

48 Patton Avenue, Suite 303  
Asheville, North Carolina 28801  
Telephone: (828) 281-3350 Facsimile: (828) 281-3351



**To:** Mark Poindexter **From:** Jim McElduff  
**Fax:** 919 733 4810 **Pages:**  
**Phone:** 919 733 4996; x261 **Date:** February 10, 1999  
**Re:** Jackson County Status Report **CC:** Jay Denton - Jackson County Manager

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• **Comments:**

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hc	02, 10, 99	DIN

Mark:

The Jackson County Phase I status report is attached. Stu Ryman or I will call you tomorrow to answer any questions you may have after reading the report.

Thank you.

**THE FLETCHER GROUP**  
Engineering and Environmental Solutions

*Transmitted by Facsimile*

February 10, 1999

Mr. Mark Poindexter  
Department of Environment and Natural Resources  
Division of Waste Management  
401 Oberlin Road, Suite 150  
Raleigh, North Carolina 27065

Subject: Jackson County Landfill  
Water Quality Investigation

Dear Mr. Poindexter:

In January, 1999 Jackson County (County) retained The Fletcher Group to develop a response plan and implement a program to meet North Carolina Department of Environment and Natural Resources (DENR) groundwater investigation requirements. DENR requested that the results of the initial investigation (Phase I) be submitted on February 10, 1999. The request by DENR for the investigation was based on previously identified groundwater contamination.

This letter provides a report of the Phase I findings and the related conclusions and recommendations. As discussed by DENR and The Fletcher Group, additional data will be returned from the laboratory within the next two weeks. These data will be evaluated and, as appropriate, the findings, conclusions, and recommendations will be modified. These modifications will be reported to DENR.

This letter provides information on four subjects:

- Background information that describes the regulatory requirements associated with the investigation.
- The purpose of the Phase I investigation.
- A description of the Phase I site characterization activities, findings, and conclusions.
- Recommendations for additional investigation, in accordance with DENR requirements.

## **BACKGROUND**

Jackson County (County) owns a closed Municipal Solid Waste Landfill in Dillsboro, North Carolina. The landfill location is shown on Figure 1. Four groundwater monitoring wells were installed near the perimeter of the landfill in 1992 and a fifth monitoring well was drilled in 1994. The monitoring well locations are shown on Figure 2. In November 1992, the County initiated a detection groundwater monitoring program as required by the North Carolina Solid Waste Management Rules; 15A North Carolina Administrative Code (NCAC) 13B. The detection monitoring program included laboratory analysis of the suite of chemicals referred to as Appendix I.

By approximately April, 1996, results of the groundwater monitoring program showed specific Appendix I constituents at concentrations that were determined to be greater than background. As required by the Solid Waste Rules, the County implemented an assessment groundwater monitoring program. This latter monitoring program is based on an expanded suite of constituents known as the Appendix II list. In correspondence from DENR to Jackson County dated March 13, 1998, DENR required the County to conduct additional investigation as a result of the presence of compounds included on the Appendix II list. This investigation must be conducted in accordance with the Title 15A NCAC 13B regulations.

## **PURPOSE**

The Phase I activities, and others that will be conducted subsequently, comprise a series of related tasks that are being completed to characterize the nature and extent of the groundwater contamination. Phase I focused on accomplishing xx goals:

- Determining whether groundwater contamination at the landfill poses an immediate risk to the local residents.
- Assessing the likelihood that landfill gas has an adverse affect on groundwater quality.
- Evaluating onsite and nearby hydrogeology.

Finally, the results of Phase I have been used to define the scope of additional tasks that will further evaluate the horizontal and vertical extent of groundwater contamination.

## **PHASE I TASKS**

### ***Community Meeting***

A community meeting was held on January 19, 1999 to inform residents of the landfill area of the operational status of the landfill and the pending groundwater investigation. During the meeting, Mr. Jay Denton, County Manager assured the residents that the County is committed to addressing the environmental issues associated with the landfill. Representatives of The Fletcher Group discussed the historical groundwater quality data and presented the plan for the Phase I investigation. Approximately 12 local residents attended the meeting.

### ***Water Use Survey***

A door to door survey was completed to identify local groundwater users within one quarter mile of the landfill boundary. The goal of the survey was to identify the location and use of wells or springs in the area. The water use survey included a review of available well construction logs to evaluate local hydrogeologic conditions.

### ***Analyze Samples from Local Domestic Wells and Springs***

As requested by DENR, a sample was collected from each domestic well or spring located within one quarter mile of the landfill boundary. Twenty samples were collected. Each sample was analyzed for volatile organic compounds (VOCs) using US EPA method 524.2. This drinking water method has a

reporting limit of 0.5 micrograms per liter ( $\mu\text{g/l}$ ). The samples were also analyzed for Total and Fecal Coliform.

Where possible, The Fletcher Group has used Test America as the analytical laboratory for all sampling. Test America, formerly known as Hydrologic, has provided analytical services for groundwater samples collected at the landfill for approximately three years. In the interests of analytical continuity and consistency, it is generally preferable to minimize the number of laboratories providing services at a single location.

### ***Notify Owners of Water Quality Results***

Each owner of a sampled well or spring was provided a copy of the analytical results. The owners were also given a letter that described the sampling procedures and explained the analytical results. An example letter is attached.

### ***Landfill Gas Evaluation***

The presence of landfill gas was evaluated to determine whether the gas could be contributing to the groundwater contamination observed in the monitoring wells at the site. The landfill gas evaluation utilized nine existing gas monitoring probes and five onsite monitoring wells. The locations of these probes and wells are shown on Figure 2. Other points were also monitored. These included offsite wells, onsite and offsite structures, and one offsite spring. Prior to monitoring the probes and wells, each was fitted with a cap that was designed to facilitate measurement of gas concentrations without mixing the gas with ambient air. The presence and concentration of landfill gas was measured using a GasTech landfill gas meter (Model GA-90). The meter measures methane, oxygen, carbon dioxide, and percent lower explosive limit (LEL) of combustible gases.

Two discrete measurements were made at each probe and well and the data were used to develop a profile of the area affected by landfill gas. The first round of measurements was recorded on January 27, 1999. The second was recorded on February 3, 1999. A comparison was then made between the locations where landfill gas was detected and the areas where groundwater contamination has been found. The purpose of the comparison was to evaluate whether there is a correlation between the occurrence of gas and groundwater contamination.

In addition to measuring gas concentrations in the wells, two samples of landfill gas were collected and submitted for laboratory analysis of VOCs. These samples were analyzed to determine whether the gas contains the same suite of VOCs as detected in groundwater. One gas sample was collected from monitoring well MW-1 and one was collected from gas probe GP-6.

***Evaluate the Interconnection of Domestic Wells and Onsite Wells and Assess On-Site Geology***  
Boring logs prepared by S&ME, Inc. for onsite monitoring wells MW-1 and MW-2 indicate that both wells are screened entirely in fractured bedrock. In order for the contamination identified in MW-1 to migrate to MW-2, or to an offsite domestic well, the fracture(s) in which MW-1 is completed must be connected to the fractures in the other wells. An understanding of the interconnectedness of the fracture system is necessary in order to design an efficient Phase II groundwater investigation program.

To evaluate the interconnectedness of the fractures, the water levels in monitoring wells MW-1, MW-2 and MW-5 were measured while, on separate days, nearby domestic wells on the Bulla and Frank Wilkie

properties were pumped and allowed to recharge. To accomplish this task, electronic water level data recorders were temporarily installed in wells MW-1, MW-2, and MW-5. From January 29 through 31, 1999 "background" water levels were measured. During this period, local domestic wells were operated normally. Then, on February 1, 1999, the pump in the Bulla well was started and allowed to run for approximately two hours while the data loggers continued to measure water levels in the monitoring wells. The well pump was shut off after only two hours because the water became turbid. On February 2, 1999, the Bulla well was again pumped, this time for six hours. During both episodes, the data loggers measured water levels in the monitoring wells MW-1, MW-2 and MW-5. On February 2, 1999, the pump began to draw air. On February 3, 1999, the Bulla well was operated normally and the Frank Wilkie well was pumped for 11 hours while the data loggers measured water levels in the monitoring wells MW-1, MW-2 and MW-5. At the end of the test period, the water level data were evaluated to determine whether there was evidence of interconnectedness. Those findings are discussed in the following section.

Also, as part of this task, The Fletcher Group is reviewing the available geologic mapping to determine if it is sufficient to support the Phase II investigation.

## PHASE I FINDINGS

### *Water Use Survey*

With the assistance of local residents, the door to door survey identified 14 wells and 6 springs on the east side of the Tuckaseegee River, within a quarter mile of the landfill boundary. Individuals in 17 residences were contacted. A list of these residences is included in Table 1. The locations of the wells and springs are shown on Figure 3. As shown on Table 1, 20 residences use groundwater from wells or springs for a domestic water supply. Five wells and one spring are shared between multiple residences. Two of the identified springs are used for domestic water supply. Four of the identified springs are not used for domestic purposes.

A public water supply system is located on Dillsboro Road. However, the water main terminates near the south boundary of the landfill. A portion of the residents south of the landfill are connected to the public water supply. The two properties located closest to the landfill (Western Builders and Webster Enterprises) are connected to the public water supply.

### *Analyze Samples from Local Domestic Wells*

VOCs have not been detected in any water samples collected from water supply wells or springs. Neither Total nor Fecal Coliform were detected in any well water sample. However, Total Coliform was detected in all six spring water samples. Fecal Coliform was detected in one spring water sample (Old Wilkey Spring No. 2). The spring containing Fecal Coliform is not used for domestic water supply. It is, however, located in a cow pasture. These results are shown in Table 1.

To date, complete laboratory reports have been received for eight samples. The remaining results are expected within one week.

### ***Landfill Gas Evaluation***

On January 27, 1999 landfill gas was detected in four monitoring wells (MW-1, MW-3, MW-4 and MW-5). The concentration of methane (a primary component of landfill gas) ranged from 0.1% by in MW-5 to 64.6% in well MW-3. Methane was also detected in four of nine gas probes (GP-2, GP-3, GP-5, and GP-6) on January 27, 1999. The concentration of methane in the gas probes ranged from 23.3% in probe GP-5 to 63.5% in probe GP-2. The concentration of methane in the two offsite locations was measured as 0% in the Bulla Spring and 26.6% in the offsite Western Builder's monitoring well. These measurements are summarized on Table 2.

The gas measurements collected on February 3, 1999 varied from those collected on January 27, 1999. These data are also summarized in Table 2. Lower methane concentrations were measured in the onsite monitoring well MW-1 and gas probes GP-3, GP-5, and GP-6. Higher gas concentrations were measured in the onsite monitoring well MW-4 and the offsite monitoring well on the Western Builders property.

The decrease at well MW-1 is attributed to the fact that the well was not capped while the pumping test was underway so the well was allowed to vent freely. The reason for the decreased methane concentration in the gas probes and increased concentration in MW-4 and the Western Builders well is not known. However, a major rain event occurred between January 27 and February 3. The associated infiltration of rainwater and fluctuations in temperature and barometric pressure may have affected the distribution of landfill gas.

An evaluation of the gas measurements indicates that, in the area of MW-1 and GP-2, gas is present both near the ground surface and at a depth of approximately 90 feet below the ground surface. Landfill gas was also found near the ground surface and at a depth of approximately 20 feet below ground in wells and probes near the southern portion of the landfill. These data suggest that the unsaturated zone of saprolite is impacted with landfill gas both north and south of the landfill.

A comparison of landfill gas readings with groundwater quality results shows a strong correlation between the occurrence of gas and the detection of VOCs in groundwater. The groundwater quality impacts detected to date occur southwest, south, and north of the landfill in MW-3, MW-4 and MW-5, and MW-1, respectively. The highest concentrations of landfill gas were also measured to the southwest, south, and north of the landfill. In addition, water samples collected from monitoring well MW-2 have historically been free of contaminants. Gas monitoring determined that the three gas probes closest to MW-2 were free of gas. Taken together, these data suggest that the gas may be a source of groundwater contamination.

To date, the landfill gas analyses have not been returned from the laboratory. The results are expected by February 19, 1999.

### ***Evaluate The Interconnection of Domestic Wells and Onsite Wells and Assess OnSite Geology***

The pumping test data are being downloaded and plotted as part of an effort to determine whether there are apparent correlations between the initiation of pumping stresses and changes in water levels in monitoring wells MW-1, MW-2 or MW-5. The findings and conclusions of this evaluation of pumping test data will be completed by February 17, 1999.

## ***PHASE I CONCLUSIONS***

As described in a preceding section, the following conclusions will be reevaluated in light of data that is returned from the laboratory during the next two weeks.

- The private drinking water wells and springs are not impacted with VOCs. As a result, groundwater contamination detected at the landfill does not pose an immediate risk to local consumers of groundwater.
- Landfill gas is prevalent along significant portions of the landfill boundaries. A comparison to groundwater analytical results suggests that landfill gas is a probable source of VOCs found in the groundwater samples.
- The nature and extent of landfill gas has not been defined. The nature of contaminants in the gas will be evaluated upon receipt of landfill gas analyses.
- The extent of landfill gas must be better understood in order to design an appropriate groundwater monitoring well network.
- Design of a groundwater monitoring network should also be based on the findings and conclusions of the pumping tests.
- An evaluation of the adequacy of available structural mapping will be included in the update of this letter in approximately two weeks.

## **RECOMMENDATIONS**

The data collected to date indicate a strong correlation between the occurrence of landfill gas and the detection of groundwater contaminants. As a result, The Fletcher Group recommends that the following three Phase II tasks focus on evaluating the extent of landfill gas.

After the extent of landfill gas has been determined, a monitoring well network can be designed to monitor water quality near the perimeters of the landfill gas plume. Knowledge of gas distribution will provide a cost effective mechanism by which the locations of future groundwater monitoring wells can be better established. The longer term implication of this approach is that the overall costs of determining the extent and magnitude of groundwater contamination can be reduced.

- Depth to bedrock in MW-1 is approximately 83 feet below the ground surface. The depth to groundwater is approximately 92 feet below ground surface. As a result, the most significant portion of landfill gas is likely to be migrating through the saprolite in that area. Therefore, the direct push method of installing gas probes in the vicinity should be a successful component of any landfill gas investigation along the north boundary of the landfill. The Fletcher Group

recommends using a direct push rig to install five sets of nested gas probes to the north of the landfill on property owned by Mr. Frank Wilkie and Mr. Johnny Connor. Three probes should be installed at each location. The first probe should be screened from 5 to 7 feet below ground surface, the second from approximately 40 to 42 feet below ground surface, and the third at the saprolite and bedrock interface. The exact screen depths will be determined during field activities. Available data indicates that groundwater occurs in bedrock north of the landfill. This being the case, groundwater sampling using a direct push probe will not be possible in that area. However, if groundwater is encountered during installation of the deeper probes, one-time groundwater samples will be collected and analyzed for VOCs using a method approved by DENR.

- Due to the fact that no well construction diagram exists for MW-5, the depth to bedrock is unknown. However, the depth to groundwater is approximately 46 feet below the ground surface. If gas flow in the southern portion of the property is similar to that found in the northern part of the property, then the most significant portion of landfill gas is likely to be migrating through the saprolite. Again using a direct push probe, install six sets of nested gas probes southeast, south, and southwest of the landfill. One set should be installed on the Webster Enterprise property, one on the Western Builders property, one on the G.S. Railroad property, and three on Jackson County property west of Dillsboro Road. Each nest should consist of two gas probes: one screened from 5 to 7 feet bgs and the second screened near the water table. It is anticipated that groundwater will occur in saprolite in these areas and, if so, a one-time groundwater sample should be collected during the installation of each deeper probe. The groundwater sample will be analyzed for VOCs using a method approved by DENR.
- After installation of the gas probes, the concentration of landfill gas should be measured in each probe using a GasTech GA-90 meter. The results of gas monitoring should then be compared with the results of one time groundwater sampling and used to select the appropriate location for additional permanent monitoring wells.

Currently, The Fletcher Group anticipates that one additional bedrock monitoring well will be required north of the landfill and at least two saprolite monitoring wells will be required to the south and southwest. With respect to immediate actions that may mitigate the effects of landfill gas, Jackson County has obtained a proposal from McGill Associates to install additional gas controls. A workplan will be submitted by facsimile to DENR for discussion prior to startup of design. Jackson County anticipates finishing the landfill gas controls within the schedule established by the 15A NCAC 13B regulations.

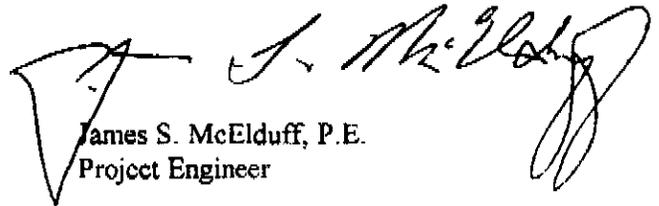
Mr. Mark Poindexter  
February 10, 1999  
Page 8

Mr. Poindexter, thank you for your assistance with this project. We anticipate providing the update to this letter by February 26, 1999. If you have any questions please contact either of us at (828) 281-3350.

Sincerely,



Stuart A. Ryman, P.G.  
Project Geologist

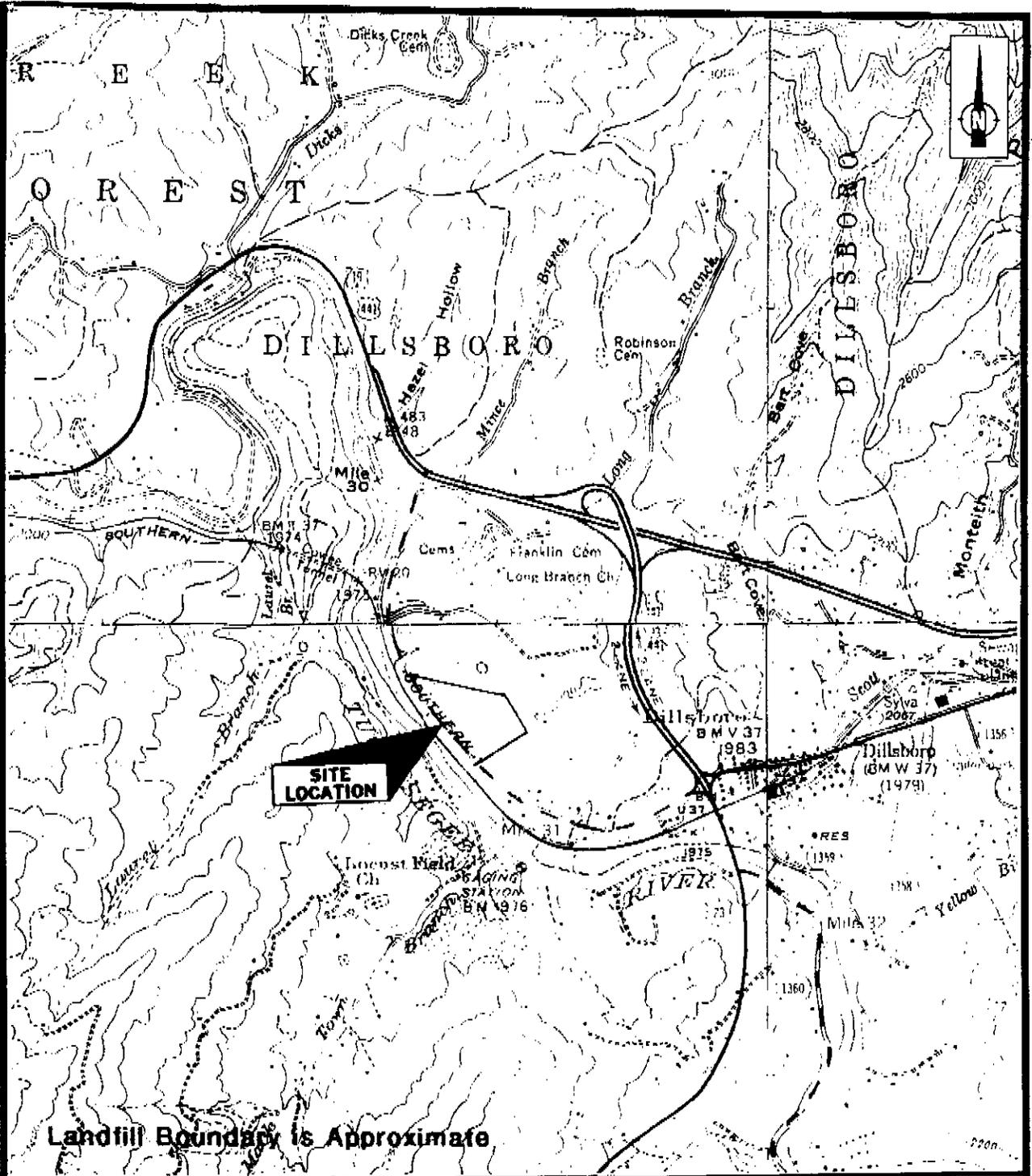


James S. McElduff, P.E.  
Project Engineer

enclosures:    Figures (3)  
                  Tables (2)  
                  Example Letter to Residents

cc: Mr. Jay Denton/Jackson County

## FIGURES

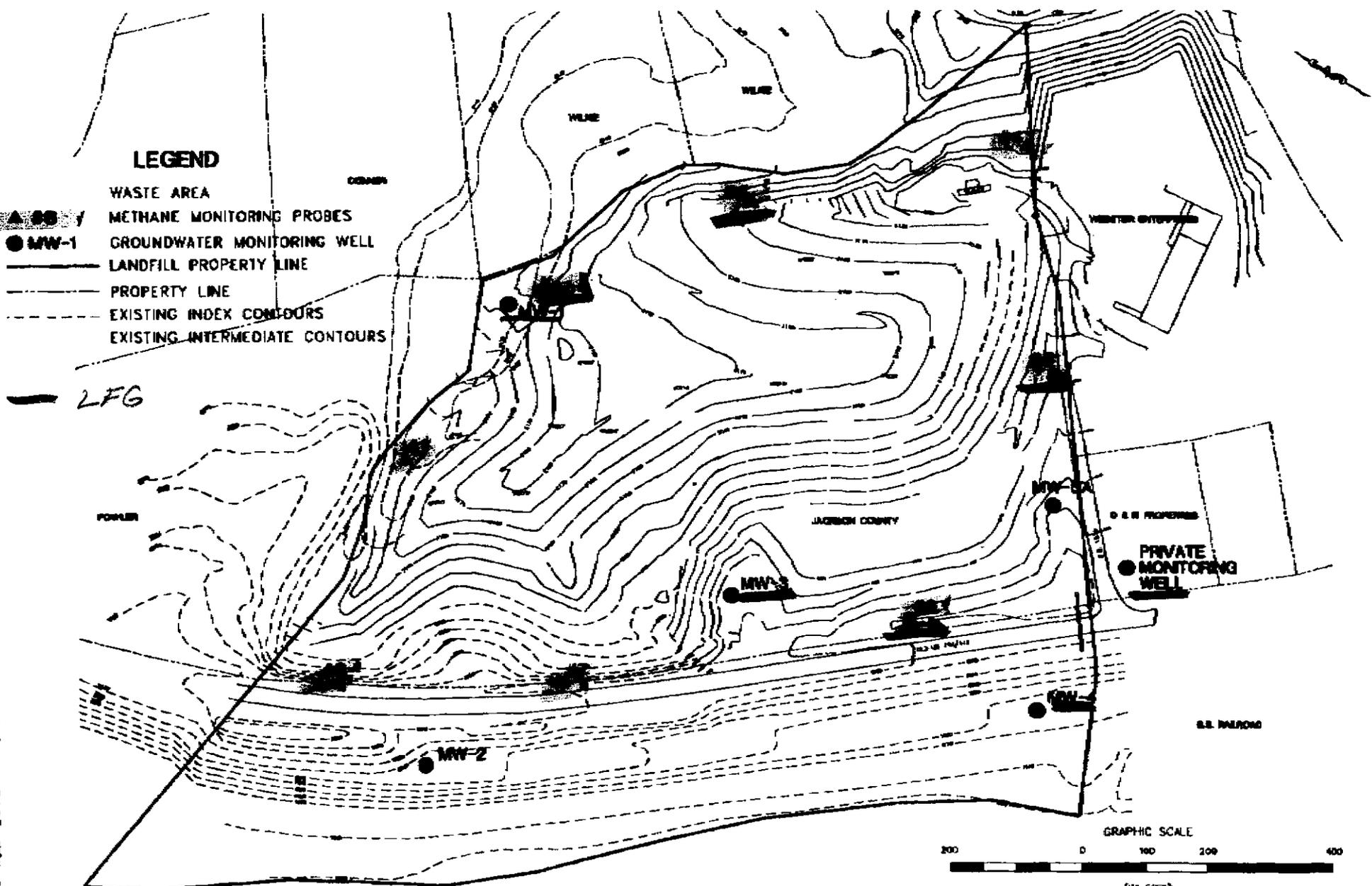


Approximate Scale:  
1 in. = 2,000 ft.

February 10, 1999  
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ASHEVILLE, NORTH CAROLINA

**FIGURE 1**

Site Location Map  
Jackson County Landfill  
Dillsboro, North Carolina

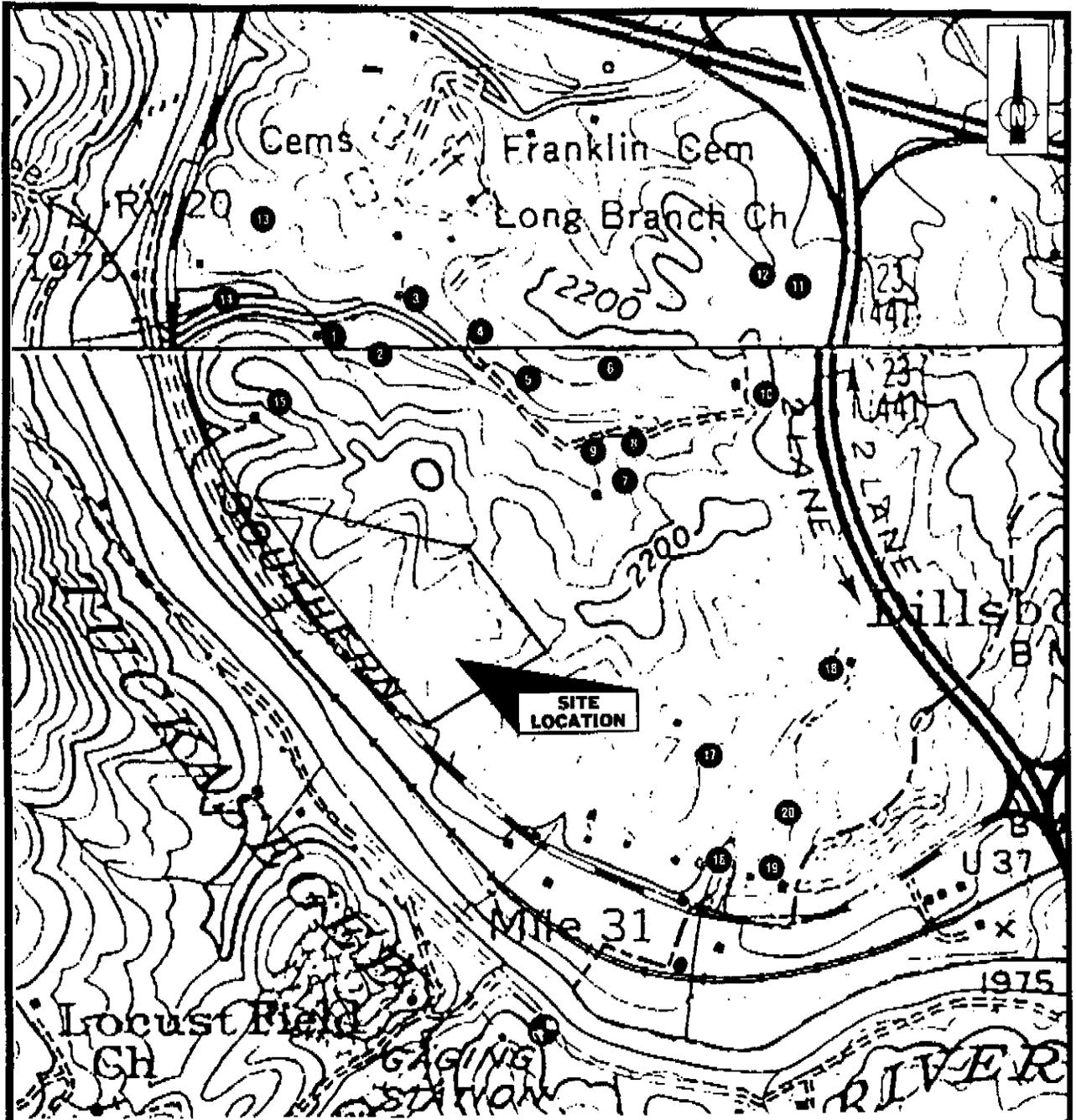


**DRAFT**

**THE FLETCHER GROUP**  
 Engineering and Environmental Solutions  
 40 PINE AVE., SUITE 201  
 ASHEVILLE, NORTH CAROLINA 28801  
 800-367-3150

**JACKSON COUNTY LANDFILL**  
 JACKSON COUNTY, NORTH CAROLINA

Figure 2



● Beneficial Use Location  
 Landfill Boundary is Approximate

Approximate Scale:  
 1 in. = 1,000 ft.

February 10, 1999  
 THE FLETCHER GROUP, INC.  
 ASHEVILLE, NORTH CAROLINA

**FIGURE 3**

Groundwater Beneficial Use Location Map  
 Jackson County Landfill  
 Dillsboro, North Carolina

## TABLES

Table 1

**JACKSON COUNTY LANDFILL  
Beneficial Use Survey  
Well and Spring Analytical Results**

Location Number	Owner of Record	Tax Lot Number	Well	Spring	Shared Water / With Whom	Bacteria Detected / Type	VOCs Detected	Notified
1	Jack Bulla	7621-98-3612	●		N/A	no	no	2/4/99
2	Bulla Spring	7621-98-3612		●	N/A	total = yes fecal = no	no	
3	John Connor	7621-98-6421	●		Sister who lives across Joe Wilkey Road	no	no	2/4/99
4	Staffelbach	7621-98-7788	●		N/A	no	no	2/4/99
5	Geneva Wall	7621-98-9484	●		N/A			
6	Dennis Wilkey	7631-08-7452	●		N/A	no	no	2/4/99
7	Frank Wilkie	7631-07-2955	●		Shares water with Mrs. Wilkey	no		
8	Old Wilkey Spring	7631-07-2955		●	N/A	total = yes fecal = no		
9	Old Wilkey Spring # 2	7631-07-2955		●	N/A	total = yes fecal = yes	no	
10	Mrs. Wilkey Spring	??6845		●	Gets water from Frank Wilkie's well	total = yes fecal = no		
11	Roger Brooks	7631-18-3297	●		Shares water with tax lot number 4413			
12	Edwin Wilkey	7631-18-3532	●		N/A			
13	Charlie Ashe	7621-99-118	●		Margaret and Ronald Russel	total = yes fecal = no		
14	A.G. Sutton Spring	7621-99-1118		●	Gets water from spring on Russel property	total = yes fecal = no	no	
15	William Wilkey	7621-88-8239	●		N/A	total = yes fecal = no		
16	Perry Sutton		●		N/A	no	no	2/4/99
17	Pullium Spring			●	Ray Buchanan Nancy Decker	total = yes fecal = no		
18	Lucile Lambert		●		N/A			
19	Ellis Stiles		●		N/A			
20	Eddie Bingham		●		N/A			

Table 2

## Jackson County Landfill

## Landfill Gas Measurements

Well	Date	Time	LEL Meter % LEL	% Methane	% CO2	% O2	Atmospheric Pressure ("H2O)	Notes
MW-1	1/27/99	11:50	24	1.1	1.4	20.4	378	
	1/27/99	14:35	20	1	1	19.4	376	
	2/3/99	14:45	0	0	0	20.4	374	No cap due to pumping test
MW-2	1/27/99	16:30	0	0	0	20.8	378	
	2/3/99	13:46	0	0	0	19.8	377	
MW-3	1/27/99	16:10	>1000	64.6	26.6	0.6	377	
	2/3/99	13:53	>1000	68.5	27.7	0	376	
MW-4	1/27/99	16:35	34	1.7	2.4	19.5	378	
	2/3/99	15:50	286	14.5	17	12.1	376	
MW-5	1/27/99	15:40	2	0.1	0.2	20.3	378	Screened entirely below the water table
	1/27/99	17:10	2	0.1	0.1	20.5	378	
	2/3/99	14:24	0	0	0	21	376	No cap due to pumping test
Gas Probe 1	1/27/99	14:20	0	0	8.4	3.1	377	
	2/3/99	14:51	0	0	5.8	10.6	374	
Gas Probe 2	1/27/99	14:50	>1000	63.5	39.8	0	376	
	2/3/99	15:00	>1000	64	40.6	0	373	
Gas Probe 3	1/27/99	15:00	766	38.2	29.8	0	376	
	2/3/99	15:07	282	14.2	9.5	13.8	374	

Table 2

## Jackson County Landfill

## Landfill Gas Measurements

Well	Date	Time	LEL Meter % LEL	% Methane	% CO2	% O2	Atmospheric Pressure ("H2O)	Notes
Gas Probe 4	1/27/99	15:10	0	0	0.5	20	376	
	2/3/99	15:15	0	0	0.6	19.8	375	
Gas Probe 5	1/27/99	15:20	480	23.3	6.4	4.7	378	
	2/3/99	14:27	50	3.4	0.7	19	376	
Gas Probe 6	1/27/99	16:00	>1000	50.5	25.2	1.9	378	
	2/3/99	14:07	562	28.1	23.1	1.7	376	
Gas Probe 7	1/27/99	16:05	0	0	0.9	19.8	378	
	2/3/99	14:00	0	0	1	18.6	376	
Gas Probe 8	1/27/99	16:15	0	0	1.4	19.3	378	
	2/3/99	13:37	0	0	2.4	15.6	377	
Gas Probe 9	1/27/99	16:25	0	0	0	20.4	378	
	2/3/99	13:33	0	0	0.1	20.3	377	
W. Builders Monitoring Well	1/27/99	15:50	586	26.6	11.5	13.6	378	Loose Cap
	2/3/99	14:18	950	46.9	23.9	6.7	376	Tight Cap
Bulla Spring	1/27/99	13:50	0	0	0	20.2	379	
Undemeath the Scale House	2/3/99	15:20	0	0	0	20.9	375	
Undemeath the Scale	2/3/99	15:25	0	0	0	21.2	375	
Webster Enterprise Outside	2/3/99	16:00	0	0	0	20.8	375	

Table 2

Jackson County Landfill

Landfill Gas Measurements

Well	Date	Time	LEL Meter % LEL	% Methane	% CO2	% O2	Atmospheric Pressure ("H2O)	Notes
Webster Enterprise Inside	2/3/99	16:05	0	0	0	20.8	375	
Mr. Johnny Conner (under house)	2/3/99	15:40	0	0	0	21.1	376	
Frank Wilkie's Well	2/3/99	16:20	0	0	0	21	374	
Frank Wilkie's Basement	2/3/99	16:15	0	0	0	20.7	375	
Frank Wilkie's Garage	2/3/99	16:15	0	0	0	20.7	375	

P.18

704 281 3351

Feb-11-99 05:04A The Fletcher Group

**ATTACHMENT**  
**Example Letter to Residents**

**THE FLETCHER GROUP**  
Engineering and Environmental Solutions

February 4, 1999

Mr. A.G. Sutton  
Dillsboro Road  
Sylva, North Carolina 28779

Subject: Results of Water Analysis

Dear Mr. Sutton:

Thank you allowing Jackson County to sample your spring. Enclosed you will find a copy of the analytical laboratory reports for the water quality testing. Two analyses were run on your spring water. The first analysis tested for the presence of volatile organic compounds (VOCs) such as the chemicals detected in the monitoring wells at the landfill. The second analysis tested for the presence of total coliform and fecal bacteria. The analytical method used for the VOC analysis is referred to as United States Environmental Protection Agency (US EPA) method 524.2 and was the method specified by the North Carolina Department of Environment and Natural Resources (DENR). The laboratory analysis tested for a total of 55 VOCs.

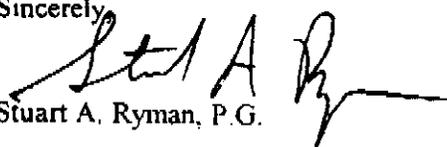
No VOCs were detected in your spring water at a detection limit of 0.0005 milligrams per liter (mg/L). Total coliform was detected in your spring water but fecal coliform was not present.

To help explain the VOC analytical results, you will find a table enclosed that lists the DENR and US EPA maximum allowable concentration for each of the 55 VOCs analyzed. The table also identifies which chemicals have been detected in wells at the landfill. As shown, the detection limit for the analytical method used was below both the DENR and US EPA allowable concentration. You may notice that the DENR specified limit for the compounds chloroform, bromoform, and vinyl chloride, is below the analytical method detection limit. This is unavoidable because there is no standard method that can measure to the low level specified by DENR. However, the method detection limit for these compounds was below the allowable concentration specified by the US EPA.

The presence of total coliform is common in surface water. Fecal coliform would be a concern, however it is not present. If your spring is unprotected, animals can introduce both total coliform and fecal bacteria. We suggest that you protect your spring water source in order to maintain its quality.

Again, we appreciate the assistance you have provided. Please feel free to call Mr. Jay Denton or Mr. Chad Parker with Jackson County if you have any questions regarding these results.

Sincerely,

  
Stuart A. Ryman, P.G.

enclosure



US EPA Method 524.2 Analytes  
and Summary of Regulatory Standards

COMPOUND	UNITS	NC 2L Standard	US EPA MCL	Detected in a Landfill Monitoring Well During 1998
p-Isopropyltoluenc	mg/L	NL	NL	
Chloromethane	mg/l.	NL	NE	•
Dichlorodifluoromethane	mg/l.	1.4	NE	•
Bromomethane	mg/L	NL	NE	
Chloroethane	mg/L	NL	NE	•
Fluorotrichloromethane	mg/L	NL	NE	
Hexachlorobutadiene	mg/L	NL	NE	
Naphthalene	mg/l.	0.021	NE	
1,2,4-Trichlorobenzene	mg/L	NL	0.07	
Cis-1,2-Dichloroethylene	mg/L	0.07	0.07	•
Dibromomethane	mg/l.	NL	NE	
1,1-Dichloropropenc	mg/L	NL	NE	
1,3-Dichloropropane	mg/L	NL	NE	
1,3-Dichloropropene	mg/l.	NL	NE	
1,2,3-Trichloropropane	mg/L	NL	NE	
2,2-Dichloropropane	mg/L	NL	NE	
1,2,4-Trimethylbenzene	mg/l.	NL	NE	•
1,2,3-Trichlorobenzene	mg/L	NL	NL	
n-Butylbenzene	mg/l.	NL	NE	
1,3,5-Trimethylbenzene	mg/L	NL	NE	•
Tert-Butylbenzene	mg/L	NL	NE	
Sec-Butylbenzene	mg/L	NL	NE	
Bromochloromethane	mg/L	NL	NE	
Chloroform	mg/L	0.00019	0.1	
Bromoform	mg/L	0.00019	0.1	
Bromodichloromethane	mg/L	NL	0.1	
Chlorodibromomethane	mg/L	NL	0.1	
Xylenes(total)	mg/L	0.53	10	•
Dichloromethane (methylene chloride)	mg/L	0.005	0.005	
o-Chlorotoluene	mg/l.	NL	NE	
p-Chlorotoluene	mg/L	NL	NE	
m-Dichlorobenzene	mg/L	NL	NE	
o-Dichlorobenzene	mg/L	NL	0.6	
p-Dichlorobenzene	mg/l.	NL	0.075	
Vinyl chloride	mg/L	0.000015	0.002	•
1,1-Dichloroethylene	mg/l.	0.007	0.007	
1,1-Dichloroethane	mg/L	0.7	NL	•
Trans-1,2-Dichloroethylene	mg/l.	0.07	0.1	
1,2-Dichloroethane	mg/L	0.00038	0.005	•
1,1,1-Trichloroethane	mg/L	0.2	0.2	•
Carbon tetrachloride	mg/l.	0.0003	0.005	
1,2-Dichloropropane	mg/L	0.00056	0.005	
Trichloroethylene	mg/L	0.0028	0.005	•
1,1,2-Trichloroethane	mg/L	NL	0.005	
1,1,1,2-Tetrachloroethane	mg/L	NL	NE	
Tetrachloroethylene	mg/L	0.0007	0.005	•
1,1,2,2-Tetrachloroethane	mg/L	NL	NE	
Chlorobenzene	mg/L	0.05	NL	•
Benzene	mg/l.	0.001	0.005	•
Toluene	mg/L	1	1	
Ethylbenzene	mg/L	0.029	0.7	
Bromobenzene	mg/l.	NL	NE	
Isopropylbenzene	mg/L	NL	NE	
Styrene	mg/l.	0.1	0.1	
n-Propylbenzene	mg/L	NL	NE	

< indicates compound not detected at or above the concentration shown

NL indicates that the compound is not listed

NE indicates that a standard has not been established

**Bold** indicates that the compound was detected in a landfill monitoring well during 1998 (Mountain Geology 5/27/98)