min	63.12'	3.17'
2.0	62.82'	2.87
3.0	62.58'	2.63
4.0	62.40'	2.45
5.0	62.23	2.28
6.0	62.08	2.13
7.0	61.93	1.98
8.0	61.80	1.85
9.0	61.70	1.75
10.0	61.60	1.65
11.0	61.50	1.55
12.0	61.40	1.45
13.0	61.31	1.36
14.0	61.23	1.28
15.0	61.16	1.21
16.0	61.09	1.14
17.0	61.03	1.08
18.0	60.97	1.02
19.0	60.90	0.95
20.0	60.85	0.90
21.0	60.80	0.85
22.0	60.75	0.80
23.0	60.71	0.76
24.0	60.67	0.72
25.0	60.64	0.69
26.0	60.60	0.65
27.0	60.57	0.62
28.0	60.53	0.58
29.0	60.53	0.58
30.0	60.48	0.53
31.0	60.45	0.50

WATUAGA ASSESSMENT RECOVERY TEST * MW-9



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NASHVILLE, TENNESSEE

Subject MW-10 (SWG) Sheet No. ___ of ___

Job No. ___

By [illegible] Date ___

MW-10
SWL = 9.18'

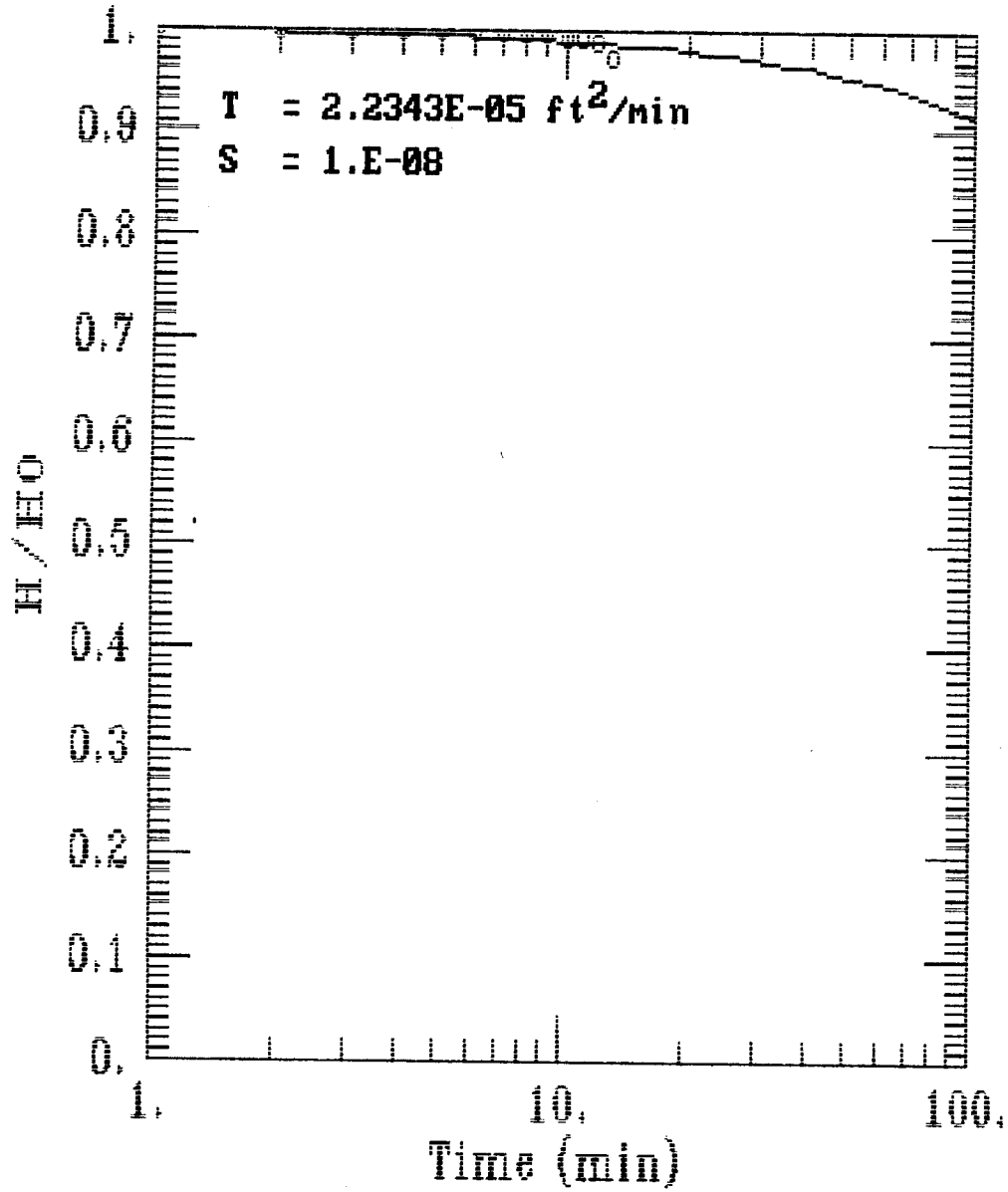
START: 1:50 PM
STOP: 3:37 PM

LW = 61.85'
rw = 0.25'

LE = 12'

TIME	D TO H_2O	ΔH
+10 sec	11.85'	2.67'
+10	11.85	2.67
+10	11.85	2.67
+20	11.85	2.67
+20	11.85	2.67
+60	11.85	2.67
+60	11.85	2.67
+180	11.84	2.66
+180	11.84	2.66
+300	11.83	2.65
+300	11.83	2.65
+300	11.82	2.64
+4,440	11.78	2.60

WATUAGA ASSESSMENT SLUG TEST * MW-10



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NASHVILLE, TENNESSEE

Subject MW-11 Recovery (Jeff's Notes) Sheet No. ___ of ___

Job No. ___

By JS Date ___

MW-11

SWL = 13.75'

PURGE RATE = 1.0027 cuft/min

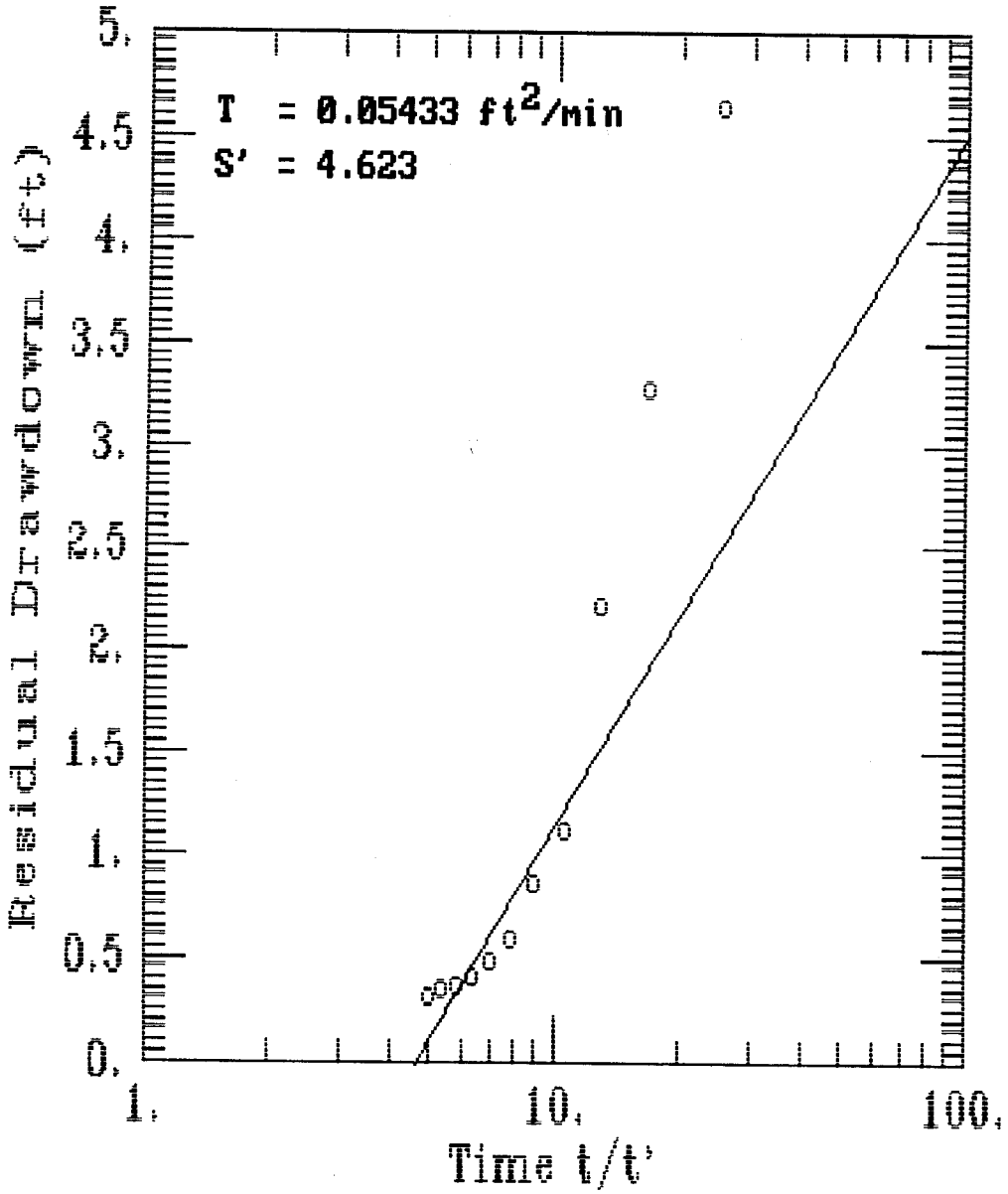
DURATION = 2.0 min

START: 3:41 PM
STOP: 3:49 PM

LW = 12.2'
rw = 4.13" = 0.34'
LE = 144" = 12'

TIME	D TO H_2O	DH
0 sec	22.0'	2.25'
+20	18.4	4.65
+10	17.02	3.27
+10	15.95	2.20
+10	14.86	1.11
+10	—	—
+10	14.34	0.59
+10	14.22	0.47
+10	14.15	0.40
+10	14.11	0.36
+10	14.09	0.34
+10	14.06	0.31

WATUAGA ASSESSMENT RECOVERY TEST * MW-11



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NASHVILLE, TENNESSEE

Subject MW-12 (REDEVELOP) : JEFF'S DATA

Sheet No. ___ of ___

Job No. ___

By ___ Date ___

MW-12

SWL = 11.14'

PURGE RATE = 0.869 cuft/min

DURATION = 12 min

START : 11:48 AM

STOP : 12:00 PM

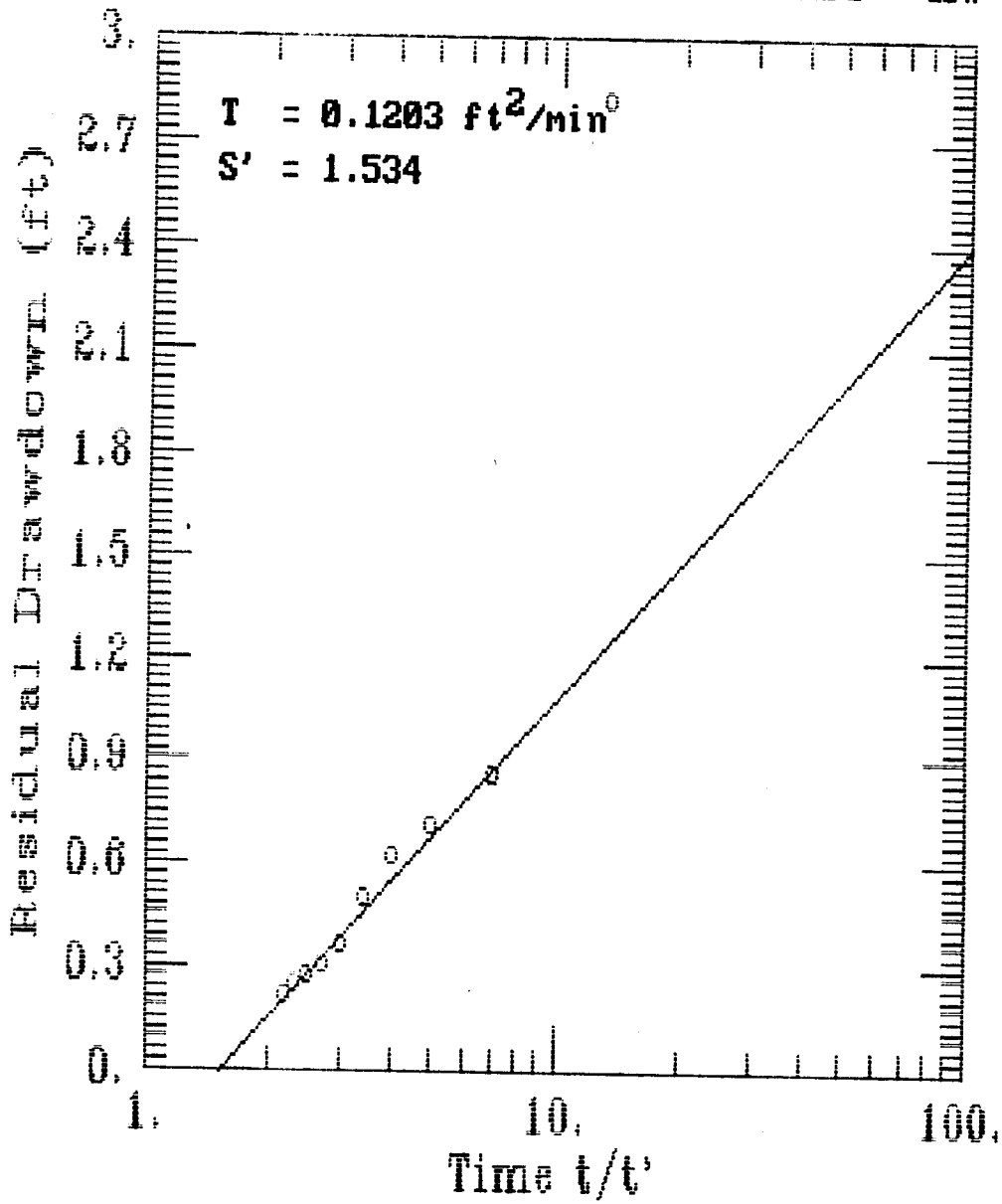
LW = 59.06'

PW = 3.0" = 0.25'

LE = 144" = 12'

TIME	DTO H_2O	ΔH
0 min	25.79'	14.65'
1.0	13.94	2.8
2.0	12.0	0.86
3.0	11.85	0.71
4.0	11.76	0.62
5.0	11.64	0.50
6.0	11.51	0.37
7.0	11.45	0.31
8.0	11.41	0.27
9.0	11.39	0.25
10.0	11.36	0.22

WATUAGA ASSESSMENT RECOVERY TEST * MW-12



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PERMEABILITY CALCULATION METHODOLOGY
BASE MODEL PRESENTATION

JOB No. : 6520-14
FACILITY : WATAUGA COUNTY LANDFILL

TEST DATE : 05/02/94

METHODOLOGY:

Calculations based on the Thiem Equation:

$$Q = 2(Pl)(K)(Le)(y/\ln(Re/rw)) \quad (1)$$

and

the rate of rise of the water level in the well after the water level has been quickly lowered some distance:

$$dy/dt = Q/[(Pl)(rc^2)] \quad (2)$$

Solving equation (2) for Q, equating the resulting expression to equation (1), integrating and solving for K, yields:

$$K = [rc^{*2} \ln(Re/rw)]/2Le\,(1/t)(\ln yo/yt) \quad (3)$$

Where:

- Lw = well length from original water level to bottom of well.
- rw = radius of well bore.
- Le = length of screened section of well.
- rc = radius of casing.
- t = time at which straight line crosses bottom of log cycle on graph of plotted data.
- yo = y at time zero (from graph).
- yt = y at time t (from graph).
- H = estimated thickness of aquifer.
- n = gravel pack porosity.
- rc*= equivalent rc accounting for gravel pack effect on water level.

A, B, and C are dimensionless parameters and a function of Le/rw.

REGRESSION COMMENTS :

* Unusual Observations on page 2 indicate a standard residual > 2.

* R-Square is the normal best fit test adjusted for Degrees of Freedom. Note: 0 < R-Square <= 1 .

WELL INFORMATION

n =	0.30	
Lw =	147.00	(inches)
rw =	4.13	(inches)
Le =	144.00	(inches)
rc =	1.00	(inches)
H =	147.00	(inches)
rc*=	2.41	(inches)

A =	2.50
B =	0.38
C =	2.10

From Figure 2 [1]

yo =	2.36	(feet)
yt =	0.01	(feet)
t =	656	(seconds)

CALCULATIONS: Because the well is fully penetrating (i.e. Lw=H)

$$\ln(Re/rw) = 0.3682 = [\,1.1/\ln(Lw/rw) + C^*rw/Le\,]^{-1}$$

$$K = 1.57E\text{-}04 \text{ cm/sec}$$

REFERENCE: [1] Bouwer, Herman. 1989. The Bouwer and Rice Slug Test. Ground Water, Vol. 27, No. 3, pp 304-309.

SLUG TEST EVALUATION

JOB No. : 6520-14
FACILITY : WATAUGA COUNTY LANDFILL
TEST DATE : 05/02/94

STATIC WATER LEVEL : 20.40 Ft
INITIAL TIME STEP : 10 Sec
INITIAL STEP FACTOR : 1

COMMENTS :

STEP	(T) CLOCK TIME (Sec)	WATER LEVEL MEASUREMENT (Feet)	(Yt) CHANGE IN WATER LEVEL (Feet)
	10	22.56	2.16
1	20	22.38	1.98
1	30	22.21	1.81
1	40	22.10	1.70
1	50	21.96	1.56
1	60	21.83	1.43
1	70	21.72	1.32
1	80	21.60	1.20
1	90	21.52	1.12
1	100	21.43	1.03
1	110	21.34	0.94
1	120	21.27	0.87
1	130	21.21	0.81
1	140	21.14	0.74
1	150	21.07	0.67
1	160	21.00	0.60
1	170	20.97	0.57
1	180	20.94	0.54
1	190	20.88	0.48
1	200	20.85	0.45
1	210	20.81	0.41
1	220	20.78	0.38
1	230	20.75	0.35
1	240	20.72	0.32
2	260	20.68	0.28
2	280	20.63	0.23
2	300	20.59	0.19
2	320	20.56	0.16
2	340	20.54	0.14
2	360	20.52	0.12
2	380	20.49	0.09
2	400	20.48	0.08
2	420		
2	440		
2	460		
2	480		
2	500		
2	520		
2	540		
2	560		

PARTIAL REGRESSION ANALYSIS SOLVING FOR:

$$\text{Log}(Yt) = \text{Log}(Yo) - mT$$

$$\text{where } m = [\text{Log}(Yo) - \text{Log}(Yt)] / T$$

INSIDE LINE

			Low	Mean	High
UNUSUAL OBSERVATIONS =	2	m	0.00360	0.00362	0.00363
R-SQUARE =	0.9996	Log (Yo)	0.367	0.373	0.379
START TIME =	30	Yo	2.326	2.360	2.395
STOP TIME =	320	Yt	0.01	0.01	0.01
DEG FREEDOM =	24	t	657	656	655
		(cm/sec) K	1.57E-04	1.57E-04	1.58E-04

OUTSIDE LINE

			Low	Mean	High
UNUSUAL OBSERVATIONS =	3	m	0.00360	0.00361	0.00362
R-SQUARE =	0.9997	Log (Yo)	0.365	0.371	0.377
START TIME =	10	Yo	2.318	2.351	2.385
STOP TIME =	360	Yt	0.01	0.01	0.01
DEG FREEDOM =	28	t	658	657	657
		(cm/sec) K	1.56E-04	1.57E-04	1.57E-04

LEFT LINE

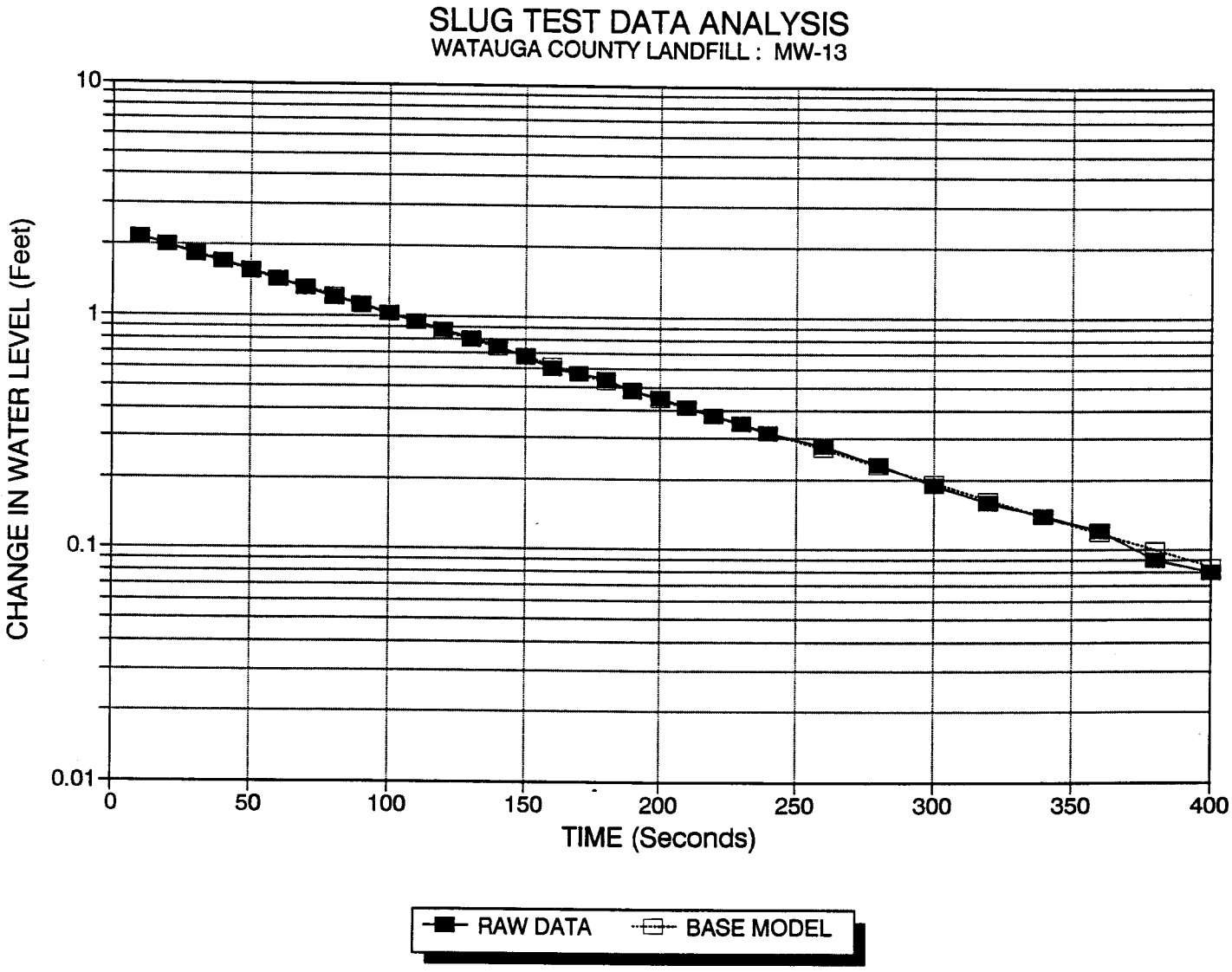
			Low	Mean	High
UNUSUAL OBSERVATIONS =	2	m	0.00360	0.00361	0.00363
R-SQUARE =	0.9997	Log (Yo)	0.366	0.372	0.378
START TIME =	10	Yo	2.321	2.354	2.388
STOP TIME =	340	Yt	0.01	0.01	0.01
DEG FREEDOM =	27	t	657	656	656
		(cm/sec) K	1.57E-04	1.57E-04	1.58E-04

RIGHT LINE

			Low	Mean	High
UNUSUAL OBSERVATIONS =	3	m	0.00360	0.00361	0.00362
R-SQUARE =	0.9997	Log (Yo)	0.365	0.371	0.378
START TIME =	20	Yo	2.318	2.352	2.386
STOP TIME =	360	Yt	0.01	0.01	0.01
DEG FREEDOM =	27	t	658	657	657
		(cm/sec) K	1.56E-04	1.57E-04	1.57E-04

BASE MODEL

			Low	Mean	High
UNUSUAL OBSERVATIONS =	2	m	0.00360	0.00361	0.00363
R-SQUARE =	0.9997	Log (Yo)	0.366	0.372	0.378
START TIME =	20	Yo	2.322	2.355	2.390
STOP TIME =	340	Yt	0.01	0.01	0.01
DEG FREEDOM =	26	t	657	656	656
		(cm/sec) K	1.57E-04	1.57E-04	1.58E-04


SLUG TEST DATA ANALYSIS
WATAUGA COUNTY LANDFILL : MW-13
CHANGE IN WATER LEVEL (Feet)
10
1
0.1
0.01
0
50
100
150
200
250
300
350
400
TIME (Seconds)
RAW DATA
BASE MODEL

Draper Aden Associates
CONSULTING ENGINEERS
BLACKSBURG - RICHMOND, VIRGINIA
NASHVILLE, TENNESSEE

Subject MW-14 (RECOVERY) : JEFF'S DATA

Sheet No. ___ of ___

Job No. ___

By ___ Date ___

MW-14 (0)

SWL = 7.65'

PURGE RATE = 1.0027 cuft/min

DURATION = 19 min

START: 12:31 PM

STOP: 12:50 PM

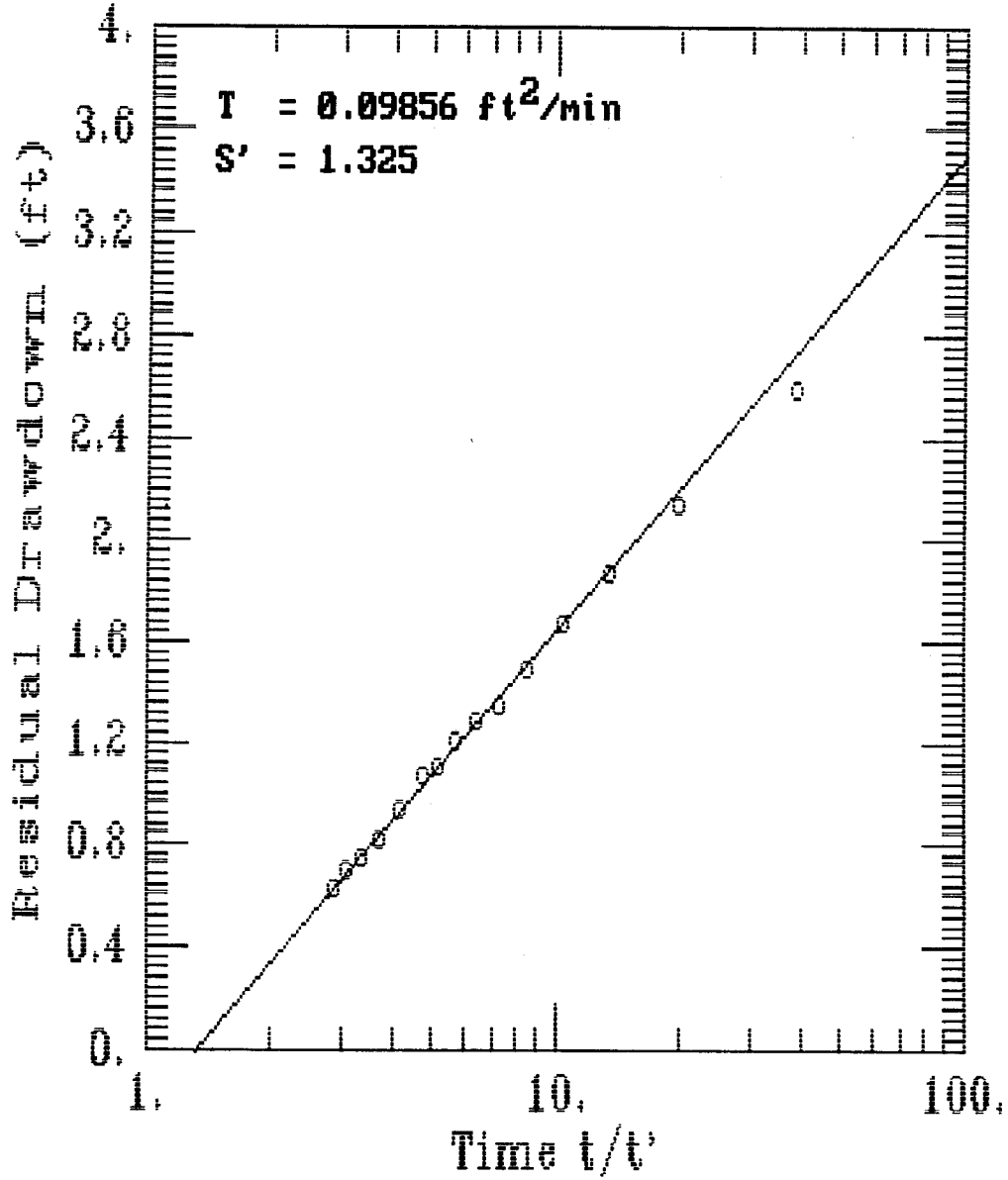
LW = 68.92'

rw = 5.0" = 0.42'

LE = 144" = 12'

TIME	D TO H_2O	ΔH
0.5 min	10.24'	2.59'
1.0	9.79	2.14
1.5	9.52	1.87
2.0	9.32	1.67
2.5	9.15	1.5
3.0	9.0	1.35
3.5	8.94	1.29
4.0	8.85	1.2
4.5	8.75	1.1
5.0	8.72	1.07
6.0	8.59	0.94
7.0	8.47	0.82
8.0	8.39	0.74
9.0	8.35	0.7
10.0	8.28	0.63

WATUAGA ASSESSMENT RECOVERY TEST * MW-14



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

Draper Aden Associates
CONSULTING ENGINEERS
BLACKSBURG - RICHMOND, VIRGINIA
NASHVILLE, TENNESSEE

Subject MW-15 (Recovery) Sheet No. ___ of ___

Job No. ___

By ___ Date ___

MW-15
SWL = 12.71'

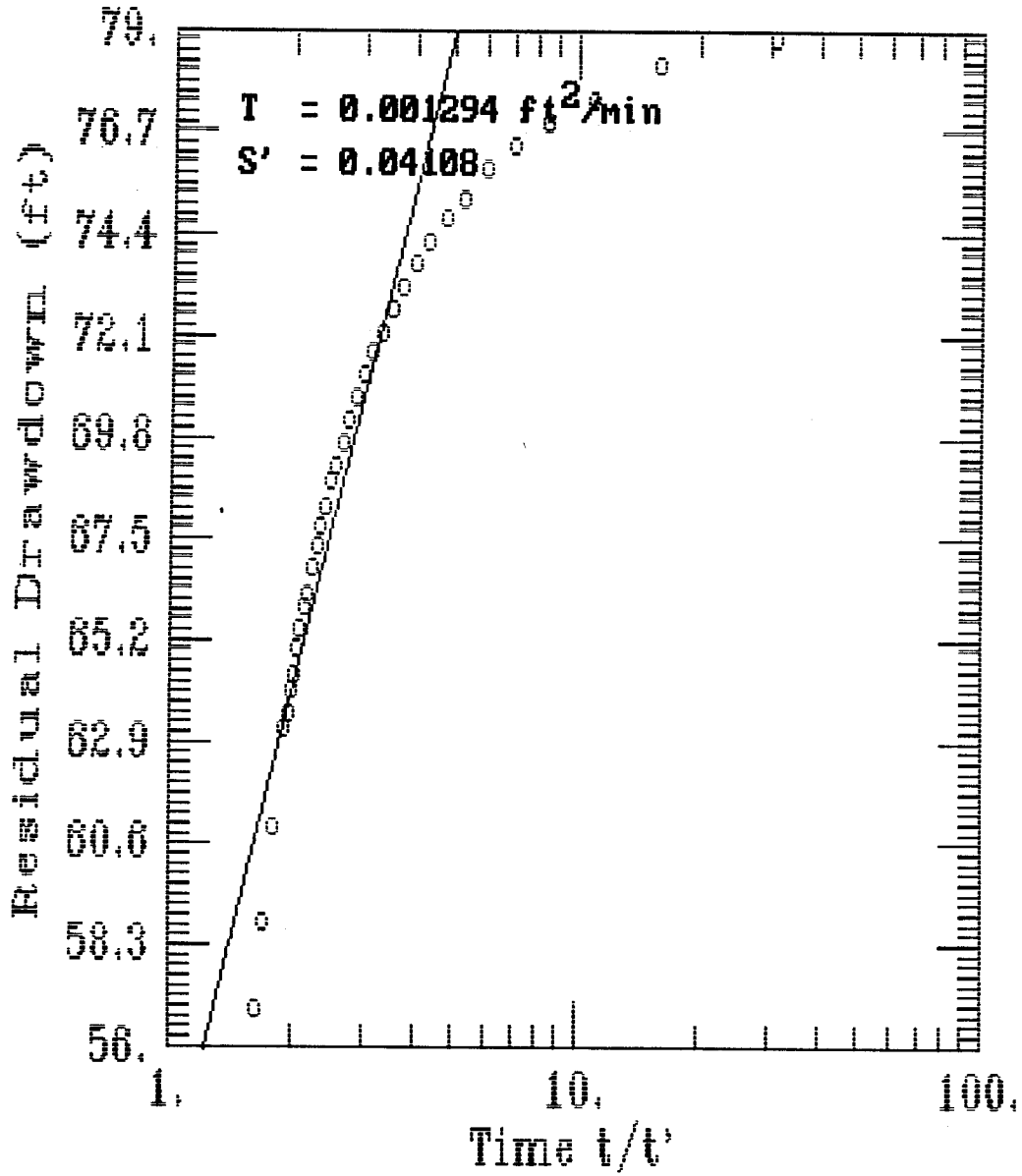
PURGE RATE = 0.267 gal/min
DURATION = 46 min

START: 1:31:30
STOP: 2:17:30

LW = 135.5'
rw = 0.25'
LE = 13.5'

TIME	D TO H_2O	ΔH
1.0	91.50'	78.79'
2.0	90.93	78.22
3.0	90.15	77.44
4.0	89.62	76.94
5.0	89.10	76.39
6.0	88.57	75.86
7.0	87.91	75.20
8.0	87.50	74.79
9.0	86.97	74.26
10.0	26.43	73.32
11.0	85.92	73.21
12.0	85.41	72.70
13.0	84.88	72.17
14.0	84.41	71.70
15.0	83.92	71.21
16.0	83.38	70.67
17.0	82.89	70.18
18.0	82.35	69.64
19.0	81.90	69.19
20.0	81.49	68.78
21.0	80.95	68.24
22.0	80.47	67.76
23.0	80.05	67.34
24.0	79.57	66.86
25.0	78.92	66.21
26.0	78.70	65.99
27.0	78.17	65.46
28.0	77.71	65.00
29.0	77.15	64.44
30.0	76.74	64.03
31.0	76.30	63.59
32.0	75.92	63.21
37.0	73.68	60.97
42.0	71.54	58.83
47.0	69.51	56.8

WATUAGA ASSESSMENT RECOVERY TEST * MW-15



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

Draper Aden Associates
CONSULTING ENGINEERS
BLACKSBURG - RICHMOND, VIRGINIA
NASHVILLE, TENNESSEE

Subject MW-16 (RECOVERY) JEFF: DDTD

Sheet No. ___ of ___

Job No. ___

By ___ Date ___

MW-16

SWL = 5.23'

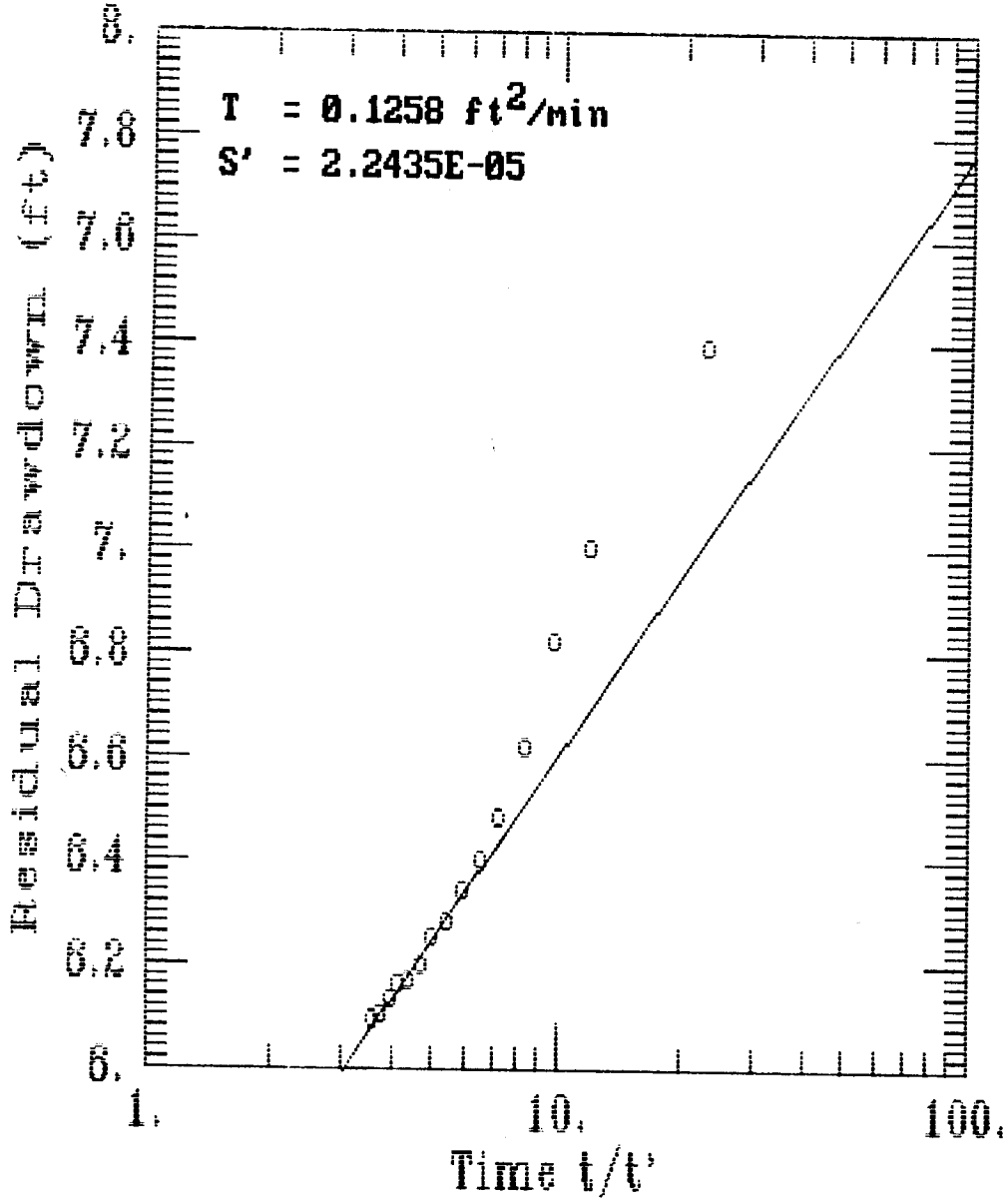
PURGE RATE = 0.802 cuft/min
DURATION = 11 min

START: 1:19 PM
STOP: 1:30 PM

LW = 20.78'
rW = 3.0" = 0.25'
LE = 144" = 12'

TIME	D TO H_2O	ΔH
0 SEC	21.00'	15.77'
+ 30	17.30	12.07
+ 30	11.50	6.27
+ 15	10.22	4.99
+ 15	9.34	4.11
+ 15	8.64	3.41
+ 15	8.05	2.82
+ 15	7.75	2.52
+ 15	7.55	2.32
+ 15	7.37	2.14
+ 15	7.23	2.00
+ 15	7.08	1.85
+ 15	7.00	1.77
+ 15	6.87	1.64
+ 15	6.78	1.55
+ 15	6.73	1.50

WATAUGA ASSESSMENT RECOVERY TEST * MW-16



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

Draper Aden Associates
CONSULTING ENGINEERS
BLACKSBURG - RICHMOND, VIRGINIA
NASHVILLE, TENNESSEE

Subject MW-17 (Recovery) Sheet No. ___ of ___

Job No. ___

By ___ Date ___

MW-17
SWL = 18.46'

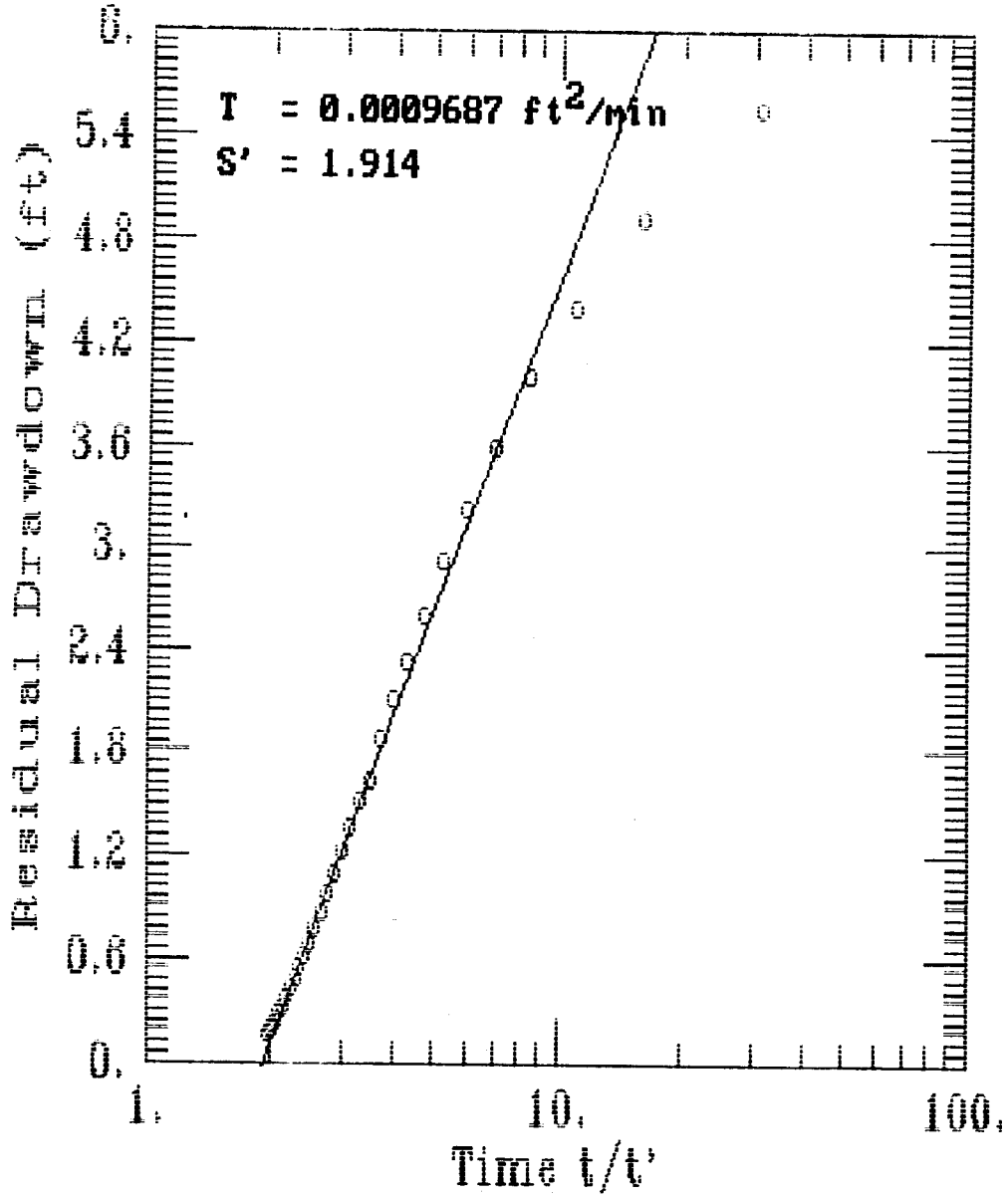
PURGE RATE = 0.0334 cuft/min
DURATION = 28 min

START: 9:52:10 am
STOP: 10:22:10 am

LW = 63.16'
PW = 0.25'
LE = 12.0'

TIME	D TO H_2O	ΔH
1.0	24.00'	5.54'
2.0	23.38	4.92
3.0	22.87	4.41
4.0	22.45	3.99
5.0	22.06	3.60
6.0	21.70	3.24
7.0	21.37	2.91
8.0	21.06	2.60
9.0	20.80	2.34
10.0	20.56	2.10
11.0	20.35	1.89
12.0	20.10	1.64
13.0	19.97	1.51
14.0	19.82	1.36
15.0	19.68	1.22
16.0	19.55	1.09
17.0	19.43	0.97
18.0	19.33	0.87
19.0	19.23	0.77
20.0	19.15	0.69
21.0	19.07	0.61
22.0	19.00	0.54
23.0	18.94	0.48
24.0	18.89	0.43
25.0	18.83	0.37
26.0	18.78	0.32
27.0	18.75	0.29
28.0	18.70	0.24
29.0	18.67	0.21
30.0	18.65	0.19
31.0	18.62	0.16

WATUAGA ASSESSMENT RECOVERY TEST * MW-17



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

Draper Aden Associates
CONSULTING ENGINEERS
BLACKSBURG - RICHMOND, VIRGINIA
NASHVILLE, TENNESSEE

Subject MW-18 (RECOVERY) Sheet No. ___ of ___

Job No. ___

By ___ Date ___

MW-18
SWL = 18.60'

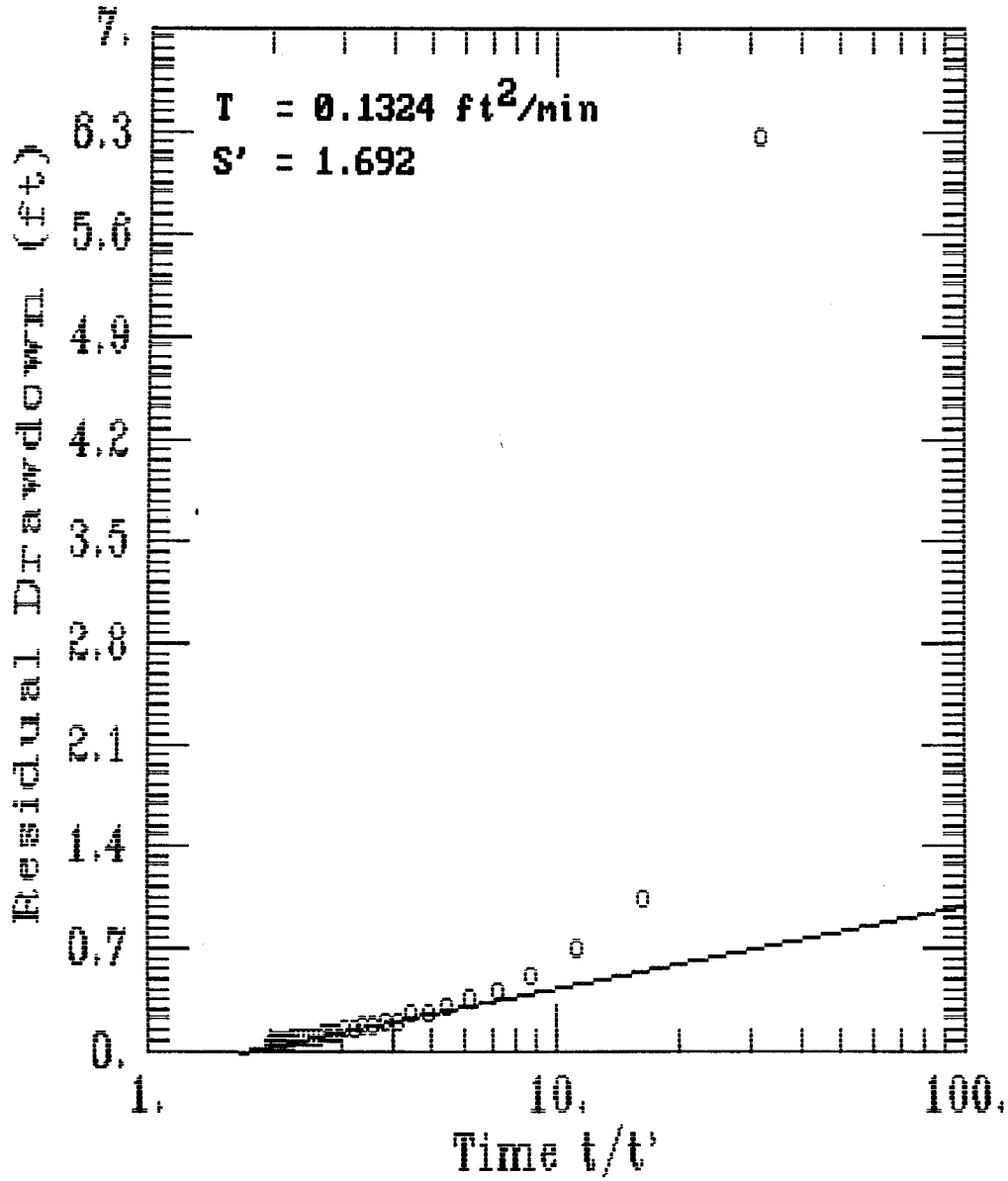
PURGE RATE = 0.401 cuft/min
DURATION = 30 min

START: 12:12:00 PM
STOP: 12:42:00 PM

LW = 54.07'
rw = 0.25'
LE = 12.0'

TIME	D TO H_2O	ΔH
1.0 min	24.85'	6.25'
2.0	19.65	1.05
3.0	19.30	0.70
4.0	19.10	0.50
5.0	19.02	0.42
6.0	18.95	0.35
7.0	18.90	0.30
8.0	18.86	0.26
9.0	18.84	0.24
10.0	18.80	0.2
11.0	18.80	0.2
12.0	18.77	0.17
13.0	18.76	0.16
14.0	18.74	0.14
15.0	18.74	0.14
16.0	18.72	0.12
17.0	18.71	0.11
18.0	18.71	0.11
19.0	18.70	0.10
20.0	18.70	0.10
21.0	18.69	0.09
22.0	18.68	0.08
23.0	18.68	0.08
24.0	18.68	0.08
25.0	18.67	0.07
26.0	18.67	0.07
27.0	18.66	0.06
28.0	18.66	0.06
29.0	18.66	0.06
30.0	18.65	0.05
31.0	18.65	0.05

WATUAGA ASSESSMENT RECOVERY TEST * MW-18



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

APPENDIX V

Potable Well Sampling Program Analytical Results

N.C. Dept. of Environment, Health and Natural Resources
Division of Laboratory Services
State Laboratory of Public Health
P.O. Box 28047, Raleigh, N.C. 27611

Environmental Sciences Analysis Report

VOC

Name of Owner, Patient or Supply: Greer, Williamson, BRemco

Address: Frat

County: Watauga

Report To: John Alley
APPALACHIAN DIST. HEALTH DEPT.

Address: ROUTE 5 BOX 199
~~ECONE, NC 28607~~

Please Read Instructions ...
VOA vials contain 1:1 HCl

Date Collected: 4/6/94

Collected By: Andrew Blethen

Analysis Desired: VOC

Laboratory Number	Sample Number	Sample Description or Remarks	Results In
941012		Frat House Tap	SEE ATTACHED SHEET(S)
941013		Bremco Tap	SEE ATTACHED SHEET(S)
941014		Williamson Tap	NO VOLATILE COMPOUNDS IDENTIFIED
941015		Greer Tap	SEE ATTACHED SHEET(S)
941016		Trip Blank	NO VOLATILE COMPOUNDS IDENTIFIED

Date Received 4-7-94 WB

Date Reported 4-14-94

Date Extracted

Date Analyzed VOC 4/8/94 JTM - 4/11/94

Reported By: John L. Neal

DEHNR Form 2364 Revised (9-89)
Laboratory
1658E

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 941012 PURGEABLE COMPOUNDS Date of Analysis 4/8/94

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	trace
Methylene Chloride	U
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	trace
2,2-Dichloropropane	U
✓cis-1,2-Dichloroethylene	
Chloroform	
(BCM) Bromochloromethane	
✓1,1,1-Trichloroethane	
1,1-Dichloropropene	
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	
✓1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	
Methyl ethyl Ketone	trace

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-O (Rev. 10/92 Laboratory Services)
#1532E D-18

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 941013 PURGEABLE COMPOUNDS Date of Analysis 4/8/94

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	1.0
Methylene Chloride	U
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	1K
2,2-Dichloropropane	U
✓cis-1,2-Dichloroethylene	1K
Chloroform	U
(BCM) Bromochloromethane	
✓1,1,1-Trichloroethane	1K
1,1-Dichloropropene	U
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	1K
✓1,2-Dichloropropane	U
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	1K
1,3-Dichloropropane	U
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-O (Rev. 10/92 Laboratory Services)
#1532E D-18

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 941015 PURGEABLE COMPOUNDS Date of Analysis 4/11/94

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	
2,2-Dichloropropane	
✓cis-1,2-Dichloroethylene	
Chloroform	
(BCM) Bromochloromethane	
✓1,1,1-Trichloroethane	
1,1-Dichloropropene	
✓Carbon Tetrachloride	
✓Benzene	1K
✓1,2-Dichloroethane	U
✓Trichloroethylene	
✓1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
✓Toluene	6.4
1,1,2-Trichloroethane	U
✓Tetrachloroethylene	trace
1,3-Dichloropropane	U
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	trace
1,1,1,2-Tetrachloroethane	U
✓p-Xylene	? 1K
✓m-Xylene	?
✓o-Xylene	trace
✓Styrene	U
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS: Unidentified peaks present

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-O (Rev. 10/92 Laboratory Services)
#1532E D-18

N.C. Dept. of Environment, Health and Natural Resources
Division of Laboratory Services
State Laboratory of Public Health
P.O. Box 28047, Raleigh, N.C. 27611

Environmental Sciences Analysis Report

VOC

Name of Owner, Patient or Supply: WATAUGA CO. LANDFILL PROJECT

Address: Rt 5 Box 199 Boone

County: WATAUGA

Report To: John Alley

Address: APPALACHIAN DIST. HEALTH DEPT.
ROUTE 5 BOX 199
BOONE, NC 28607

Date Collected: 30 MAR 94

Collected By: J. Alley

Analysis Desired: VOC

Laboratory Number	Sample Number	Sample Description or Remarks	Results In
940929	1	WARD	SEE ATTACHED SHEET(S)
940930	2	Edwards	SEE ATTACHED SHEET(S)
940931		Trip Blank	NO VOLATILE COMPOUNDS IDENTIFIED

Date Received 3-31-94 WA

Date Reported 4-11-94

Date Extracted

Date Analyzed VOC 4/6/94 JPM

Reported By: John L. Neal

DEHNR Form 2364 Revised (9-89)
Laboratory
1658E

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 940929 PURGEABLE COMPOUNDS Date of Analysis 4/6/94

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	1K
2,2-Dichloropropane	U
✓cis-1,2-Dichloroethylene	
Chloroform	trace T
(BCM) Bromochloromethane	U
✓1,1,1-Trichloroethane	1K
1,1-Dichloropropene	U
✓Carbon Tetrachloride	1K
✓Benzene	U
✓1,2-Dichloroethane	
✓Trichloroethylene	1K
✓1,2-Dichloropropane	U
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	1K
1,3-Dichloropropane	U
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS: Unidentified peaks present

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-0 (Rev. 10/92 Laboratory Services)
#1532E D-18

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 940930 PURGEABLE COMPOUNDS Date of Analysis 4/6/94

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	1K
2,2-Dichloropropane	U
✓cis-1,2-Dichloroethylene	
Chloroform	trace T
(BCM) Bromochloromethane	U
✓1,1,1-Trichloroethane	trace
1,1-Dichloropropene	U
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	
✓1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS: Unidentified peaks present

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-0 (Rev. 10/92 Laboratory Services)
#1532E D-18

N.C. Dept. of Environment, Health and Natural Resources
Division of Laboratory Services
State Laboratory of Public Health
P.O. Box 28047, Raleigh, N.C. 27611

VOC

Environmental Sciences Analysis Report

Name of Owner, Patient or Supply: LANDFILL PROJECT / HERITAGE AMERICAN

Address: BOONE

County: WATAUGA

Report To: JOHN ALLEY

Address: APPALACHIAN DIST. HEALTH DEPT.
ROUTE 5 BOX 199
BOONE, NC 28607

Please Read instruction sheet
VOA vials contain 1:1 HCl

Date Collected: 30 MAR 94 / 29 MAR 94

Collected By: John Alley

Analysis Desired: VOC

Laboratory Number	Sample Number	Sample Description or Remarks	Results In
940926	1	PERRY - LANDFILL collected 30 MAR 94	SEE ATTACHED SHEET(S)
940927	2	SPRINGHOUSE - VAC - collected 29 MAR 94	SEE ATTACHED SHEET(S)
940928		Trip Blank	NO VOLATILE COMPOUNDS IDENTIFIED

Date Received 3-31-94 Wb

Date Reported 4-11-94

Date Extracted

Date Analyzed VOC 4/5/94 JPM

Reported By: John L. Neal

DEHNR Form 2364 Revised (9-89)
Laboratory
1658E

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 940926 PURGEABLE COMPOUNDS Date of Analysis 4/5/94

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	
2,2-Dichloropropane	
✓cis-1,2-Dichloroethylene	
Chloroform	1K T
(BCM) Bromochloromethane	U
✓1,1,1-Trichloroethane	
1,1-Dichloropropene	
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	
✓1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-O (Rev. 10/92 Laboratory Services)
#1532E D-18

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 940927 PURGEABLE COMPOUNDS Date of Analysis 4/5/94

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	1K
2,2-Dichloropropane	U
✓cis-1,2-Dichloroethylene	1.4
Chloroform	U
(BCM) Bromochloromethane	
✓1,1,1-Trichloroethane	1K
1,1-Dichloropropene	U
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	4.8
✓1,2-Dichloropropane	U
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	1K
1,3-Dichloropropane	U
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-O (Rev. 10/92 Laboratory Services)
#1532E D-18

N.C. Dept. of Environment, Health and Natural Resources
Division of Laboratory Services
State Laboratory of Public Health
P.O. Box 28047, Raleigh, N.C. 27611

VOC

Environmental Sciences Analysis Report

Please Read instruction sheet
VOA vials contain 1:1 HCL

Name of Owner, Patient or Supply: COUNTY LANDFILL PROJECT

Address: BOONE

County: WATAUGA

Report To: JOHN ALLEY

Address: APPALACHIAN DIST. HEALTH DEPT.
ROUTE 5 BOX 199
BOONE, NC 28607

MAY 09 1994

Date Collected: 20 OCT 93

Collected By: John Alley

Analysis Desired:

Laboratory Number	Sample Number	Sample Description or Remarks	Results In
933400	1	DALE GRESSNE	NO VOLATILE COMPOUNDS IDENTIFIED
933401	2	HELTON - UNSWORTH	NO VOLATILE COMPOUNDS IDENTIFIED
933402	3	JIM WELCH	SEE ATTACHED SHEET(S)
933403	4	McCLINTOCK	SEE ATTACHED SHEET(S)
933404	5	JONATHAN HAYES	SEE ATTACHED SHEET(S)
		GREEN PILAR ROAD	
		(NOT ASSOC WITH LANDFILL)	
933405		Trip Blank	NO VOLATILE COMPOUNDS IDENTIFIED

Date Received 10-22-93 WG

Date Reported 11/2/93

Date Extracted

Date Analyzed VOC 10/28/93 AM

Reported By: John L. Neal

DEHNR Form 2364 Revised (9-89)
Laboratory
1658E

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 933404 PURGEABLE COMPOUNDS Date of Analysis 10/28/93

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	
2,2-Dichloropropane	
✓cis-1,2-Dichloroethylene	
Chloroform	trace T
(BCM) Bromochloromethane	U
✓1,1,1-Trichloroethane	
1,1-Dichloropropene	
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	
✓1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-O (Rev. 10/92 Laboratory Services)
#1532E D-18

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 933403 PURGEABLE COMPOUNDS Date of Analysis 10/28/93

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	
2,2-Dichloropropane	
✓cis-1,2-Dichloroethylene	
Chloroform	1K T
(BCM) Bromochloromethane	U
✓1,1,1-Trichloroethane	
1,1-Dichloropropene	
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	
✓1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS: Unidentified peak present small. J

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-O (Rev. 10/92 Laboratory Services)
#1532E D-18

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 933402 PURGEABLE COMPOUNDS Date of Analysis 10/28/93

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	JK
Isopropyl ether	U
1,1-Dichloroethane	
2,2-Dichloropropane	
✓cis-1,2-Dichloroethylene	
Chloroform	JK T
(BCM) Bromochloromethane	U
✓1,1,1-Trichloroethane	trace
1,1-Dichloropropene	U
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	trace
✓1,2-Dichloropropane	U
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-O (Rev. 10/92 Laboratory Services)
#1532E D-18

N.C. Dept. of Environment, Health and Natural Resources
Division of Laboratory Services
State Laboratory of Public Health
P.O. Box 28047, Raleigh, N.C. 27611

VOC

Environmental Sciences Analysis Report

Please Read instruction sheet
VOA vials contain 1:1 HCL

Name of Owner, Patient or Supply: BROOK HOLLOW MHP COUNTY LANDFILL PROJECT

Address: BOONE NC

County: WATAUGA

Report To:

Address: APPALACHIAN DIST. HEALTH DEPT. ROUTE 5 BOX 199 BOONE, NC 28607

Date Collected: 11 OCT 93

Collected By: John Alley

Analysis Desired:

OCT 1993

Laboratory Number	Sample Number	Sample Description or Remarks	Results In
933239		Brook Hollow MHP	NO VOLATILE COMPOUNDS IDENTIFIED
933240		VOC BLANK	NO VOLATILE COMPOUNDS IDENTIFIED

Date Received 10-12-93 WG

Date Reported 10-18-93

Date Extracted

Date Analyzed VOC 10/13/93 PM

Reported By: John L. Neal

DEHNR Form 2364 Revised (9-89)
Laboratory
1658E

North Carolina Department of Environment, Health, & Natural Resources
Division of Epidemiology
Environmental Epidemiology Section

Drinking Water Health Risk Evaluation
General

Watauga COUNTY

DATE 10/27/93 LABORATORY NUMBER 933239

(✓) Based on these analytical results, this water should be considered safe for normal usage.

( ) Chemical analysis did not show any contamination. Water should be resampled if odor or taste persists.

( ) The water should not be used for drinking or cooking purposes, avoid prolonged bathing/showering.

( ) Based on these analytical results, this water is highly contaminated and should not be used for drinking, cooking or bathing/showering.

( ) The laboratory results are not conclusive, please resample:

PLEASE INDICATE ON LAB SHEET THAT IT IS A RESAMPLE AND PROVIDE PREVIOUS SAMPLE NUMBER(S).

( ) COMMENTS:

For further information, contact Dr. Ken Rudo or Dr. Luanne Williams, Environmental Epidemiology Section, (919) 733-3410.

DEHNR 3891 (5/92)
Environmental Epidemiology Section (Review 5/95)

N.C. Dept. of Environment, Health and Natural Resources
Division of Laboratory Services
State Laboratory of Public Health
P.O. Box 28047, Raleigh, N.C. 27611

Environmental Sciences Analysis Report

Name of Owner, Patient or Supply: WATAUGA CO. LANDFILL PROJECT

Address:

County: WATAUGA

Report To: JOHN ALLEY

Address: APPALACHIAN DIST. HEALTH DEPT.
ROUTE 5 BOX 199
BOONE, NC 28607

Date Collected: 21 SEP 93

Collected By: J. Alley

Analysis Desired:

VOC

Please Read instruction sheet
VOA vials contain 1:1 HCl

Laboratory Number	Sample Number	Sample Description or Remarks	Results In
932977	#1	CONE WELL	NO VOLATILE COMPOUNDS IDENTIFIED
932978	#2	SUDDRETH WELL	NO VOLATILE COMPOUNDS IDENTIFIED
932979	#3	BRENCO (HOUSE) WELL	NO VOLATILE COMPOUNDS IDENTIFIED
932980		Trip Blank #1	NO VOLATILE COMPOUNDS IDENTIFIED
932981		Trip Blank #2	NO VOLATILE COMPOUNDS IDENTIFIED
932982		Trip Blank #3	NO VOLATILE COMPOUNDS IDENTIFIED

Date Received 9-23-93 WE

Date Reported 10-4-93

Date Extracted

Date Analyzed VOC 9/29-9/30/93 JTM

Reported By: John O'Neal

DEHNR Form 2364 Revised (9-89)
Laboratory
1658E

N.C. Dept. of Environment, Health and Natural Resources
Division of Laboratory Services
State Laboratory of Public Health
P.O. Box 28047, Raleigh, N.C. 27611

Environmental Sciences Analysis Report

Name of Owner, Patient or Supply: Watauga Co Landfill Project

Address: Boone NC 28607

County: Watauga

Report To: John Alley

Address: APPALACHIAN DIST. HEALTH DEPT. ROUTE 5 BOX 199 BOONE, NC 28607

Date Collected: 8-9-93

Collected By: Wendell Jones

Analysis Desired:

VOC

~~PETROLEUM PRODUCTS~~

Please Read instruction sheet
VOA vials contain 1:1 HCL

VOCs only rcvd

Laboratory Number	Sample Number	Sample Description or Remarks	Results In
932328	Well #1	McClintock	SEE ATTACHED SHEET(S)

Date Received 8/10/93 JPM

Date Extracted

Date Reported 8-26-93

Date Analyzed VOC 8/13/93 JPM PT/GC/MS 8-25-93 nw

Reported By: John L. Neal

DEHNR Form 2364 Revised (9-89)
Laboratory
1658E

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 932328 PURGEABLE COMPOUNDS Date of Analysis 8/13/93

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	
2,2-Dichloropropane	
✓cis-1,2-Dichloroethylene	
Chloroform	1K T
(BCM) Bromochloromethane	U
✓1,1,1-Trichloroethane	
1,1-Dichloropropene	
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	1K
✓Trichloroethylene	U
✓1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

Results confirmed by PT/GC/MS.
8-25-93 TW

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-O (Rev. 10/92 Laboratory Services)
#1532E D-18

N.C. Dept. of Environment, Health and Natural Resources
Division of Laboratory Services
State Laboratory of Public Health
P.O. Box 28047, Raleigh, N.C. 27611

Environmental Sciences Analysis Report

VOC

Name of Owner, Patient or Supply: Watauga Landfill Project

Address: Boone

County: Watauga

Report To: John Alley

Address: APPALACHIAN DIST. HEALTH DEPT.
ROUTE 5 BOX 199
BOONE, NC 28607

Please Read instruction sheet
VOA vials contain 1:1 HCL

Date Collected: 8-3-93

Collected By: Wendell Fox

Analysis Desired:

Laboratory Number	Sample Number	Sample Description or Remarks	Results In
922286		Well #1 ~~Yates~~ Richard Yates	SEE ATTACHED SHEET(S)
922287		Well #2 Dwight Cook	NO VOLATILE COMPOUNDS IDENTIFIED
922288		Well #3 Animal Control Office	NO VOLATILE COMPOUNDS IDENTIFIED
922289		Trip Blank	NO VOLATILE COMPOUNDS IDENTIFIED

Date Received 8-4-93 WG

Date Reported 8-17-93

Date Extracted

Date Analyzed VOC 8/11 - 8/12/93 JPM

Reported By: John L. Neal

DEHNR Form 2364 Revised (9-89)
Laboratory
1658E

N. C. DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES, ENVIRONMENTAL SCIENCES SECTION
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 932286 PURGEABLE COMPOUNDS Date of Analysis 8/11/93

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
✓trans-1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	
2,2-Dichloropropane	
✓cis-1,2-Dichloroethylene	
Chloroform	1K T
(BCM) Bromochloromethane	U
✓1,1,1-Trichloroethane	
1,1-Dichloropropene	
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	
✓1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
✓Toluene	
1,1,2-Trichloroethane	
✓Tetrachloroethylene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
✓Chlorobenzene	U
✓Ethylbenzene	
1,1,1,2-Tetrachloroethane	
✓p-Xylene	
✓m-Xylene	
✓o-Xylene	
✓Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
tert-Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
sec-Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
✓1,2-Dichlorobenzene	
Bis (2-Chloroisopropyl) Ether	
1,2-Dibromo-3-Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Dept. of Environment, Health, & Natural Resources
DEHNR 3068-O (Rev. 10/92 Laboratory Services)
#1532E D-18

APPENDIX VI

Standard Groundwater Monitoring Field Collection Forms

STANDARD FIELD PROTOCOL - INITIAL ACTIVITIES

Project Watauga County Landfill Permit #95-02 Date _____
Sampling Sequence _____ Weather/Temperature _____
Samplers _____
Static Water Level measurement equipment _____
procedure _____

Well evacuation equipment _____
procedure _____

Sample withdrawal equipment _____
procedure _____

Sample filtration equipment _____
procedure _____

Types of sample containers and method of preservation used for required analysis (in order of sequence of filling containers)

_____
_____
_____
_____
_____
_____

Internal temperature of shipping containers at outset of sampling

_____

Temperature equipment _____
calibration procedure _____
measurement procedure _____

pH equipment _____
calibration procedure _____
measurement procedure _____

Conductivity equipment _____
calibration procedure _____
measurement procedure _____

Conductivity calibration measurements/time _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-1 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 76.65 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.653 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 37 feet] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging_____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-2 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 177.50 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 17.0 ft.] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging_____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-3 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 39.60 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging_____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-4 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 29.40 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 11.0 ft.] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging_____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-5 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 73.00 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.624 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging_____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-6 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 58.00 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.624 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging_____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-7 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 50.00 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.624 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging_____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-8 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 67.00 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-9 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 86.40 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-10 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 70.03 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-11 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 25.80 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 1.045 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-12 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 72.75 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-13 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 31.65 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 1.045 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-14 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 71.00 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 1.567 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-15 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 178.00 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 13.0 ft.] *1.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-16 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 26.80 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-17 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 94.54 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

ASSESSMENT MONITORING WELL SAMPLE COLLECTION FORM

Project: Watauga County Landfill Permit #95-02

Well # MW-18 date_____ time_____

Condition of well _____

Reference Point - Top of Well Casing:
Total Depth to water = DTW = _____ (in feet)
Total depth of well = TD = 73.20 (in feet)
Water column length = $L_{c(ft.)}$ = (TD-DTW) = _____ (in feet)

Volume of water in well casing = $V_{c(gal.)}$ = $L_{c(ft.)}$ * 0.163 gal/ft.
= _____

Volume of water in filter pack = $V_{f(gal.)}$ =
= [$L_{c(ft.)}$, Not to exceed 12.0 ft.] * 0.522 gal/ft.
= _____

Unit Well Volume = V_w (Gallons) = (V_c + V_f) = _____
Minimum Purge Volume (Gallons) = 3 * V_w = _____

Description of water before purging _____

Measurements collected during purging:

	Time	Temperature	pH	Conductivity	Pumping Rate
1.					
2.					
3.					
4.					

Total volume of water purged ..... _____
Description of water after purging _____

Measurements collected after purging:

pH Calibration: _____

Final four (4) replicate measurements of:

	Temperature	pH	Conductivity	Time
1.				
2.				
3.				
4.				

Misc. Field Observations _____

Sampler signatures (date/time) _____
_____

STANDARD FIELD PROTOCOL - FINAL ACTIVITIES

Project: Watauga County Landfill Permit #95-02 Date: _____

Internal temperature of shipping containers at completion of sampling:
_____

Sample destination _____
Method of transportation _____

Sampler signatures (date/time) _____
_____
_____

APPENDIX VII

Landfill Groundwater Organic Analysis Summary Table and Data Evaluation

WATAUGA COUNTY LANDFILL GROUNDWATER
ORGANIC CONSTITUENTS DETECTED
December 11, 1990, November 16-18, 1992 and March 3, 1993 SAMPLING EVENTS

Analyte	Date Sampled	Analytical Method	MDL	MW-1	MW-2	MW-3	MW-4	PZ-24	NCS	MCL	TRIP
Trichloroethene	December 11, 1990	SW846 Method 8240	5			9		---	2.8	5	
(TCE)	November 16-18, 1992	SW846 Method 8010	1			23		110	2.8	5	
	March 5, 1993	EPA Method 502.2	0.2	0.4	2.4	18.1	0.7		2.8	5	
	March 5, 1993	SW846 Method 8021	0.2		2.1	15.7	0.8	79.5	2.8	5	
1,1,1-Trichloroethane	December 11, 1990	SW846 Method 8240	5		394	102			200	200	
(1,1,1-TCA)	November 16-18, 1992	SW846 Method 8010	1		980	68	6		200	200	
	March 5, 1993	EPA Method 502.2	0.4		1646	19.0	10.5		200	200	
	March 5, 1993	SW846 Method 8021	0.4		1212	19.0	22.5	1.4	200	200	
Tetrachloroethene	December 11, 1990	SW846 Method 8240	5		7	25			0.7	5	
(PCE)	November 16-18, 1992	SW846 Method 8010	1		5	39		4	0.7	5	
	March 5, 1993	EPA Method 502.2	0.5	0.5	11.2		1.6		0.7	5	
	March 5, 1993	SW846 Method 8021	0.5		11.8	24.9	1.6	12.5	0.7	5	
1,1,-Dichloroethane	December 11, 1990	SW846 Method 8240	5		52	178			700[1]	---	
(1,1-DCA)	November 16-18, 1992	SW846 Method 8010	1		41	250		81	700[1]	---	
	March 5, 1993	EPA Method 502.2	0.7		96	173.3	1.2	77	700[1]	---	
	March 5, 1993	SW846 Method 8021	0.7		82	161	1.1	43.7	700[1]	---	
1,1-Dichloroethene	December 11, 1990	SW846 Method 8240	5		80	7			7	7	
(1,1-DCE)	November 16-18, 1992	SW846 Method 8010	1		110	14			7	7	
	March 5, 1993	EPA Method 502.2	0.7		232	10.3	5.1	0.9	7	7	
	March 5, 1993	SW846 Method 8021 and *(8240)	0.7 *(0.3)		143.6	9	4.5	*	7	7	
cis-1,2-Dichloroethene	March 5, 1993	EPA Method 502.2	0.7	0.7	1.4	36.4		225	70	70	
(cis-1,2-DCE)	March 5, 1993	SW846 Method 8021 and *(8240)	0.7 *(0.7)		1	26.6	*	87.8	70	70	

Note: All Concentrations are in ppb (ug/L) (other footnotes located on page 4)

WATAUGA COUNTY LANDFILL GROUNDWATER
ORGANIC CONSTITUENTS DETECTED
DECEMBER 11, 1990, NOVEMBER 16-18, 1992 AND MARCH 5, 1993 SAMPLING EVENTS

Analyte	Date Sampled	Analytical Method	MDL	MW-1	MW-2	MW-3	MW-4	PZ-24	NCS	MCL	TRIP
Methylene Chloride	December 11, 1990	SW846 Method 8240	5			23		---	5	5	
	November 16-18, 1992	SW846 Method 8010	1			16		15	5	5	
	March 5, 1993	EPA Method 502.2	0.6		4.2	9.4			5	5	
	March 5, 1993	SW846 Method 8021	0.6						5	5	
Vinyl Chloride	December 11, 1990	SW846 Method 8240	10					---	.015	2	
	November 16-18, 1992	SW846 Method 8010	1			3		12	.015	2	
	March 5, 1993	EPA Method 502.2	0.4			3.4		18.3	.015	2	2.6
	March 5, 1993	SW846 Method 8021 and *(8240)	0.4 *(1.0)			*		*	.015	2	
Dichlorodifluoromethane	December 11, 1990	SW846 8240	5			21		---	0.19	---	
	November 16-18, 1992	SW846 Method 8010	1						0.19	---	
	March 5, 1993	EPA Method 502.2	0.8			11.8		6.9	0.19	---	
	March 5, 1993	SW846 Method 8021 and *(8240)	0.8 *(0.8)			*			0.19	---	
Chloroethane	December 11, 1990	SW846 Method 8240	10					---	---	---	
	November 16-18, 1992	SW846 8010	1			5		8	---	---	
	March 5, 1993	EPA Method 502.2	1.4		2.6				---	---	
	March 5, 1993	SW846 method 8021 and *(8240)	1.4 *(10)			*		*	---	---	
Trans-1,3-Dichloropropene	December 11, 1990	SW846 Method 8240	5			9-J		---	70	100	
	November 16-18, 1992	SW846 Method 8010	1					3	70	100	
	March 5, 1993	EPA Method 502.2	0.7			0.9		5.5	70	100	
	March 5, 1993	SW846 Method 8021 and *(8240)	0.7 *(0.7)			*			70	100	

Note: All Concentrations are in ppb (ug/L) (other footnotes located on page 4)

WATAUGA COUNTY LANDFILL GROUNDWATER
ORGANIC CONSTITUENTS DETECTED
DECEMBER 11, 1990, NOVEMBER 16-18, 1992 AND MARCH 5, 1993 SAMPLING EVENTS

Analyte	Date Sampled	Analytical Method	MDL	MW-1	MW-2	MW-3	MW-4	PZ-24	NCS	MCL	TRIP
Benzene	December 11, 1990	SW846 Method 8240	5					---	1.0	5	
	March 5, 1993	EPA Method 502.2	0.1			1.5	0.5	6.3	1.0	5	
	March 5, 1993	SW846 Method 8021	0.1			1.3		6.3	1.0	5	
1,4-Dichlorobenzene	November 15-18, 1992	SW846 Method 8010	0.3			0.5			0.19	75	
	March 5, 1993	EPA Method 502.2	0.5		0.8				1.8	75	
	March 5, 1993	SW846 Method 8021	0.5						1.8	75	
Chloroform	December 11, 1990	SW846 Method 8240	5					---	0.19	100	
	November 16-18, 1992	SW846 Method 8010	1				2	1	0.19	100	3
	March 5, 1993	EPA Method 502.2	0.3						0.19	100	
	March 5, 1993	SW846 Method 8021	0.3			0.5			0.19	100	
1,2-Dichloropropane	December 11, 1990	SW846 Method 8240	5					---	0.56	5	
	November 16-18, 1992	SW846 Method 8010	1						0.56	5	
	March 5, 1993	EPA Method 502.2	0.3		0.3	0.3			0.56	5	
	March 5, 1993	SW846 Method 8021 and *(8240)	0.3 *(0.3)			*	*	*	0.56	5	
2,2-Dichloropropane	March 5, 1993	EPA Method 502.2	0.7	0.7	1.4				---	---	
	March 5, 1993	SW846 Method 8021 and *(8240)	0.7 *(0.7)		*	*	*	*	---	---	
1,1-Dichloropropene	March 5, 1993	SW846 Method 8240	0.5	3.8					---	---	
Bis(2-ethylhexyl)phthalate	March 5,1993	SW846 Method 8270	2		20				---	---	
Xylenes, Total	March 5, 1993	SW846 Method 8021	0.4					1	0.4	10	
4,4'-DDD	March 5, 1993	SW846 Method 8080	0.1					0.1	---	---	

Note: All Concentrations are in ppb (ug/L) (other footnotes located on page 4)

WATAUGA COUNTY LANDFILL GROUNDWATER
ORGANIC CONSTITUENTS DETECTED
DECEMBER 11, 1990, NOVEMBER 16-18, 1992 AND MARCH 5, 1993 SAMPLING EVENTS

Analyte	Date Sampled	Analytical Method	MDL	MW-1	MW-2	MW-3	MW-4	PZ-24	NCS	MCL	TRIP
Bromodichloromethane	December 11, 1990	SW846 Method 8240	5					---	---	100	
	November 16-18, 1992	SW846 Method 8010	1						---	100	
	March 5, 1993	EPA Method 502.2	0.3		0.6				---	100	
Carbon Tetrachloride	December 11, 1990	SW846 Method 8240	5					---	0.3	5	
	November 16-18, 1992	SW846 Method 8010	1						0.3	5	
	March 5, 1993	EPA Method 502.2	0.1			0.2	0.2	0.3	0.3	5	
	March 5, 1993	SW846 Method 8021	0.1						0.3	5	
	March 5, 1993	SW846 Method 8021	0.3						0.38	5	
1,2-Dichloroethane	December 11, 1990	SW846 Method 8240	5					---	0.38	5	
	November 16-18, 1992	SW846 Method 8010	1			1			0.38	5	
	March 5,1993	EPA Method 502.2	0.3		0.3				0.38	5	
	March 5, 1993	SW846 Method 8021 and *(8240)	0.3 *(0.3)		*	*		*	0.38	5	

EPA SW-846 Methods 8011, 8030, 8040, 8090, 8120, 8150, and 8310 were Also Performed on Samples Collected on March 5, 1993, Resulting in No Analytes Detected.

MDL Analytical Method Detection Limit
NCS North Carolina Water Quality Standard (DEHNR: 15A NCAC 2L .0202)
MCL EPA Primary Drinking Water Standard Maximum Contaminant Level

December 11, 1990 Sampling Event - Conducted by Engineering Tectonics and split-sampled with the NCDEHNR Solid Waste Section - Analysis performed by the North Carolina State Laboratory of Public Health.
November 16-18, 1993 and March 5, 1993 Sampling Event - Conducted by Draper Aden Associates - Analysis performed by Central Virginia Laboratories and Consultants, Inc. (CVLC).
EPA Metho 502.2 Co-elutes compounds cis-1,2-Dichloroethene and 2,2-Dichloropropane

J denotes estimated result
[1] denotes proposed NCS
* denotes *(method) utilized and analyte not detected

Note: All Concentrations are in ppb (μg/L)

Data Evaluation

The organic compounds detected in the groundwater at Watauga County Landfill are primarily dense Chlorinated solvents. The solvents have little affinity for soils and are seldom a problem in surface water because of their volatility. (EPA/600/8-83/019. May 1983). Metals concentrations detected in the groundwater are generally low or are below the analytical method detection limit, although several metals, Cadmium and Iron in particular, have been observed at levels above those established by the EPA MCL and the Secondary MCL, respectively.

Metal concentrations observed during the Assessment monitoring program will be evaluated to determine if groundwater resources are being adversely impacted by sources not directly related to the aquifer medium. The Groundwater and Surface Water Monitoring Program (SAP - Appendix I) included as an attachment to the Watauga County Assessment Plan describes the metal analysis to be conducted as part of the Assessment Plan. Cadmium, Iron, Barium, and Mercury will comprise the initial metal target analyte list for the first year of Assessment monitoring. Subsequent to complete annual Appendix II analyses conducted on the 'core' assessment monitoring well network, appropriate revisions to the target analyte list will be made.

The Groundwater and Surface Water Monitoring Program, Appendix I of the Assessment Plan, also describes the organic analysis to be conducted as part of the Assessment Plan. The following twelve "primary detected organic compounds" will initially be included in the target analyte list for the first year of Assessment monitoring. Analytical results of additional organic analytes provided by the necessary methods will also be provided. Subsequent to the complete annual Appendix II analyses conducted on the 'core' assessment monitoring well network, appropriate revisions to the target analyte list will be made.

A descriptive summary of constituents detected as a result of prior sampling and analysis is contained in the Evaluation of Existing Data contained in Section II of the Assessment Plan. Tables presenting data summaries of landfill well groundwater, potable well water, stream, and leachate analyses are also contained within Section II of the Assessment Plan. The following data evaluation explores in greater detail the organic constituents detected at the site.

Primary Detected Organic Compounds

The organic compounds detected at significant levels in three (3) previously existing downgradient groundwater monitoring wells (i.e. MW-2, MW-3, and MW-6), listed by order of decreasing occurrence and concentration are:

Parameters detected at significant levels in virtually all downgradient monitoring wells	Highest concentration reported (ppb)	NCS/MCL (ppb, ug/L)	Location of highest concentration
1,1,1-Trichloroethane (1,1,1-TCA)	1646	200/200	MW-2
1,1-Dichloroethene, *1,1-Dichloroethylene* (1,1-DCE)	232	7/7	MW-2
1,1-Dichlorethane (1,1-DCA)	250	700 (proposed)/--	MW-3
cis-1,2-Dichloroethene, cis-1,2-*Dichloroethylene* (cis-1,2-DCE)	225	70/70	MW-6
Tetrachloroethene, *tetrachloroethylene, perchloroethylene* (PCE)	39	0.7/5	MW-3
Trichloroethene, *trichloroethylene* (TCE)	110	2.8/5	MW-6

All of the constituents listed above were detected above associated EPA Maximum Contaminant Levels (MCL) and the North Carolina Groundwater Quality Standards (NCS) in one or more site groundwater monitoring wells (except for 1,1-DCA which does not have an established MCL or NCS).

All of the compounds listed above were also detected in three (3) of the potable water wells neighboring the site (i.e.: Nissan-Mazda, BREMCO and Carroll residence wells). PCE and TCE were detected above associated MCLs and NCSs in the Nissan-Mazda and Carroll residence wells. In the BREMCO potable well, all (6) compounds were observed only at unquantifiable levels below 1 ppb or at the detection limit of 1 ppb (1,1-DCE).

Five (5) of these compounds (i.e. 1,1,1-TCA, 1,1-DCE, 1,1-DCA, PCE, and TCE) were additionally detected at lower concentrations in five (5) other potable water wells neighboring the site (i.e.: Bolick rental, Greer, Shared Well #2, Ward, and Simko residences). All five (5) of these compounds were not detected in each potable water well and were mostly detected close to the method detection limit for each compound. The presence or source of these trace level compounds in these five (5) potable water wells can not be confirmed at this time.

A summary of the landfill groundwater analysis results for organic compounds listed above can be found on page 1 of the attached detected organic constituent summary table. Page 1 of the summary table presents all the groundwater analysis results for these six chlorinated volatile organics collected to date for the Watauga County Landfill monitoring wells, MW-1, MW-2, MW-3, MW-4, and MW-6. A summary of residential and business potable well analysis results can be found on Table 2.

The organic compounds detected at significant levels primarily in previously existing downgradient groundwater monitoring points located along the Bolick site (i.e.: MW-3 and MW-6), listed by order of decreasing occurrence and concentration are:

Parameters detected at significant levels primarily in downgradient monitoring points located along the Bolick Site	Highest concentrations reported (ppb)	NCS/MCL (ppb; ug/L)	Location of highest concentration
Methylene Chloride, *dichloromethane* (DCM)	23	5/5	MW-3
Dichlorodifluoromethane	21	0.19/---	MW3
Vinyl Chloride	18	0.015/2	MW-6
Benzene	6	1/5	MW-6
Trans-1,3-Dichloropropene	9	70/100	MW-3
Chloroethane	8	---/---	MW-6

Methylene Chloride and Vinyl Chloride were detected above associated MCLs and NCSs in both groundwater wells, MW-3 and MW-6. Methylene chloride was found just below the MCL at MW-2. It was found recently at the Carroll's residence at 138.2 ppb, well above the MCL of 5 ppb.

Dichlorodifluoromethane was also detected above the NCS in both MW-3 and MW-6 but does not have an established MCL.

Benzene was also detected above the MCL and NCS in MW-6 but only above the NCS in MW-3.

Trans-1,3-Dichloropropene was detected twice in MW-3 and MW-6, although well below the established NCS and MCL.

Chloroethane, although analyzed in four (4) sampling events, was only detected in MW-3 and MW-6 on one (1) event and additionally detected in MW-2 on a different sampling event. Chloroethane does not have an established MCL or NCS.

Methylene Chloride was detected in the Carroll residence well water in two out of three sampling events and Vinyl Chloride was detected in the Carroll residence well water in only one out of three sampling events. Although detected on different sampling events the two compounds have also been detected in the accompanying trip blank. The concentrations of Methylene Chloride and Vinyl Chloride detected in the Carroll residence well were above the established NCS and MCL for Methylene Chloride, and above and approaching, respectively, the established NCS and MCL for Vinyl Chloride. Methylene Chloride was detected at 138.2 ppb in the June 23, 1993 sampling of the Carroll residence well water, well above the MCL of 5 ppb.

Methylene Chloride has also been detected at various levels in three (3) other domestic wells within the Rocky Mountain Heights Subdivision. Methylene Chloride was possibly detected in the Perry residence well water although the analytical result was an estimated result denoted by the analytical lab only as <0.06. Methylene Chloride was detected at significant levels in the initial sampling of two other residential wells (Shared well # 1 and the Ward well). Resampling of the Perry residence well, the Shared Well #1 and the Ward residence well resulted in the absence (non-detection) of Methylene Chloride, suggesting a laboratory contaminant source.

Dichlorodifluoromethane was detected above the established NCS in three of the potable water wells neighboring the site (i.e.: Nissan-Mazda, Carroll, and Perry residences). Again, Dichlorodifluoromethane does not have an associated MCL.

Benzene was detected above the established NCS on all three sampling events of the Carroll residence well but below the established MCL. Benzene was not detected in any other potable water well neighboring the site.

Trans-1,3-Dichloropropene was not detected in any of the sampled potable water wells neighboring the site.

Chloroethane was detected in the Carroll residence well water at concentrations greater than twenty (20) times the concentrations observed in any of the groundwater monitoring wells at the landfill. Chloroethane was also detected in the Nissan-Mazda well water greater than twice the concentrations observed in any of the groundwater monitoring wells at the landfill. Chloroethane does not have an established MCL or NCS.

In summary, parameters detected in the landfill wells and also detected in potable wells above applicable MCLs are Methylene Chloride (Carroll), TCE (Carroll/Nissan) and PCE (Carroll/Nissan).

A summary of analysis results for the organic compounds discussed above can be found in pages 2 and 3 of the attached detected organic constituent summary table. Page 2 of the summary table lists Chlorinated volatile organics detected primarily in groundwater monitoring points located along the Bolick site and page 3 lists detected Benzene and Propane derivatives.

Questionable Detected Organic Compounds

Other organic compounds identified by landfill groundwater sampling and analysis were:

1) Detected at trace levels approaching or at analytical minimum detection limits,
2) Previously known as common laboratory contaminants,
3) Detected only once and at only one monitoring point, and/or
4) Also detected in the Trip Blank.

These compounds are listed with appropriate detection addendums as referenced above are:

Chloroform	1,3,4
Bromodichloromethane	1,2
Carbon Tetrachloride	1
1,2-Dichloroethane	1
1,4-Dichlorobenzene	1
1,2-Dichloropropane	1
2,2-Dichloropropene	1
1,1-Dichloropropene	2
Bis(2-ethylhexyl)phthalate	2,4
Xylenes, Total	1,2
4,4'-DDD	1,2

2,2-Dichloropropane additionally co-elutes with cis-1,2-Dichloroethene when utilizing EPA Method 502.2. Related data sets utilizing different analytical methods suggests 2,2-Dichloropropane detection was likely the result of the presence of cis-1,2-Dichloroethane.

A summary of analysis results for the organic compounds discussed above can be found on pages 3 and 4 of the attached detected organic constituent summary table. These compounds will continue to be analyzed in Full Appendix II monitoring scheduled for "core" assessment wells.

Organic Compounds Only Detected in Potable Water Wells

Organic compounds detected in the residential and business potable water wells neighboring the site but not detected in the monitoring well network at the landfill, listed by order of decreasing occurrence and concentration are:

Parameters detected only at potable water wells	Highest concentration (ppb)	NCS/MCL (ppb; ug/L)	Location Detected
Chloromethane	1.48/<0.9	---/---	Carroll/Perry
Trichlorofluoromethane	37.1/0.4	2100/---	Carroll/Nissan
Styrene	2.8	0.014/100	Carroll/Greer
tert-Butylbenzene	1.1	---/---	Carroll/Bolick
Ethylbenzene	trace	29/700	Greer
Isopropylbenzene	0.7/0.6	---/---	Bolick rental
1,3,5-Trimethylbenzene	0.7	---/---	Bolick rental
Napthalene	0.7	---/---	BREMCO/Perry
Toluene	$0.6^T/0.8^T$	1000/1000	Carroll/Nissan/Greer
4-Isopropyltoluene	0.2	---/---	Carroll
alpha-Chlordane	0.4	0.027/2	Shared Well #1
gamma-Chlordane	0.3	0.027/2	Shared Well #1
sec-Butylbenzene	0.2	---/---	Shared Well #1
Tert-Butyl Methyl Ether	2.4	200/---	Carroll
Methyl Ethyl Ketone	trace	170/---	Bolick rental

The fifteen (15) organic compounds listed above are contaminants that have previously been associated with private water well systems (Sorg, Thomas, 1986). Eight (8) of the compounds only detected in the residential and business potable water wells are BTEX components and are often found as the result of activities immediately around the private well heads and/or components of the well systems. Eight (8) of the compounds were detected in the Carroll residence well with three (3) of these same compounds were also detected in the Nissan-Mazda well.

The two (2) Chlordane compounds are commonly used in Termite extermination. The chlordane compounds were detected in only one (1) well, and their occurrence is likely a result of improper application. A resampling of the chlordane contaminated well resulted in no detection of any organic compounds.

A presentation of analytical results for the fifteen (15) organic compounds discussed above can be found in the summary table for the volatile and semi-volatile constituents detected in the residential and business potable water well testing.