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Solid Waste
Section

Groundwater and Surface Water
Assessment Monitoring Results Report
June 23-24, 1998 Event

Watauga County Landfill
Watauga County, North Carolina
NCDENR Permit No. 95-02

Prepared for:

Watauga County Board of Commissioners

and

North Carolina Department of Environment and Natural Resources
Division of Solid Waste Management
Solid Waste Section

Prepared by:

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DAA Job No. 6520-21

September 10, 1998

Draper Aden Associates
Blacksburg ◆ Richmond, Virginia
Engineering ◆ Surveying ◆ Environmental Services

September 10, 1998

Mr. Mark Poindexter
Hydrogeologist
Groundwater Compliance Unit
Solid Waste Section
Division of Waste Management
North Carolina Department of Environment and Natural Resources
401 Oberlin Road, Suite 150
Raleigh, N.C. 27605

RE: Watauga County Landfill, Assessment Monitoring Program,
DAA Job No. 6520-21

Dear Mr. Poindexter:

Please find enclosed the Fifth Semiannual Assessment Monitoring Event Report for the Watauga County Landfill for your review and comments. The enclosed report presents the validated results of the fourth semi-annual Assessment Monitoring event, conducted on June 23-24, 1998 by Draper Aden Associates. Preliminary summary analytical data tables for this event were sent to you on July 28, 1998.

The report discusses sampling procedures, analytical results, and overall conclusions of the monitoring event. Appendix E, provided as a separate volume, contains copies of all associated laboratory data and data validation reports.

The next assessment monitoring event is scheduled for January 1999. The monitoring event will comply with the following approved monitoring program revisions:

1) annual monitoring of the larger set of the core monitoring well network,
2) annual analysis for target metals, and
3) withdrawal of select non-impacted assessment monitoring wells from routine groundwater monitoring during 1998-1999.

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If you should have any questions or comments concerning the enclosed report, please do not hesitate to contact me.

Sincerely,
DRAPER ADEN ASSOCIATES

Jeffrey E. Smith
Project Geologist

JES
enclosure

cc: Mr. James S. Ratchford, Watauga County Manager
Mr. Bob Frye, Assistant Watauga County Manager, with enclosure
Mr. Bill Ross, Brooks, Pierce, McLendon, Humphrey and Leonard, L.L.P., w/ enclosure
Mr. Richard M. DiSalvo, Jr., P.E., Vice-President, DAA
Mr. Scott Kroll, P.E., Environmental Program Manager, DAA
Mr. Michael D. Lawless, P.G., Groundwater Project Manager, DAA

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EXECUTIVE SUMMARY

This report presents the results of the semiannual Assessment Monitoring groundwater and surface water sampling event conducted at the Watauga County Landfill, NCDENR Permit No. 95-02, Watauga County, North Carolina, on June 23-24, 1998 by Draper Aden Associates. Assessment monitoring was conducted in accordance with the Watauga County Landfill Assessment Plan (DAA, Sept. 3, 1993) and subsequent monitoring program revisions as approved by the NCDENR. The analytical results obtained from the monitoring event are similar to the results obtained from the previous eight assessment events. Parameter concentration and distribution trends indicate steady state conditions, where sourcing of contaminants is balanced by removal, are predominant across the site. The analytical results indicate the northern edge of the occurrence of assessment target parameters in the groundwater primarily exists within the construction right-of-way for the pending Route 421 bypass. South of the bypass, the detection of assessment target parameters was concentrated between the saddle, located between the landfill and the Rocky Mountain Heights Subdivision, and the west and north drainages below the landfill.

Prior to the June 23-24, 1998 Assessment monitoring event, the NCDENR approved the following monitoring program revisions:

1) the initiation of monitoring a smaller set of the core monitoring well network for semiannual monitoring and a larger set for annual monitoring,
2) annual rather than semiannual analysis for target metals, and
3) withdrawal of select non-impacted assessment monitoring wells from routine groundwater monitoring during 1998-1999.

The subset of the existing twelve core well network approved for semiannual monitoring includes the following six wells: MW-2, MW-3, MW-6, MW-9, MW-12 and MW-17. The groundwater at these six monitoring points exceeds the EPA MCL for one or more organic target parameters.

A remedial cap was installed at the facility in the fall of 1996. The remedial cap focuses on source containment as an immediate remedial action, as established by the EPA's presumptive remedy directive (EPA 540-F-93-035, September 1993). Additional risk assessment activities address exposure pathways outside the source area. These activities include the provision of potable water via the extension of public water along the existing Route 421 alignment. Response actions for exposure pathways outside the source area are being combined with the presumptive remedy to develop a comprehensive site response. Source containment, implemented through a remedial cap, supplemented by risk assessment, institutional controls, natural attenuation, and continuing assessment investigation comprise the broad package of remedial actions currently being conducted at the site.

1.0. INTRODUCTION

This report presents the results of the fifth semiannual Assessment monitoring groundwater and surface water sampling event conducted at the Watauga County Landfill, NCDENR Permit No. 95-02, Watauga County, North Carolina, on June 23-24, 1998 by Draper Aden Associates. The report discusses sampling procedures, analytical results, and overall conclusions of the June 23-24, 1998 event. Tables and figures are provided in Appendix A. A summary of target parameter analytical results is presented in Tables 2A-C. Non-target parameter analytical results are provided in Table 3. Groundwater elevation measurements are provided in Table 4. Background Assessment analytical results are provided in Tables 5A-E and Tables 6A-B. The Groundwater and Surface Water Monitoring Program Site Map (Figure 1) depicts the potentiometric surface as inferred from static water level elevations obtained during the sampling event. Appendix E contains copies of all associated laboratory data. A data validation summary and completed Quality Assurance/Quality Control (QA/QC) criteria forms used to validate the data are also contained in Appendix E.

Assessment monitoring was conducted in accordance with the Watauga County Landfill Assessment Plan (DAA, September 3, 1993) and monitoring program revisions as detailed in the Remedial Investigation and Alternatives Report (DAA, January 12, 1996) and subsequent monitoring event reports. Appendix I of the Assessment Plan, The Groundwater and Surface Water Monitoring Program, details the schedule and procedures to be implemented for collecting groundwater and surface water samples, analyzing the samples for specified parameters, and evaluating and reporting data.

1.1. Groundwater Monitoring Well Network

Nineteen groundwater monitoring wells (MW-1 through MW-19) comprise the assessment groundwater monitoring well network at the Watauga County Landfill. Monitoring well locations are shown on the Groundwater and Surface Water Monitoring Program site map (Figure 1). MW-6 and MW-16 were abandoned subsequent to the second semiannual assessment monitoring event (April 1996). The abandonment of MW-6 was necessary to permit construction of the landfill cap and the abandonment of MW-16 was necessary to permit construction of the 421 bypass (Figure 2).

In order to maximize the effectiveness and efficiency of the groundwater monitoring program, the assessment well network is stratified into two groups of "core" and "boundary" wells. Core assessment wells are selected based on the well's ability to monitor and characterize migration of potential slugs of contaminants. Boundary assessment wells are selected based on the well's ability to monitor and characterize the limits of the horizontal and vertical extent of the contaminants.

In July 1995, after the first semiannual assessment monitoring event (fifth assessment event), NCDENR approved the withdrawal of non-impacted boundary wells from the routine compliance monitoring program on the condition that the boundary wells be rotated in and out of routine monitoring on a regular basis. The boundary wells were sampled again during 1997-1998. NCDENR subsequently approved withdrawal of select non-impacted boundary wells from routine groundwater monitoring during 1998-1999.

The six non-impacted boundary wells remain operational. Future monitoring is based on annual review of temporal contaminant distribution trends.

The current stratification of the assessment monitoring well network is as follows:

CORE WELLS	BOUNDARY WELLS
MW-1	MW-4
MW-2	MW-5
MW-3	MW-13
MW-6 (abandoned)	MW-14
MW-7	MW-16 (abandoned)
MW-8	MW-18
MW-9	
MW-10	
MW-11	
MW-12	
MW-15	
MW-17	
MW-19	

1.2 Surface Water Sampling

The goal of the surface water monitoring system at Watauga County Landfill is to provide representative surface water samples for assessing the water streams located downgradient of the waste disposal area. Six surface water monitoring points serve to meet this objective.

- (S-1) The last of the series of sediment ponds is sampled to provide a representative sample for assessing the quality of the surface water originating from the landfill before the water discharges into the stream.

- (S-2) The spring capture outfall located adjacent to the last of the series of sediment ponds is sampled to provide a representative sample for assessing the quality of the water originating from the spring capture system located beneath the fill area.

- (S-3) The stream is sampled at the landfill property boundary (approximately 600 feet below the last sediment pond) to provide a representative sample for assessing the water quality of the stream below the waste disposal area. No sampling location is available upstream of the waste disposal area since the stream originates immediately below and adjacent to the disposal area.

- (S-4) The stream located below the Bolick site is sampled approximately 30 feet below the landfill property boundary to provide a representative sample for assessing the water quality of the surface water below the Bolick site. This sampling location is chosen instead of the

sediment pond located on the Bolick site to provide a sample that is more representative of the potential influence of groundwater from the soil aquifer.

- (S-5) A seep, located below the waste disposal area and directly above the sediment pond, was observed flowing during the first quarter background event (June 1994). This seep is sampled in addition to the four originally proposed surface water sampling locations.
- (S-6) An additional surface water monitoring point, located approximately 800 feet below the existing surface water monitoring point S-4, was added subsequent to the first semiannual sampling event (July 1995). This monitoring point is sampled to provide a representative sample for assessing the persistence of surface water impacts observed at S-4 further downgradient along this drainage.

In addition to these six surface water sampling locations, any leachate production observed during surface water sampling events is also sampled. A grid field screening inspection of the landfill is conducted concurrent with the sampling event to verify the presence or absence of leachate production. No leachate production was observed.

1.3 Sampling and Analysis Schedule

1.3.1 Groundwater

During the first year of Assessment groundwater monitoring (1994-1995) four quarterly background sampling events were conducted on each groundwater monitoring well. Semiannual sampling is currently conducted. The fifth semiannual Assessment monitoring event was conducted on June 23-24, 1998. The groundwater Assessment monitoring schedule is outlined in Table 1.

Monitoring Parameters

The analytical scans performed on each monitoring well during the first year of assessment background monitoring were designed to analyze for all the target parameters detected and tentatively confirmed as a result of the initial comprehensive sampling event performed on the previously existing well network MW-1 through MW-7 (March 1993). The initial analytical list was comprised of the complete EPA Appendix II List of Hazardous Inorganic and Organic Parameters (40 CFR, Part 258) required for Assessment Monitoring under the NCDENR requirements for Municipal Solid Waste Landfills (15A NCAC 13B Section .1600). A summary results table of the initial March 1993 sampling event are contained in Appendix C of this report and detailed in Sections II and III of the Assessment Plan (DAA, September 3, 1993).

The complete EPA Appendix II analysis was repeated on the network of core wells during the first semiannual event (July 1995). Additional parameters detected, and verified through Quality Assurance / Quality Control (QA/QC) validation procedures as being present, that were not identified in prior Assessment monitoring events, were added to the assessment target parameter list. Target parameters not detected during all five previous assessment monitoring program events,

and verified through QA/QC validation procedures as not being present, were deleted from the assessment target parameter list. As required, amendments to the existing target parameter list were evaluated and approved by the NCDENR, prior to implementation. For amended target parameters, it was proposed that four independent samples be collected and analyzed for those additional parameters during the following four semiannual sampling events at all core wells to establish background.

Revisions to the target inorganic parameter list involved adding four metal parameters (chromium, cobalt, nickel, and vanadium) and deleting two other metal parameters (cadmium and mercury). The presence of cadmium and mercury in the groundwater at the site was not supported by the analytical results of all four assessment background or the first semiannual monitoring events. Chromium, cobalt, nickel, and vanadium were observed in three or more wells, although also at levels far below EPA MCL and NC groundwater standards (NCSs), as a result of the comprehensive EPA Appendix II analytical scan performed during the first semiannual event.

As a result of four successive assessment sampling events, all the assessment target metal parameters (including chromium, cobalt, nickel, and vanadium) were observed at levels far below EPA MCL and NCSs. Subsequent to the January 1998 Assessment monitoring event NCDENR approved completing target metal analysis annually rather than semiannually.

Revisions to the target organic parameter list involved deleting trans-1,3-dichloropropene. The analytical results of the four background monitoring events and the first semiannual assessment sampling event confirmed the absence of trans-1,3-dichloropropene in the groundwater and surface waters at the site. Thus, per the decision criteria outlined in the Assessment Plan, trans-1,3-dichloropropene was removed from the target parameter list. Draper Aden Associates recommends herein (Section 5.1) that ether and dichlorofluoromethane be added to the target parameter list. Ether and dichlorofluoromethane have routinely been included in the standard method parameter lists utilized in all previous Assessment monitoring events, but have not been treated as target parameters.

As approved by NCDENR, monitoring of additional EPA Appendix II parameters that have not been confirmed in any of monitoring wells to date is no longer required.

Analytical Methods

During the first year of background Assessment Monitoring (1994-1995), analyses of the core wells utilized EPA Contract Laboratory Program – Statements of Work (CLP-SOW) for all four quarterly events. Organic analyses of the boundary wells alternated between CLP and Low Level Risk Assessment (LLRA) analytical methods for each quarterly event. Metal analyses of all monitoring wells utilized CLP methods on all events.

Since completing the first year of quarterly background sampling (April 1995), the core wells have been monitored on a semiannual basis. The first semiannual assessment monitoring

event analyzed for the EPA Appendix II List of Hazardous Inorganic and Organic Parameters (40 CFR Part 258), utilizing LLRA analytical methods for organic parameters and CLP analytical methods for metal parameters.

Monitoring continues to be conducted on a semiannual basis for the organic target parameters detected as a result of the complete EPA Appendix II analysis. Monitoring is conducted on an annual basis for the metal target parameters. Reevaluation of the site network and monitoring scheme is conducted after review of the results of each sampling event. The monitoring program continues to follow a two-tiered analytical approach utilizing both EPA CLP-SOW analytical methods and LLRA screening by EPA-SW846 analytical methods. The CLP-SOW are utilized to generate high-level quality data with documented QA/QC protocols. The LLRA methods (EPA-SW-846) are utilized for risk assessment screening to preliminarily identify low levels of parameters that may be present. The groundwater analysis schedule provides an outline of analytical methodology designated for each event (Table 1).

The assessment monitoring schedule alternates between CLP and LLRA analytical methods for groundwater organic analyses each semiannual event. The second and fourth semiannual assessment monitoring events analyzed for all target assessment monitoring parameters (both organic and metal) using CLP-SOW. The third semiannual assessment monitoring event analyzed groundwater for all target assessment monitoring parameters in the core wells utilizing LLRA analytical methods for organic parameters and CLP analytical methods for metal parameters. The fifth (detailed herein) semiannual event utilized CLP-SOW. The sixth semiannual assessment monitoring event will utilize LLRA methods.

1.3.2 Surface Water

Surface water monitoring has been conducted on a semiannual basis since the initiation of the Assessment Plan monitoring program. The analytical scans that are performed on the surface water and leachate samples utilize CLP SOW and are designed to analyze for all the target parameters detected as a result of the comprehensive Appendix II analysis. The surface water assessment monitoring schedule is outlined in Table 1.

2.0 GROUNDWATER AND SURFACE WATER SAMPLING FIELD PROCEDURES

Groundwater and surface water samples were collected according to the Watauga County Landfill Groundwater and Surface Water Monitoring Plan (DAA, September 3, 1993). Field notes, contained in Appendix B, document sample collection procedures.

2.1 Well Purging and Sample Collection

Dedicated stainless steel and TEFLON electrical submersible pumps were permanently installed in the monitoring well network subsequent to the first Assessment event. Draper Aden Associates' environmental technicians used the dedicated pumps to purge and collect groundwater

samples from the well network during the June 23-24, 1998 sampling event. All non-dedicated equipment was decontaminated between sampling of each monitoring well.

A minimum of three well casing volumes of groundwater were removed from each monitoring well prior to sample collection. Well casing volumes were calculated from measurements of depth to water, and total well depth taken prior to purging. Stabilization of field analyses for pH and specific conductivity were used to verify that stagnant water within the well as removed during purging, and that groundwater representative of the near-aquifer was being sampled. Field notes summarize and document well purging calculations and results (Appendix B).

2.2 Field Meter Calibration

Measurements of pH and specific conductivity were analyzed at each well by completing multiple measurements in the field, at the time of groundwater purging. Although pH and specific conductivity are not assessment monitoring parameters, the measurements were used to ensure groundwater quality and stabilization.

Hanna 9023 pH/temperature and 9033 conductivity meters were used for the field measurement of pH, and conductivity. The meter was calibrated in the field using laboratory-grade buffers for pH, and KCl solution for specific conductivity. Field notes in Appendix B document field meter calibration methods for the sampling event.

2.3 Quality Control Blank Samples

Trip blanks were utilized as part of the assessment monitoring program. Trip blanks were prepared by the analyzing laboratory to accompany the sample kits at all times. The trip blanks employed sample containers and volumes identical in physical and chemical integrity to the samples used for actual sample collection. The trip blank was analyzed for all parameters included in the sampling event. The trip blank served as a control on sample kit preparation, analysis in the laboratory, and sample kit transportation.

Field blanks were not collected, due to the use of dedicated purging/sampling equipment.

2.4 Sample Containers and Shipment

Groundwater samples were collected in U.S. EPA approved containers prepared and supplied by the analyzing laboratory. Where applicable, the analyzing laboratory prepared organic sample containers with hydrochloric acid (HCl) prior to sample collection. Total metal samples were preserved in the field using nitric acid supplied by the analyzing laboratory. All samples were placed on ice in a cooler at approximately 4°C immediately after collection. A chain of custody seal was placed on each sample and each cooler to verify samples were not disturbed during transport. The coolers were shipped to the analyzing laboratory by overnight courier service.

2.5 Chain of Custody Documentation

Chain of Custody (COC) documentation and analysis requests are contained with the laboratory report. Laboratory analytical data sheets are found in Appendix E.

COC forms provided by the analyzing laboratory or developed by Draper Aden Associates were used to document the custody of the samples from the time they were collected in the field to the time the custody of the samples was relinquished by Draper Aden personnel. Relinquishing custody of the samples was accomplished by shipping through an overnight carrier service. The information recorded in the COC included sampling location, sampling points, number of samples, type of sampling containers, sample preservation procedures, matrix spike samples, if any, blanks accompanying the samples, date and time of sample collection, and the date and time custody was relinquished. These COC forms were sent with the samples to the analyzing laboratory. Analysis request forms, with lists of parameters required to be analyzed for the different analytical methods to be used, were also attached along with the COC forms.

3.0. LABORATORY ANALYSIS

3.1 List of Laboratories

Volatile organic analyses by EPA CLP-SOW were performed by CompuChem Environmental Corporation, a division of Liberty Analytical Corporation of Research Triangle Park, NC (CompuChem).

3.2 Analytical Methods

All CLP analytical techniques used were in accordance with the procedures listed in the CLP-SOW Organics OLMO3.2.

3.3 Data Quality Objectives

Quality Assurance Objectives for Measurements

Data quality objectives (DQO) are established to ensure that the data collected throughout is sufficient and of adequate quality for the intended use. Overall DQO included the following:

- Precision - A measurement of the reproducibility of measurements compared to their average value. Precision is measured by the use of splits, replicate samples, or co-located samples and field audit samples.

- Accuracy - This measures the bias in a measurement system by comparing a measured value to a true or standard value. Accuracy is measured by the use of standards, spiked samples, and field audit samples.

- Representativeness - This is the degree to which a sample represents the characteristic of the population being measured. Representativeness is controlled by defining sample collection protocols and adhering to them throughout the evaluation.

- Completeness - This is the ratio of validated data points to the total samples collected. Completeness is achieved through duplicate sampling and resampling, when necessary.

- Comparability - This is the confidence that one data set can be compared to another. Comparability is achieved through the use of standard methods to control the precision and accuracy of the data sets to be compared by use of field audit samples.

The CLP-SOWs are utilized to generate a high level quality data with documented QA/QC protocols. Estimated CLP-SOW results are provided for preliminary assessment purposes only. Estimated data is not intended for use in determining regulatory compliance issues.

Internal Quality Control

i. **Field Quality Control** - Field QC procedures are summarized in Section 2.0.

ii. **Analytical Quality Control** - Analytical QC procedures for CLP analytical techniques are guided by adherence to CLP deliverables. All QC data and records generated by the laboratory were examined for adherence to method requirements by Draper Aden Associates. A laboratory QC report generally consists of the following components:

- spikes
- blanks
- duplicates
- raw data
- surrogate parameters
- instrument adjustment
- calibration
- quantification
- chromatograms
- additional QC requirements (organic and inorganic)

For this project, QC reports are provided with the target parameter analytical results for all sampling events.

4.0. DATA VALIDATION

The CLP analyses were performed in adherence to the relevant CLP-SOW. Results of the CLP-SOW analyses were summarized and reported by the analyzing laboratory in standard CLP reporting format. Draper Aden Associates conducted data validation of each data set. The results from each sampling event were evaluated in association with corresponding QA/QC information provided by the analyzing laboratory.

4.1 Laboratory Reporting Qualifiers

Two different types of qualifiers were associated with laboratory analyses and data validation: **laboratory reporting qualifiers** and **data validation qualifiers.**

The laboratory used **laboratory reporting qualifiers** to flag sample results with reference to relevant QA/QC criteria. Laboratory reporting qualifiers were unique to the analyzing laboratory and are defined in the laboratory data package presented in Appendix E. In addition to the laboratory reporting qualifiers, project specifications required the laboratory performing the analytical services to utilize the following additional data qualifiers and definitions:

Qualifiers

D - Denotes the sample was diluted to obtain the result.
S - Method of Standard Additions was utilized to obtain the result.
E - Laboratory recoveries fell outside EPA control limits. Results are approximate concentrations.
TI - The laboratory tentatively identified the parameter.

Definitions

CRQL. Contract Required Quantitation Limit (associated with CLP organics only). Organic Data qualified with a "U", refer to CRQL.

4.2 Data Validation Qualifiers

Data validation was completed using guidance from the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", (Document 1) USEPA, February, 1993.

Data Validation was performed on the results presented in the laboratory analysis report, and the validated results were flagged, where required, using the appropriate CLP **data validation qualifiers.** The data validation qualifiers are divided into two categories; **organic** data validation qualifiers and **inorganic** data validation qualifiers. The CLP **data validation qualifiers** are different from the **laboratory reporting qualifiers.** Definitions of the nationally recognized data validation qualifiers used by Draper Aden Associates in the validation process and for the reported results are presented below.

Organic Data Validation Qualifiers

U - The parameter was analyzed for, but was not detected (the numerical value associated with the data validation qualifier is the reported sample LOQ for organics and the reported sample IDL for inorganics).

J - The parameter was positively identified; the associated numerical value is the approximate concentration of the parameter in the sample.

N - The analysis indicates the presence of a parameter for which there is presumptive evidence to make a "tentative identification".

NJ - The analysis indicates the presence of a parameter that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

UJ - The parameter was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the parameter in the sample.

R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the parameter cannot be verified.

Inorganic Data Validation Qualifiers

U - The parameter was analyzed for, but was not detected above the IDL.

J - The result is estimated.

R - The sample result is rejected due to serious deficiencies in the ability to analyze the sample or meet quality control criteria. The presence or absence of the parameter in the sample cannot be verified.

4.3 Organic Data Review

Draper Aden Associates performed a limited review of the analytical results for volatile organic parameters analyzed by EPA CLP 3/90 SOW document number OLM03.2. The reduced parameter list included dichlorodifluoromethane in addition to the standard OLM03.2 SOW parameter list.. Monitoring well samples were collected from locations denoted as MW-2, MW-3, MW-8, MW-9, MW-12, MW-17, and surface water samples denoted as S-1, S-2, S-3, S-4, S-5, and S-6 during the June 23-24, 1998 fifth semiannual Assessment monitoring event at the Watauga County Landfill.

The analytical laboratory, CompuChem, submitted results in a final certificate of analysis which included sample analytical results as well as relevant documentation to validate and verify the analytical results.

The evaluation of CompuChem's compliance with the method was based on a limited review of the following items: QC deliverables package, case narrative, technical holding time and preservation requirements, laboratory control samples (LCS), instrument performance check, instrument calibrations, blank analysis, surrogate spike recoveries, internal standard requirements, MS/MSD analysis and confirmation of detected parameters. Review of transcriptions from raw data to summary sheets was performed. Specific representative calculations were not performed except where noted. The following information is intended to summarize data review results and any observed significant deviations from method and/or contractual requirements.

The original certificate of analysis was complete in its presentation and the data were of acceptable quality. However, the fourteen day technical holding time was exceeded for all sample analyses. Samples were collected on June 23, 1998 and June 24, 1998 and analyzed July 9, 1998 and July 10, 1998 on days 15 and 16 following sample collection. All parameter results in all samples are qualified as estimated due to failure to meet technical holding time requirements. The method holding time of 10 days following sample receipt by the laboratory was also exceeded. Samples arrived at CompuChem on June 26, 1998 and should have been analyzed by July 6, 1998 in order to meet the method requirements. All other preservation criteria were met.

The case narrative incorrectly states that some samples were analyzed within holding time. This may be the result of the date listed on page 77-CompuChem Receiving Log. A revised narrative was requested and is presented in the revision section of this report.

All initial calibration requirements were met. All continuing calibration requirements were met. The laboratory method blanks and the trip blank contained low levels of methylene chloride. All samples also contained low levels of methylene chloride which were qualified as blank contamination. Surrogate criteria was not met in the initial analyses of samples MW-8, MW-9, MW-17, and S-1. Reanalyses provided acceptable surrogate recoveries. Please disregard the initial analyses and refer to the reanalyses for these sample results. It should be noted that both initial and reanalyses were performed out of holding time. All other surrogate criteria was met. All internal standard area and retention time requirements were fulfilled. Matrix spike/matrix spike duplicate analyses were performed on MW-3. All MS/MSD QC requirements were met. Overall, instrument performance appeared acceptable.

Numerous target parameters were detected both above and below the CRQL.Sample MW-2 was analyzed at a 1/2.5 and 1/6.2 dilution. CRQLs were raised to 25 µg/l for all MW-2 parameter results. A review of tentatively identified compound (TIC) results revealed the presence of dichlorofluoromethane and ether in several samples. Chlorofluoromethane was also tentatively identified in the sample collected from MW-9.

5.0 DISCUSSION OF ANALYTICAL RESULTS

Tables 2A-C (Appendix A) provide a summary of the target analytical results obtained from the June 23-24, 1998 sampling event. Note that the analytical results are remarkably similar to the results obtained from the previous eight assessment events (Tables 5A-D).

These results were validated in-house by Draper Aden Associates according to the discussion provided in Sections 3.0 and 4.0 of this report. Tables 2A-C list for each parameter, as applicable, an MCL established by the USEPA and groundwater quality standard established by the state of NC, the CRQL, and the analytical method.

Estimated analytical results for the target parameters are provided for preliminary assessment purpose only. Estimated analytical data is not intended for use in determining regulatory compliance issues.

A summary of additional non-target parameter analytical results obtained from the second semiannual assessment sampling event is provided in Table 3. Non-target parameter data is provided for preliminary assessment purpose only and is not intended for use in determining regulatory compliance issues.

Target Organic Parameters

The analytical results for the eleven current target organic parameters obtained from the June 23-24, 1998 assessment sampling event are summarized in Tables 2A-C. The analytical results obtained for each parameter is individually discussed below. A discussion of distribution trends for each parameter is also presented.

1,1-Dichloroethane (1,1-DCA)

1,1-DCA is typically observed at elevated concentrations in more monitoring wells and occurs more pervasively throughout the site than any other target parameter. 1,1-DCA was detected in all six, core subset monitoring wells (MW-2, MW-3, MW-8, MW-9, MW-12 and MW-17). All 1,1-DCA concentrations were considerably below the NC groundwater quality standard of 700 µg/l. No EPA MCL exists for 1,1-DCA. Concentrations of 1,1-DCA were also observed at three surface water sampling locations (S-1, S-2 and S-4). All 1,1-DCA concentrations were considerably below the NC surface water quality standard of 42 µg/l.

1,1-DCA was observed at concentrations between 20 and 100 µg/l in all six, core subset groundwater monitoring locations:

- the nested well pair, shallow well MW-3 (67 µg/l) and deep well MW-17 (100 µg/l), located at the downgradient property boundary of the Bolick site;
- MW-2 (100 µg/l), located in the north drainage below the waste disposal area;

- MW-9 (24 µg/l), located along the southern saddle above the landfill;
- MW-8 (48 µg/l), located between the landfill and the Bolick site, and
- MW-12 (66 µg/l), located downgradient of the Bolick site.

Lower concentrations of 1,1-DCA below 20 µg/l were observed at two surface water monitoring locations:

- surface water monitoring location S-4 (15 µg/l), located below the Bolick site landfill property boundary; and
- surface water monitoring location S-2 (8 J µg/l), located at the spring capture outfall below the waste disposal area in the north drainage.

1,1-DCA has previously been detected in the Rocky Mountain Heights Subdivision at the abandoned Carroll residence potable well (in 1993) and at trace levels in the active Ward and Shared Well #2 potable wells (between 1994 and 1996). Recent sampling events performed on the Ward residence and Shared Well #2 in 1997 and 1998 have not detected 1,1-DCA. 1,1-DCA has not been detected in any additional wells in the Rocky Mountain Heights Subdivision to date.

1,1-DCA has previously been detected in the west drainage at the abandoned Nissan-Mazda Dealership's potable well (in 1993), BREMCO (on all ten events between 1993 and 1998), and the Bolick rental residence (on five of seven events between 1993 and 1998). Recent sampling performed on the Bolick rental residence in 1998 did not detect 1,1-DCA. 1,1-DCA has not been detected in any additional potable wells to date.

Tetrachloroethene (PCE)

PCE was detected or estimated at concentrations above the EPA MCL of 5 µg/l five of six core subset monitoring wells (MW-2, MW-3, MW-8, MW-12 and MW-17) and detected or estimated above the NCS of 0.7 µg/l in all six core subset wells. PCE was estimated in one surface water sampling location (S-4) at a concentration below the NC surface water quality standard of 8.85 µg/l.

PCE was detected at concentrations above the EPA MCL (5 µg/l) at the following five of six core subset groundwater monitoring locations:

- the nested well pair shallow well MW-3 (16 µg/l) and deep well MW-17 (26 µg/l), located at the downgradient Bolick site property boundary;
- the deep well MW-12 (19 µg/l), located downgradient of the Bolick site, below the Boone-Nissan septic field;
- MW-8 (18 µg/l), located within the Bolick site; and
- MW-2 (12 J µg/l), located within the bedrock aquifer in the north drainage below the waste disposal area.

PCE was also estimated at concentrations below the EPA MCL (5 µg/l) in:

- MW-9 (3 J µg/l), located along the southern saddle above the landfill.

PCE has previously been detected in the Rocky Mountain Heights Subdivision at the abandoned Carroll residence potable well (in 1993) and at trace levels in the Ward residence potable well (between 1993 and 1996). The most recent sampling of the Ward residence (1998) did not detect PCE. PCE has not been detected in any additional wells in the Rocky Mountain Heights Subdivision to date.

PCE has previously been detected in the west drainage at the abandoned Nissan-Mazda Dealership's potable well (in 1993), BREMCO (on all nine events between 1994 and 1998), and the Greer residence (in 1994). A subsequent sampling event performed on the Greer residence in 1994 did not detect PCE. PCE has not been detected in any additional potable wells to date.

Trichloroethene (TCE)

TCE was detected or estimated at concentrations above the EPA MCL of 5 µg/l in four core subset monitoring wells (MW-3, MW-8, MW-12 and MW-17) and detected or estimated above the NCS of 2.8 µg/l in five core subset wells (+ MW-9). TCE was not detected in MW-2, although the non-detect is likely the result of this well's elevated LOQ (25 µg/l). CLP analytical methods require this elevated LOQ due to matrix interference problems caused by elevated levels of other target organic parameters in MW-2 (see Section 4.3). TCE was estimated in one surface water sampling location (S-4) at a concentration below the NC surface water quality standard of 92.4 µg/l.

TCE distribution trends are similar to PCE distribution trends. TCE was detected at concentrations above the EPA MCL (5 µg/l) at the following various groundwater monitoring locations:

- the nested well pair shallow well MW-3 (8 J µg/l) and deep well MW-17 (15 µg/l), located at the downgradient Bolick site property boundary;
- the deep well MW-12 (10 µg/l), located downgradient of the Bolick site, below the Boone-Nissan septic field; and
- MW-8 (9 J µg/l), located within the Bolick site.

TCE was also estimated at concentrations below the EPA MCL (5 µg/l) in:

- MW-9 (3 J µg/l), located along the southern saddle above the landfill.

TCE has previously been detected in the Rocky Mountain Heights Subdivision at the abandoned Carroll residence potable well (in 1993) and at trace levels in the Ward residence potable

well (in 1993 and 1994). Six subsequent sampling events performed on the Ward residence between 1995 and 1998 did not detect TCE. TCE has not been detected in any additional wells in the Rocky Mountain Heights Subdivision to date.

TCE has previously been detected in the west drainage at the abandoned Nissan-Mazda Dealership's potable well (in 1993 and 1994), BREMCO's well (on all ten events between 1993 and 1998), and the Bolick rental residence (in 1993). Six subsequent sampling events performed on the Bolick rental residence between 1994 and 1998 did not detect TCE. TCE has not been detected in any additional potable wells to date.

cis-1,1-Dichloroethene (cis-1,2-DCE)

CLP-SOW analytical results for cis-1,2- DCE are reported as part of a total concentration of cis- and trans- isomers of the parameter (total 1,2-DCE). Total 1,2-DCE was detected at concentrations above the EPA MCL and NCS of 70 µg/l in one core subset well (MW-17). 1,2-DCE was detected below the EPA MCL and NCS in four core subset wells (MW-3, MW-8, MW-9 and MW-12) 1,2-DCE was not detected in MW-2. Previous LLRA analysis for MW-2 also indicates that 1,2-DCE is not present. Therefore, this non-detect is not likely the result of this well's elevated LOQ (25 µg/l). 1,2-DCE was detected or estimated at two surface water sampling locations (S-2 and S-4) at concentrations considerably below the NC surface water quality standard of 140,000 µg/l.

1,2-DCE distribution trends are similar to PCE, TCE, and dichlorodifluoromethane distribution trends.

1,2-DCE was observed at the highest concentration (above the EPA MCL and NCS) at:

- MW-17 (79 µg/l), located at the downgradient property boundary of the Bolick site;

Concentrations of 1,2-DCE (below the EPA MCL and NCS) were also observed at:

- MW-3 (50 µg/l), located at the downgradient Bolick site property boundary;
- MW-12 (53 µg/l), located downgradient of the Bolick site;
- MW-8 (48 µg/l), located adjacent to the landfill and the Bolick site; and
- MW-9 (12 µg/l), located along the southern saddle above the landfill.

In 1993, cis-1,2-DCE was detected in the abandoned Carroll residence potable well, located on the property located immediately adjacent to MW-9. Cis-1,2-DCE has not been detected in any additional wells in the Rocky Mountain Heights Subdivision to date.

Cis-1,2-DCE has previously been detected in the west drainage at the abandoned Nissan-Mazda Dealership's potable well (in 1993 and 1994) and BREMCO's well (on eight of ten events between 1993 and 1998). Cis-1,2-DCE has not been detected in any additional potable wells to date.

Concentrations of 1,2-DCE were observed at surface water sampling locations:

- S-2 (4 J µg/l), located at the spring capture outfall below the waste disposal area in the north drainage; and
- S-4 (21 µg/l), stream below landfill property boundary of the Bolick site.

Dichlorodifluoromethane

Dichlorodifluoromethane was detected at concentrations above the NCS of 0.19 µg/l in two core subset monitoring wells (MW-3 and MW-12). Dichlorodifluoromethane was not detected in MW-2, MW-8, MW-9 and MW-17. Previous LLRA analysis for MW-2 also indicates that 1,2-DCE is not present. Therefore, this non-detect is not likely the result of this well's elevated LOQ (25 µg/l). No EPA MCL exists for dichlorodifluoromethane. Dichlorodifluoromethane was not detected at any surface water sampling locations.

Dichlorodifluoromethane distribution trends are similar to PCE, TCE, and 1,2-DCE distribution trends. Dichlorodifluoromethane was detected primarily along the west drainage basin adjacent to the landfill. Concentrations of dichlorodifluoromethane were observed in MW-3 (3 J µg/l) and MW-12 (3 J µg/l), located within and below the Bolick site.

In 1993, dichlorodifluoromethane was detected in the abandoned Carroll and the active Perry residence potable wells located on the properties located immediately adjacent to MW-9. Dichlorodifluoromethane has not been detected in any additional potable wells in the Rocky Mountain Heights Subdivision to date.

Dichlorodifluoromethane has previously been detected in the west drainage at the abandoned Nissan-Mazda Dealership's potable well (in 1993). Dichlorodifluoromethane has not been detected in any additional potable wells to date.

1,1,1-Trichloroethane (1,1,1-TCA)

1,1,1-TCA was detected at concentrations above the EPA MCL and NCS of 200 µg/l in one core subset monitoring well (MW-2). 1,1,1-TCA was also detected below the EPA MCL and NCS in four core subset monitoring wells (MW-3, MW-8, MW-12 and MW-17). 1,1,1-TCA was not detected in MW-9. 1,1,1-TCA was not detected at any surface water sampling locations.

1,1,1-TCA, although occurring throughout the core of the site, is observed at the highest concentrations, above the EPA MCL and NCS of 200 µg/l, deep in the bedrock of the northern drainage basin below the landfill, in:

- MW-2 (710 E µg/l) located in the northern drainage below the landfill.

Lower concentrations of 1,1,1-TCA were estimated in:

- the nested pair, shallow MW-3 (3 J µg/l) and deep MW-17 (3 J µg/l), located in the west drainage basin at the downgradient Bolick site property boundary;
- MW-12 (6 J µg/l), located below the downgradient Bolick site property boundary; and
- MW-8 (3 J µg/l), located in the west drainage basin within the Bolick site.

1,1,1-TCA has previously been detected in the Rocky Mountain Heights Subdivision at the abandoned Carroll residence potable well (in 1993) and at trace levels in the Ward residence well (between 1993 and 1994). Six subsequent sampling events performed at the Ward residence between 1995 and 1998 did not detect 1,1,1-TCA. 1,1,1-TCA has also been detected in three additional potable wells in the Rocky Mountain Heights Subdivision; the Simko residence well (on four sampling events performed between 1993 and 1997), the Shared Well #2 (on two of eight sampling events performed between 1993 and 1998), and a Meadowridge condominium well (on one event performed in 1993).

1,1,1-TCA has previously been detected in the west drainage at the abandoned Nissan-Mazda Dealership's potable well (in 1993) and BREMCO (on all ten events between 1993 and 1998). 1,1,1-TCA has not been detected in any additional potable wells to date.

1,1-Dichloroethene (1,1-DCE)

1,1-DCE was detected at concentrations above the EPA MCL and NCS of 7 µg/l one core subset monitoring well (MW-2). 1,1,1-TCA was also detected below the EPA MCL and NCS in three core subset monitoring wells (MW-8, MW-12 and MW-17). 1,1,1-TCA was not detected in MW-3, MW-9, MW-17 or in any of the surface water samples.

Similar to the distribution of 1,1,1-TCA, 1,1-DCE is also observed at the highest concentrations deep in the bedrock of the northern drainage basin below the landfill. Concentrations for 1,1-DCE above the EPA MCL and NCS were only observed in the deep well MW-2 (50 µg/l), located in northern drainage below the landfill. Monitoring wells located in the west drainage basin reveal either low level, estimated concentrations or the non-detection of 1,1-DCE; MW-3 (non-detect), MW-8 (2 J µg/l), MW-12 (2 J µg/l), and MW-17 (non-detect).

1,1-DCE has previously been detected in the Rocky Mountain Heights Subdivision at the abandoned Carroll residence potable well (in 1993) and at trace levels in Shared Well #2 (in 1994 and 1995). Five subsequent sampling events performed on Shared Well #2 between 1995 and 1998 did not detect 1,1-DCE. 1,1-DCE has not been detected in any additional potable wells in the Rocky Mountain Heights Subdivision to date.

1,1-DCE has previously been detected in the west drainage at the abandoned Nissan-Mazda Dealership's potable well (in 1993), BREMCO (on nine events between 1994 and 1998) and at trace levels in the Bolick rental residence (on three out of four events between 1994 and 1996). Two

subsequent sampling events performed on the Bolick rental residence in 1997 and 1998 did not detect 1,1-DCE. 1,1-DCE has not been detected in any additional potable wells in the west or north drainages to date.

Benzene

Concentrations of benzene were estimated (below the method CRQL) below the EPA MCL of 5 µg/l and at or above the NCS of 1 µg/l in five core monitoring wells (MW-3, MW-8, MW-9, MW-12 and MW-17). Benzene was not detected in MW-2. Previous LLRA analysis for MW-2 also indicates that benzene is not present. Therefore, this non-detect is not likely the result of this well's elevated LOQ (25 µg/l). Benzene was also estimated at concentrations below the NC surface water quality standard of 71.4 µg/l in one surface water sampling location (S-2).

In 1993, benzene was detected in the abandoned Carroll residence potable well, located on the property located immediately adjacent to MW-9. Benzene has not been detected in any additional wells in the Rocky Mountain Heights Subdivision to date.

Benzene has only been detected on two separate events in the potable wells located in the west and north drainages. Benzene has been detected on one out of ten events performed on the BREMCO well and detected on one out of three events performed on the Greer well.

Vinyl Chloride

Concentrations of vinyl chloride were estimated (below the method CRQL) at or below the EPA MCL of 2 µg/l and above the NCS of .015 µg/l in four core monitoring wells (MW-8, MW-9, MW-12 and MW-17). Vinyl chloride was not detected in MW-2, MW-3 and MW-9. Although previous LLRA analysis for MW-2 and MW-9 also indicates that vinyl chloride is not present, previous analysis for MW-3 has detected vinyl chloride. Vinyl chloride was not detected in any surface water samples.

Vinyl chloride distribution trends are similar to PCE, TCE, and cis-1,2-DCE distribution trends. Vinyl chloride is primarily detected within the west drainage and along the southern saddle above the landfill.

In 1993, vinyl chloride was detected in the abandoned Carroll residence potable well, located on the property located immediately adjacent to the southern saddle. Vinyl chloride has not been detected in any additional potable wells to date.

Methylene Chloride

As discussed in Section 4.4, low-level methylene chloride detected below the method LOQ in all the groundwater and surface water samples is attributed to laboratory contamination. Methylene chloride is a common laboratory contaminant. The laboratory method blanks and the trip

blank contained low levels of methylene chloride and all samples which contained low levels of methylene chloride were qualified as blank contamination. Previous assessment monitoring events detected methylene chloride at concentrations above the EPA MCL and NCS of 5 µg/l in only one groundwater monitoring well (MW-9). MW-9 is located adjacent to the Carroll Residence, between the landfill and the Rocky Mountain Heights Subdivision.

In 1993, methylene chloride was detected in the Rocky Mountain Heights Subdivision in four wells; the abandoned Carroll residence potable well, Shared Well #1, and the Ward and Perry residences potable wells. Multiple subsequent sampling events performed Shared Well #1, and the Ward and Perry residences potable wells have not detected methylene chloride. Methylene chloride has not been detected in any additional potable wells to date.

Chloroethane

Chloroethane was detected and/or estimated (detected below the method CRQL) in five core monitoring wells (MW-3, MW-8, MW-9, MW-12 and MW-17) and four surface water sampling locations (S-1, S-2, S-4 AND S-5). All surface water concentrations were considerably below the NC surface water quality standard of 860 µg/l No EPA MCL or NCS standard exists for chloroethane.

Chloroethane was observed at the highest concentrations in wells adjacent to the disposal area:

- MW-9 (8 J µg/l), located adjacent to the Carroll property and south of the disposal area;
- MW-8 (11 µg/l), located within the Bolick site, west to the disposal area

Slightly lower concentrations of chloroethane were also observed in three monitoring wells located further downgradient in the west drainage:

- the nested well pair, shallow well MW-3 (5 J µg/l) and deep well MW-17 (6 J µg/l), located at the downgradient property boundary of the Bolick site; and
- MW-12 (5 J µg/l), located downgradient of the Bolick site below the Boone-Nissan septic field.

In 1993, chloroethane was detected in the abandoned Carroll residence and the abandoned Nissan-Mazda Dealership's potable wells. Chloroethane has not been detected in any additional potable wells to date.

Concentrations of chloroethane were observed at four surface water sampling locations:

- S-1 (2 J µg/l), located at the last of the series of sediment ponds below the waste disposal area in the north drainage.
- S-2 (26 µg/l), located at the spring capture outfall below the waste disposal area in the

north drainage;

- S-4 (1 J µg/l), the stream below the Bolick site landfill property boundary; and
- S-5 (1 J µg/l), a seep located below the waste disposal area and directly above the first of the series of sediment ponds.

Non-Target Organic Parameters

The analytical results of additional detected non-target organic parameters are summarized in Table 3. The analytical results obtained for non-target parameters, are provided to preliminary identify those parameters which may need to be continually monitored. If upon continued semiannual data collection, the presence of any non-target parameters are confirmed by repeated analysis, the parameter will be added to the target parameter list.

Additional non-target parameters were tentatively identified in three core subset monitoring wells (MW-8, MW-9 and MW-12) and one surface water sampling location (S-2). A combined total of three non-target compounds were tentatively identified in the monitoring wells. One non-target compound was tentatively identified in the surface water monitoring location. The tentatively identified compounds (TICs) and associated sampling points are presented below.

NON-TARGET PARAMETER	MONITORING POINT(S)
ether	S-1, S-2, MW-8 and MW-9
dichlorofluoromethane	MW-8, 9 and 17
chlorofluoromethane	MW-9

The TIC concentrations were estimated at levels below established NC groundwater and surface water quality standards.

As indicated in Table 6A and 6B (Cumulative Detected Non-target Organic Parameter Analytical Results), the presence of ether and dichlorofluoromethane detected in the June 23-24, 1998 sampling event are confirmed by the non-target analytical results obtained from previous assessment sampling events. Due to the continued presence of these two non-target parameters, Draper Aden Associates recommends ether and dichlorofluoromethane be added to the target parameter list. Ether and dichlorofluoromethane have routinely been included in the standard method parameter lists utilized in all previous Assessment monitoring events, but have not been treated as target parameters. Draper Aden Associates recommends ether and dichloroflouromethane be treated as target parameters in future Assessment events.

Non-target parameter distribution trends will continue to be evaluated. Other non-target compounds have not been detected repeatedly in the wells as a result of previous background analyses (Table 6A, Appendix A). The isolated detection of these other non-target compounds in the wells is not indicative of a pervasive, persistent occurrence.

6.0. POTABLE WELL SAMPLING AND ANALYSIS PROGRAM

The initial domestic and commercial use potable well sampling event was developed and conducted by Draper Aden Associates on March 5, 1993 at the direction of Watauga County and approval of State officials to protect public health and welfare. The ongoing potable water well sampling and analysis program is currently being jointly conducted by the Appalachian District Health Department (ADHD) and the NC State Laboratory of Public Health.

The objective of the potable well sampling and analysis program is to investigate and evaluate the potential influence and associated risks of the landfill on neighboring groundwater resources. Potable well water samples collected by the ADHD are analyzed for volatile organic compounds by the State Laboratory utilizing EPA Method 502.2. Potable water well locations with accompanying sampled well reference number can be found on the Site Map (Figure 1). A summary of the analytical results of the potable well testing program collected to date are presented in Appendix D.

The analytical results of the domestic and commercial use potable water well sampling and analysis program previously indicated that two of the forty-one sampled potable wells neighboring the landfill are significantly impacted by volatile organic compounds. These two significant impacted wells are the Carroll residence (well reference no. 12) and the Nissan-Mazda Dealership well (well reference no. 4). These two potable water wells have been replaced by connections to the Town of Boone's public water system and have not been resampled during the past several years. Discussions of individual potable well analytical results obtained previously can be found in earlier Assessment reports.

At this time the cause or source of all the organics detected in the potable well sampling program cannot be determined. It should be noted that eight (8) of twenty-one (21) compounds detected in the Carroll residence well have not been detected in the landfill monitoring well network. The differences in parameter "fingerprints" in groundwater beneath these sites compared to "fingerprints" for landfill wells tends to indicate potential impacts resulting from activities specifically undertaken on these sites and/or immediately around the private well heads and/or components of the well systems.

Review of the analytical results from all the potable well sampling conducted recently, performed by the NC Department of Epidemiology, indicate that the sampled well waters are acceptable for all uses due to either non-detection or low level detection of organic analytes. Individual well analytical results obtained recently are discussed below.

6.1 February 1998 Sampling Event

Six wells were sampled in August 1998:

- Blue Ridge Electric Membership Company (well reference no. 5),
- Hollar and Greene Produce (well reference no. 6),
- Edwards residence; shared well #2 (well reference no. 14),
- Ward Residence (well reference no. 24),
- Meadowridge condominiums; Apt. #1 (well reference no. 38), and
- Meadowridge condominiums; Apt. #38 (well reference no. 44).

Blue Ridge Electric Membership Company, BREMCO (well reference no. 5)

Six chlorinated volatile organic solvent compounds (1,1-DCA, 1-1-DCE, cis-1,2-DCE, 1,1,1,-TCA, TCE, and PCE), tetrahydrofuran and benzene were detected in the February, 1998 sampling of the BREMCO well. Estimated concentrations below the quantitation limit of 5 ppb were reported for TCE, 1,1-DCA and 1,1-DCE (e.g. 0.5 ppb, 1.6 ppb, and 2.6 ppb, respectively). The EPA MCL for TCE is 5 ppb and for 1,1-DCE is 7 ppb, No EPA MCL exists for 1,1-DCA. The other detected organic compounds were observed at trace and unquantifiable levels below 0.5 ppb.

The same six chlorinated volatile organic solvent compounds detected as a result of the February, 1998 sampling event have also been detected in previous sampling events conducted on the BREMCO well. All six chlorinated compounds have been detected in the past nine sampling events. Three compounds (1,1-DCA, 1,1,1-TCA, and TCE) have been detected in all ten previous sampling events.

Tetrahydrofuran, detected at the quantification limit of 0.5 ppb, has not been detected as a result of the ten previous sampling events. Benzene, observed at trace and unquantifiable levels below 0.5 ppb, was only previously detected on the most recent February 1998 event.

Hollar and Greene Produce (well reference no. 6)

The Hollar and Greene Produce well, located directly north of the BREMCO well, was also resampled and analyzed during this sampling event. The Hollar and Greene Produce well has been sampled previously in 1993 and analysis detected no volatile organic compounds. The August 1998 resampling and analysis of the Hollar and Greene Produce well also resulted in **no detected volatile organic compounds**.

Shared Well #2 (well reference no. 14)

Shared well #2, which serves four residences in the Rocky Mountain Heights Subdivision, was sampled for the tenth time in August 1998. The recent August 1998 sampling event resulted in **no detected volatile organic compounds.** The previous February 1998 and June 1997 sampling events also resulted in no detected volatile organic compounds.

The initial, March 1993 sampling detected only low levels of 1,4-dichlorobenzene, which is a compound that has not been detected in the landfill monitoring well network.

The 2nd March 1994 sampling detected trace levels of chloroform, which is a common transformation product resulting from the chlorination of well systems, and also detected two common chlorinated compounds (1,1-DCE and 1,1,1-TCA) at unquantifiable levels below 1 ppb.

The 3rd January 1995 sampling detected 1,1-DCE at unquantifiable levels below 1 ppb.

Shared well #2 was drilled deeper in the fall of 1995 in order to provide needed water production. Resampling was performed to investigate the effect of drilling the well deeper on the concentrations of organic compounds found in this potable well. The fourth resampling, performed in October 1995, detected 1,1-DCA (not 1,1-DCE) at unquantifiable levels below 1 ppb, trace levels of PCE and 1,1,1-TCA, and chloroform at 9 ppb. Chloroform is likely a transformation product resulting from the recent chlorination of the well system. A variety of additional compounds that due not appear related to the organic constituents found in the landfill's monitoring well network were also detected. These compounds include the following: bromodichloromethane, dibromochloromethane, 2-chlorotoluene, 4-chlorotoluene, methyl ethyl ketone, and tetrahydrofuran. The presence of these compounds was likely a byproduct resulting from the overdrilling of the well bore.

The 5th April 1996 resampling only detected 1,1-DCE at unquantifiable levels below 1 ppb, and the 6th October 1996 resampling again detected 1,1-DCE at unquantifiable levels below 1 ppb and trace levels of PCE .

The recent two shared well #2 resampling events in 1988 were sampled from the Edwards residence. Shared well #2 was first sampled from the Cone residence on March 18, 1993. Subsequent resampling of shared well #2 (2nd, 3rd, 4th, and 5th sampling events) was completed at the adjacent Edwards residence and more recently (6th and 7th sampling events) at the Milsap's residence.

Ward Residence (well reference no. 24)

The recent 11th resampling and analysis of the Ward residence potable well performed in February, 1998 detected trace levels of 1,1-DCA, PCE and chloroform.

Only two of ten previous Ward residence sampling events, the 4th and 10th tenth sampling event, resulted in no detected volatile organic compounds. The combined analyses from the ten previous sampling events conducted on the Ward residence well detected trace and/or unquantifiable levels below 1 ppb of five chlorinated organic compounds (1,1-DCA, PCE, TCE, 1,1,1-TCA, and carbon tetrachloride).

Three previous Ward residence sampling events also detected trace levels of chloroform, a common transformation product result from the chlorination of well systems. The initial Ward residence sampling event also detected the laboratory contaminant, methylene chloride at 3.2 ppb.

Analyses from next nine consecutive sampling events at the Ward residence, performed by the NC State Laboratory of Public Health, did not detect methylene chloride.

Meadowridge condominiums; Unit #1 (38) and Unit # 38 (44)

The total number of potable wells providing water to the Meadowridge condominiums was confirmed prior to the August 1998 sampling event. A total of four wells exist at the Meadowridge condominiums. Three of these wells were sampled prior to August 1998. The remaining Meadowridge well not sampled to date (well reference no. 44), and the Meadowridge well (well reference no. 38), providing water to the Welch residence (Unit #1), were sampled and analyzed in August 1998, resulting in **no detected volatile organic compounds.**

The two other wells providing potable water to the Meadowridge condominiums (well reference no. 42 and. 43) were sampled in February 1998. The analysis of water from both of these wells resulted in **no detected volatile organic compounds.**

Previous sampling of the Meadowridge condominiums from the Welch residence, Unit #1 (well reference no. 38), located in the "midlevel" of the condominium complex, performed in October, 1993, detected chloroform and trans-1,2-DCE at unquantifiable levels below 1 ppb and trace levels of 1,1,1-TCA and TCE. Chloroform is a common transformation product from the chlorination of well systems and trans-1,2-DCE has not been confirmed present in the landfill monitoring well network to date. 1,1,1-TCA and TCE, detected at trace levels, are found in many common solvents. Resampling of the "midlevel" of the Meadowridge condominium complex in February, 1995 from Unit #2 resulted in the detection of no volatile organic compounds.

6.2 Pending Potable Well Sampling

The next semiannual potable well sampling event is scheduled to coincide with the next groundwater monitoring event, tentatively scheduled for December, 1998. The sampling program will continue to involve the semiannual sampling of six to eight residences.

The sampling program will continue to concentrate on sampling those wells that have previously shown trace level detections of organics similar to those detected in the landfill groundwater monitoring well network. This is accomplished by routine, semiannual sampling of the three wells that have previously shown trace level detections of organics similar to those detected in the landfill groundwater monitoring well network [i.e. BREMCO (well reference no. 5), Ward Residence (well reference no. 24), and Shared Well #2 (well reference no. 14)].

The semiannual schedule also continues to incorporate periodic confirmational sampling on other potable wells that have previously shown nondetection of target organic analytes, or have shown detections of organics dissimilar to those detected in the landfill groundwater monitoring well network. This is accomplished by including the sampling of three (or more as appropriate) additional potable wells during each semiannual sampling event. The decision criteria for inclusion

of additional wells in the potable well sampling program will continue to be based both on previous sampling results as well as public input or requests.

The ADHD continues to attempt to sample the seasonally occupied McClintock residence (well reference no. 33). It was anticipated that the residents might be available during August, since the two previous sampling events performed on this well were performed during August and October, but ADHD was not successful at contacting them for this event. It was reported during previous sampling events that this potable well is used so infrequently that the water is very turbid and not very potable for esthetic reasons.

7.0. CONCLUSIONS

7.1 Parameter Distribution

The analytical results obtained from the fifth semiannual assessment monitoring event are similar to the results obtained from the previous eight assessment events. The analytical results indicate the northern edge of the occurrence of assessment target parameters in the groundwater primarily exists within the construction right-of-way for the Route 421 bypass. South of the bypass, the detection of assessment target parameters was concentrated between the saddle, located between the landfill and the Rocky Mountain Heights Subdivision, and the west and north drainages below the landfill.

West Drainage

In the west drainage, the detection of target parameters above groundwater standards was observed in both the soil and bedrock aquifer, extending from the landfill to the bypass. All eleven target organic parameters were detected above the method LOQ in MW-12, located south of the bypass. Previous organic analyses performed on the piezometer network in 1992, indicates the target parameters are confined to the trough of the west drainage.

Five target organic parameters were detected at the surface water sampling location, S-4, located in the west drainage. Sampling and analysis performed on surface water sampling location, S-6, located approximately 800 feet downstream from S-4, did not detect any target organic parameters.

North Drainage

In the north drainage, the detection of target parameters is confined to the bedrock aquifer. The elevated levels of the target parameters detected in the deep well accessing the bedrock groundwater in the north drainage indicate the parameters have preferentially migrated to deeper fracture zones within the bedrock. Downgradient of the northern drainage, the bedrock aquifer system enters the central watershed of Rocky Branch and is likely significantly diluted. Previous

low level detection of 1,1,1-TCA in the nested well pair, MW-14 and MW-15, suggests groundwater flow continues to follow the northern drainage orientation before reaching the apex of the watershed at Rocky Branch. The Chevrolet Dealership's potable well is located downgradient within this Rocky Branch watershed. The absence of similar volatile organic parameters detected at the Chevrolet Dealership's potable well suggests non-impact at the dealership's well location (Appendix D). Note that an abandoned and an existing septic field utilized by the dealership are also located in this area. Three non-landfill related organic parameters, likely originating from automotive sources near the potable well head, have been observed in the dealership's potable well.

Southern Saddle

Several organic compounds detected in the monitoring well located along the southern saddle between the landfill and the Rocky Mountain Heights subdivision, particularly methylene chloride, were observed at markedly different concentrations than the levels of the organic compounds detected in the remainder of the monitoring well network. In 1993, the abandoned Carroll residence well (reference no. 12), located approximately 100 feet from MW-9, was found to be significantly impacted by many of the same organic compounds. It should be noted that eight (8) of twenty-one (21) compounds detected in the Carroll residence well have not been detected in the landfill monitoring well network. At this time the cause or source of all the organics detected in the Carroll well cannot be determined. The differences in parameter "fingerprints" in groundwater from the Carroll well compared to "fingerprints" for other landfill wells (including MW-9) tends to indicate potential impacts resulting from activities specifically undertaken around the Carroll well and/or immediately around the Carroll well head and/or components of the well system.

The analytical results obtained from the monitoring well installed along the saddle between the landfill and the Rocky Mountain Heights Subdivision (MW-9) indicates the organic parameters observed in the Carroll residence potable well are not confined to the Carroll property. Trace levels of these organic parameters have been previously detected in several other potable wells located in the Rocky Mountain Heights Subdivision. The frequency of detection of these trace levels has declined significantly between 1993 and 1998. In fact, organic parameters have only been detected in the Rocky Mountain Heights Subdivision in the Ward residence well during 1997 and 1998.

7.2 Target Parameter Summary

As discussed previously throughout this report, the analytical results obtained from the fifth semiannual assessment monitoring event are similar to the results obtained from the previous eight assessment events.

The detection of six target parameters, benzene, chloroethane, cis-1,2-DCE, TCE, vinyl chloride and dichlorodifluoromethane, was only reported within the west drainage and southern saddle.

The detection of 1,1,1-TCA and 1,1-DCE was observed in both the west and the north

drainages, although these parameters were observed at higher levels in the north drainage at the deep bedrock well MW-2.

The detection of PCE was observed in both the west and the north drainages, although at higher levels in the west drainage.

The detection of 1,1-DCA was observed at elevated concentrations in more monitoring wells throughout the site than any other target parameter.

Due to low level laboratory contamination of methylene chloride, the presence or absence of methylene chloride could not be determined.

7.3 Closing

Next Assessment Monitoring Event

The next assessment monitoring event is scheduled for January 1999. The monitoring event will comply with the following approved monitoring program revisions:

4) annual monitoring of the larger set of the core monitoring well network,
5) annual analysis for target metals, and
6) withdrawal of select non-impacted assessment monitoring wells from routine groundwater monitoring during 1998-1999.

Additional Assessment Investigations

The assessment monitoring well, MW-19, was installed in the west drainage in response to trace level detections observed in the Blue Ridge Electric Company's (BREMCO) potable well (Potable Well Analysis Summary Table, Appendix D). These trace level detections suggest groundwater flow within the west drainage may follow a N55°W lineament set within the west drainage. The well was installed approximately fifty feet north-northwest of BREMCO's potable well (well reference no. 5, see Figure 1), along the N55°W lineament set trace. Two subsequent samplings of MW-19 have resulted in no detected volatile organic compounds.

The depth of the screened interval of MW-19 was chosen to coincide with the first portion of the aquifer encountered most likely to be impacted, based on present contaminant distributions identified in the west drainage. At 55 feet in depth, the drilling encountered the geologic contact between a porous schist/gneiss unit and a dense, discretely fractured amphibolite/gneiss unit. This contact coincides with the N55°W lineament set trace at this location. The geologic contact along the N55°W lineament set trace represents a core fracture zone within the bedrock fracture system. Abundant groundwater was observed at this depth and the monitoring well was completed at 70 feet in depth and screened over the geologic contact.

Watauga County is currently exploring the options available for assessing impacts observed in the BREMCO potable well in the west drainage of landfill. Impacts observed in the BREMCO well suggest that contaminants are migrating in a deeper zone than that screened by monitoring well MW-19. The BREMCO well is reported as drilled to a total depth of 425 feet. We have been unsuccessful at locating a detailed well record specifying groundwater production zones.

Rather than installing an additional monitoring well, the County is exploring the feasibility of utilizing the existing BREMCO well bore to identify the depth of impact. The BREMCO well is an open bore and likely intersects numerous discrete fractures. The County recently obtained permission from BREMCO representatives to photo-log and geophysically log the well bore to identify water-producing fracture zones. Once the water-producing zones are delineated, an inflatable straddle packer assembly will be utilized to hydraulically isolate and sample each discrete fracture zone. This strategy is considered the most efficient method of evaluating the vertical distribution of impacted groundwater at this location. NCDENR is in agreement with utilizing this method to investigate impacts observed in the BREMCO well in the west drainage

APPENDIX A

TABLES AND FIGURES

Table 1

Watauga County Landfill
Groundwater and Surface Water
Assessment Monitoring Schedule

GROUNDWATER MONITORING	1st Year (94/95) Quarterly Sampling Events				Subsequent Semiannual Sampling Events*	
"CORE" ASSESSMENT WELLS						
Target Parameter Monitoring Parameters*	CLP Methods	CLP Methods	CLP Methods	CLP Methods	Low Level Risk Assessment Screening Methods	CLP Methods
"BOUNDARY" ASSESSMENT WELLS***						
Target Parameter Monitoring Parameters*	LLRA Methods	CLP Methods	LLRA Methods	CLP Methods	LLRA Methods	-
SURFACE WATER MONITORING						
Target Parameter Monitoring Parameters*	CLP Methods	-	CLP Methods	-	CLP Methods	CLP Methods

CLP - EPA Contract Laboratory Program Methods
LLRA - Low Level Risk Assessment Screening Methods (EPA SW-846)

* - semiannual analysis for target organics; annual analysis for target metals.
** - semiannual monitoring of a subset of the core monitoring well network (MW-2, MW-3, MW-6, MW-9, MW-12 and MW-17). The groundwater at these six monitoring points exceeds the EPA MCL for one or more organic target parameters;. annual monitoring of the existing twelve core monitoring well network for semiannual monitoring.
*** - withdrawal of non-impacted wells for monitoring year 1998-1999.

Watauga County Landfill
Watauga County, North Carolina
Upgradient Well: MW-1
08/18/98

Table 2A
Fifth Semi-Annual Monitoring Event
Assessment Target Parameter Analytical Results
Core Groundwater Monitoring Wells

153 TVOC 167 TVOC 239 TOC

Parameters	Event	Results ug/L(ppb)												NCS (ug/L)	MCL (ug/L)
		MW-2		MW-3		MW-8		MW-9		MW-12		MW-17			
ORGANICS															
Benzene	6/23-24/1998	25	UJ	1	J	3	J	3	J	2	J	2	J	1	5
Chloroethane	6/23-24/1998	25	UJ	5	J	11	J	8	J	5	J	6	J	-	-
Dichlorodifluoromethane	6/23-24/1998	25	UJ	3	J	10	UJ	10	UJ	3	J	10	UJ	0.19	-
1,1-Dichloroethane	6/23-24/1998	100	J	67	J	48	J	24	J	66	J	100	J	700	-
1,1-Dichloroethene	6/23-24/1998	160	J	10	UJ	2	J	10	UJ	2	J	1	J	7	7
1,2-Dichloroethene (total)	6/23-24/1998	25	UJ	50	J	43	J	12	J	52	J	79	J	70	70
Methylene Chloride	6/23-24/1998	25	UJ	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	5	5
Tetrachloroethene	6/23-24/1998	12	J	16	J	18	J	3	J	19	J	26	J	0.7	5
Trichloroethene	6/23-24/1998	25	UJ	8	J	9	J	3	J	10	J	15	J	2.8	5
1,1,1-Trichloroethane	6/23-24/1998	710	J	3	J	3	J	10	UJ	6	J	3	J	200	200
Vinyl Chloride	6/23-24/1998	25	UJ	10	UJ	2	J	10	UJ	2	J	2	J	0.015	2

Notes:
U Denotes not detected [the associated numerical value is the Limit of Quantitation (LOQ)].
J Denotes an estimated value.

NCS Denotes North Carolina Groundwater Quality Standard (T15A: 02L .0200)
MCL Denotes EPA Maximum Contaminant Level (EPA 822-R-94-001)

- Denotes Not Established.
Shading denotes parameter results that exceed U.S. EPA MCLs.

Organic parameters were analyzed in accordance with EPA CLP Statement of Work OLMO 3.2.

Watauga County Landfill
Watauga County, North Carolina

08/18/98

Table 2B
Fifth Semi-Annual Monitoring Event
Assessment Target Parameter Analytical Results
Surface Water Monitoring Locations

Parameters	Sampling Date	Results ug/L(ppb)												WQS (ug/L)
		S-1		S-2		S-3		S-4		S-5		S-6		
ORGANICS														
Benzene	6/23-24/1998	10	UJ	1	J	10	UJ	10	UJ	10	UJ	10	UJ	71.4
Chloroethane	6/23-24/1998	2	J	26	J	10	UJ	1	J	4	J	10	UJ	860
Dichlorodifluoromethane	6/23-24/1998	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	570000
1,1-Dichloroethane	6/23-24/1998	10	UJ	8	J	10	UJ	15	J	10	UJ	10	UJ	42
1,1-Dichloroethene	6/23-24/1998	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	3.2
1,2-Dichloroethene (total)	6/23-24/1998	10	UJ	4	J	10	UJ	21	J	10	UJ	10	UJ	140000
Methylene Chloride	6/23-24/1998	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	1600
Tetrachloroethene	6/23-24/1998	10	UJ	10	UJ	10	UJ	5	J	10	UJ	10	UJ	8.85
Trichloroethene	6/23-24/1998	10	UJ	10	UJ	10	UJ	3	J	10	UJ	10	UJ	92.4
1,1,1-Trichloroethane	6/23-24/1998	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	555
Vinyl Chloride	6/23-24/1998	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	525

Notes:

WQS Denotes North Carolina Surface Water Quality Standard (T15A: 02B .0200)

U Denotes not detected [the associated numerical value is the Limit of Quantitation (LOQ)].

J Denotes an estimated value.

- Denotes not established.

Organic parameters were analyzed in accordance with EPA CLP Statement of Work OLMO 3.2.

Watauga County Landfill
Watauga County, North Carolina
Upgradient Well: MW-1
08/18/98

Table 3
Fifth Semi-Annual Assessment Monitoring Event

Detected Non-Target Organic Parameters

Tentatively Identified Compounds													
Parameter	Event	S-1		S-2		MW-8		MW-9		MW-17		WQS (ug/L)	NCS (ug/L)
Ether	6/23-24/1998	6	NJ	7	NJ	12	NJ	6	NJ	10	NJ	50000	-
Dichlorofluoromethane	6/23-24/1998	~		~		12	NJ	29	NJ	14	HJ	-	1400
Chlorofluoromethane	6/23-24/1998	~		~		~		10	NJ	~		-	-

Notes:

WQS Denotes North Carolina Surface Water Quality Standard (T15A: 02B .0200)
NCS Denotes North Carolina Groundwater Quality Standard (T15A: 02L .0200)
~ Denotes Not Detected
- Denotes Not Available
J Denotes an estimated value
N Denotes tentatively identified
Organic parameters were analyzed in accordance with USEPA CLP SOW OLMO 3.2.

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Watauga County Landfill
Watauga County, North Carolina
Upgradient Well: MW-1

18-Aug-98

TABLE 4
GROUNDWATER LEVEL DATA
MONITORING WELLS

	REFERENCE ELEVATION								
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9
GROUND	3339.03	3151.24	3182.25	3150.06	3263.81	3262.55	3270.56	3235.39	3356.65
MEASURING POINT	3341.80	3152.94	3183.12	3152.52	3267.69	3266.04	3273.53	3239.77	3359.23

DATE	STATIC WATER LEVEL								
6/20/94	38.00	7.88	18.43	13.48	NM	44.12	23.03	17.68	59.35
9/27/94	39.69	7.51	17.42	10.45	NM	43.99	30.73	17.38	57.79
2/6/95	37.57	5.58	16.20	8.18	50.39	42.85	45.88	15.41	59.54
4/11/95	37.94	6.46	16.85	9.22	48.95	42.81	49.11	16.05	59.30
7/10/95	41.20	6.60	17.43	8.94	50.29	43.73	48.98	17.42	80.17
4/9/96	38.71	5.85	7.01	8.40	49.87	42.87	44.32	16.80	61.28
4/8/97	38.30	5.59	16.35	NM	NM	ABANDONED	40.50	17.43	62.47
1/13/98	43.71	7.00	17.51	8.54	55.46	ABANDONED	44.18	20.32	63.56
6/23/98	36.84	5.94	14.01	7.98	46.82	ABANDONED	43.07	16.92	62.15

DATE	GROUNDWATER ELEVATION								
6/20/94	3303.80	3145.06	3164.69	3139.04	NM	3221.92	3250.50	3222.09	3299.88
9/27/94	3302.11	3145.43	3165.70	3142.07	NM	3222.05	3242.80	3222.39	3301.44
2/6/95	3304.23	3147.36	3166.92	3144.34	3217.30	3223.19	3227.65	3224.36	3299.69
4/11/95	3303.86	3146.48	3166.27	3143.30	3218.74	3223.23	3224.42	3223.72	3299.93
7/10/95	3300.60	3146.34	3165.69	3143.58	3217.40	3222.31	3224.55	3222.35	3279.06
4/9/96	3303.09	3147.09	3176.11	3144.12	3217.82	3223.17	3229.21	3222.97	3297.95
4/8/97	3303.50	3147.35	3166.77	NM	NM	ABANDONED	3233.03	3222.34	3296.76
1/13/98	3298.09	3145.94	3165.61	3143.98	3212.23	ABANDONED	3229.35	3219.45	3295.67
6/23/98	3304.96	3147.00	3169.11	3144.54	3220.87	ABANDONED	3230.46	3222.85	3297.08

	REFERENCE ELEVATION								
	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16	MW-17	MW-18
GROUND	3202.18	3156.44	3156.82	3117.39	3117	3117.15	3141.42	3181.14	3117.12
MEASURING POINT	3203.87	3159.6	3159.15	3119.72	3120	3120.65	3142.72	3183.62	3119.63

DATE	STATIC WATER LEVEL								
6/20/94	8.18	13.35	11.04	19.66	7.94	11.92	5.32	17.93	17.93
9/27/94	8.09	13.22	10.78	19.57	7.89	11.82	5.68	17.83	17.86
2/6/95	7.73	13.22	10.61	19.39	7.52	11.55	4.61	17.05	17.58
4/11/95	7.90	13.00	10.58	19.53	7.75	11.87	5.11	17.48	17.65
7/10/95	7.91	12.53	10.48	19.62	7.74	11.96	4.54	18.11	17.94
4/9/96	7.67	12.73	10.38	19.56	7.59	11.85	4.67	17.78	17.81
4/8/97	7.67	12.28	9.48	NM	NM	11.91	ABANDONED	17.17	NM
1/13/98	8.25	12.48	9.65	19.75	7.44	11.74	ABANDONED	18.60	18.32
6/23/98	7.32	11.82	9.11	NM	7.49	11.79	ABANDONED	14.83	17.53

DATE	GROUNDWATER ELEVATION									
6/20/94	3195.69	3146.25	3148.11	3100.06	3112.06	3108.73	3137.40	3165.69	3101.70	
9/27/94	3195.78	3146.38	3148.37	3100.15	3112.11	3108.83	3137.04	3165.79	3101.77	
2/6/95	3196.14	3146.38	3148.54	3100.33	3112.48	3109.10	3138.11	3166.57	3102.05	
4/11/95	3195.97	3146.60	3148.57	3100.19	3112.25	3108.78	3137.61	3166.14	3101.98	
7/10/95	3195.96	3147.07	3148.67	3100.10	3112.26	3108.69	3138.18	3165.51	3101.69	
4/9/96	3196.20	3146.87	3148.77	3100.16	3112.41	3108.80	3138.05	3165.84	3101.82	#
4/8/97	3196.20	3147.32	3149.67	NM	NM	3108.74	ABANDONED	3166.45	NM	
1/13/98	3195.62	3147.12	3149.50	3099.97	3112.56	3108.91	ABANDONED	3165.02	3101.31	
6/23/98	3196.55	3147.78	3150.04	NM	3112.51	3108.86	ABANDONED	3168.79	3102.10	

1) ALL MEASUREMENTS IN FEET.
2) ALL ELEVATIONS REFERENCE MEAN SEA LEVEL.
3) MEASURING POINT (M.P.) IS FROM THE TOP OF WELL CAS
4) NM - NOT MEASURED
5) ESTIMATED ELEVATION OF MW-19 IS 3125.0.
STATIC WATER LEVEL FOR MW-19 ON 4/8/97 WAS 4.85 FT, 1/15/98 - 10.21 FT, AND 6/23/98 - 2.67 FT.
CORRESPONDING GROUNDWATER ELEVATION FOR MW-19 ON 4/8/97 WAS 3120.15 FT,
1/13/98 - 3114.79 FT, AND 6/23/98 - 3122.33 FT.

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Watauga County Landfill
Watauga County, North Carolina
Upgradient Well: MW-1
02/16/98

Table 5A
Background Assessment Organic Target Parameter Analytical Results
Core Groundwater Monitoring Wells

Parameter	Event	Results ug/l (ppb)																										Analysis Type	NCS (ug/L)
		MW-1		MW-2		MW-3		MW-6		MW-7		MW-8		MW-9		MW-10		MW-11		MW-12		MW-15		MW-17					
Organics																													
Benzene	6/20/94	10	U	120	U	10	U	9	J	0.42	J	0.72	J	0.4	J	5.3	U	5.3	U	5.3	U	5.30	U	5.3	U	CLP/8021	1
	9/27/94	10	U	9	J	2	J	12	J	3	J	5	J	4	J	10	U	10	U	10	U	10	U	2	J	CLP	1
MCL= 5 ug/l	2/06/95	10	U	150	U	2	J	12	J	3.6		5	J	2	J	50	U	10	U	10	U	1.0	U	10	U	CLP	1
	4/11/95	10	U	200	U	1	J	10	J	3	J	6	J	3	J	71	U	10	U	10	U	10	U	10	U	CLP	1
	7/10/95	2	U	2	U	2.3		14		2.2		6.2		4		2	U	2	U	2	U	10	U	2	U	8021	1
	7/10/95	5	U	5	U	2.6	J	13		2.7	J	5.5		3.8	J	5	U	5	U	5	U	-		5	U	8260	1
	4/10/96	1	J	91	U	2	J	11	J	5	J	5		4	J	23	U	10	U	1	J	10	U	10	U	CLP	1
	4/8/97	1	U	100	U	2		-		4.8		2.3		3.9		100	U	1	U	1.4		1	U	1		8021	1
	1/15/98	10	U	20	U	3	J	-		2	J	2	J	3	J	14	U	10	U	2	J	10	U	2	J	CLP	1
Chloroethane	6/20/94	10	U	120	U	6	J	8	J	7.33	J	9.44		56.78	J	9.29	U	1.16	J	20.23		9.29	U	28.21		CLP/8021	-
	9/27/94	10	U	170	U	8	J	10	J	16		7	J	18		10	U	10	U	5	J	10	U	7	J	CLP	-
no MCL established	2/06/95	10	U	150	U	7	J	11	J	28		7	J	17		50	U	10	U	4	J	1.0	U	5	J	CLP	-
	4/11/95	10	U	200	U	6	J	8	J	16		7	J	15		71	U	10	U	2	J	10	U	4	J	CLP	-
	7/10/95	2	U	2	U	10	U	15	U	9.2		10	U	20	U	2	U	2	U	5	U	10	U	5	U	8021	-
	7/10/95	5	U	5	U	8.7		16		22		9.3		21		5	U	5	U	6.4		-		4.9	J	8260	-
	4/10/96	10	U	91	U	8	J	14	J	41		10	J	16		23	U	10	U	5	J	10	U	5	J	CLP	-
	4/8/97	1	U	1	U	46		-		58		38		110		1	U	12		40		1	U	30		8021	-
	1/15/98	10	U	20	U	10		-		19		12		12		20		10	U	5	J	10	U	9	J	CLP	-
Dichlorodifluoromethane	6/20/94	10	U	120	U	7	J	25	U	46.64	U	2.26	J	13.92	J	46.64	U	1.88	J	9.83	J	46.64	U	1.44	J	CLP/8021	0.19
	9/27/94	10	U	10	J	4	J	25	U	10	U	2	J	9	J	10	U	10	U	4	J	10	U	4	J	CLP	0.19
no MCL established	2/06/95	10	U	150	U	10	U	25	U	1	U	14		27		50	U	2	J	10	U	1.0	U	12		CLP	0.19
	4/11/95	10	U	200	U	10	U	25	U	10	U	7	J	9	J	71	U	10	U	4	J	10	UJ	3	J	CLP	0.19
	7/10/95	2	UJ	2	UJ	6.9	J	2	UJ	2	UJ	16	J	2	UJ	2	UJ	2	UJ	5.7	J	10	U	5.3	J	8021	0.19
	7/10/95	5	U	5	U	7.2		2.2	J	5	U	6.7		2.8	J	5	U	1.7	J	4	J	-		4.2	J	8260	0.19
	4/10/96	10	U	91	U	10	U	25	U	10	U	10	U	10	U	23	U	10	U	10	U	10	U	10	U	CLP	0.19
	4/8/97	1	U	1	U	6.4		-		1	U	17		11		1	U	3		10		1	U	1	U	8021	0.19
	1/15/98	10	U	20	U	11		-		10	U	12		10	U	14	U	10	U	10	U	10	U	10	U	CLP	0.19
1,1-Dichloroethane	6/20/94	10	U	75	J	160		97		10.42	J	35.33	J	13.63	J	28.62	J	25.23	J	82.77	J	0.26	J	105.03	J	CLP/8021	700
	9/27/94	10	U	110	J	200		110		1	J	70		23		84		27		130		10	U	230		CLP	700
no MCL established	2/06/95	10	U	160		180		140		2.9		74		30		37	J	28		120		1.0	U	170		CLP	700
	4/11/95	10	U	98	J	130		94		4	J	58		35		67	J	18		77		10	U	130		CLP	700
	7/10/95	2	U	81		130		100	J	4.8		60	J	36		58	J	22		100		10	U	102	J	8021	700
	7/10/95	5	U	94		160		130		6.8		71		40		55		26		120		-		130		8260	700
	4/10/96	10	U	130		150		120		5	J	80		36		22	J	26		120		10	U	130		CLP	700
	4/8/97	1	U	84		90		-		9.4		52		28		27		26		82		1	U	76		8021	700
	1/15/98	10	U	29		97		-		13		55		27		11	J	30		82		10	U	88		CLP	700
1,1-Dichloroethene	6/20/94	10	U	150		5	J	25	U	9.75	U	0.3	J	9.75	U	32.29		9.75	U	1.15	J	9.75	U	1.09	J	CLP/8021	7
	9/27/94	10	U	210		6	J	25	U	10	U	4	J	10	U	160		10	U	5	J	10	U	3	J	CLP	7
MCL= 7 ug/l	2/06/95	10	U	360		6	J	25	U	1	U	6	J	10	U	100		10	U	4	J	1.0	U	3	J	CLP	7
	4/11/95	10	U	150	J	3	J	25	U	10	U	3	J	10	U	120		10	U	2	J	10	U	1	J	CLP	7
	7/10/95	2	U	170		4		2	U	2	U	5.7		2	U	160	J	0.86	J	3.9		10	U	1.8	J	8021	7
	7/10/95	5	U	170	J	3.7	J	1.3	J	5	U	4.1	J	5	U	88		5	U	3.6	J	-		1.6	J	8260	7
	4/10/96	10	U	210		3	J	25	U	10	U	6	J	10	U	51		10	U	3	J	10	U	2	J	CLP	7
	4/8/97	1	U	180		1.9		-		1	U	4.9		0.54	J	84		1.1		2.7		0.77	J	1.2		8021	7
	1/15/98	10	U	50		2	J	-		10	U	3	J	10	U	20		10	U	2	J	10	U	1	J	CLP	7
cis 1,2-Dichloroethene(3)	6/20/94	10	U	120	U	37		330		0.97	J	28.9		0.95	J	9.49	U	5.05	J	28.13		9.49	U	60.79	J	CLP/8021	70
	9/27/94	10	U	170	U	61		380		3	J	93		2	J	10	U	8	J	47		10	U	120		CLP	70
MCL= 70 ug/l	2/06/95	10	U	150	U	54		370		7.2		91		2	J	50	U	8	J	37		1.0	U	80		CLP	70
	4/11/95	10	U	200	U	44		330		9	J	100		4	J	71	U	6	J	30		10	U	70		CLP	70
	7/10/95	2	U	2	U	65		440	J	4.4		110	J	7.4		2	U	11		37		10	U	72	J	8021	70
	7/10/95	5	U	5	U	50		430		7.9		89		6.2		5	U	7.6		42		-		63		8260	70
	4/10/96	10	U	91	U	10	U	420		6	J	78		11		23	U	11		54		10	U	87		CLP	70
	4/8/97	1	U	1	U	6.4		-		4.4		34		13		1	U	17		60		1	U	100		8021	70
	1/15/98	10	U	20	U	11		-		11		29		14		14	U	18		56		10	U	87		CLP	70
trans-1,3-Dichloropropene	6/20/94	10	U	120	U	10	U	25	U	24.49	U	24.49	U	24.49	U	24.49	U	24.49	U	24.49	U	24.49	U	24.49	U	CLP/8021	-
	9/27/94	10	U	170	U	10	U	25	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	14	U	CLP	-
no MCL established	2/06/95	10	U	150	U	10	U	25	U	1	U	10	U	10	U	50	U	10	U	10	U	1.0	U	10	U	CLP	-
	4/11/95	10	U	200	U	10	U	25	U	10	U	10	U	10	U	71	U	10	U	10	U	10	U	2	U	8021	-
	7/10/95	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	-		5	U	8260	-
	7/10/95	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U						

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Watauga County Landfill
Watauga County, North Carolina
Upgradient Well: MW-1
02/27/98

Table 5A
Background Assessment Organic Target Parameter Analytical Results
Core Groundwater Monitoring Wells

Parameter	Event	Results ug/l (ppb)																												Analysis Type	NCS (ug/L)
		MW-1		MW-2		MW-3		MW-6		MW-7		MW-8		MW-9		MW-10		MW-11		MW-12		MW-15		MW-17							
Methylene Chloride	6/20/94	8	J	120	U	6	U	11	J	36.2	UJ	36.2	UJ	140.1	J	36.2	UJ	36.2	UJ	8.58	J	36.20	UJ	36.2	UJ					CLP/8021	5
	9/27/94	10	U	490		14	U	25	U	10	U	4	J	73		180		10	U	28	U	10	U	58	U					CLP	5
MCL= 5 ug/l	2/06/95	10	U	150	U	10	U	25	U	1.5		10	U	93		50	U	10	U	10	U	1.0	U	10	U					CLP	5
	4/11/95	10	U	200	U	10	U	25	U	10	U	10	U	120		71	U	10	U	10	U	10	U	10	U					CLP	5
	7/10/95	2	U	2	U	2.4		1.2	J	2	U	4.7		89		2	U	2.9		3.3		10	U	2.2						8021	5
	7/10/95	5	U	5	U	5	U	5	U	5	U	5	U	160		5	U	5	U	5.9	U	-		5	U					8260	5
	4/10/96	10	U	91	U	10	U	25	U	10	U	10	U	120		23	U	10	U	10	U	10	U	10	U					CLP	5
	4/8/97	1	U	1	U	0.71	J	-		1.4		1.6		100		1	U	0.7	J	1.1		0.656	J	0.63	J					8021	5
	1/15/98	1	J	20	U	2	J	-		2	J	3	J	90		4	J	1	J	2	J	1	J	2	J					CLP	5
Tetrachloroethene	6/20/94	10	U	120	U	44		6	J	0.88	J	7.55	J	2.15	J	1.3	J	7.47	J	22.78		7.84	U	37.43						CLP/8021	0.7
	9/27/94	10	U	170	U	53		26		10	U	33		5	J	12	J	9	J	36		10	U	64						CLP	0.7
MCL= 5 ug/l	2/06/95	10	U	18	J	46		32		1	U	31		4	J	6	J	8	J	32		1.0	U	48						CLP	0.7
	4/11/95	10	U	200	U	33		13	J	10	U	33		5	J	10	J	7	J	28		10	U	41						CLP	0.7
	7/10/95	2	U	12		31		13		2	U	42	J	5		13		10		27		10	U	40						8021	0.7
	7/10/95	5	U	9.9		37		14		5	U	38		3.6	J	5.7		8.1		31		-		30						8260	0.7
	4/10/96	10	U	20	J	46		10	J	10	U	36		4	J	4	J	12		37		10	U	41						CLP	0.7
	4/8/97	1	U	11		21		-		1	U	13		3.4		4.4		11		23		1	U	21						8021	0.7
	1/15/98	10	U	4	J	31		-		10	U	11		3	J	3	J	10		25		10	U	28						CLP	0.7
Trichloroethene	6/20/94	10	U	120	U	16		21	J	21.2	U	21.2	U	21.2	U	21.2	U	21.2	U	5.74	J	21.20	U	15.7	J					CLP/8021	2.8
	9/27/94	10	U	170	U	23		71		10	U	15		6	J	10	U	3	J	14		10	U	34						CLP	2.8
MCL= 5 ug/l	2/06/95	10	U	150	U	19		88		2.5	U	14		6	J	50	U	3	J	12		2.5	U	24						CLP	2.8
	4/11/95	10	U	200	U	12		53		1	J	13		6	J	71	U	2	J	10		10	U	19						CLP	2.8
	7/10/95	2	U	1.2	J	20		67	J	1.6	J	28		8.6		2	U	5.8		16		10	U	21	J					8021	2.8
	7/10/95	5	U	5	U	16		47		1.2	J	15		6		5	U	3.1	J	13		-		17						8260	2.8
	4/10/96	10	U	91	U	23		28		10	U	16		6	J	23	U	4	J	15		10	U	19						CLP	2.8
	4/8/97	1	U	1.9		12		-		53	U	11		5.1		1.2		6		14		1	U	16						8021	2.8
	1/15/98	10	U	20	U	11		-		1	J	8	J	4	J	14	U	5	J	12		10	U	16						CLP	2.8
1,1,1-Trichloroethane	6/20/94	10	U	1800		31		25	U	30.11	U	2.42	J	11.89	J	130.14	J	4.83	J	16.79	J	0.08	J	13.39	J					CLP/8021	200
	9/27/94	10	U	1900		35		25	U	10	U	6	J	18		1830		5	J	24		5	J	16						CLP	200
MCL= 200 ug/l	2/06/95	10	U	2700		31		25	U	1	U	6	J	14		650		5	J	18		2.5		14						CLP	200
	4/11/95	10	U	2000		21		25	U	10	U	5	J	16		1300		5	J	17		3	J	10						CLP	200
	7/10/95	2	U	1600		26		2	U	2	U	6		12		990		5.9		17		10	U	7.8						8021	200
	7/10/95	5	U	1600		21		5	U	5	U	4.9	J	9.8		740		4.8	J	16		-		7						8260	200
	4/10/96	10	U	1300		21		25	U	10	U	8	J	8	J	290		6	J	15		4	J	7	J					CLP	200
	4/8/97	1	U	770		8.2		-		1	U	4.5		1.5		570		6.1		11		4.1		2.9						8021	200
	1/15/98	10	U	320		7	J	-		10	U	4	J	10	U	150		7	J	9	J	5	J	3	J					CLP	200
Vinyl Chloride	6/20/94	10	U	120	U	10	U	10	U	6.6	UJ	6.6	UJ	6.6	UJ	6.6	UJ	6.6	UJ	6.6	UJ	6.60	UJ	6.6	UJ					CLP/8021	0.15
	9/27/94	10	U	170	U	3	J	10	U	10	U	5	J	10	U	10	U	10	U	10	U	10	U	14	U					CLP	0.15
MCL= 2 ug/l	2/06/95	10	U	150	U	2	J	20	U	3.6	J	6	J	10	U	50	U	10	U	10	U	1.0	U	10	U					CLP	0.15
	4/11/95	10	U	200	U	10	U	10	U	2	J	6	J	10	UJ	71	U	10	U	10	UJ	10	UJ	10	U					CLP	0.15
	7/10/95	2	U	2	U	2.8	J	12	U	2	U	11	J	2	U	2	U	2	U	2.3		10	U	0.94	J					8021	0.15
	7/10/95	5	U	5	U	3.1	J	23	U	5	U	7.2		5	U	5	U	5	U	5	U	-		5	U					8260	0.15
	4/10/96	10	U	91	U	2	J	14	U	10	U	5	J	10	U	23	U	10	U	10	U	10	U	10	U					CLP	0.15
	4/8/97	1	U	1	U	0.98		-		1	U	3	J	1	U	1	U	2.8	J	1	U	1	U	4	J					8021	0.15
	1/15/98	10	U	20	U	10	U	-		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U					CLP	0.15

TABLE 5A NOTES:

U Denotes not detected (the associated numerical value is the CRQL/LOQ).
J Denotes an estimated value
CRQL Contract Required Quantification Limit (CLP Methods)
LOQ Limit of Quantitation (SW-846 Methods)
- Denotes Not Avaliable or Not Sampled
Shading - denotes parameter results that exceed U.S. EPA Maximum Contaminant Levels.

NCS Denotes North Carolina Groundwater Quality Standard (T15A: 02L .0200)
MCL Denotes EPA Maximum Contaminant Level (EPA 822-R-94-001)

ANALYSIS TYPE:

1) Organic parameters were analyzed utilizing CLP Statement of Work OLMO1.9(3/90), SW-846 Method #8260 and/or #8021, as noted.
2) For CLP, 1,2-Dichloroethene was reported as total concentration; for 8021/8260 concentration was reported for cis-isomer.
3) For the 6/20/94 event, monitoring wells MW-8, MW-9, MW-10, MW-11, MW-12, MW-15 and MW-17, SW-846 anlytical method #8021 analysis was performed. Other monitoring locations were analyzed using CLP analytical methods.

j:\6520-21\CORRESP\REPORTS\TABLE5A3.XLS

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Watauga County, North Carolina
Upgradient Well: MW-1
02/27/98

Table 5B
Background Assessment Organic Target Parameter Analytical Results
Boundary Groundwater Monitoring Wells
Results ug/l(ppb)

Parameter	Event	MW-4		MW-5		MW-13		MW-14		MW-16		MW-18		Analysis Type	NCS (ug/L	MCL (ug/L)
Benzene	6/20/94	10	U	-		5.30	U	5.30	U	5.30	U	5.30	U	8021	1	5
	9/27/94	2	J	-		10	U	10	U	2	J	1	J	CLP	1	5
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	1	5
	4/11/95	10	U	10	U	10	U	10	U	10	U	10	U	CLP	1	5
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	1	5
	4/10/96	-		-		-		-		-		-		CLP	1	5
	4/8/97	-		-		-		-		-		-		8021	1	5
	1/15/98	10	U	10	U	10	U	10	U	-		10	U	CLP	1	5
Chloroethane	6/20/94	10	U	-		9.29	U	9.29	U	9.29	U	9.29	U	8021	-	-
	9/27/94	18		-		10	U	10	U	10	U	10	U	CLP	-	-
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	-	-
	4/11/95	10	U	10	U	10	U	10	U	10	U	10	U	CLP	-	-
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	-	-
	4/10/96	-		-		-		-		-		-		CLP	-	-
	4/8/97	-		-		-		-		-		-		8021	-	-
	1/15/98	10	U	10	U	10	U	10	U	-		10	U	CLP	-	-
Dichlorodifluoromethane	6/20/94	10	U	-		46.64	U	46.64	U	46.64	U	46.64	U	8021	0.19	-
	9/27/94	10	U	-		10	U	10	U	10	U	10	U	CLP	0.19	-
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	0.19	-
	4/11/95	10	U	10	U	10	U	10	UJ	10	UJ	10	UJ	CLP	0.19	-
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	0.19	-
	4/10/96	-		-		-		-		-		-		CLP	0.19	-
	4/8/97	-		-		-		-		-		-		8021	0.19	-
	1/15/98	10	U	10	U	10	U	10	U	-		10	U	CLP	0.19	-
1,1-Dichloroethane	6/20/94	10	U	-		0.99	J	43.10	U	43.10	U	43.10	U	8021	700	-
	9/27/94	10	U	-		10	U	10	U	10	U	10	U	CLP	700	-
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	700	-
	4/11/95	10	U	10	U	10	U	10	U	10	U	10	U	CLP	700	-
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	700	-
	4/10/96	-		-		-		-		-		-		CLP	700	-
	4/8/97	-		-		-		-		-		-		8021	700	-
	1/15/98	10	U	10	U	10	U	10	U	-		10	U	CLP	700	-
1,1-Dichloroethene	6/20/94	10	U	-		9.75	U	9.75	U	9.75	U	9.75	U	8021	7	7
	9/27/94	10	U	-		10	U	10	U	10	U	10	U	CLP	7	7
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	7	7
	4/11/95	10	U	10	U	10	U	10	U	10	U	10	U	CLP	7	7
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	7	7
	4/10/96	-		-		-		-		-		-		CLP	7	7
	4/8/97	-		-		-		-		-		-		8021	7	7
	1/15/98	10	U	10	U	10	U	10	U	-		10	U	CLP	7	7
cis-1,2-Dichloroethene(3)	6/20/94	10	U	-		9.49	U	9.49	U	9.49	U	9.49	U	8021	70	70
	9/27/94	10	U	-		10	U	10	U	10	U	10	U	CLP	70	70
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	70	70
	4/11/95	10	U	10	U	10	U	10	U	10	U	10	U	CLP	70	70
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	70	70
	4/10/96	-		-		-		-		-		-		CLP	70	70
	4/8/97	-		-		-		-		-		-		8021	70	70
	1/15/98	10	U	10	U	10	U	10	U	-		10	U	CLP	70	70
trans-1,3-Dichloropropene	6/20/94	10	U	-		24.49	U	24.49	U	24.49	U	24.49	U	8021	-	-
	9/27/94	10	U	-		10	U	10	U	10	U	10	U	CLP	-	-
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	-	-
	4/11/95	10	U	10	U	10	U	10	U	10	U	10	U	CLP	-	-
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	-	-

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Methylene Chloride	6/20/94	10	U	-		36.20	UJ	36.20	UJ	36.20	UJ	36.20	U	8021	5	5
	9/27/94	13	U	-		10	U	10	U	33		27		CLP	5	5
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	5	5
	4/11/95	10	U	10	U	10	U	10	U	10	U	10	U	CLP	5	5
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	5	5
	4/10/96	-		-		-		-		-		-		CLP	5	5
	4/8/97	-		-		-		-		-		-		8021	5	5
	1/15/98	-		-		-		-		-		-		CLP	5	5
Tetrachloroethene	6/20/94	10	U	-		7.84	U	0.24	J	7.84	U	7.84	U	8021	0.7	5
	9/27/94	10	U	-		10	U	10	U	10	U	10	U	CLP	0.7	5
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	0.7	5
	4/11/95	10	U	10	U	10	U	10	U	10	U	10	U	CLP	0.7	5
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	0.7	5
	4/10/96	-		-		-		-		-		-		CLP	0.7	5
	4/8/97	-		-		-		-		-		-		8021	0.7	5
	1/15/98	10	U	10	U	10	U	10	U	-		10	U	CLP	0.7	5
Trichloroethene	6/20/94	10	U	-		21.20	U	21.20	U	21.20	U	21.20	U	8021	2.8	5
	9/27/94	10	U	-		10	U	10	U	10	U	10	U	CLP	2.8	5
	2/06/95	10	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	8021	2.8	5
	4/11/95	10	U	10	U	10	U	10	U	10	U	10	U	CLP	2.8	5
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	2.8	5
	4/10/96	-		-		-		-		-		-		CLP	2.8	5
	4/8/97	-		-		-		-		-		-		8021	2.8	5
	1/15/98	10	U	10	U	10	U	10	U	-		10	U	CLP	2.8	5
1,1,1-Trichloroethane	6/20/94	10	U	-		30.11	U	30.11	U	30.11	U	30.11	U	8021	200	200
	9/27/94	10	U	-		10	U	10	U	10	U	10	U	CLP	200	200
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	200	200
	4/11/95	10	U	10	U	10	U	1	J	10	U	10	U	CLP	200	200
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	200	200
	4/10/96	-		-		-		-		-		-		CLP	200	200
	4/8/97	-		-		-		-		-		-		8021	200	200
	1/15/98	10	U	10	U	10	U	10	U	-		10	U	CLP	200	200
Vinyl Chloride	6/20/94	10	U	-		6.60	UJ	6.60	UJ	6.60	UJ	6.60	U	8021	0.02	2
	9/27/94	10	U	-		10	U	10	U	10	U	10	U	CLP	0.02	2
	2/06/95	10	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	8021	0.02	2
	4/11/95	10	UJ	10	U	10	U	10	UJ	10	UJ	10	UJ	CLP	0.02	2
	7/10/95	10	U	10	U	10	U	10	U	10	U	10	U	8021	0.02	2
	4/10/96	-		-		-		-		-		-		CLP	0.02	2
	4/8/97	-		-		-		-		-		-		8021	0.02	2
	1/15/98	10	U	10	U	10	U	10	U	-		10	U	CLP	0.02	2

TABLE 5B NOTES:

U Denotes not detected (the associated numerical value is the CRQL/LOQ).
J Denotes an estimated value.
CRQL Contract Required Quantification Limit (CLP Methods)
LOQ Limit of Quantitation (SW-846 Methods)
- Denotes Not Available or Not Sampled.
Shading - denotes parameter results that exceed U.S. EPA Maximum Contaminant Levels.
NCS Denotes North Carolina Groundwater Quality Standard (T15A: 02L .0200).
MCL Denotes EPA Maximum Contaminant Level (EPA 822-R-94-001).

ANALYSIS TYPE:

1) For the 9/27/94, 4/11/95, 4/10/96 and 1/15/98 events, boundary monitoring well analyses were performed utilizing CLP Statement of Work OLMO3.2, SW-846 Method #8260 and/or #8021, as noted.
2) For CLP, 1,2-Dichloroethene was reported as total concentration; for 8021/8260 concentration was reported for cis-isomer.
3) For the 6/20/94, 2/6/95, 7/10/95 and 4/8/97 events, boundary monitoring well analyses were performed utilizing SW-846 Method #8021.

P:\06\5\20\06520-21\CORRESP\REPORTS\[TABLE5B4.XLS]BOUNDARY

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Watauga County, North Carolina
Upgradient Well: MW-1
02/27/98

Table 5C
Background Assessment Organic Target Parameter Analytical Results
Surface Water Sampling Locations
Results ug/l(ppb)

Parameter	Event	S1		S2		S3		S4		S5		L1		Mt. Spring		WQS (ug/L)	MCL (ug/L)
ORGANICS																	
Benzene	6/20/94	10	U	3	J	10	U	1	J	10	U	-		-		1.19	5
	9/27/94	-		-		-		-		-		10	U	10	U	1.19	5
	2/06/95	10	U	10	U	10	U	10	U	10	U	10	U	-		1.19	5
	4/11/95	-		-		-		-		-		-		-		1.19	5
	7/10/95	10	U	10	U	10	U	10	U	10	U	-		-		1.19	5
	4/10/96	10	U	2	J	10	U	10	U	10	U	-		-		1.19	5
	4/8/97	10	U	2	J	10	U	10	U	10	U	-		-		1.19	5
	1/15/98	10	U	3	J	10	U	10	U	10	U	-		-		1.19	5
Chloroethane	6/20/94	10	U	56		10	U	10	U	11		-		-		-	-
	9/27/94	-		-		-		-		-		13		10	U	-	-
	2/06/95	10	U	26		10	U	2	J	7	J	6	J	-		-	-
	4/11/95	-		-		-		-		-		-		-		-	-
	7/10/95	15		10	U	10	U	4	J	10	U	-		-		-	-
	4/10/96	8	J	46		10	U	3	J	5	J	-		-		-	-
	4/8/97	10	U	50		10	U	1	J	23		-		-		-	-
	1/15/98	10	U	56		10	U	10	U	10	U	-		-		-	-
Dichlorodifluoromethane	6/20/94	10	U	4	J	10	U	10	U	10	U	-		-		-	-
	9/27/94	-		-		-		-		-		10	U	10	U	-	-
	2/06/95	10	U	10	U	10	U	10	U	10	U	10	U	-		-	-
	4/11/95	-		-		-		-		-		-		-		-	-
	7/10/95	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ	-		-		-	-
	4/10/96	10	U	10	U	10	U	10	U	10	U	-		-		-	-
	4/8/97	10	U	10	U	10	U	10	U	10	U	-		-		-	-
	1/15/98	10	U	10	U	10	U	10	U	10	U	-		-		-	-
1,1-Dichloroethane	6/20/94	1	J	23		10	U	59		2	J	-		-		-	-
	9/27/94	-		-		-		-		-		10	U	10	U	-	-
	2/06/95	10	U	10	U	10	U	45		10	U	10	U	-		-	-
	4/11/95	-		-		-		-		-		-		-		-	-
	7/10/95	6	J	20		10	U	41		2	J	-		-		-	-
	4/10/96	3	J	15		10	U	30		2	J	-		-		-	-
	4/8/97	10	U	14		10	U	12		10	U	-		-		-	-
	1/15/98	10	U	15		10	U	10	U	10	U	-		-		-	-
1,1-Dichloroethene	6/20/94	10	U	10	U	10	U	10	U	10	U	-		-		-	7
	9/27/94	-		-		-		-		-		10	U	10	U	-	7
	2/06/95	10	U	10	U	10	U	10	U	10	U	10	U	-		-	7
	4/11/95	-		-		-		-		-		-		-		-	7
	7/10/95	10	U	10	U	10	U	10	U	10	U	-		-		-	7
	4/10/96	10	U	10	U	10	U	35		10	U	-		-		-	7
	4/8/97	10	U	10	U	10	U	15		10	U	-		-		-	7
	1/15/98	10	U	10	U	10	U	1	J	10	U	-		-		-	7
cis-1,2-Dichloroethene(3)	6/20/94	10	U	4	J	10	U	58		10	U	-		-		-	70
	9/27/94	-		-		-		-		-		10	U	10	U	-	70
	2/06/95	10	U	10	U	10	U	42		10	U	10	U	-		-	70
	4/11/95	-		-		-		-		-		-		-		-	70
	7/10/95	1	J	3	J	10	U	42		10	U	-		-		-	70
	4/10/96	10	U	5	J	10	U	10	U	10	U	-		-		-	70
	4/8/97	10	U	6	J	10	U	10	U	10	U	-		-		-	70
	1/15/98	10	U	5	J	10	U	10	U	10	U	-		-		-	70
trans-1,3-Dichloropropene	6/20/94	10	U	10	U	10	U	10	U	10	U	-		-		-	70
	9/27/94	-		-		-		-		-		10	U	10	U	-	-
	2/06/95	10	U	10	U	10	U	10	U	10	U	10	U	-		-	-
	4/11/95	-		-		-		-		-		-		-		-	-
	7/10/95	10	U	10	U	10	U	10	U	10	U	-		-		-	-

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Methylene Chloride	6/20/94	6	J	9	J	3	J	1	J	8	J	-		-		-	5
	9/27/94	-		-		-		-		-		10	U	10	U	-	5
	2/06/95	10	U	2	J	3	J	1	J	10	U	10	U	-		-	5
	4/11/95	-		-		-		-		-		-		-		-	5
	7/10/95	10	U	10	U	10	U	10	U	10	U	-		-		-	5
	4/10/96	10	U	10	U	10	U	10	U	10	U	-		-		-	5
	4/8/97	10	U	3	J	1	J	10	U	10	U	-		-		-	5
	1/15/98	1	J	4	J	4	J	1	J	2	J	-		-		-	5
Tetrachloroethene	6/20/94	10	U	10	U	10	U	18		10	U	-		-		0.8	5
	9/27/94	-		-		-		-		-		10	U	10	U	0.8	5
	2/06/95	10	U	10	U	10	U	12		10	U	10	U	-		0.8	5
	4/11/95	-		-		-		-		-		-		-		0.8	5
	7/10/95	10	U	10	U	10	U	11		10	U	-		-		0.8	5
	4/10/96	10	U	10	U	10	U	9	J	1	J	-		-		0.8	5
	4/8/97	10	U	10	U	10	U	4	J	10	U	-		-		0.8	5
	1/15/98	10	U	10	U	10	U	10	U	10	U	-		-		0.8	5
Trichloroethene	6/20/94	10	U	1	J	10	U	13		10	U	-		-		3.08	5
	9/27/94	-		-		-		-		-		10	U	10	U	3.08	5
	2/06/95	10	U	10	U	10	U	8	J	10	U	10	U	-		3.08	5
	4/11/95	-		-		-		-		-		-		-		3.08	5
	7/10/95	10	U	1	J	10	U	8	J	10	U	-	-	-	-	3.08	5
	4/10/96	10	U	1	J	10	U	6	J	1	J	-		-		3.08	5
	4/8/97	10	U	1	J	10	U	3	J	10	U	-		-		3.08	5
	1/15/98	10	U	10	U	10	U	10	U	10	U	-		-		3.08	5
1,1,1-Trichloroethane	6/20/94	10	U	2	J	10	U	3	J	10	U	-		-		-	200
	9/27/94	-		-		-		-		-		10	U	10	U	-	200
	2/06/95	10	U	10	U	10	U	2	J	10	U	10	U	-		-	200
	4/11/95	-		-		-		-		-		-		-		-	200
	7/10/95	10	U	1	J	10	U	2	J	10	U	-		-		-	200
	4/10/96	10	U	10	U	10	U	2	J	2	J	-		-		-	200
	4/8/97	10	U	10	U	10	U	10	U	10	U	-		-		-	200
	1/15/98	10	U	10	U	10	U	10	U	2	J	-		-		-	200
Vinyl Chloride	6/20/94	10	U	10	U	10	U	10	U	10	U	-		-		2	2
	9/27/94	-		-		-		-		-		10	U	10	U	2	2
	2/06/95	10	U	10	U	10	U	2	J	10	U	10	U	-		2	2
	4/11/95	-		-		-		-		-		-		-		2	2
	7/10/95	10	U	10	U	10	U	3	J	10	U	-	-	-		2	2
	4/10/96	10	U	10	U	10	U	10	U	10	U	-		-		2	2
	4/8/97	10	U	2	J	10	U	10	U	10	U	-		-		2	2
	1/15/98	10	U	10	U	10	U	10	U	10	U	-		-		2	2

TABLE 5B NOTES:

U Denotes not detected (the associated numerical value is the CRQL).
J Denotes an estimated value
CRQL Contract Required Quantification Limit (CLP Methods)
- Denotes Not Avaliable or Not Sampled
WQS Denotes North Carolina Class WS-1 Surface Water Quality Standard (T15A: 02B .0200)
MCL Denotes EPA Maximum Contaminant Level (EPA 822-R-94-001)
Shading - denotes parameter results that exceed U.S. EPA Maximum Contaminant Levels.

ANALYSIS TYPE:

1) Organic parameters were analyzed utilizing CLP Statement of Work OLMO3.2.
2) For CLP analyses, 1,2-Dichloroethene is reported as total concentration.

:\06\5\20\06520-21\CORRESP\REPORTS\[TABLE5B4.XLS]SURFACE WATER

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Watauga County Landfill
Watauga County, North Carolina
Upgradient Well: MW-1
02/27/98

Table 5D
Background Assessment Metal Target Parameter Analytical Results
Core Groundwater Monitoring Wells

Parameter	Event	Results ug/l(ppb)																										Analysis Type	NCS (ug/L)	MCL (ug/L)
		MW-1		MW-2		MW-3		MW-4		MW-6		MW-8		MW-9		MW-10		MW-11		MW-12		MW-17									
		METALS, TOTAL																												
Barium, Total	6/20/94	203		199		123		24.2		652		281		710		109		117		101		117						CLP	2000	2000
	9/27/94	149		204		119		23.5		502		86.9		632		113		153		101		90.4						CLP	2000	2000
	2/06/95	157		192		109		27.2		418		70.4		615		94.8		176		104		87.2						CLP	2000	2000
	4/11/95	143		212	J	82		23.2	J	477		65		628	J	93.1		295		97.7	J	77.3						CLP	2000	2000
	7/10/95	125		210	J	94.5		23.8		499		70.6		612		103		199		110		79						CLP	2000	2000
	4/10/96	144		178		142		-		570		63.5		507		105		268		119		75.7						CLP	2000	2000
	4/8/97	171		219		97		-		-		259		659		83		137		145		106						CLP	2000	2000
Iron, Total	6/20/94	409		24.4	U	9950		24.4	U	24900		16100	J	7060		5460		337	J	1800	J	3220						CLP	300	300*
	9/27/94	1390		140		9320		71.8		9170		418		42		3100		3.8	U	16		149						CLP	300	300*
	2/06/95	2830		46		6610		552		5930		368		735		2240		296		61.3		260						CLP	300	300*
	4/11/95	2490	J	245	J	3600	J	54.4	UJ	8300	J	149	J	81.7	UJ	234	J	15.7	U	54.4	UJ	63.7	J					CLP	300*	300*
	7/10/95	646		U*		4480		U*		7980		455		U*		508		9.7	U	U*		48.5						CLP	300*	300*
	4/10/96	1660		257		8550		-		9760	J	334		348	J	3340		13.3	U	13.3	U	53.5						CLP	300*	300*
	4/8/97	8760		U*		4480		-		-		11500		U*		U*		U*		U*		U*						CLP	300*	300*
Cadmium, Total	6/20/94	6.0	J	4.5	UJ	5.5	J	4.5	UJ	4.5	UJ	4.6	UJ	4.5	UJ	4.5	UJ	4.6	UJ	4.6	UJ	4.5	UJ					CLP	5	5
	9/27/94	4.3	U	4.6	U	4.6	U	4.6	U	4.3	U	4.3	U	4.6	U	4.6	U	4.3	U	4.6	U	4.6	U					CLP	5	5
	2/06/95	0.5	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U					CLP	5	5
	4/11/95	0.3	U	4.4	UJ	0.3	U	4.4	UJ	0.3	U	0.3	U	4.4	UJ	0.3	U	0.3	U	4.4	UJ	0.3	U					CLP	5	5
	7/10/95	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U					CLP	5	5
	4/10/96	-		-		-		-		-		-		-		-		-		-		-						CLP	5	5
	4/8/97	-		-		-		-		-		-		-		-		-		-		-						CLP	5	5
Mercury, Total	6/20/94	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U					CLP	1.1	2
	9/27/94	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U					CLP	1.1	2
	2/06/95	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U					CLP	1.1	2
	4/11/95	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U					CLP	1.1	2
	7/10/95	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U					CLP	1.1	2
	4/10/96	-		-		-		-		-		-		-		-		-		-		-						CLP	1.1	2
	4/8/97	-		-		-		-		-		-		-		-		-		-		-						CLP	1.1	2

TABLE 5D NOTES:
NCS Denotes North Carolina Groundwater Quality Standard (T15A: 02L .0200)
MCL Denotes EPA Maximum Contaminant Level (EPA 822-R-94-001)
U Denotes not detected (the associated numerical value is the Instrument Detection Level (IDL)).
U* Denotes result less than 5X method blank concentration.
J Denotes an estimated value
* Denotes a Secondary Maximum Contaminant Level (SMCL) for Total Iron
- Denotes Not Avaliable or Not Sampled
Shading: - denotes parameter results that exceed U.S. EPA Maximum Contaminant Levels.

ANALYSIS TYPE:
CLP analytical methods utilize relevant Atomic Adsorption technique and Inductively Coupled Plasma (ICP) method, in accordance with EPA Contract Laboratory Program (CLP) Statement of Work ILMO 3.0 for metal analysis.

P:\06\5\20\06520-21\CORRESP\REPORTS\[TABLES5C4.XLS]TABLE5D

NOTES ON PAGE 2

Watauga County Landfill
Watauga County, North Carolina
Upgradient Well: MW-1
02/27/98

Table 5E
Background Assessment Metal Target Parameter Analytical Results
Boundary Groundwater Monitoring Wells and Surface Water Sampling Locations

Parameter	Event	Results ug/l(ppb)																																Analysis Type	NCS (ug/L)	MCL (ug/L)
		MW-5		MW-7		MW-13		MW-14		MW-15		MW-16		MW-18		S1		S2		S3		S4		S5		L1		Mt Spring										
		METALS, TOTAL																																		
Barium, Total	6/20/94	-		439		54.2		18.4		94.9		66.8		73.6		133		755		366		94.1		197		-		-								CLP	2000	2000
	9/27/94	-		698		59.7		17.4		79		70.6		78.7		-		-		-		-		-		-		-								CLP	2000	2000
	2/06/95	710		743		79.4		16.3		82.3		72.5		67.9		86.8	J	350	J	235	J	82.5	J	472	J	2240	J	5.5								CLP	2000	2000
	4/11/95	591		426		54.4		16.4	J	78.4	J	70.3	J	83	J	-		-		-		-		-		-		-								CLP	2000	2000
	7/10/95	700		-		116		19.5		73.6		67		90		502		592		277		861		310		-		-								CLP	2000	2000
	4/10/96	-		612		-		-		56.3	J	-		-		346	J	427	J	182	J	68.5	J	113	J	-		-								CLP	2000	2000
	4/8/97	-		10300		-		-		77.3		-		-		122		732		253		72		11500		-		-								CLP	2000	2000
Iron, Total	6/20/94	-		15200		283		100	U	2110		78.6		24.4		11300		30800		8600		1040		26400		-		-								CLP	300	300*
	9/27/94	-		19200		450		3.8		554		117		12.2		-		-		-		-		-		-		-								CLP	300	300*
	2/06/95	475		26400		2370		61.3		975		490		61.3		13200	J	42000	J	8790	J	3110	J	90300	J	255000	J	31.4								CLP	300	300*
	4/11/95	15.7	U	5180	J	131	J	40.8	UJ	490	J	331	J	40.8	UJ	-		-		-		-		-		-		-								CLP	300	300*
	7/10/95	9.7	U	-		3960		9.7	U*	21.2		9.7	U*	9.7	U*	19400		36100		5740		1290		87900		-		-								CLP	300*	300*
	4/10/96	-		12000	J	-		-		194	J	-		-		503	J	4390	J	1260	J	285	J	688	J	-		-								CLP	300*	300*
	4/8/97	-		10300		-		-		U*		-		-		7480		29100		5300		529		2000000		-		-								CLP	300*	300*
Cadmium, Total	6/20/94	-		4.5	UJ	4.5	UJ	4.5	UJ	4.5	UJ	4.5	UJ	4.5	UJ	4.5	U	4.5	U	4.5	U	4.5	U	4.5	U	-		-								CLP	5	5
	9/27/94	-		4.3	U	4.3	U	4.3	U	4.6	U	4.6	U	4.6	U	-		-		-		-		-		-		-								CLP	5	5
	2/06/95	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.3	U							CLP	5	5
	4/11/95	0.3	U	12.3		0.3	U	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	-		-		-		-		-		-		-								CLP	5	5
	7/10/95	0.5	U	-		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U	-		-								CLP	5	5
	4/10/96	-		-		-		-		-		-		-		-		-		-		-		-		-		-								CLP	5	5
	4/8/97	-		-		-		-		-		-		-		-		-		-		-		-		-		-								CLP	5	5
Mercury, Total	6/20/94	-		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	-		-								CLP	1.1	2
	9/27/94	-		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	-		-		-		-		-		-		-								CLP	1.1	2
	2/06/95	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U							CLP	1.1	2
	4/11/95	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	-		-		-		-		-		-		-								CLP	1.1	2
	7/10/95	0.2	U	-		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	-		-								CLP	1.1	2
	4/10/96	-		-		-		-		-		-		-		-		-		-		-		-		-		-								CLP	1.1	2
	4/8/97	-		-		-		-		-		-		-		-		-		-		-		-		-		-								CLP	1.1	2

TABLE 5E NOTES:
NCS Denotes North Carolina Groundwater Quality Standard (T15A: 02L .0200)
MCL Denotes EPA Maximum Contaminant Level (EPA 822-R-94-001)
U Denotes not detected (the associated numerical value is the Instrument Detection Level (IDL)).
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* Denotes a Secondary Maximum Contaminant Level (SMCL) for Total Iron
- Denotes Not Avaliable or Not Sampled
Shading - denotes parameter results that exceed U.S. EPA Maximum Contaminant Levels.

ANALYSIS TYPE:
CLP analytical methods utilize relevant Atomic Adsorption technique and Inductively Coupled Plasma (ICP) method, in accordance with EPA Contract Laboratory Program (CLP) Statement of Work ILMO 3.0 for metal analysis.

Watauga County Landfill

Watauga County, North Carolina
Upgradient Well: MW-1
02/16/98

Table 6A

Cumulative Detected Non-Target Organic Parameter Analytical Results
Contract Laboratory Program (CLP) Statement of Work (SOW) - Organics

Parameter	Event	Results ug/L(ppb)																														NCS (ug/L)	MCL (ug/L)
		MW-1		MW-3		MW-4		MW-7		MW-8		MW-9		MW-10		MW-11		MW-12		MW-17		S1		S2		S3		S5							
Acetone	6/20/94	61		-		-		-		-		-		-		-		-		-		-		-		-		-				700	-
	9/27/94	-		-		-		-		-		-		40	J	-		-		-		-		-		-		-				700	-
	4/11/95	-		-		-		15	J	-		-		-		-		-		-		-		-		-		-				700	-
	4/8/97	-		-		-		-		-		-		-		-		-		-		-		-		-		-				700	-
2-Butanone	9/27/94	-		-		-		19		-		-		-		-		-		-		-		-		9	J	-				700	-
	7/10/95	-		-		-		-		-		-		-		-		-		-		-		-		-		-				170	-
	4/8/97	-		-		-		-		-		-		-		-		-		-		5	J	-		-		-				170	-
Carbon Tetrachloride	4/11/95	-		-		2	J	-		-		-		-		-		1	J	2	J	-		3	J	-		-				170	-
1,2-Dichloroethane	4/8/97	-		-		-		-		-		-		-		-		-		-		-		-		-		-				0.3	5
1,2-Dichloropropane	1/15/98	-		-		-		-		-		-		-		-		-		-		-		1	J	-		-				0.36	-
1,2-Dichloropropane	4/11/95	-		-		-		-		1	J	-		-		-		-		-		-		1	J	-		-				-	-
	2/6/95	-		1	J	-		-		1	J	-		-		-		-		2	J	-		-		-		-				0.56	5
	4/8/97	-		-		-		-		-		-		-		-		-		1	J	-		-		-		-				0.56	5
2-methyl-2-pentanone	6/20/94	24		-		-		-		-		-		-		-		-		-		-		-		-		-				0.56	5
,1,2,2-Tetrachloroetha	6/20/94	2	J	-		-		-		-		-		-		-		-		-		-		6		-		-				-	-
Ethylbenzene	6/20/94	10		-		-		-		-		-		-		-		-		-		-		-		-		-				-	-
	7/10/95	-		-		-		-		-		-		-		-		-		-		-		6		-		-				29	700
	4/8/97	-		-		-		-		-		-		-		-		-		-		-		3	J	-		-				29	700
	1/15/97	-		-		-		-		-		-		-		-		-		-		-		2	J	-		-				29	700
Toluene	6/20/94	2	J	-		-		-		-		-		-		-		-		-		-		2	J	-		-				29	700
	4/11/95	-		-		2	J	-		-		-		-		-		1	J	4	J	-		7		-		-				1000	1000
	7/10/95	-		-		-		-		-		-		-		-		-		-		-		-		-		-				1000	1000
	4/8/97	-		-		-		-		-		-		-		-		-		-		-		2	J	-		-				1000	1000
	1/15/97	-		-		-		-		-		-		-		-		-		-		-		2	J	-		-				1000	1000
Xylene (total)	6/20/94	64		-		-		-		-		-		-		-		-		-		-		2	J	-		-				1000	1000
	9/27/94	-		-		-		1	J	-		3	J	-		-		-		-		-		20		-		-				530	10000
	4/11/95	-		-		-		-		-		3	J	-		-		-		-		-		-		-		-				530	10000
	7/10/95	-		-		-		-		-		-		-		-		-		-		-		-		-		-				530	10000
	4/8/97	-		-		-		-		-		-		-		-		-		-		1	J	6	J	-		2	J			530	10000
	1/15/97	-		-		-		-		-		-		-		-		-		-		-		6	J	-		-				530	10000
																								6	J	-		-				530	10000

Tentatively Identified Compounds

Parameter	Event	Results ug/L(ppb)																															
		S-2		MW-3		MW-6		MW-8		MW-9		MW-11		MW-12		MW-16		MW-17		MW-18													
Hexane	4/11/95	-		-		-		-		-		-		-		7	NJ	-		-													
Ether	1/15/98	7	NJ	-		-		-		-		-		-		-		-		-													
Trichlorofluoromethane	4/11/95	-		-		-		-		200	NJ	-		-		-		-		-													
Dichlorofluoromethane	1/15/98	-		14	NJ	-		9	NJ	22	NJ	-		9	NJ	-		10	NJ	-													
Trimethylsilanol	1/15/98	-		7	NJ	-		-		-		-		-		-		-		-													
Unknown Alkane	4/11/95	-		-		-		-		-		6	NJ	-		-		-		-													
	4/11/95	-		-		-		-		-		9	NJ	-		-		-		-													
	4/11/95	-		-		-		-		-		6	NJ	-		-		-		-													
Unknown Cycloalkane	4/11/95	-		-		-		-		-		12	NJ	-		-		-		-													
	4/11/95	-		-		-		-		-		28	NJ	-		-		-		-													
Unknown Hydrocarbon	4/11/95	-		-		-		-		-		10	NJ	-		10	NJ	7	NJ	7	NJ												
	4/11/95	-		-		-		-		-		5	NJ	-		7	NJ	37	NJ	-													
	4/11/95	-		-		-		-		-		13	NJ	-		18	NJ	9	NJ	-													
	4/11/95	-		-		-		-		-		-		-		9	NJ	-		-													
Unknown Unsaturated Hydrocarbon	4/11/95	-		-		-		-		-		7	NJ	-		-		-		-													
	7/10/95	-		-		-		-		-		-		-		-		-		-													
Unknown Ketone	4/11/95	-		-		50	NJ	-		-		8	NJ	-		-		-		-													

Notes:

NCS Denotes North Carolina Groundwater Quality Standard (T15A: 02L .0200)
MCL Denotes EPA Maximum Contaminant Level (EPA 822-R-94-001)
~ Denotes Not Detected
- Denotes Not Available
J Denotes an estimated value
N Denotes tentatively identified
Parameters were analyzed in accordance with USEPA CLP SOW OLMO3.2.

P:\06\5\20\06520-21\CORRESP\REPORTS\[TABLE6A4.XLS]TABLE6A

Watauga County Landfill

Watauga County, North Carolina
Upgradient Well: MW-1
11/27/95

Table 6B

Cumulative Detected Non-Target Organic Parameter Analytical Results

Low Level Risk Assessment (LLRA) Analytical Methods

Parameter	Event	Method	Results ug/L (ppb)																												NCS (ug/L)	MCL (ug/L)
			MW-3		MW-6		MW-7		MW-8		MW-9		MW-10		MW-12		MW-13		MW-14		MW-16		MW-17		MW-18		Trip Blank						
1,2,3-Trichlorobenzene	6/20/94	8021	~		~		~		~		~		~		0.32	J	0.47	J	~		~		~		~		~						-	-
1,4-Dichlorobenzene	7/10/95	8260	~		~		~		1.1	J	~		~		~		~		~		~		~		~		~						75	100
	4/8/97	8021	~		-		2.6		~		~		~		~		~		~		~		~		~		~						75	100
1,3,5-Trimethylbenzene	6/20/94	8021	~		~		~		~		0.17	J	~		~		~		~		~		~		~		~						-	-
Isopropylbenzene	6/20/94	8021	~		~		~		~		0.41	JB	~		1.06	JB	~		~		1.67	JB	~	JB	0.50	JB	0.36	JB					-	-
n-Propylbenzene	6/20/94	8021	~		~		~		~		0.50	J	~		0.33	J	~		~		0.66	J	~		~		~						-	-
Trichlorofluoromethane	6/20/94	8021	~		~		~		~		20.50	J	~		~		~		~		~		~		~		~						2,100	-
	7/10/95	8260	1.1	J	~		~		~		~		~		~		~		~		~		~		~		~						2100	-
	4/8/97	8021	1.02		-		~		~		1.38		~		1.29		~		~		~		~		~		~						2100	-
Styrene	6/20/94	8021	~		~		~		~		0.94	J	~		0.65	J	~		~		~		~		~		~						100	100
Napthylene	6/20/94	8021	~		~		0.33	J	~		0.69	J	~		0.74	J	7.07	J	~		0.62	J	~		~		~						-	-
o-Xylene	6/20/94	8021	~		~		0.83	J	~		~		~		~		~		~		~		~		~		~						530	10,000
	2/6/95	8021	~		~		0.6		~		~		~		~		~		~		~		~		~		~						530	10,000
	7/10/95	8260	~		~		~		~		3.0	J	~		~		~		~		-		~		~		~						530	10000
t-bb+tmb+s-bb	6/20/94	8021	~		~		44.97	J	8.91	J	~		~		0.83		~		~		~		~		~		~						-	-
trans-1,2-Dichloroethene	6/20/94	8021	~		~		1.53	J	2.03	J	~		~		1.47	J	~		~		~		1.31		~		~						70	100
	2/6/95	8021	~		~		2.6		~		~		~		~		~		~		~		~		~		~						70	100
	7/10/95	8260	1.6	J	5.7		1.6	J	1.4	J	~		~		~		~		~		~		~		~		~						70	100
1,2,-Dichloroethane	7/10/95	8260	1.8	J	~		~		~		~		~		~		~		~		~		1.8	J	~		~						0.36	-
	7/10/95	8021	1.8	J	~		~		0.89	J	~		~		~		~		~		~		1.7	J	~		~						0.36	-
	4/8/97	8021	1.52		-		~		0.89	J	~		~		1.09		~		~		-		1.76		~		~						0.36	-
Dibromochloromethane	2/6/95	8021	~		~		~		~		~		~		~		~		0.6	J	~		~		~		~						-	100
Bromomethane	2/6/95	8021	~		~		5.8		~		~		~		~		~		~		~		~		~		~						0.30	-
	7/10/95	8260	2.4	J	~		~		~		~		~		~		~		~		~		~		~		~						0.30	-
1,2-Dichloropropane	2/6/95	8021	~		~		1.6	J	~		~		~		~		~		~		~		~		~		~						0.56	5
	7/10/95	8260	1	J	1	J	1.6	J	~		~		~		~		~		~		~		~		~		~						0.56	5
	7/10/95	8021	~		~		1.4	J	0.87	J	~		~		~		~		~		~		0.80		~		~						0.56	5
	4/8/97	8021	0.689	J	-		1.4	J	0.87	J	~		~		0.657	J	~		~		-		0.97	J	~		~						0.56	5
2-Butanone	7/10/95	8021	~		~		15		4.9	J	~		3.1	J	~		~		~		~		~		~		~						170	-

Notes:

NCS Denotes North Carolina Groundwater Quality Standard (T15A: 02L .0200)

MCL Denotes EPA Maximum Contaminant Level (EPA 822-R-94-001)

~ Denotes not detected

- Denotes Not Available

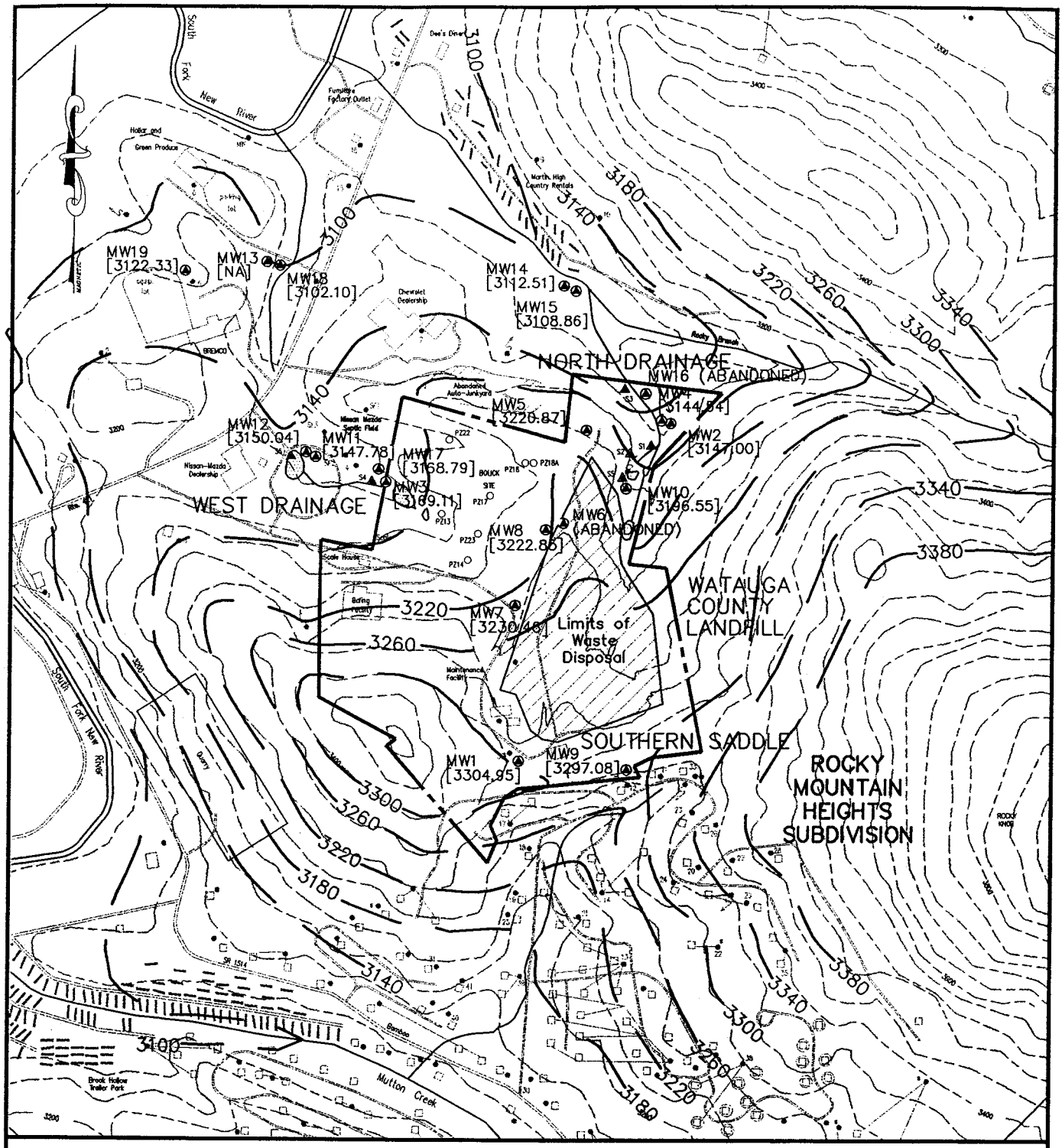
J Denotes an estimated value

B Denotes present in blank

Shading Denotes Parameter results that meet or exceed U.S. EPA Maximum Contaminant Levels

t-bb+tmb+s-bb: tert-Butylbenzene + 1,2,4-Trimethylbenzene + sec-Butylbenzene

P:\06\5\20\06520-21\CORRESP\REPORTS\[TABLE6B4.XLS]TABLE6B



LEGEND

- Stream
- Overhead Power
- Existing Ground (Elevation in Feet Above MSL)
- Pond
- Existing Residence/Multi-unit Residence
- Existing Mobile Home
- Assessment Monitoring Wells With Groundwater Elevation in Feet Above MSL
- SS Surface Water Sampling Locations

Groundwater Potentiometric Elevation
(Inferred from static water level data obtained on June 23, 1998)
contour interval 40 feet

- SF1 Septic Field Monitoring Wells
- Spring
- S Spring Used as Potable Water Source
- 2 Existing Potable Well/Sampled Well Ref. No.

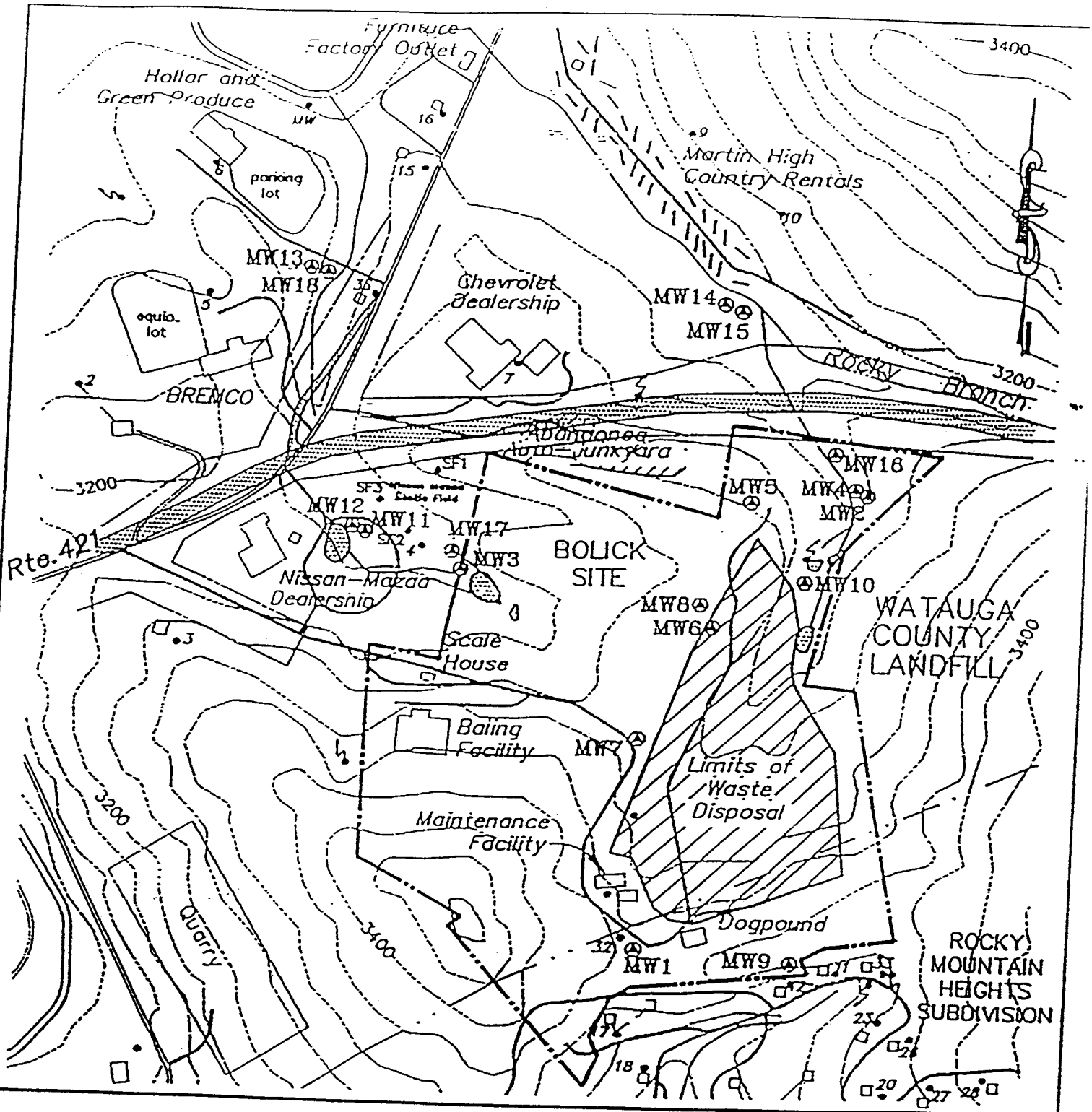
GROUNDWATER AND SURFACE WATER MONITORING PROGRAM MAP
WATAUGA COUNTY LANDFILL
WATAUGA COUNTY, NORTH CAROLINA

Job No.: 6520-21
Scale: 1" =300'±
Date: 13 AUGUST 98

FIGURE 1

Draper Aden Associates
CONSULTING ENGINEERS
Blacksburg, VA – Richmond, VA

6520F.dwg



PROPOSED ROUTE 421 BYPASS MAP

Draper Aden Associates CONSULTING ENGINEERS	JOB No.	DATE:	SCALE:	FIGURE
	6520-14	10 JUN 94	1"=600'±	2

APPENDIX B

FIELD NOTES

MEMORANDUM

MEMO TO: Jeff Smith

FROM: Len DiIoia

DATE: June 25, 1998

RE: 1998 Semiannual Assessment Groundwater Sampling Event at the Watauga County Landfill DAA JN: 6520-21

On June 23-24, 1998, DAA personnel completed the June 1998 semiannual Assessment Groundwater Sampling Event at the Watauga County Landfill. The following is a summary of this event.

- All monitoring wells were purged and sampled using dedicated Grundfos impeller driven pumps.
- Monitoring well MW-3 was the QA/QC well for this sampling event.
- A Hanna 9023 pH/temp and 9033 conductivity meters were used to record indicator parameters in the field.
- CompuChem laboratories performed the analysis for this sampling event.
- CLP volatiles was the only parameter collected for this event.
- Monitoring well MW-19 was discovered to be damaged. The protective casing was broken, the effluent tube was missing and the electrical connection was pushed into its casing. Prior to leaving the site technicians started the pump and were able to produce water. Attempts to secure the well or at least prevent surface water from compromising the groundwater will be made during the July gas monitoring event.

2. Watauga Co LF

June 23, 1998

DAA JN# 6520-21

DAA Personnel: RDR / JHM

DAA Event: SA Assessment (Volatiles Only)

0815 Leave DAA

Stop For Fuel, Ice, Supplies

1100 Arrive Onsite

* Check in Front Office, Mr. Bob Frye Ont. Delivery from CompuChem containing 6 VOA's & Labels has not arrived. Contact ms. cathy Dover, Lab delivery sent C'Burg instead of Landfill. ~~As per~~ Will fill only 2 VOA's on some wells in order to obtain a sample for all wells. ~~will~~

Weather: Partly to ~~mostly~~ mostly Cloudy Temp in upper 80's, Wind Calm

Site Wide Water Level Measurements

	Well	Depth To Water	Notes
	mw-1	36.84'	Time: 1550
	mw-2	5.94'	Time 1535
	mw-3	14.01'	Time: 1135
	mw-4	7.98'	~~Time: 1224~~ ~~1205~~ RDR 6-23-98
	mw-5	46.82'	Time: 1205
	mw-7	43.07'	Time: 1150, Lock
	mw-8	16.92'	Time: 1157
	mw-9	~~36.8~~ 62.15'	Time: 1600
	mw-10	7.32'	Time: 1215
	mw-11	11.82'	Time: 1120
	mw-12	9.11	Time: 1120
*	mw-13	* see below	* see Note 1
	mw-14	7.49'	Time: 1233
	mw-15	11.79'	Time: 1233
	mw-17	14.83'	Time 1135
	mw-18	17.53'	Time: 1255
*	mw-19	* 2.67	* Time: 1305, Le

Note *1 - Unable to obtain signal fro probe, appears to be wate in well but due to low co conductivity of water, a me could not be obtained. A m of 19.75' was recorded on event.

Note *2 - Lid is has been removed fr

casing has been bent into well connection. Electrical Lead is damaged. Effluent tube is missing. Well is open to surface water through opening for effluent tube.

* pH meter calibrated to pH 7 & 4, Cond Reads 1480 uS in 1413 uS standard.

- 1345 MW-8 well in good condition

TD: 67.00
DTW: ~~67.00'~~ 16.92
Lc 50.08

Lc * .163 = 8.16 Gall.
8.16 * 3 Well Volumes = 24.49 Gall.

Begin Purge: 1352 Initial Purge: Clear, Silty (Brown), then Clear, NO Odor

Time	Temp	pH	Cond	Purge Rate	Est Purge Volume
1356	17.8	6.52	633	1 GPM	4 Gall.
1400	17.0	6.81	659	1 GPM	8 Gall.
1406	16.0	6.91	638	1 GPM	14 GAL.

1411 Well went dry after purging approximately 19 Gallons
Final Purge was clear, NO odor

* Cap missing over water level probe entrance

* Check Surface Sample 6 location for water flow. Small flow observed
S6 sample Time 1430 6/23/99
2 VOA's collected.

1435 - MW-12 well in good condition

TD: 72.75
DTW: 9.11
Lc 63.64

Lc * .163 = 10.37
10.37 * 3 Well Volumes =

Begin Purge: ~~1430~~ 1443 Initial Purge: Clear, Odor

Time	Temp	pH	Cond ~~Tem~~	Purge Rate	Est. Pur
1445	14.6	6.77	240	1.5 GPM	3 G
1449	14.1	6.51	247	1.5 GPM	9
1454	13.7	6.40	232	1.5 GPM	17
1459	~~14.3~~ 13.9	6.40	236	1.5 GPM	24

DIAL DOWN AT 1504 FOR 18 min
TOTAL VOLUME PURGED ≈ +32 GAL
FINAL PURGE CLEAR, NO ODOR
SAMPLE COLLECTION TIME 1522
3 VOA's collected

* 1500 - Contact LLD @ DAAi Discuss problems w/ MW-14 and miss[illegible] Sampling [illegible]

1600 - mw-9 Well Appears in Good Condition

TD: 86.40
DTW: 62.15
Lc 24.25

Lc * .163 = 3.95
3.95 * 3 well Volumes = 11.86 Gal

Begin Purge: 1603 Initial Purge: CLEAR, SLIGHT SULPHRIC OD

Time	Temp	pH	Cond	Purge Rate	Estimated Purge Volume
1604	15.8	6.42	568	1 GPM	1 GAL
1606	14.5	6.33	484	1 GPM	3 GAL
1610	15.2	6.29	482	1 GPM	7 GAL
1614	15.5	6.32	476	1 GPM	11 GAL

DIAL DOWN AT 1615
TOTAL VOL. PURGED ≈ + 12 GAL
FINAL PURGE CLEAR, NO ODOR
SAMPLE COLLECTION TIME 1637 6/23/94

* 3 - ~~BOA~~ VOA COLLECTED

1700 - mw-11 well in good condition

TD: 94.54'
DTW: 14.83'
Lc 79.71

Lc * .163 = 12.99 Gall.
12.99 * 3 well Volumes = 38.96 Gallons

Begin Purge: 1502 Initial Purge: Cle
NO Odo

Time	Temp	pH	Cond	Purge Rate	PURGE
1703	13.9	6.55	220	2 GPM	2 GA
1706	13.4	6.67	233	2 GPM	8 GA
1711	15.5	6.48	230	2 GPM	18 G

WELL WENT DRY AT 1711
Final Purge: clear, NO odor
Total Volume Purged: ≈ 18 Gall.

1730 Leave Site
1800 Arrive @ Hotel

6/24/94

-0730 Leave Hotel
Stop for fuel, ice, and water

-0755 Arrive on Site

-0800 mw-2 well in good condi

TD: 177.50
DTW: 5.94
Lc 171.56

Lc * .163 = 6.24 per DR
* 3 well

Lc * .66 SAL/ft (4" well) = 113.23 ga

Begin Purge: 0811 Initial Purge: clear, No odor

Time	Temp	pH	Cond	Purge Rate	Est Purge Volume
0817	13.1	6.75	280	2 GPM	12 GAL
0826	13.2	6.85	267	2 GPM	30 GAL
0835	13.4	7.14	276	2 GPM	48 GAL
0847	13.4	7.23	271	2 GPM	72 GAL
0904	13.3	7.26	270	2 GPM	106 GAL

DIAL DOWN AT 0908 FOR 45 MIN
TOTAL VOL PURGED ≈ +114 GAL
FINAL PURGE CLEAR, NO ODOR
SAMPLE COLLECTION TIME 0953 6/24/98
3 VOAs

Surface Samples collected (2 VOA's each.)

S6	1430	6/23/98
S1	0910	6/24/98
S2	0920	6/24/98
S3	0900	6/24/98
S5	0940	6/24/98

** S#2 and S1 VOA bottles UP.

1035 MW-8 (purged on 6/23/98)
Sample Collection Time: 1045 6/24/98
* Pump allowed to run 2-3 min in order to clear lines
3-VOA's collected

1105 MW-17 (purged on 6/23/98
Sample Collection Time: 1115
* Pump allowed to run 2-3 min in order to clear lines
3-VOA's collected

1120 MW-3 well in good condi

TD: 39.60
DTW: 14.01'
LC 25.59'

4c x .163 = 4.17
4.17 * 3 well vol
12.51

Begin Purge: 1118 Initial Purg
SLIGHTLY SILTY, W
(SEDIMENT)

Time	Temp	pH	Cond	Purge Rate	Est Purge Volume
1119	14.9	6.34	191	1/2 GPM	1/2 GAL
1125	15.1	6.20	182	1/2 GPM	4 GAL
1130	14.9	6.08	184	1/2 GPM	6 GAL
1136	15.0	6.06	182	1/2 GPM	8 GAL

DIAL DOWN AT 1143 FOR 10 MIN.
TOTAL VOL. PURGED ≈ 13 GAL
FINAL PURGE: CLOUDY, NO ODOR
SAMPLE COLLECTION TIME 1152 6/24/98
9 VOA's (MS + MSD)

1200
Surface Sample 4 Collection Time
1200 6/24/98

1300 Leave Site

1615 Arrive @ DAA, Unload Truck

APPENDIX C

Previous Landfill Groundwater Organic Analysis
Summary Table

[redacted] 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)

[redacted] 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

denotes estimated result
denotes proposed NCS
denotes *(method) utilized and analyte not detected

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

Drawings Under Seperate Cover

Drawing Under Seperate Cover

APPENDIX D

Potable Well Organic Analysis Summary Table

POTABLE WELL TESTING - WATAUGA COUNTY, NC
RESULTS OF VOLATILE AND SEMI-VOLATILE ANALYSIS

date: 3/5/98

CONSTITUENT	MARCH 5, 1993*	MARCH 18, 1993*	MARCH 24, 1993*	JUNE 23, 1993**	JULY 13, 1994**	NCS	MCL
Carroll Residence (12)							
Benzene	2.1	1.7		1.9		1.0	5
Chloroethane	173.4	74.5		**ND**		---	---
Chloromethane	**ND**	14.8		**ND**		---	---
Dichlorodifluoromethane	30.6	**ND**		**ND**		0.19	---
1,1-Dichloroethane	20.9	17.4		**ND**		700	---
1,1-Dichloroethene	4.1	1.5		**ND**		7	7
cis-1,2-Dichloroethene#	1.2	0.9		<1.0		70	70
2,2-Dichloropropane#	1.2	0.9		**ND**		---	---
4-Isopropyltoluene	**ND**	0.2	NS	**ND**	NS	---	---
Isopropylbenzene	0.6	**ND**		**ND**		---	---
Methylene Chloride	**ND**	43.0 (T)		138.2		5	5
Styrene	2.8	0.5		**ND**		0.014	100
Tert-Butyl Methyl Ether	**ND**	**ND**		2.4		200	---
Tetrachloroethene	5.4	4.7		4.2		0.7	5
Toluene	**ND**	0.6 (T)		**ND**		1000	1000
1,1,1-Trichloroethane	19.7	15.7		29.4		200	200
Trichloroethene	7	5.5		7.0		2.8	5
Trichlorofluoromethane	37.1	20.2		**ND**		2100	---
Vinyl Chloride	1.7 (T)	**ND**		**ND**		0.015	2
p and m-Xylene	**ND**	**ND**		<1:0		400	10,000
o-Xylene	**ND**	3.4		2.9		400	10,000
Nissan-Mazda Dealership (4)							
Carbon Tetrachloride	0.2		**ND**		**ND**	0.3	5
Chloroethane	19.1		**ND**		**ND**	---	---
Dichlorodifluoromethane	8.2		8.7		**ND**	0.19	---
1,1-Dichloroethane	98.5		63.1		104.3	700	---
1,2-Dichloroethane	**ND**		0.5		**ND**	0.38	---
1,1-Dichloroethene	5.4		3.7		4.7	7	7
cis-1,2-Dichloroethene#	22.2		13.0		23.7	70	70
1,2-Dichloropropane	0.5		0.3		**ND**	0.56	5
2,2-Dichloropropane#	22.2	NS	13.0	NS	**ND**	---	---
Tetrachloroethene	21.8		28.1		30.9	0.7	5
Toluene	**ND**		0.8(T)		**ND**	1000	1000
1,1,1-Trichloroethane	14.7		19.3		22.9	200	200
Trichloroethene	11.2		9.1		12.6	2.8	5
Trichlorofluoromethane	0.4		**ND**		**ND**	2100	---
o-Xylene	0.4		0.5(T)		**ND**	400	10,000

NOTE: All Concentrations are in ppb (ug/L). (Other footnotes located on page 4)

P:\06\5\20\06520-21\CORRESP\REPORTS\June98rpt\[POTTABLS.XLS]POTABLE (pg1&2)

POTABLE WELL TESTING - WATAUGA COUNTY, NC
RESULTS OF VOLATILE AND SEMI-VOLATILE ANALYSIS

date: 2/5/98

CONSTITUENT	3/5/93*	3/18/93*	5/11/93**	6/23/93**	3/30/94**	4/6/94**	8/2/94**	12/7/94**	4/26/95**	10/24/95**	4/9/96**	5/20/96**	10/9/96**	6/4/97**	2/10/98**	8/17/98**	NCS	MCL
Blue Ridge Electric Membership Company - (BREMCO) (5)																		
Benzene	ND					ND	ND	ND	ND	ND	ND		ND	ND	3.2 (J)	trace	1	5
1.1-Dichloroethane	0.7					<1.0	1.4	1.0	1.2	1.8	1.5		1.5	2.0	3.2 (J)	1.6	700	---
1,1,1-Trichlorothane	0.2					<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	trace	trace	200	200
Trichloroethene	0.5	NS	NS	NS	NS	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NS	<1.0	<1.0	1.2 (J)	0.5	2.8	5
1,1-Dichloroethene	ND					1.0	1.9	<1.0	1.1	1.7	1.0		<1.0	1.7	3.9 (J)	2.6	7	7
cis-1,2-Dichloroethene	ND					<1.0	ND	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	0.5 (J)	trace	70	70
Tetrachloroethene	ND					<1.0	<1.0	trace	<1.0	<1.0	<1.0		<1.0	<1.0	trace	trace	0.7	5
Tetrahydrofuran	ND					ND	ND	ND	ND	ND	ND		ND	ND	ND	0.5 (J)	---	---
Bolick rental resident (2)																		
tert-Butylbenzene	1.1					ND				ND	ND		ND	ND	ND		---	---
Isopropylbenzene	0.7					ND				ND	ND		ND	ND	ND		---	---
Trichloroethene	0.5					ND				ND	ND		ND	ND	ND		2.8	5
1,3,5-Trimethylbenzene	0.7	NS	NS	NS	NS	ND	NS	NS	NS	ND	ND	NS	ND	ND	ND	NS	---	---
1,1-Dichloroethane	ND					trace				<1.0	trace		<1.0	trace	ND		700	---
1,1-Dichloroethene	ND					trace				trace	ND		trace	ND	ND		7	7
Methyl Ethyl Ketone	ND					trace				35.3	ND		ND	ND	ND		170	---
Tetrahydrofuran	ND					ND				42.3	ND		ND	ND	ND		---	---
Perry Residence (11)																		
Dichlorodifluromethane	2.5			ND	ND								ND				0.19	---
Naphthalene	0.7			ND	ND								ND				---	---
Chloromethane	<9	NS	NS	ND	ND	NS	NS	NS	NS	NS	NS	NS	ND	NS	NS	NS	---	---
Methylene Chloride	<0.6			ND	ND								ND				5	5
Chloroform				ND	<1.0								NDT				0.19	100
Greer residence (15)																		
Benzene		ND				<1.0		ND									1.0	5
Toluene		ND				6.4		ND									1000	1000
Tetrachloroethene	NS	ND	NS	NS	NS	trace	NS	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.7	5
Ethylbenzene		ND				trace		ND									29	700
p and m - Xylene		ND				<1.0		ND									400	10,000
Styrene		ND				trace		ND									0.14	100
Ward residence (24)																		
Methylene Chloride			3.2	ND	ND		ND	ND	ND	ND		ND	ND		ND	ND	5	5
1,1,1-Trichloroethane			<1.0	<1.0	<1.0		ND	ND	ND	ND		ND	ND		ND	ND	200	200
Trichloroethene			trace	trace	<1.0		ND	trace	ND	ND		ND	ND		ND	ND	2.8	5
Tetrachloroethene	NS	NS	ND	trace	<1.0	NS	ND	trace	trace	<1.0	NS	<1.0	trace	NS	ND	trace	0.7	5
Carbon Tetrachloride			ND	ND	<1.0		ND	ND	ND	ND		ND	ND		ND	ND	0.3	5
1,1-Dichloroethane			ND	ND	<1.0		ND	<1.0	<1.0	trace		<1.0	ND		ND	trace	700	---
Chloroform			ND	ND	trace		ND	ND	trace	trace		ND	ND		ND	trace	0.19	100
1,2-Dibromoethane (EDB)			ND	ND	ND		ND	ND	ND	trace		ND	ND		ND	ND	0.0004	0.05

NOTE: All Concentrations are in ppb (ug/L). (Other footnotes located on page 4)

POTABLE WELL TESTING
WATAUGA COUNTY, NC
RESULTS OF ANALYSIS

CONSTITUENT	3/5/93**	4/26/95**	4/9/96**	2/10/98**	NCS	MCL
Chevrolet dealership (7)						
chloroform	ND	ND	ND	39.7	0.19	100
bromodichloromethane	ND	ND	ND	5	---	100
t-butyl methyl ether	ND	24.4	2.5	ND	200	---

CONSTITUENT	3/18/93*	5/11/93**	9/21/93**	3/30/94**	1/12/95**	10/24/95**	4/9/96**	10/9/96**	6/12/97**	2/10/98**	NCS	MCL
Shared Well #1 (8 Houses) (13)												
sec-Butylbenzene	0.2	ND	ND								---	---
Carbon Tetrachloride	0.1	ND	ND								0.3	5
Methylene Chloride	1.5	ND	ND	NS	NS	NS	NS	NS	NS	NS	5	5
alpha-Chlordane	0.4	ND	ND								0.27	2
gamma-Chlordane	0.3	ND	ND								0.27	2
Shared Well #2 (4 Houses) (14)												
1,4-Dichlorobenzene	0.5			ND	ND	ND	ND	ND	ND	ND	---	---
1,1-Dichloroethane	ND			ND	ND	<1.0	<1.0	<1.0	ND	ND	700	---
1,1-Dichloroethene	ND			<1.0	<1.0	ND	ND	ND	ND	ND	7	7
Tetrachloroethene	ND			ND	ND	trace	ND	trace	ND	ND	0.7	5
1,1,1-Trichoroethane	ND	NS	NS	<1.0	ND	trace	ND	ND	ND	ND	200	200
Chloroform	ND			trace	ND	9.0	ND	ND	ND	ND	0.19	100
Bromodichloromethane	ND			ND	ND	1.4	ND	ND	ND	ND	---	100
Dibromochloromethane	ND			ND	ND	<1.0	ND	ND	ND	ND	---	---
2-Chlorotoluene	ND			ND	ND	1.2	ND	ND	ND	ND	---	---
4-Chlorotoluene	ND			ND	ND	1.0	ND	ND	ND	ND	---	---
Methyl Ethyl Ketone	ND			ND	ND	24.6	ND	ND	ND	ND	170	---
Tetrahydrofuran	ND			ND	ND	13.4	ND	ND	ND	ND	---	---

date: 3/5/98

CONSTITUENT	3/23/93**	5/11/93**	6/23/93**	8/3/93**	8/9/93**	10/20/93**	9/21/94**	1/12/95**	2/21/96**	5/20/96**	10/9/96**	6/12/97**	2/10/98**	8/19/98**	NCS	MCL
Simko residence (20)																
1,1,1-Trichloroethane	trace									trace	trace	trace			---	200
Chloroform	<1.0	NS	NS	NS	NS	NS	NS	NS	NS	<1.0	NDT	ND	NS	NS	0.19	100
Johnson residence (23)																
Chloroform	NS	trace	NS	NS	NS	NS	NS	NS	NS	<1.0	NS	<1.0	ND	NS	0.19	100
McLean residence (26)																
Chloroform	NS	NS	<1.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.0	100
Yates residence (30)																
Chloroform	NS	NS	NS	<1.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.19	100
McClintock residence (33)																
1,2-Dichloroethane	NS	NS	NS	NS	<1.0	<1.0	ND	NS	NS	NS	NS	NS	NS	NS	700	---
Chloroform					<1.0	ND	<1.0								0.19	100
Meadowridge condominiums (38)																
Chloroform						<1.0			ND					ND	0.19	100
trans-1,2-Dichloroethene						<1.0			ND					ND	70	70
1,1,1-Trichloroethane	NS	NS	NS	NS	NS	trace	NS	NS	ND	NS	NS	NS	NS	ND	200	200
Trichloroethene						trace			ND					ND	2.8	5
Austin residence (40)																
Chloroform	NS	NS	NS	NS	NS	NS	NS	trace	NS	NS	NS	NS	NS	NS	0.19	100

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

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POTABLE WELL TESTING - WATAUGA COUNTY, NC
WELLS SHOWING NO DETECTED ORGANIC COMPOUNDS

date: 3/5/98

SAMPLING LOCATION	SAMPLING DATES
Colene Bolick residence (1)	March 5, 1993* and February 21, 1996**
Roten residence (3)	March 5, 1993* and July 3, 1994**
Hollar and Green Produce (6)	March 5, 1993* and August 19, 1998**
Vannoy residence (8)	March 5, 1993*
Martin High Country Rentals #1 (9)	March 5, 1993*
Martin High Country Rentals #2 (10)	March 5, 1993*
Williamson residence (16)	March 18, 1993*
Suddreth residence (17)	March 18, 1993*, September 21, 1993**, and July 3, 1994**
Taylor residence (18)	March 18, 1993*, October 9, 1996**
Hodges residence (19)	March 18, 1993*
Findt residence (21)	March 18, 1993*
Rusher residence (22)	March 23, 1993*
Younce residence (25)	May 11, 1993**
Medloin residence (27)	June 23, 1993**
Rector residence (28)	June 23, 1993**
Robinson residence (29)	June 23, 1993**
Cook residence (31)	August 3, 1993**
Animal Control Office (32)	August 3, 1993**
Brook Hollow Trailer Park (37)	October 11, 1993**
Green residence (34)	October 20, 1993**
Shared well #3 (35)	October 20, 1993**
BREMCO residence (36)	September 21, 1993**
Isaacs residence (39)	November 16, 1994**
Norris residence (41)	January 12, 1995**
Meadowridge Condominiums (42)	February 16&17, 1998**
Meadowridge Condominiums (43)	February 16&17, 1998**
Meadowridge Condominiums (44)	August 19, 1998**

TABLE NOTES:

The sampled well reference number as presented on the Vicinity Map (Figure 1) is denoted in parentheses following the sampling locations name.

* Laboratory analysis performed by Central Virginia Laboratories and Constultants (CVLC) utilizing EPA Methods 502.2 (Volatiles) and 525.1 (Semi-Volatiles).

** Laboratory Analysis performed by NCDENR Division of Laboratory Services utilizing EPA Method 502.2 (Volatiles).

NSC - North Carolina Water Quality Standard (DEHNR-15A NCAC 2L.0202)

MCL - EPA Primary Drinking Water Standard Maximum Contaminant Level

# denotes compound co-elutes.

ND denotes no compounds detected for entire analytical scan.

NDT denotes compound detected in trip blank at same concentration as well sample.

NS denotes not sampled on that date.

NA denotes compound not analyzed on that date.

(J) denotes estimated result.

(T) denotes found in Trip Blank.

trace = < 0.5 ppb (ug/l)

APPENDIX E

Laboratory Analytical Data Reports
And Associated Data Validation Forms (as Separate Volume)